C.G. Conn Tuba Designs from 1880-1940:
An Investigation of Early Tuba Product Lines and Construction Techniques

by

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ABSTRACT

The C.G. Conn instrument manufacturing company is known as one of the most successful and innovative band instrument manufacturers in the history of the United States. Many of C.G. Conn’s instrument product lines have undergone significant changes throughout the company’s history, especially in the brass family. The C.G. Conn tuba product lines are no exception to this company’s extraordinary success, and have been significantly redesigned since the company began manufacturing these instruments in circa 1880. This research project investigates the tuba product lines that C.G. Conn manufactured between 1880 and 1940. C.G. Conn designed six different tuba product lines during this timeframe, including an unnamed tuba product line with Stölzel valves, the Wonder Valve line, the New American line, the Wonder Model line, the 20-J, and the 22-J instrumental product lines. These tuba product lines have been investigated using extant publications and patent information because the majority of C.G. Conn’s internal records prior to 1970 have been lost. In addition to investigating each of C.G. Conn’s early tuba product lines, this project also explores the particularly anomalous design in the top-action valve apparatus of the Conn Wonder Model tuba product line. This anomalous design was implemented in the all of C.G. Conn’s top-action tuba and tuba-like product lines from circa 1890-1940. This author’s measurements of period instruments and analysis of data taken from these measurements indicates that this anomalous top-action valve apparatus design utilized interchangeable parts with other front-action C.G. Conn tuba product lines.
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INTRODUCTION

The C.G. Conn instrument manufacturing company is recognized as one of the most successful and innovative band instrument manufacturers in the history of the United States. The strides this company made in instrument design (particularly in valve technology, instrument wrap\(^1\), and bore diameter expansion)\(^2\) were especially important to the integration of new concepts in the development of the concert tuba\(^3\), which had been first patented only thirty-nine years before C.G. Conn was founded in 1874.\(^4\)

Unfortunately, much of the historical documentation regarding the C.G. Conn instrument manufacturing company’s construction techniques, equipment, and training have been lost due to factory fires in 1883 and 1910.\(^5\) Beyond the loss of these early records, almost all of C.G. Conn’s historical documents after the factory fire of 1910 were unfortunately disposed of during a transition in the company’s corporate headquarters during the 1970s.\(^6\) Despite the loss of these historical records, it is still possible to investigate this chapter in the development of the modern tuba through other research methods. The principal methods used to investigate this timeframe will include examination of extant period (circa 1880-1940) advertisements and periodicals, analysis of patent information, and analysis of extant period (circa 1880-1940) advertisements and periodicals, analysis of patent information, and analysis of extant period (circa 1880-1940) advertisements and periodicals, analysis of patent information, and analysis of extant period (circa 1880-1940) advertisements and periodicals, analysis of patent information, and analysis of extant period (circa 1880-1940) advertisements and periodicals, analysis of patent information.

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1 ‘Wrap’ is a term used in brass instrument manufacturing that is used to discuss the curvature of tubing in an instrument.


3 Concert tubas are often simply referred to as tubas, and typically played in a seated position. This instrument design will be discussed at length throughout this document, and excludes other tuba-like instruments such as sousaphones, helicons, and bombardons.


5 Ibid.

and measurements taken from period tuba models from the instrument collections at the National Music Museum of Vermillion, South Dakota.

This document investigates the six earliest tuba product lines produced by the C.G. Conn instrument manufacturing company between approximately 1880 and 1940 and discusses the design of these instrument product lines in Chapter 1. The first two tuba product lines were only offered by C.G. Conn over the course of approximately ten years which is a rather brief period of time when compared to this company’s third design. C.G. Conn’s third tuba design was in production for nearly fifty years. The two tuba product lines of this third design, based on two patents granted to Charles Gerard Conn in 1889 and 1890, were first made available for purchase circa 1890 and became the basic designs for all of C.G. Conn’s concert tuba, euphonium, baritone, tenor horn, and alto horn product lines manufactured by the C.G. Conn instrument manufacturing company until 1940. C.G. Conn’s next two tuba product lines were released in roughly 1940, and implemented new designs which differentiated these instruments significantly from the earlier tuba product lines.

The two tuba product lines of the third C.G. Conn design, called the “New American Model” and “New Wonder Model” tubas, were highly endorsed by leading artists of the time and were considered to demonstrate high quality in their

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7 This list of instruments (the euphonium, baritone, tenor horn, and alto horn) will often be referred to as ‘tuba-like’ instruments throughout this document due to the construction similarities that these instruments exhibit, especially in early C.G. Conn instrument design.


While these tuba product lines showed immense success in the highly competitive instrument sales market of the United States during their time of manufacture, the New Wonder Model tuba and tuba-like product lines were built with a highly anomalous valve apparatus design when compared to many contemporary and modern tuba models. This atypical design and the potential reasons for such a design in the New Wonder Model tubas and tuba-like product lines will be discussed at length in Chapter 2, including a new study of the apparent use of interchangeable parts between the New Wonder Model tuba product lines and the New American Model tuba product lines.

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12 John Joseph Swain, “A Catalog of the E-flat Tubas in the Arne B. Larson Collection at the University of South Dakota.” (PhD diss., Michigan State University, 1985), 221.
13 Hodapp, 7.
CHAPTER 1

THE EARLY C.G. CONN TUBA PRODUCT LINES
SECTION 1: THE SUCCESS AND ADVERTISEMENT OF EARLY C.G. CONN TUBAS

The C.G. Conn instrument manufacturing company is well known for its innovative and competitive role in the early environment of band instrument construction and sales in the United States. Although this company originally designed and sold cornets after their foundation in 1874, C.G. Conn quickly became one of the most competitive distributors of nearly every band instrument and was endorsed by musical artists from both the United States and abroad.\textsuperscript{14} The C.G. Conn tuba product lines were no exception in this company’s success, and were as heavily endorsed by artists as the cornets and trumpets with which C.G. Conn established its early national prestige.\textsuperscript{15}

The first three tuba product lines that the C.G. Conn instrument manufacturing company designed and manufactured were available from approximately 1880 to 1940. Many of these tuba models were a common fixture in many of the preeminent concert bands and orchestras and the choice of many tuba artists throughout the United States.\textsuperscript{16} Additionally, these tuba product lines were able to maintain a considerable amount of success during this timeframe when many instrument manufacturing companies were vying for a place in the competitive instrument market in the United States. Companies such as York & Sons, H.N. White, Holton, and the Grand Rapids Instrument Company were all simultaneously working to secure their individual successes\textsuperscript{17} alongside C.G. Conn in this unpredictable period in instrument manufacturing history, and each of these popular manufacturers witnessed other young companies struggle and fail to survive in

\textsuperscript{14} Swain, 271.
\textsuperscript{15} Conn, Selling Points and Testimonials “Bass,” 22-36.
\textsuperscript{16} Ibid. I 22-36.
\textsuperscript{17} Hodapp, 4-10.
such a competitive and quickly evolving market.\textsuperscript{18} The source of the C.G. Conn instrument manufacturing company’s success in sales during this timeframe is likely a culmination of a multifaceted and well-managed business plan that was adjusted carefully throughout this company’s development\textsuperscript{19} coupled with C.G. Conn’s commitment to the quality of their instrumental products through innovative and adaptive construction techniques.\textsuperscript{20}

The C.G. Conn instrument manufacturing company was not only innovative in construction techniques but was at the forefront of marketing and advertising during these early years of instrument manufacturing and sales in the United States.\textsuperscript{21} Like many companies of this era, C.G. Conn initially worked as a mail-order business, predominantly distributing full product catalogs that contained brief descriptions of their instruments and some reviews from notable artists of the era.\textsuperscript{22} In addition to these full product catalogs, C.G. Conn began to release a publication titled \textit{C.G. Conn’s Truth}\textsuperscript{23} in September of 1890 and kept these periodicals in publication into the 1940s.\textsuperscript{24} Unlike a typical mail-order catalog, the \textit{C.G. Conn’s Truth} periodicals were filled with stories, endorsements, images, and anecdotes about C.G. Conn instruments. Many of these periodicals included success stories of ensembles comprised entirely, or at least in

\textsuperscript{18} Swain 267-274.
\textsuperscript{19} Swain, 270-272.
\textsuperscript{20} Conn, \textit{Selling Points and Testimonials “Bass,”} 2-4.
\textsuperscript{21} Trevor Herbert, "Selling brass instruments: The commercial imaging of brass instruments (1830-1930) and its cultural messages," \textit{Music In Art: International Journal for Music Iconography} 29, no. 1-2 (March 1, 2004): 213
\textsuperscript{22} Swain, 271.
\textsuperscript{23} Sometimes referred to as the \textit{C.G. Conn Musical Truth}, \textit{Conn’s Truth}, or \textit{Conn’s Musical Truth}.
\textsuperscript{24} Deborah Check Reeves, “C.G. Conn’s Double-Wall Wonder Clarinets.” National Music Museum.
http://orgs.usd.edu/nmm/Clarinets/Conn/DoubleWallClarinets/ConnDblWallClarinetsBanks.html (accessed July 12, 2014)
majority, of C.G. Conn instrument players, humorous stories from these musicians, and sections devoted to endorsements of specific instruments by players and conductors in both recognized and budding ensembles throughout the United States and even occasionally from abroad. While the *C.G. Conn’s Truth* publications were seemingly designed to be for the entertainment and enrichment of a musically savvy audience, the periodical also included pricing and ordering information for the instrumental products that were endorsed in each issue. This new form of marketing periodical demonstrated C.G. Conn’s versatility and ingenuity in the competitive marketing environment that evolved around musical instrument sales and construction in the United States during the late 1800s. Several examples of the imagery, prose, and endorsements taken from a *C.G. Conn’s Truth* may be seen in further detail in Appendix A.

Beginning in the 1920s, the C.G. Conn instrument manufacturing company also began to publish a series of instrument-specific catalogs and pamphlets for each of the C.G. Conn band instrument product lines, although they had been publishing cornet/trumpet-specific marketing materials as early as the 1890s. These instrument-specific catalogs were extensive collections of high-fidelity images, construction information, dimensions, accessories, advertisements, and endorsements of the instrument featured within each publication. The endorsement sections of these instrument-specific catalogs were similar in content to the endorsements found in many of the *C.G. Conn Truth* periodicals, but were typically much more extensive and allowed for greater focus on each instrument’s most renowned artists as well as budding artists.

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throughout the United States.\textsuperscript{26} The instrument-specific pamphlets utilized some of the images and advertisements used in the instrument-specific catalogs, but were considerably limited in length and as such focused on basic product lines and ordering information.\textsuperscript{27} These instrument-specific marketing materials served as a targeted marketing tool for the C.G. Conn instrument manufacturing company and allowed for the general catalogs to be less cumbersome. The instrument-specific marketing materials provided separate but considerably detailed information to each of their specific instrumental clientele. An example of a tuba-specific catalog (1923-1924) and several selections from a euphonium-specific (1921) catalog from this period of advertisement can be seen in further detail in Appendix A, figures A-4 and A-5.

While C.G. Conn’s marketing expertise and diversity in advertisements likely played a major role in this company’s overall success in the competitive musical instrument trade of the early 1900s, C.G. Conn was also known for the remarkable quality of their instruments. C.G. Conn’s early tuba product lines were one of many product lines that were standards in the musical instrument industry and were known to have a very high quality of construction which likely contributed to their success.\textsuperscript{28} In particular, the two tuba product lines that were patented and manufactured by C.G. Conn in 1889 and 1890 became the basic designs for all of this company’s concert tuba,

\textsuperscript{26} Conn, \textit{Selling Points and Testimonials “Bass,”} 22-36.
\textsuperscript{27} C.G. Conn, \textit{French Horn, Mellophone, Alto} (Musical Instrument Manufacturers Archive Conn Catalogs 1888-1949, National Music Museum, ca. 1927), 16.
\textsuperscript{28} Hodapp, 6-8.
euphonium, baritone, and alto horn\textsuperscript{29} product lines until approximately 1940.\textsuperscript{30} Each of the separate instrumental product lines that utilized these two early designs was also quite successful in the competitive market of musical instrument sales in the United States,\textsuperscript{31} at least in part due to the high level of quality in construction for which C.G. Conn became so well known.\textsuperscript{32}

\textsuperscript{29} Details of each of these instrumental product lines can be seen in further detail in Appendix A.
\textsuperscript{31} Hodapp, 6-8.
\textsuperscript{32} Swain, 221 271.
SECTION 2: THE FIRST KNOWN C.G. CONN TUBA PRODUCT LINE

The first known C.G. Conn tuba product was made available as early as 1879, and the design included a modified Stölzel valve for which Charles Gerard Conn received a patent on November 1, 1881. Stölzel valves are an early variety of piston valve developed originally by Henrich Stölzel as early as 1814. Dr. Sabine Klaus states the following in her writing about the elements of brass instrument construction:

The main difference between the Stölzel valve and the [modern] Périnet valves is that the main tubing enters the piston from below. Two different Stölzel valve models can be distinguished. In the "early model," the piston is guided and the spring is stopped by a horizontal screw, going through the outer casing. In the "later model," the spring is enclosed in a barrel; therefore, no screw is visible at the valve casing. Guidance is provided by a key fitting in a groove or keyway at the valve casing.

The Stölzel valve featured in this tuba model’s design would be classified as the later model mentioned above. Further details of this modified Stölzel valve patent can be found in Appendix B, in figure B-1.

In addition to this tuba model’s unique implementation of modified Stölzel valves, this model also featured a noteworthy design which causes the instrument’s lead-pipe to travel behind the valve apparatus and form a hand grip for its player. The early Stölzel valve tuba model also featured engraved metal touch-pieces on the valves, rather than the inlaid mother-of-pearl touch-pieces which became C.G. Conn’s standard.

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33 Tuba pitched in E-flat by C.G. Conn, Serial Number 4037, NMM 5,892, Musical Instrument Collection, National Music Museum, The University of South Dakota, Vermillion, SD, ca. 1880-1881.
35 The Périnet valve will be discussed at length in Section 3.
accoutrement for brass instrument product lines starting as early as 1888. \(^{38}\) This tuba model was available in the key of E-flat with a top-action\(^{39}\) valve assembly, but it is unlikely this design was also available in the key of B-flat. \(^{40}\) The loss of so many early C.G. Conn records due to factory fires in 1883 and 1910 has left the name of this product line a mystery even though it was likely available for between roughly six and ten years. \(^{41}\) It is possible that this tuba model was advertised during this timeframe, but any extant periodicals available from 1879-1888 do not reference this line of tuba model. It could be that this tuba product line was available only by request until C.G. Conn released the company’s next tuba product lines in approximately 1888.

This first tuba model with Stölzel valves shares very few design characteristics with the product lines patented in 1889 and 1890 which were mentioned above, possibly due to the tightness of wrap that Stölzel valves can cause in tuba design when compared to Périnet pistons. While an image of this tuba model was not available in any C.G. Conn periodicals, an extraction of an image from Charles Gerard Conn’s United States patent No. 249,012 can be seen below in figure 2.1. Unfortunately, this patent diagram is not entirely accurate to the final design of this instrument. The lead-pipe construction of this tuba model must have been modified at some time after this patent was submitted. This tuba model’s final design lengthened the lead-pipe section of the instrument to enter into the third valve casing, rather than the first valve entry that is shown below. Aside from

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\(^{38}\) Tuba pitched in E-flat by C.G. Conn, Serial Number 4037, NMM 5,892, Musical Instrument Collection, National Music Museum, The University of South Dakota, Vermillion, SD, ca. 1880-1881.

\(^{39}\) The term ‘action’ refers to the placement of valves on a tuba, which are most typically listed as ‘top-action/right-facing’ and ‘front-action/left-facing.’ This common tuba construction variable will be discussed at length later in this document.


\(^{41}\) Banks, “The Conn Company Archive.”
construction difference in the lead-pipe, the remainder of this basic design is quite similar to the single C.G. Conn Stölzel valve tuba model which is in the musical instrument collection of the National Music Museum in Vermillion, South Dakota.\textsuperscript{42}

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure2_1.png}
\caption{The first known C.G. Conn tuba product with Stölzel valves. Model name unknown, pitched in E-flat, available circa 1880-1888.}
\end{figure}

\textsuperscript{42} Tuba pitched in E-flat by C.G. Conn, Serial Number 4037, NMM 5,892, Musical Instrument Collection, National Music Museum, The University of South Dakota, Vermillion, SD, ca. 1880-1881.

\textsuperscript{43} Charles G. Conn, Piston-Valve Musical Instrument, US Patent No. 249,012, filed April 2, 1881, and issued November 1,1881.
It is tempting to consider that this first C.G. Conn tuba model with Stölzel valves may have been imported or designed using European patents due to a popular trend in early musical instrument manufacturing in the United States. Not only is the design of this tuba model so fundamentally dissimilar in design from all of C.G. Conn’s subsequent low brass product lines, the presence of a traditionally German Stölzel valve on a tuba manufactured in the United States is also considerably anomalous. The practice of importing and then signing unmarked instruments from Europe was fairly popular with early American instrument manufacturers, especially when these manufacturers were in the first stages of selling new instrument product lines.44 While this practice was fairly popular in this timeframe, and certainly would have been a viable option for the staff at the C.G. Conn instrument manufacturing company, there is enough extant documentation to provide a strong case that this tuba model was indeed designed and manufactured by C.G. Conn. The strongest argument that this tuba model was designed and manufactured by C.G. Conn is found in Charles Gerard Conn’s patent from 1881 to modify Stölzel valves, specifically in the context of tuba and valve trombone product lines.45 An engraving on the bell of this tuba model in the musical instrument collection of the National Music Museum which claimed that the instruments were “made by C.G. Conn [of] Elkhart [Indiana]”46 serves as an additional, if somewhat less credible, sample of evidence that this instrument was designed and manufactured in the United States, because many of the other musical instrument manufacturers that were importing and

44 Swain, 271.
46 Tuba pitched in E-flat by C.G. Conn, Serial Number 4037, NMM 5,892, Musical Instrument Collection, National Music Museum, The University of South Dakota, Vermillion, SD, ca. 1880-1881.
signing unmarked instruments would make similar claims. Particularly with C.G. Conn’s patent information as support of this tuba model’s design, this tuba model was most likely designed and constructed by C.G. Conn in the United States rather than being imported despite this tuba product line’s somewhat anomalous design and the popularity of the this importation trend.

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47 Swain, 271-272.
SECTION 3: THE C.G. CONN “WONDER VALVE” TUBA PRODUCT LINE

The next C.G. Conn tuba product lines which were regularly advertised and made available for sale from approximately 1888-1890 are also unlike all of the later C.G. Conn tuba, euphonium, baritone, and alto horn product lines. These two new tuba product lines were titled the “New Model Wonder Valve Double Bb Bass” model and the “Bell Up Wonder Valve Eb Bass,” model, and featured top-action valve assembly with bottom-sprung Périnet piston valves. Périnet piston valves are one of the most common piston valves found on modern brass instruments, and are described by Dr. Sabine Klaus in her writings on brass instrument construction:

The Périnet valve is named after François Périnet, the Parisian who invented this type of piston valve in 1838 and patented it the following year. The valve loops are arranged in such a way that the inlet tubing is positioned on a different level than the outlet tubing. The piston is held at rest by a spring, which is placed either on top (top-sprung) or below (bottom-sprung) the piston. The Périnet valve is now the standard for trumpets in most countries (except Germany and Austria), and is often simply called the ‘piston valve.’

Both of these tuba models were part of a series of instrument product lines that C.G. Conn marketed as the “Wonder Valve Band Instruments.” Alto horns, tenor horns, baritones, euphoniums, tubas, and helicons were all advertised as Wonder Valve instruments in this 1888 C.G. Conn catalog, and it is likely that each of these instrumental product lines included a design from the Périnet valve modification patent which was issued to Charles Gerard Conn on June 15, 1886. Initially this patent seems to indicate this valve modification is intended to be implemented in cornets, but Conn states

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48 Tubas in this timeframe were often referred to as basses, brass basses, or even blow basses.
49 Conn, C.G. Conn – Solo and Band Instruments Catalog.
50 Sabine Klaus, “Elements of Brass Instrument Construction.”
51 Conn, C.G. Conn – Solo and Band Instruments Catalog.
in the specifications of this new technology that the invention would be utilized in the
“improvements in cornets and other piston-valve musical instruments.”52 C.G. Conn’s
modification of the Périnet piston valve for this technology’s implementation in multiple
product lines is reminiscent of the efforts made in the earlier Stölzel valve modifications
in 1881.53 This modified Périnet piston valve design may be seen in further detail in
Appendix B in figure B-2.

The Bell Up Wonder Valve Eb Bass model was listed in an 1888 C.G. Conn
catalog as being “patented in Europe and America,”54 which is a further indicator that this
tuba model was developed and modified from existing patents much like the Stölzel
valve patent that C.G. Conn acquired earlier in 1881.55 The Stölzel valve tuba model that
C.G. Conn offered previously was most likely replaced by this new Wonder Valve E-flat
tuba model, as there no other mention of the previous Stölzel valve model in this or other
extant periodicals from circa 1888. The Wonder Valve Eb Bass was available for
purchase with three valves, although it is possible that a fourth valve could have been
added because this was available on other tuba and euphonium Wonder Valve products in
the same 1888 C.G. Conn catalog.56 An image of the Bell Up Wonder Valve Eb Bass
tuba model taken from a C.G. Conn Catalog published in 1888 is shown below in figure
3.1.

53 Charles G. Conn, Piston-Valve Musical Instrument, US Patent No. 249,012, filed April 2, 1881, and
issued November 1,1881.
54 Conn, C.G. Conn – Solo and Band Instruments Catalog.
55 Charles G. Conn, Piston-Valve Musical Instrument, US Patent No. 249,012, filed April 2, 1881, and
issued November 1,1881.
56 Conn, C.G. Conn – Solo and Band Instruments Catalog.
The New Model Wonder Valve Double Bb Bass was listed as “patented April 15, 1886,” in a C.G. Conn catalog from 1888, but no records of any patent extended to Charles Gerard Conn on this date can currently be found. It is feasible that this printing of “April 15” was a mistake in the C.G. Conn catalog, and that the patent utilized in the construction of this new tuba model in the key of B-flat was in fact the modified Périernet valve patent that Conn was awarded on June 15, 1886. This is the most probable patent used considering that the New Wonder Model Valve Double Bb Bass was part of the Wonder Valve product line, which featured this same valve technology on each of the other tuba-like instruments. This tuba model is also the only Wonder Valve product listed in this catalog without a claim of “patented in the United States and Europe,” which might indicate that this particular model of B-flat tuba was an initial design or prototype for a new tuba product line. This concept that the New Model Wonder Valve Double Bb Bass may have been a prototype seems feasible because the Wonder Valve instruments were available for only four years or less before being replaced permanently with two new tuba designs which stayed in production for roughly 50 years. The New Model Wonder Valve Double Bb Bass is also likely the first B-flat tuba model that C.G. Conn offered, as the advertisement claims that this new model was designed:

In response to a demand for a Bass [Tuba] with more volume of tone and capable of greater resources than the Eb Bass, I have constructed a BBb Bass of light weight, convenient and handy proportions which can be used by any bass player with ordinary lung capacity. The use of this instrument will prove invaluable to bands of more than 18 persons.

57 Ibid.
59 Conn, C.G. Conn – Solo and Band Instruments Catalog.
Each of the instruments within the Wonder Valve series were also designed to incorporate the primary tuning slide before the valve apparatus,\(^60\) which is atypical for the construction and design techniques of many other tubas and tuba-like instruments made in the United States during this timeframe. Most other tuba models from competing manufacturers featured a design which placed the primary tuning slide of the instrument after the valve apparatus, which tended to allow for a more rapid expansion of the tuba model’s bore after the valve apparatus.\(^61\) The New Model Wonder Valve Double Bb Bass was available with either three or four valves in this 1888 catalog, and was also available with “extra engraving.”\(^62\) An artistic interpretation of this extra engraving option on the bell of these instruments can be seen below in figures 3.1 and 3.2. Images of the both the Bell Up Wonder Valve Eb Bass and the New Model Wonder Valve Double Bb Bass taken from a C.G. Conn Catalog published in 1888 is pictured below in figures 3.1 and 3.2.

\(^{60}\) Ibid.
\(^{61}\) Swain, 221.
\(^{62}\) Conn, C.G. Conn – Solo and Band Instruments Catalog.
The valve apparatuses of both the Bell Up Wonder Valve Eb Bass and the New Wonder Valve Double Bb Bass are worth consideration. This valve apparatus design is similar to most contemporary and modern top-action tuba valve configurations with bottom-sprung Périnet valves, but is completely anomalous from the next 50 years of top-action tuba, euphonium, tenor horn, and alto horn designs produced by C.G. Conn. It is also noteworthy that the Wonder Valve series tenor horn, baritone, and euphonium seem to be built from the same basic design as the Wonder Valve tubas. Examples of these other tuba-like instruments utilizing the Wonder Valve design can be seen in Appendix A in figure A-1. This design was replaced in each of these Wonder Valve product lines with

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63 Ibid.
64 Ibid.
C.G. Conn’s new patents and product lines released in approximately 1890. This significant disparity in construction between this traditional design and C.G. Conn’s next top-action design will be discussed at length in several later sections of this document.

As mentioned above, the design of the Wonder Valve tuba product lines differ from the early Stölzel valve model and C.G. Conn’s next series of tuba product lines. Most notably, the valve apparatus design of each of these product lines implemented different technologies designed from three different patents. Additionally, each of these three tuba product lines were constructed with different dimensions in their bells and outer bough structures. These disparities in design indicate that it is unlikely that any significant construction components were reutilized or shared between the first three top-action C.G. Conn tuba product lines.

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66 See Appendix B for additional information regarding these valve technology patents.
67 “Boughs” refer to the loops of tubing that are found between the valve apparatus and bell section of tubas. These boughs often form the outer shape of the instrument. Boughs are also referred to as bows or loops in some writings.
68 Height (also referred to as ‘length’ in some publications) was the greatest variable, as can be seen in Appendix A.
SECTION 4: THE C.G. CONN “NEW AMERICAN” AND “WONDER MODEL” TUBA PRODUCT LINES

The next two tuba product lines offered by C.G. Conn were first made available for purchase in approximately 1890, and the designs for these products immediately replaced all of the preexisting tuba and tuba-like instrument models that were manufactured by C.G. Conn. These two product lines were called the “New American Model” and the “Wonder Model” tubas, and marked the first time that C.G. Conn offered both front-action (the New American Model) and top-action (the Wonder Model) tubas and tuba-like instruments. The New American Model tubas were the first known front-action instruments made available by C.G. Conn, and were likely very popular due to the general preference that tubists have for front-action instruments. Each of these designs featured bottom-sprung Périnet valves and was initially offered with the primary tuning slides located after the valve apparatus. These two new C.G. Conn tuba models were also available for purchase from an 1895 C.G. Conn Catalog in a variety of finishes and with various accessories, but it is worth noting that each of the two separate models could be purchased for the same price. This same catalog also lists the basic dimensions of each of these separate models as interchangeable, saying that the each of the tuba models:


Once C.G. Conn secured these patents for the New American Model in 1889 and the Wonder Model in 1890, they continued to manufacture tuba product lines that

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69 Swain, 177
70 C.G. Conn, Wonder and American Model Valve Instruments.
71 Ibid.
were simple variations on these basic models for approximately the next fifty years. In fact, these two initial product lines implemented a design which became the basis of all the other tuba, euphonium, and alto/tenor horn product lines manufactured by the C.G. Conn instrument manufacturing company until 1940. The basic design and the similarities of these other tuba-like products can be seen in further detail in Appendix A, figures A-4, A-5, and A-6, and the patents for these two new C.G. Conn instrumental product lines can be seen in Appendix B, figures B-3 and B-4. The New American Model and Wonder Model tubas can be seen below in figure 4.1 and 4.2.

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74 Conn, Selling Points and Testimonials “Bass,” 3-18.
76 Conn, French Horn, Mellophone, Alto.
77 Conn, Conn Band and Orchestra Instruments, 36-37.
The New American Model tubas, which will hereafter be referred to as American Model tubas, were built with a fairly standard front-action valve apparatus design\(^80\) when compared to other contemporary tubas manufactured in the United States.\(^81\) While the first advertisement of these American Model tubas offered them only in the key of E-flat, they were available in both the keys of B-flat and E-flat within three to five years.\(^82\)

According to the American Model instrument patent, the American Model tubas were designed to allow for a fourth valve to be easily integrated to these instruments during the

\(^{78}\) Conn, *Wonder and American Model Valve Instruments*.
\(^{79}\) Ibid.
\(^{80}\) Swain, 150 170 177.
construction process. While this fourth valve option was not initially advertised in their 1895 advertisement, C.G. Conn made a common practice of listing this in later catalogs. The early advertisements of the American Model tuba also made a definite appeal to their target audience’s sense of nationalism, with endorsements such as “invented and patented by an American, manufactured by American workmen, and immensely popular with American bandsmen and musicians.” While these front-action tubas employed a standard valve apparatus, the outer bough structure of these instruments was considerably more open in wrap than many of the other competitive contemporary front-action tuba models. While the basic design of the C.G. Conn American Model tubas remained unchanged for approximately the next 50 years, the subsequent models built using this design underwent many minor changes in model name, size, and bore expansion. Many of these additional front-action concert tuba and tuba-like instrument models released during this construction period can be seen in further detail in Appendix A.

While the design of the front-action valve apparatus of the C.G. Conn American Model tubas was standard when compared to contemporary competitive tuba models, the top-action valve apparatus of the C.G. Conn Wonder Model tubas was an absolute anomaly and perhaps the most notably unique design that C.G. Conn has implemented in the history of this company’s tuba product lines. This top-action valve apparatus featured tubing which ascended upwards out of the valves and then doubled back down,

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85 Conn, Wonder and American Model Valve Instruments.
86 ‘Open in wrap’ means that these tubas were designed to incorporate gradual curves of the instrument’s main tube and valve tubing. This type of construction is most often referred to as open wrap.
87 Swain, 120 150.
89 Swain, 126.
forming an oval- or square-shaped section of tubing for each of the valve tuning slides and valve tubing. This square-like shape in the valve tubing was most prominent in the first and third valve tubing of C.G. Conn’s top-action E-flat tubas, but was pronounced in all three sections of valve tubing on their B-flat tubas. The 1895 C.G. Conn catalog known for featuring the Wonder Model tuba, and the 1890 patent for Conn Wonder Model instruments, claims that this valve apparatus arrangement will “prevent the accumulation of water in valve slides” and be implemented in “alto [horns], tenor [horns], baritones, euphoniums, and basses [tubas] of all kinds.”

Dr. John Swain wrote about this “rather special valve slide tubing arrangement” as well, mentioning that such a design implemented in the valve apparatus would allow the tubing of the third valve to be “especially protected by the main coil [bough],” which could have been an additional consideration in the design of the C.G. Conn Wonder Model tubas. Another possibility that will be explored at length in several later sections of this document is that this top-action valve tubing apparatus was designed in particular to be interchanged with the valve tubing of C.G. Conn’s front-action valve apparatus product lines as a means of streamlining the construction process of these two separate instrument designs. An expanded image of one valve and valve tubing from the C.G. Conn Wonder Model tuba valve apparatus is shown below in figure 4.3 and may be compared with another expanded image of a more standard top-action valve that was

93 Swain, 126.
manufactured and designed by C.G. Conn in their earlier New Wonder Valve Double Bb Bass in figure 4.4.

While the C.G. Conn Wonder Model top-action instrument product lines were designed with an atypical valve apparatus, the remainder of the structures of these tubas and tuba-like product lines were quite similar to contemporary and competitive top-action instrument designs.94 The top-action C.G. Conn Wonder Model tubas first known advertisement was on the same page as the New American Model tubas in an 1895 mail-order catalog and shared many of the options discussed above that were originally offered with this front-action counterpart model. The C.G. Conn Wonder Model tubas were also first available in the key of E-flat, featured a primary tuning slide located after the valve apparatus, and came with several accessory options with their purchase. Like their front-action counterpart models, the Wonder Model tubas were available with a variety of finishing and plating options. C.G. Conn’s first finish package included a burnished silver-plated finish with gold plated ferrules, valve touch-pieces, valve-tops/bottoms, and water keys and mother-of-pearl inlaid valve touch-pieces. The second finish package featured a burnished, fully silver-plated instrument with mother-of-pearl inlaid valve touch pieces. C.G. Conn’s third finish package was available with a “highly polished brass finish” with silver plated mountings and mother-of-pearl inlaid valve touch pieces.95 Similarly to the New American Model front-action tubas, the Wonder Model instruments featured a considerably more open wrap in their outer boughs than many of the contemporary competing tuba models.96

94 Swain, 177.
95 Conn, Wonder and American Model Valve Instruments.
96 Swain, 177.
Although the C.G. Conn Wonder Model tubas and tuba-like product lines underwent several small modifications, such as an increase in bore diameter, relocation of the primary tuning slide, and some other minor cosmetic adjustments like engraving.

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98 Conn, C.G. Conn – Solo and Band Instruments Catalog.
location, all of the subsequent top-action tuba and tuba-like product lines utilized the same basic design as the Wonder Model tubas until the release of the Conn 20-J tuba product line in approximately 1940.

As was mentioned above, many minor modifications to these two tuba product lines patented in 1889 and 1890 were applied over the next fifty years, and many new model names were applied to these product lines during this timeframe. Because these adjustments to each the overall designs were so slight during this fifty year span, these newer individual product lines are sometimes difficult to identify accurately without referring to each instrument’s serial number and attempting to match each instrument with a publication or catalog from that same year of manufacture. Unfortunately, creating a comprehensive list of each of the models released in this timeframe would be impossible without access to extant catalogs from each year from circa 1890 until 1940. However, a C.G. Conn tuba-specific catalog from 1923-1924 provides a great deal of information regarding the variety of tuba product models that were available during these fifty years of manufacture. A euphonium/baritone-specific catalog from January of 1921 also shows many of the tuba-like products that utilized these same basic designs during this timeframe.

The most significant differences between the C.G. Conn tuba models available in the 1920s and the original design of the New American Model and Wonder Model tubas

100 These subsequent product lines can be seen in Appendix A.
101 Conn, Conn Band and Orchestra Instruments, 36-37.
103 Conn, Baritones and Euphoniums.
were the location of the primary tuning slide and an increase of the bore diameter and bore expansion of the outer boughs of these instruments. These minor adjustments in the overall design began to make these tubas somewhat larger than the original product lines released in circa 1890. This tuba-specific C.G. Conn catalog also featured several helicon and sousaphone models, but the outer structures of these instruments are so disparate from the designs of concert tubas that it is unlikely that they shared many construction characteristics with the concert tuba product lines. However, like the earlier Wonder Valve instrument series which were most likely related due to valve technology, the helicons and sousaphones offered in this tuba-specific catalog are all advertised as “Wonder Model” instruments. While this product series name is not a conclusive piece of evidence in the case of these marching instruments, it might be possible that these instruments shared some basic valve apparatus designs with the front-action C.G. Conn tuba product lines.

The entirety of the tuba product lines available in this C.G. Conn tuba-specific catalog are part of the “New Wonder Model” product line, which should be noted is a different series of instruments than the 1890 “New Wonder Model E-flat Bass.” The term “Wonder” model had become rather popular with the C.G. Conn instrument manufacturing company and was used as an addition to many of this company’s product

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104 The primary tuning slide was located before the valve apparatus in these more recent tuba models, with the exception of one product available in this catalog.
106 Conn, *C.G. Conn – Solo and Band Instruments Catalog.*
lines during their early years, but it did often link groups of instrumental product lines together as a result of design.\textsuperscript{108}

The 1923-1924 tuba-specific C.G. Conn catalog offered nine different models of concert tuba based off of C.G. Conn’s original patents in 1889 and 1890, including: the Standard Eb Basses (top-action model 2-J and front-action model 4-J), the “Professional” Eb Basses (top-action model 10-J and front-action model 12-J), the “Giant” Eb Basses (top-action model 18-J and front-action model 20-J), the “Monster” BBb Basses (top-action model 26-J and front-action model 28-J), and the Orchestra Grand Bass in BBb or CC (both front-action, B-flat model 34-J and C model 36-J).\textsuperscript{109} This same catalog also details the different helicon and sousaphone models available during the 1920s, including: the Helicon Monster BBb (model 32-K), the Wonder Model Helicon in Eb (model 10-K), the Sousaphone Bass in BBb (raincatcher\textsuperscript{110} model 34-K), the Sousaphone Bass in Eb (raincatcher model 18-K), the Sousaphone Grand Bass in BBb (front-facing model 38-K), and the Sousaphone Grand Bass in Eb (front-facing model 26-K).\textsuperscript{111}

These different tuba, sousaphone, and helicon models were common fixtures in many preeminent ensembles of this era, and were endorsed by many well established tuba artists. Some of the more prominent artists to endorse the C.G. Conn tuba products included August Helleberg, William J. Bell, and John Kuhn (also known as “Red Cloud”).\textsuperscript{112} The Helleburg model mouthpiece made originally for the artist August Helleburg, later models of which have become recognized as a standard mouthpiece in

\textsuperscript{108} Reeves, “C.G. Conn’s Double-Wall Wonder Clarinets.”
\textsuperscript{110} “Raincatcher” sousaphones are an early variety of this instrument, with a bell that points directly upward instead of facing forward.
\textsuperscript{111} Conn, \textit{Selling Points and Testimonials “Bass,”} 12-17.
\textsuperscript{112} Ibid., 17-19.
modern tuba playing,\textsuperscript{113} was even available in this early C.G. Conn tuba-specific catalog.\textsuperscript{114} These different C.G. Conn tuba models and artist endorsements can be seen in further detail in Appendix A, figure A-5.

A C.G. Conn euphonium/baritone-specific catalog from 1921 also offers nine varieties of tuba-like models which are built from the basic designs utilized in this company’s tuba product lines. Unfortunately, this instrument-specific catalog does not indicate the model number of each of these euphoniums and baritones, but each of these nine models are part of the Wonder instrument series like the tubas, sousaphones, and helicons mentioned above. This catalog also contains endorsements from many leading euphonium artists of this era, perhaps most notably Salvatore Florio and Simone Mantia.\textsuperscript{115} Each of these euphonium and baritone models which share the notable construction characteristics of the C.G. Conn tuba-like instrument product lines and the endorsements of these outstanding early euphonium artists from the United States can be seen in further detail in Appendix A, figure A-4.

The C.G. Conn General Catalog “B” from November of 1924 also includes an example of the alto horn designs which are also built from the 1889 and 1890 American and Wonder model instrument patents. It should be noted that many of these instrument models were offered in both low pitch and high pitch due to the gradual transition in tuning frequency which occurred in the United States and abroad during this timeframe, which could have also prompted some of the minor design changes that were

\textsuperscript{113} Hodapp, 9.


\textsuperscript{115} Conn, \textit{Baritones and Euphoniums.}
implemented during this manufacturing period.\textsuperscript{116} This could have been the impetus for the C.G. Conn Instrument Company’s design shift that repositioned the tuning slide in the tuba-like instrumental product lines.

Placing a primary tuning slide before the valve apparatus in tuba-like instruments generally requires that the tuning slide is cylindrical, meaning that each side of the tuning slide is of the same diameter. This is contrasted by the primary tuning slides placed after a tuba-like instrument’s valve apparatus which are able to expand in their bore diameter, often making the exit side of the tuning slide much larger in bore than that of the entrance.\textsuperscript{117} If instrumentalists were playing in multiple ensembles with different pitch centers during this time of transition, it would be much easier build standard equipment for adjusting the intonation/length of the larger low brasses with standard cylindrical tubing than needing specialized equipment for each different model based on each model’s bore expansion and tuning slide dimensions. This way, additional slides or loops of tubing could be added to instruments with much more ease, because manufacturers could simply produce cylindrical slide extenders for existing primary tuning slides rather than creating a replacement slide.

While each of these two designs underwent several small modifications during the 50 years in which they were manufactured, these designs were eventually replaced by a new model that was released in approximately 1940.

\textsuperscript{117} Swain, 221.
SECTION 5: THE C.G. CONN 20-J AND 22-J PRODUCT LINES

Around 1940, C.G. Conn released a new tuba product line – the 20-J/22-J Short Action Recording Bass – that marked the end of a 50 year manufacturing period of C.G. Conn’s New American and New Wonder model tubas. The 20-J top-action tuba model incorporated C.G. Conn’s newly patented technology for short-action valves, a primary tuning slide located after the valve apparatus, greatly expanded and re-wrapped boughs, a directional/recording bell, and a newly designed top-action valve apparatus. This new top-action valve apparatus was likely designed to accommodate the newly patented short-action valves, which have oval shaped entrance and exit tubing, but maintains the basic appearance of the earlier atypical C.G. Conn top-action valve apparatus. The most significant differences in the design of this valve apparatus can be seen in the wrap of the third valve and the traditional arrangement of the second valve. The 22-J front-action tuba also incorporated this same new valve technology and similar alterations, but with a redesigned front-action valve apparatus. The most notable difference in this valve apparatus can be seen in the first valve tubing, which has been stretched towards the bell in order to accommodate the new oval-shaped vents of the short-action valves. The C.G. Conn 20-J top-action model can be seen below in Figure 5.1. Additional information about the Conn 20-J and short-action valves can be found in Appendix A, figure A-7.

118 Conn, Conn Band and Orchestra Instruments, 36-37.
120 Conn, Conn Band and Orchestra Instruments, 36-37.
Figure 5.1: The C.G. Conn 20-J, Top-Action, Key of B-flat. Note the expanded outer boughs and re-wrapping of the valve tubing in the second and third valve.

The creation of the C.G. Conn 20-J and 22-J tuba models marks the end of this investigation of the early tuba product lines available through the C.G. Conn instrument manufacturing company. While these newly released tuba product lines were likely successful, the next sections of this document will investigate the unique and anomalous design that was incorporated into the top-action tuba models that were patented by Charles Gerard Conn in 1890 and then left in production for the next approximately 50 years.

121 Ibid., 36.
CHAPTER 2:

INVESTIGATION OF THE C.G. CONN TUBA DESIGNS AND CONSTRUCTION TECHNIQUES
SECTION 6: REVIEW OF THE ANOMALOUS C.G. CONN TUBA DESIGN

The purpose of this section is to briefly elaborate on the previous discussion of the anomalous construction techniques used in C.G. Conn’s top-action tuba product lines. The ‘Conn Wonder Model’ product line implemented a particularly anomalous design in the configuration of these tuba model’s valve apparatus.122 Most notably, the valve tubing of the ‘Conn Wonder Model’ exits their valve casings in an upward direction, which is a counter-intuitive construction technique and atypical with the arrangement of other tuba valve apparatuses built in this era.123 This unique top-action valve apparatus in the ‘Conn Wonder Model’ product line was patented in 1890, and the design was implemented in various product lines – including top-action tubas, euphoniums, and alto horns – until approximately 1940.124 Why would the C.G. Conn instrument manufacturing company utilize such a counter-intuitive design as that implemented in the ‘Conn Wonder Model’ instruments for approximately fifty years? Although there are no longer any records of the techniques used to construct this product line, an investigation utilizing comparative measurements indicates that C.G. Conn may have implemented a construction technique which utilized interchangeable parts between the Conn Wonder Model (top-action) and the Conn American Model (front-action) tuba product lines.

By taking and analyzing measurements of period tubas from the musical instrument collection at the National Music Museum of Vermillion, South Dakota, it is clear that the C.G. Conn instrument manufacturing company designed their top-action and front-action tuba product lines to be built with a significant number of

122 Swain, 158.
124 Conn, Conn Band and Orchestra Instruments, 36-37.
interchangeable parts. These interchangeable parts between the C.G. Conn tuba models are especially prominent in the bell, outer bows, and sections of the valve apparatus. Utilizing interchangeable parts in their distinct tuba product lines would have proven to be economical for the C.G. Conn instrument manufacturing company at the possible cost of ergonomics or ease of playing of these top-action instruments.

Because of such a significant loss of historical documentation regarding the construction of these instruments, the principle theories about their construction have been either hearsay or conjecture. This document investigates the implementation of these interchangeable parts by analyzing new areas of evidence, including: analysis of patents regarding these instrument product lines, forty-seven comparative measurements of fourteen C.G. Conn instruments (from 1890 to 1940),¹²⁵ and advertisements/interviews from C.G. Conn periodicals. This document also discusses the anatomy of tubas, describes and analyzes my research on instruments from the National Music Museum, and analyzes historical documentation of the unusual ‘Conn Wonder Model’ top-action tuba design. Using this evidence, especially the concrete evidence provided by my comparative measurements, this document offers another explanation for the reasoning behind the C.G. Conn instrument manufacturing company’s peculiar design in their top-action tuba product lines.

¹²⁵ These measurements were taken on-site at the National Music Museum by this author.
SECTION 7: THE ANATOMY OF CONCERT TUBAS

In order to discuss the construction techniques of these C.G. Conn tubas, it is important to first have a general understanding of the anatomy of the concert tuba. The basic components that are included in a concert tuba are the leadpipe, valve apparatus, primary tuning slide, boughs, and bell. These components can be seen in greater detail in Appendices C and D along with diagrams that will serve to familiarize the reader with the anatomy of concert tubas.

The concert tuba designs that will be discussed throughout this chapter of the document will be broken down into two varieties: front-action (like the C.G. Conn American Model) and top-action (like the Conn Wonder Model). The ‘action’ refers to placement of the valve apparatus and each model of concert tuba stems from two traditional configurations.

As discussed earlier, front-action tubas are directly influenced by early German designs which originally implemented traditional rotary valves and the antiquated Berlin valves. The Berlin valve is a predecessor to the modern Perinét piston valve, but the entrance and exit ports of the valve casing are “arranged on the same plane as the main tubing,” which often made the Berlin valves too large for comfortable hand positioning when implemented on tubas. This arrangement of valve casing ports on Berlin valves also made the organization and placement of the valve tubing difficult. Modern front-action instruments typically employ the use of rotary valves, bottom-sprung Perinét

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127 Though C.G. Conn produced a large number of low brass product lines (including: sousaphones, helicons, euphoniums, baritones, and others), this portion of the document is devoted strictly to their concert tubas.
128 Klaus, “Elements of Brass Instrument Construction.”
piston valves, or both of these valve types working in conjunction.\textsuperscript{129} Traditionally, early front-action tubas have a significant distance between their upper bough and rim of the instrument’s bell.\textsuperscript{130} This arrangement of the bough tubing results in a tighter wrap\textsuperscript{131} over the majority of the tuba’s length.

As was mentioned earlier, the C.G. Conn American Model tubas utilized a standard front-action valve section that shares similarities with contemporary tuba designs and even modern tuba designs. One of the many contemporary musical instrument manufacturers that competed with C.G. Conn in this timeframe was Holton, a company which also manufactured rather popular tuba product lines. The design of a Holton front-action tuba is displayed next to the design of a C.G. Conn front-action tuba to show these similarities below. Figure 7.1 displays a Holton front-action tuba and figure 7.2 displays an image taken from C.G. Conn’s patent for American Model front-action instruments. Take notice of the similarities in valve apparatus between these two distinct tuba models from two separate instrument manufacturing companies. There are considerable differences in these two tuba models worth noting as well, particularly that the Holton tuba implements a bell-forward\textsuperscript{132} and that the C.G. Conn sketch incorporates a bell-up\textsuperscript{133} design. This consideration has no noticeable impact on the valve apparatus in tuba design.\textsuperscript{134}

\footnotesize
\begin{itemize}
\item \textsuperscript{129} Bevan, 355.
\item \textsuperscript{130} This design is still commonly implemented in modern instruments manufactured by the German instrument manufacturing company Mirafone.
\item \textsuperscript{131} “Tighter wrap” indicates that these tubas would have been designed with more sudden/rapid curvatures to the main tubing of these instruments. This construction technique is most often referred to as closed wrap.
\item \textsuperscript{132} “Bell-forward” is also sometimes referred to as recording bell.
\item \textsuperscript{133} “Bell-up” is also sometimes referred to as concert bell.
\item \textsuperscript{134} Charles G. Conn, Brass Wind Musical Instrument. US Patent No. 931,273, filed February 13, 1908, and issued August 17, 1909.
\end{itemize}
Contrastingly, top-action tubas are in many ways a descendent of the saxhorn and a group of similar early brass instruments that were popular in France and England, which implemented a rotary valve apparatus or Périnet pistons placed in line with the upper-most bough of the instrument. These top-action instruments incorporate a distinct design in their upper boughs that allow for a player’s right hand to access the

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137 Bevan, 256 283.
instrument’s valves. The Périnet piston valve (which is now the most widely used piston technology in brass instrument manufacturing) was first incorporated into French top-action instruments and then later into front-action instruments by manufacturers in the United States of America, but this new technology did not initially change the basic wrapping of the two different action-types of concert tubas.

Figure 7.3: Holton top-action design. Pitched in E-flat, bell-up model.  
Figure 7.4: C.G. Conn top-action design. Pitched in E-flat, bell-forward model.

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138 This design is still employed in current instruments manufactured by the British instrument manufacturing company Besson.
139 Bevan, 283.
140 Drobnak, 92.
The two images above compare the designs of a traditional Holton top-action tuba model with the atypical design of the C.G. Conn top-action tuba model. Figure 7.3 displays a Holton top-action tuba pitched in E-flat, and the reader should carefully note the immediate downward turn that each valve’s tubing makes after leaving the valve casing. Figure 7.4 displays a sketch of the C.G. Conn Wonder Model top-action tuba pitched in E-flat, and one should note the sudden upwards turn that each valve’s tubing makes after leaving the valve casing. A closer image of the C.G. Conn top-action valve tubing can be seen above in figure 4.3 as a review.

Both top-action and front-action tubas are still in production by modern instrument manufacturers. Professional tuba players, especially in the United States of America, tend to favor front-action tubas because this design allows a player to use his or her left hand to adjust the tuning slides of the valve apparatus while playing, whereas top-action tubas make this course of action uncomfortable. Front-action tubas also allow for a more natural and ergonomic hand position for the player’s right hand. The most significant physical dissimilarity caused by the placement of the valve apparatus is manifested in the direction of the tuba’s bell. From the player’s perspective, front-action tubas have a left-facing bell and top-action tubas have a right-facing bell. This concept of altered bell direction as a result of valve location is demonstrated in figures 7.5 and 7.6 below. Take note of the identical outer bough and bell structures of these two instruments. The only significant disparity between these two tubas is the valve

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142 Bevan, 281-283.
143 Swain, 177.
144 To review, the direction of bell from the player’s perspective is another common name for these two concert tuba designs. In these cases the tubas are referred to as: left-facing (front-action) or right-facing (top-action).
apparatus. These two C.G. Conn tuba models even show similarities in their valve tubing placement, in particular the first and third valve tubing of each instrument, when these tuba models are compared. These similarities between the valve tubing can also be in further detail in figures 8.1 and 8.2.

The C.G. Conn instrument manufacturing company eventually offered both a German (front-action) and a French (top-action) model of tuba to the American ‘melting pot’ that was this company’s clientele. However, manufacturing both models would not

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**Figure 7.5:** Front-action C.G. Conn Tuba. Note that this design incorporates an identical outer bough structure to the Top-Action instrument in Figure 7.6.

**Figure 7.6:** Top-Action C.G. Conn Tuba. Note the similarities between the valve tubing seen in the Front-Action instrument in Figure 7.5.

146 Ibid.
have been cost-effective, especially when the amount of time and labor involved in the production of the largest member of the brass family is taken into consideration. It is possible that C.G. Conn took the initiative to merge two previously separate designs in their front-action and top-action tubas. The bell and outer boughs of these tubas were influenced by a traditionally French tuba design, while the valve apparatus of each model was based on a German design. This construction method would have allowed for C.G. Conn to accommodate the specific demands of their diverse clientele without an unnecessary delay in production time or use of specific tools for the different models.
SECTION 8: THE ATYPICAL DESIGN OF THE C.G. CONN TOP-ACTION TUBAS

The inspiration for this investigation came while this author was re-cataloguing the tubas manufactured in the United States of America from the musical instrument collection at the National Music Museum in Vermillion, South Dakota. While working with several dozen tubas, this author was perplexed each time a top-action C.G. Conn instrument that had been manufactured between 1890 and 1940 was encountered. The design of the valve apparatus appeared to be counter-productive because of the unnecessarily complicated upward loops of tubing that constituted the design each of the valve’s tuning slides. This top-action valve apparatus in the C.G. Conn Wonder Model instruments appeared to have been more labor-intensive to assemble, more difficult to maintain and repair, and seems particularly counter-intuitive because each section of valve-tubing incorporates at least 2 additional right-angle adjustments when compared to more conventional designs. Typically right-angle adjustments are avoided in tuba construction, and that was one of the most notable features of the C.G. Conn Wonder Model top-action tubas.

On the other hand, the front-action C.G. Conn tubas seemed conventional in the design of their valve-apparatus, which was similar to many of the other tubas from this period from other competitive instrument manufacturers as has been discussed above. It was not until perusing an 1895 C.G. Conn Catalogue and Price List from the National Music Museum’s Musical Instrument Manufacturer’s Archive that this author

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147 Bevan, 280.
148 Referred to as ‘MIMA,’ most commonly at the National Music Museum.
suddenly realized that the two product lines – which were pictured side-by-side – were almost certainly constructed to utilize interchangeable parts.

Figure 8.1: C.G. Conn Top-Action Valve Apparatus. Arrows indicate the direction of airflow through the valve section. Note the upward direction of valve tubing from each valve’s exit ports.

Figure 8.2: C.G. Conn Front-Action Valve Apparatus. Note the similarities in tubing which mirrors the slides of the Top-Action design in the first and third valves.

A detailed comparison of the valve apparatus from both the top-action and front-action C.G. Conn tuba models is displayed above in figures 8.1 and 8.2. The top-action valve apparatus in figure 8.1 is shown from behind the valve apparatus, as if from the

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149 Conn, *Wonder and American Model Valve Instruments.*
player’s perspective, and displays the valve pathways with arrow indicators as they travel through the valve casings. This image in figure 8.1 is visible in a larger format in Appendix G due to this image’s complexity. The front-action valve apparatus in figure 8.2 is displayed from in front of valve apparatus, as if from the opposite of the player’s perspective. Review the similar placement of the valve tubing, especially in the first and third valve slides of each instrument. The valve tubing appears more natural in the front-action valve apparatus because of the valve casing’s horizontal orientation. This orientation allows for the valve entrance and exit ports to be in line with the valve tubing, juxtaposed by the parallel position of the top-action valve casing in relationship to its valve tubing.

Other low brass researchers have noticed the strange top-action design in the C.G. Conn tubas produced during this timeframe. Most notably, Dr. John Swain mentions this odd valve tubing in his dissertation, *A Catalog of the E-flat Tubas in the Arne B. Larson Collection at the University of South Dakota*. Swain comments on this design five times in his dissertation, and in his first dealing with C.G. Conn top-action tubas he states:

> This is one of a number of Conn instruments in the collection with a rather special valve slide tubing arrangement. The tubing for the first and third valves begins by ascending toward the top of the valves, and then it doubles back down. This is a space-saving arrangement which allows the third valve especially to be protected by the main coil.

This conclusion – although this statement is certainly a plausible consideration that could have been part of C.G. Conn’s tuba manufacturing – is not supported by any evidence.

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152 Swain, 158-159 171 174 231.
153 Ibid. 158.
throughout Swain’s writings.¹⁵⁴ Regrettably, I am forced to consider this hypothesis to be based on supposition due to lack of evidence in his writings, however likely this design consideration might have been in C.G. Conn’s top-action tuba design.

However, Swain makes an important comparison between the C.G. Conn top-action and front-action tubas based on the measurements acquired during his cataloguing procedures. While describing a front-action tuba from the National Music Museum’s collection, Dr. Swain writes “the valve assembly of this tuba is different than that of the [C.G.] Conn top-action instruments, but the remainder of the construction is similar to that of the top-action tubas.”¹⁵⁵ This noteworthy statement supports the possibility that these two different models of tubas were, in fact, designed to utilize interchangeable parts.

In addition to Dr. Swain’s writings, this Top-Action tuba design is described in detail in a United States patent submission made in 1890 by Charles Gerard Conn. This patent claims that this unique wrapping of the valve tubing is designed to prevent water from collecting in the instrument’s valve tubing and direct that water to the primary tuning slide. This is accomplished by “construct[ing] the valve-slides [so] that when the valves are depressed the air is made to enter said slides in an upward direction, so that it is impossible for any water which may be in the valves to run into the slides.”¹⁵⁶ This claim is also presented in several period advertisements for the ‘Wonder Model’ tubas.¹⁵⁷ This explanation for the top-action tuba design is the only extant official record by C.G.

¹⁵⁴ Ibid.
¹⁵⁵ Swain, 177.
Conn that makes any mention of this unique valve apparatus that was incorporated in so many tuba and tuba-like product lines.

Unfortunately, this proposed solution to the problem of water collecting in the valve tubing possesses several significant complications that immediately bring to question the validity of C.G. Conn’s claim. Firstly, this design ignores the fact that the principal source of water forming in the valves of a brass instrument is condensation.\textsuperscript{158} Secondly, this complicated construction technique which “excluded all water from the valve slides”\textsuperscript{159} was significantly more expensive and time consuming than the option of adding water-keys to each of valve tuning slides. Adding this simple and effective technology – which was already incorporated on the primary tuning slide of all of their brass instruments – instead of a complicated new valve apparatus would have alleviated the concern of water forming in the valve slides at a fraction of the cost. Also, the production of this design was replaced by a more conventional top-action valve apparatus shortly after 1940.\textsuperscript{160} Surely if the 1890 design for top-action instruments truly barred water from collecting in the tuning slides it would have been worth maintaining, and would have been vastly popular. Finally, it is imperative to recognize that advertisements from 1890 to 1940 often incorporated a dramatic sense of bravura regarding merchandise.\textsuperscript{161} Many C.G. Conn advertisements incorporated outlandish (and often unfounded) claims to entice customers to order C.G. Conn products. Some of these exaggerated advertisements included statements such as “all successful players play Conn

\textsuperscript{158} It is conceivable, though unlikely, that this understanding regarding condensation involving brass instruments may not have been common knowledge in when this proposition was made in 1890.
\textsuperscript{159} Charles G. Conn, Musical Wind Instrument. US Patent No. 436,696, filed February 6, 1890, and issued September 16, 1890.
\textsuperscript{160} Conn, \textit{Conn Band and Orchestra Instruments}, 36-37.
\textsuperscript{161} Herbert, 213.
instruments,” “scientifically proven to have superior tone,” “perfect in intonation,” and
“enhances the musical value of any band by fifty per cent,”\(^{162}\) among many others.\(^{163}\)
Although it is plausible that this design was intended to prevent water from collecting in
a tuba’s valve slides, this author suggests that there may have been other economical
motivations for this unusual construction technique as well.

This lack of concrete evidence regarding the reason for this strange top-action
design and the unexpected similarities between their top-action and front-action tuba
models provoked several questions. Why would C.G. Conn produce such an atypical
design for only fifty years if this design truly prevented water from collecting in the
slides? What is the connection between the top-action and front-action designs and is
there a way to quantify any relationship between these product lines? The answers to
these questions could not be found either in extant historical documents or in modern
scholarship.

\(^{162}\) C.G. Conn, \textit{This is why Sousa and His Band use and Endorse Conn Instruments.} (Musical Instrument
\(^{163}\) Conn, \textit{Selling Points and Testimonials “Bass,”} 1 22-36.
SECTION 9: THE INFLUENCE TO PURSUE COMPARATIVE MEASUREMENTS

Without historical documentation to answer the questions raised above in Section 8, a new area of data collection needed to be explored. This author decided to follow in the footsteps of a fellow tubist’s research on historical instruments. Dr. Jeffrey Hodapp worked in the National Music Museum several years before this author’s time spent researching in Vermillion, South Dakota, and his research involving comparative measurements of York and C.G. Conn tubas provided a series of techniques that could yield physical data to investigate C.G. Conn’s use of interchangeable parts.

Dr. Jeffrey Hodapp’s dissertation, *The York Tuba: Design Idiosyncrasies that Contribute to its Unique Sound*,\(^{164}\) provided an excellent example of investigation of historic tuba design through comprehensive and comparative measurements. Hodapp’s research was directed on collecting measurements of the bore expansion of York tubas and comparing these results to the expansion in C.G. Conn tubas from the same timeframe.\(^{165}\) The detail with which these measurements were taken inspired this author’s own methods for comparison between Top-Action and Front-Action tubas.

Dr. Hodapp also published an article in the International Tuba/Euphonium Association Journal regarding his research on historic York tubas, which have become renowned and desirable\(^{166}\) due to outstanding tone quality and the role that these instruments played in solidifying the use of open-wrap tubas in professional settings.\(^{167}\)

Although the York factory was closed in 1971, many modern tuba designs are either

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\(^{164}\) Jeffrey Paul Hodapp, “The York Tuba: Design Idiosyncrasies that Contribute to its Unique Sound” (DMA diss., University of Madison-Wisconsin, 2002).

\(^{165}\) Hodapp, 11-16.


direct copies from older York designs or incorporate design elements that are strongly influenced by York wrap and bore expansion.\textsuperscript{168} This article’s goal was to quantify what elements of construction caused these instruments to have such a desirable tone quality.

Hodapp devised two main forms of measurement in order to calculate the cause of fine tone quality. His first method was a physical measurement of each instrument and the second was an analysis of the harmonic content of each tuba’s sound while played with a standard mouthpiece.\textsuperscript{169} Hodapp took these measurements with the use of calipers, tape measures, and plastic sheets.\textsuperscript{170} His physical measurements determined that the central pipe of the tubas manufactured by York & Sons had a very gradually and precisely widening taper within each of the boughs and bell, while the C.G. Conn tubas had sections of nearly cylindrical tubing followed by sections of rapidly growing taper in order to compensate the lack of taper in the previous sections. These measurements were taken at 29 points between the valve apparatus and the termination of the bell on each of the tubas that were analyzed in this study.\textsuperscript{171} Hodapp’s analysis of each instrument’s sound\textsuperscript{172} suggests that evenly tapered bore causes an instrument’s tone to have a greater capacity for harmonic content, and thusly a richer sound.\textsuperscript{173}

\textsuperscript{169} The mouthpiece used in this study was the industry standard mentioned earlier, the Conn Helleburg model.
\textsuperscript{170} These thin plastic sheets were used to measure sections of the instrument that had been damaged. The concept behind the use of this product was to simulate the original diameter of sections of the instrument that had been bent in such a way that measurements would be otherwise skewed.
\textsuperscript{171} Hodapp, 2002, 10-14.
\textsuperscript{172} The analysis of each instrument’s sound was made possible by the program VoceVista®, which produced a visual representation of each tone’s harmonic content spectrum.
\textsuperscript{173} Hodapp, 2002, 25.
Hodapp’s procedure of comparative measurements provided the initial framework for the investigation of the design of C.G. Conn tubas. After analyzing his measurement techniques, this author designed a system of measurements that would provide data to either defend or refute the likelihood that C.G. Conn designed these two tuba models with interchangeable parts in mind.
SECTION 10: SELECTION OF POINTS OF MEASUREMENT

The first step in devising a system of measurements for comparison between Top-Action and Front-Action tubas involved determining which points along the approximately fourteen foot length of each instrument would provide the most relevant data. After careful consideration, this author chose forty-seven points of measurement and designed a systematic method to measure each of the suitable C.G. Conn tubas in the National Music Museum’s collection. These forty-seven points were chosen as a result of several criterion, including: potential for interchangeability, structural importance, and involvement with the central pipe of each instrument. This author initially hoped to include both E-flat and B-flat tubas in this study, but was forced to exclude the lower pitched instruments due to a lack of compatible instrument models to compare. The National Music Museum’s collection had fourteen E-flat tubas that were constructed during this timeframe, including eight front-action and six top-action instruments.

The forty-seven points of measurement selected for this project were taken in the order of their role in a tuba’s energy chain. The energy chain refers to the pathway of energy from an instrument’s initiation point to said instrument’s termination point.174

Forty-seven points of measurement were chosen after carefully reviewing the potential for interchangeability, structural importance, and order that each of these potential points occurred along the energy chain of the tuba. This author also compared many of these points of measurement to those from Jeffrey Hodapp’s dissertation.

Calipers, measuring tape, and thin sheets of paper were used to measure each chosen point to an accuracy within 0.06 inches. These forty-seven points of measurement are listed in detail in Appendices C and D.

After collecting over 600 individual measurements, this author then entered the new data into a Microsoft Excel© document and began to compare relevant quantities. There are now two documents, one that analyzed the measurements to an accuracy of 0.001 inches and a second that examined these same measurements to an accuracy of 0.01 inches. This author selected this course of action in order to present both an accurate representation of the miniscule measurements in the valve tubing while also preserving precision with the larger measurements like those found in the outer boughs and bell section. Cells containing relevant matching measurements were then highlighted and tallied in order to provide new insight on the likelihood that C.G. Conn was implementing interchangeable parts in their tuba construction methods.

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175 These calipers allowed for an accuracy of up to 0.001 inches for any measurement smaller than six inches.
176 These thin sheets of paper were used to measure sections of the instrument that had been damaged in a similar fashion to the thin plastic sheets used by Dr. Jeffrey Hodapp.
177 It is generally assumed that inches would have been the favored method of measurement because these instruments were made by an American manufacturer. If a measurement was greater than six inches, then its accuracy was reduced to within 0.06 inches due to limitations of the calipers used in this project.
178 Several instruments were in a state of disrepair, which caused some areas of measurement to be inaccessible. This caused the final number of measurements to be slightly lower than the originally anticipated 658 points of measurement. Some of the more common issues of disrepair are documented in Appendix C.
SECTION 11: OUTCOMES OF THE COMPARATIVE MEASUREMENTS

The results of these comparative measurements show a very high percentage of significant matching measurements, which can be seen in greater detail in Appendix F. These outcomes demonstrate that the C.G. Conn top-action and front-action tubas were most likely designed to incorporate interchangeable parts. Overall, when these measurements are compared at a level of 0.001 inches there are 19.55% of significant identical figures. The percentage of identical figures increases to 46.99% when this same data is compared at a level of 0.01 inches. These levels of comparison were chosen because it is uncertain as to what level of standard the C.G. Conn Manufacturing Company’s tools were calibrated during this time period. While it is quite likely that many tools were calibrated to a standard of 0.01 inches, there is not enough extant documentation to assume that they were able to control the quality of their tools at a higher level of accuracy during the time period of this study.

Several areas demonstrate a significant number of matches. These include: the mouthpiece receiver, the piston diameters, the piston port diameters, the diameter of the valve tubing at their ferrules, the valve tubing bore diameters, most areas of the primary tuning slide, and the primary bough’s circumference. Because of the relative number of matches in these areas (from 64% to 92%), these measurements and matches help to support that the C.G. Conn instrument manufacturing company was using procedures to make these parts interchangeable to make assembly of these instruments more cost-effective.

179 A chart designed to examine this level of comparison can be found in Appendix F.
180 Consult Appendix F-4 for details on this data.
181 These measurements can be found in both Appendix F-3 and F-4.
Some aspects of this data collection were skewed because of damage to the instruments. The outer boughs and bell of each instrument that were examined were damaged, some quite severely.\textsuperscript{182} Because of this damage, it was nearly impossible to acquire an accurate measurement of the bell diameter, bell section length, circumference of the boughs, and length of the boughs. However, it is possible that these sections of the instrument were also designed to be interchangeable before sustaining damage that altered my measurements because of the significant number of identical measurements found in the undamaged sections of these same instruments.

These comparative measurements collected from each instrument in this study provide strong evidence that C.G. Conn implemented interchangeable parts in their top-action and front-action tubas that were manufactured between 1890 and 1940. The analysis of these measurements has also provided a new means of investigating the construction techniques that were hitherto a mystery because of the loss of historical documentation.

\textsuperscript{182} Several common problems involving instrument damage are pictured in Appendix E, in Figures E-7 through E-9.
CONCLUSION

This document has examined the six earliest tuba product lines and construction techniques of the C.G. Conn instrument manufacturing company, one of the most successful band instrument manufacturers in the history of the United States. Regrettably, the majority of C.G. Conn’s historical documentation prior to 1970 has been lost, leaving much of this company’s history, operation, and construction techniques to educated supposition. However, much of the lost history of C.G. Conn’s early tuba product lines has been recovered as a result this investigation of extant publications, patents, and period instruments.

The first six C.G. Conn tuba product lines manufactured each showed this company’s considerable ingenuity in the competitive environment of instrument manufacture and sales in the United States between 1880 and 1940. Despite the notably anomalous design the Conn Wonder Model tuba product line, C.G. Conn maintained a leading role as a seller of tubas and other band instruments renowned for the quality of this company’s instruments. In fact, this atypical top-action valve apparatus design was ubiquitous in C.G. Conn’s tuba and tuba-like instrument construction for nearly half a century.

This document also investigates C.G. Conn’s apparent use of interchangeable parts between the Conn Wonder Model and Conn American Model tuba product lines through this author’s analysis of data taken from period instruments. This investigation provides strong evidence that these two tuba product lines were implementing interchangeable parts, which would have likely provided C.G. Conn with an economical benefit while still catering to a diverse clientele.

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____. Musical Wind Instrument. US Patent No. 436,696, filed February 6, 1890, and issued September 16, 1890.


“The York Tuba: Design Idiosyncrasies that Contribute to its Unique Sound.”


Instruments from the National Music Museum Researched in this Study


APPENDIX A

C.G. CONN TUBA-RELATED PERIODICALS

PERIODICALS IN CHRONOLOGICAL ORDER
FIGURE A-1
FIRST KNOWN ADVERTISEMENT FOR WONDER VALVE BAND INSTRUMENTS

C.G. Conn – Solo and Band Instruments Catalog - 1888
FIGURE A-1 – CONTINUED
Write to C. G. Conn's Manufactories for prices on all kinds of Musical Merchandise.

**BELL UP WONDER VALVE EB BASS**

Length, 33 inches. Weight, 10 pounds.

The instruments made by C. G. Conn have been fully endorsed by all of the leading bandmasters and musicians in the United States Army and Navy, and bands will make no mistake in supplying themselves with them.

A liberal discount from the list prices is given when several instruments are purchased at one time. All instruments are sent subject to approval, and a rigid and impartial comparison and test with other instruments is invited, and any instrument made upon the equal-valve system which does not prove, after sufficient trial, to be fully all that is represented, either the price paid for it will be returned or the instrument made good. Mr. Conn is responsible and will do all he represents.

I will guarantee this Bass to be the best in the world for full, organ-like volume of tone, ease of blowing and perfect construction and durability. It is symmetrical in proportion, lies convenient and easy to the side when in use, and every part liable to injury is fully protected by guards and bands.

Address all orders to

C. G. Conn, Elkhart, Ind., - - - and Worcester, Mass.
FIGURE A-1 – CONTINUED

Write to C. G. Conn’s Manufactory for prices on all kinds of Musical Merchandise.

New Model Wonder Valve Double Bb Bass.

Description of BBb Bass.

Weight, complete, 36 lbs. Diameter of Bell, 10 inches. Length Bb Tenor, 64 inches. Weight, 14 lbs. For symmetrical proportions, easy of blowing, powerful and reso- nant qualities that will transpose to any lower tone below manufactured.

EBb BASS.

Patented April 13, 1890.

In response to a demand for a bass with more volume of tone and capable of greater resonance than the BBb Bass, I have constructed a BBb Bass of light weight, convenient and handy proportions which can be used by any bass player with ordinary long infancy. The use of this instrument will prove invaluable to bands of more than 16 persons.

C. G. CONN,


Address all Orders to
FIGURE A-2
FIRST KNOWN ADVERTISEMENT FOR NEW AMERICAN AND WONDER MODELS
Wonder and American Model Valve Instruments, Catalog and Price List – 1895
FIGURE A-3
C.G. Conn’s Truth Vol. 5, No. 7, November 1903 – November 1903
FIGURE A-3, CONTINUED

The phonograph has been made for its perfect tones, not only absolutely free from harshness or noise, but also for its musical quality. The instrument and its accompanying accessories are all made with care and precision, so that the player can always expect the same quality of tone whenever he wishes to play. The tone quality is perfectly natural and can be heard with perfect clarity even at a distance.

**Wonder Flute Tab.**

It is hard to believe that these beautiful flutes can be made of such a delicate material as glass. The flute is made of a single piece of glass and is supported by the player's fingers. The sound is produced by the air passing through the glass, causing it to vibrate. The player can control the pitch by changing the pressure of his fingers on the glass.

**Instruments-Kyle-Con.**

A simple flute of this kind is made by Mr. John A. Detmers, Flute in Atlantic Hotel Orchestra, Dearborn, Michigan, date of Aug. 29, 1901.

**Used His Flute Almost Seven Years and It is Improving.**

The flute was originally made from a piece of glass and has been in use for almost seven years. During this time, the player has improved his technique and the flute has shown signs of wear. The player has made modifications to the flute to improve its sound quality.

**Faseway Flute.**

From the Philippines wood came a flute made from a single piece of glass. The flute is held by the player's fingers and is supported by the player's body. The sound is produced by the air passing through the glass, causing it to vibrate. The player can control the pitch by changing the pressure of his fingers on the glass.

**The Wonder Flute Tab.**

*G. C. Conklin, Flute Tab.*

The Wonder Flute Tab is made from a single piece of glass and is supported by the player's fingers. The sound is produced by the air passing through the glass, causing it to vibrate. The player can control the pitch by changing the pressure of his fingers on the glass.

**A Simple Customer-Sears Patent Flute.**

*G. C. Conklin, Flute Tab.*

A simple flute of this kind is made by Mr. John A. Detmers, Flute in Atlantic Hotel Orchestra, Dearborn, Michigan, date of Aug. 29, 1901.

**True Sound of the Flute Tab.**

*G. C. Conklin, Flute Tab.*

The flute is made of a single piece of glass and is supported by the player's fingers. The sound is produced by the air passing through the glass, causing it to vibrate. The player can control the pitch by changing the pressure of his fingers on the glass.

**Indicative Sound of the C.G. Conklin Flute Tab.**

*G. C. Conklin, Flute Tab.*

The flute is made of a single piece of glass and is supported by the player's fingers. The sound is produced by the air passing through the glass, causing it to vibrate. The player can control the pitch by changing the pressure of his fingers on the glass.

**The Complete Flute Tab.**

*G. C. Conklin, Flute Tab.*

A simple flute of this kind is made by Mr. John A. Detmers, Flute in Atlantic Hotel Orchestra, Dearborn, Michigan, date of Aug. 29, 1901.

**Flute Tab.**

*G. C. Conklin, Flute Tab.*

The flute is made of a single piece of glass and is supported by the player's fingers. The sound is produced by the air passing through the glass, causing it to vibrate. The player can control the pitch by changing the pressure of his fingers on the glass.

**Indicative Sound of the C.G. Conklin Flute Tab.**

*G. C. Conklin, Flute Tab.*

The flute is made of a single piece of glass and is supported by the player's fingers. The sound is produced by the air passing through the glass, causing it to vibrate. The player can control the pitch by changing the pressure of his fingers on the glass.

**The Complete Flute Tab.**

*G. C. Conklin, Flute Tab.*

A simple flute of this kind is made by Mr. John A. Detmers, Flute in Atlantic Hotel Orchestra, Dearborn, Michigan, date of Aug. 29, 1901.

**Flute Tab.**

*G. C. Conklin, Flute Tab.*

The flute is made of a single piece of glass and is supported by the player's fingers. The sound is produced by the air passing through the glass, causing it to vibrate. The player can control the pitch by changing the pressure of his fingers on the glass.

**Indicative Sound of the C.G. Conklin Flute Tab.**

*G. C. Conklin, Flute Tab.*

The flute is made of a single piece of glass and is supported by the player's fingers. The sound is produced by the air passing through the glass, causing it to vibrate. The player can control the pitch by changing the pressure of his fingers on the glass.

**The Complete Flute Tab.**

*G. C. Conklin, Flute Tab.*

A simple flute of this kind is made by Mr. John A. Detmers, Flute in Atlantic Hotel Orchestra, Dearborn, Michigan, date of Aug. 29, 1901.
FIGURE A-3, CONTINUED
FIGURE A-4
Baritones and Euphoniums – Instrument-specific catalog – January 1921
The Latest Model Conn Ltd., Euphonium Has Surpassed all Former Models in its Intonation, Tonal Quality and Power of Tone

Top Action
Built in Bb—3 or 4 Valves.

Front Action

The C. G. Conn Ltd. New Wonder Model Single Bell Euphonium

SPECIFICATIONS
Length, 28½ in. Width, 11 in. Weight, 6½ lbs.
Bell Diameter, 11 in.
FIGURE A-4, CONTINUED
FIGURE A-5
Selling Points and Testimonials “Bass” – Tuba-specific catalog, 1923-1924
INTRODUCTORY

THE BASSES of all Military Bands and Concert or Symphony Orchestras give the fundamental tone color to these organizations and therefore must, of necessity, be rich in tone quality, perfect in intonation, sonorous in volume, responsive to the lightest attack, and must play easily. The lightest as well as the most powerful tone must be obtainable in order to give the proper fundamental to the ensemble of the Band or Orchestra and must never fail to function.

The String Basses have in the past served to suffice in most large Orchestras but with the more modern music now performed the Bass has been added and has proven most effective and necessary. The imperfection of the Bass during the earlier periods made it impossible to admit of their use in conjunction with the Strings; but the marked development in perfecting the Bass in the Conn Ltd. has given the Music World instruments of such a high character that they do so with the utmost satisfaction.

The Conn Ltd. Basses have been in use in all of the most prominent Concert Bands since the days of Gilmore and in Orchestras since the popularity of the Celebrated Thomas Chicago Symphony Orchestra. Every organization of prominence from those days down to the present have seen the Conn Basses in use. This record for the Conn product is one for which we may rightfully feel elated. There has never been a time when the Conn factories have not made persistent efforts toward the perfecting of all its Basses and it is through this fact that the most capable Bass Artists of the world have discovered that the Conn Basses were worthy of their careful test. In all instances where such a test has been made the Artists were eager to express their admiration and preference for the Conn product.

In presenting this Catalog to our readers we invite them to read the opinions as expressed by those who own Conns, and we desire, also, to express our regret in not being able to publish the thousands of letters contained in our files which teem with the highest praise for our Basses. Many Artists have never sent us their photos but have complimented us repeatedly on the virtues of their Conn Basses.

Most respectfully,

C. G. CONN Ltd.,
Elkhart, Indiana.
The one great secret of manufacturing an easy playing, correct scale Bass may be found in the manufacturer’s knowledge of the law of acoustics and its correct application to the proportions and construction of the different parts of the instruments. During the half century since the first Conn Bass was built, there have been no experiments too trying, no time too precious and no material too expensive in the Conn Company’s efforts to bring the Conn Bass to its present unequaled standard of perfection. The result has been the unprecedented demand for Conn Basses in all models and finishes.
The Bass Department of the Conn Ltd. factories is the largest and most modernly equipped of its kind in the world employing a force of workmen who are completely skilled in the arts of Bass construction. Each employee has started his career in this department as an apprentice and has learned the trade from the bottom. He is exceedingly well prepared to handle any part of the construction work with the assurance that proportions will be exactly correct and that the instrument will be of the highest class when completed.
A SUPERIOR FEATURE NOT FOUND IN ANY BASS OTHER THAN A CONN

The Conn Ltd. has spared no expense in improving its methods of manufacture. Thousands of dollars have been expended in new machinery, tools and other equipment in order to build each and every part of the various instruments in the most perfect possible manner. This equipment also added materially in increasing the efficiency of the production.

THE HYDRAULIC EXPANSION PROCESS

This process is fully patented by the Conn Ltd. and is fully described in our pamphlet entitled "How Wind Musical Instruments Have Been Improved." The Old process and the new imperfect Hand-Made bent taper branches cause defective intonation. The CONN process assures perfect intonation and also reduces the branches and makes them less liable to breakage. Each taper branch is placed in a perfectly tool-made die, locked therein, completely surrounded by this die, the nozzle of the Hydraulic apparatus is locked tightly into the end of one of the branch tubes, while the other end of the tube is perfectly plugged by another part of the apparatus. The entire die containing the tube is locked securely in the Hydraulic press and the water is then released and forced into the branch of the instrument of a certain tonnage of pressure which expands the branch to the walls of the perfect die. This pressure is so powerful that if the branch possesses any weak point in it body that weak point will split and the branch is then jinked. Through this Hydraulic system each branch becomes identical with another of the same character and the interior of the branch is made as smooth as glass. The exterior of the branch assumes a perfectly smooth surface, the same as the die in which it is expanded.

THEREFORE, with the branches of Conn Instruments made perfectly alike and exceptionally smooth on their interior, one can readily realize why they should produce more perfect and clear tones, play much more easily, possess more perfect intonation and stand the war and tear better through the hardening of the metal than any other instrument manufactured by the old process. The Old process requires the filling of the branches by lead, pitch or other composition so that the maker can hammer the outside of the branch until it becomes smooth on the exterior but by this method the interior of the branch cannot fail to be irregular and uneven, thereby instruments thus made could not possess the superior qualifications as outlined above as being possessed by the NEW PROCESS constructed C. G. Conn Ltd. Instruments. Comparison proves this.
The C. G. Conn Ltd.
New Wonder Model
Standard Eb Bass

Dimensions:
Length, 31".
Width, 14".
Weight, 12 lbs.
Bell: Diam., 16".

RICH IN TONE, MOST PRACTICAL.
 Handsome and Durable. Highly
Endorsed by Eminent Players.
The C. G. Conn Ltd. New Wonder Model
“Professional” Eb Bass

The professional Eb bass fills a long-felt want among the bass players of today, as they possess the volume and are not cumbersome.

Dimensions:
- Length, 33".
- Width, 15".
- Weight, 14 lbs.
- Bell diam., 18".

Top Action 10-J
The C. G. Conn Ltd. New Wonder Model
“Professional” Eb Bass

A practical Eb Bass for any style of engagement and used by most of the business players who desire volume with pure tone in a light weight bass.

Front Action
12.5

Dimensions:
Length, 33".
Width, 15".
Weight, 14 lbs.
Bell Diam., 18".
The C. G. Conn Ltd. New Wonder Model
"Giant" Eb Bass

A splendid substitute for the BB bass for those accustomed to the Eb bass and equally effective.

Dimensions:
Length, 37"
Width, 17"
Weight, 17 lbs.
Bell Diam., 30"

Top Action
18-J

FIGURE A-5, CONTINUED
The C. G. Conn Ltd. New Wonder Model
“Giant” Eb Bass

Dimensions:
Length, 37”.
Width, 17”.
Weight, 17 lbs.
Bell Diam., 20”

THE "GIANT" POSSESSES THE SAME CALIBRE AND VOLUME OF TONE AS THE MONSTER BB BASS AND IT RESPONDS WITH THE SLIGHTEST EFFORT.
The C. G. Conn Ltd. New Wonder Model
“Monster” BBb Bass

Dimensions:
Length, 36".
Width, 17".
Weight, 18½ lbs.
Diam. Bell, 22".

Top Action
20-J
The C. G. Conn Ltd. New Wonder Model
"Monster" BBb Bass

The Conn Ltd. BBb Basses are recognized as the most perfect in intonation, the easiest blowing and most responsive, rich toned basses on the market.

Dimensions:
Length, 38".
Width, 18".
Weight, 22 lbs.
Bell Diam., 22".

Front Action
28 J

89
The C. G. Conn Ltd. New Wonder Model
Helicon Basses in BBb

Dimensions:
BBb Bass
Height: 41”
Weight: 20½ lbs.
Bell Diam.: 22”

THE HELICON MONSTER BBb
WITH EITHER THREE OR FOUR VALVES.
THESE MODELS ARE THE PRACTICAL ONES FOR MILITARY OR MARCHING BANDS.
The C. G. Conn Ltd. New Wonder Model Helicon Basses in Eb

The Helicon Eb Basses of the New Wonder Models have made an enviable reputation through their use in the celebrated military bands of the Americas, Canadian, English, Spanish, French and other armies.

For marching purposes the Conn Ltd. New Wonder Helicon Model Basses cannot be surpassed.

Height 39”.
Weight, 13½ lb.
Bell Diam. 16”.

10-K—Eb
The C. G. Conn Ltd. Sousaphone Basses built in Eb or BBb

THE BASS THAT WAS MADE FOR SOUSA AND HIS BAND AND WHICH HAS SINCE BEEN ADOPTED BY ALL LARGE CONCERT BANDS.

BUILT IN Eb OR BBb

A BASS THAT IS NEEDED TO COMPLETE ANY LARGE BAND.

Dimensions:
Height, 53".
Weight, 20 lbs.
Bell Diam., 22".

34-K—BBb
The C. G. Conn Ltd. Sousaphone Basses Built in Eb

The sousaphone model basses are built with a detachable and adjustable bell, permitting the bell to be turned in the various directions desired. The sousaphone is built in the professional or medium and giant sizes with either three or four valves.

Height 47".
Weight 19 lbs.
Bell Diam. 20".
The C. G. Conn Ltd. Sousaphone
Grand Basses in BBb

The new Wonder model as here presented is the largest improved sousaphone bass and is becoming the most popular of any of the large basses. Its tonal quality is considered truly wonderful and its ease of blowing a constant subject among bass players. It is the king of all the basses.

Dimensions:
Height, 60".
Weight, 32 lbs.
Bell Diam., 24".
The C. G. Conn Ltd. Sousaphone Grand Basses in Eb

The sousaphone grand in Eb is a splendid substitute for the BBb in the same model. For the bass player accustomed to the Eb basses and is equally as effective. It is supplied with either three or four valves, as desired, and is built in the universal pitch of A440.

Dimensions:
Height 53".
Weight 25 lbs.
Bell Diam. 23"
The C. G. Conn Ltd. New Wonder Model Orchestra Grand Bass in BBb or CC

Dimensions:
Length, 40 in.
Width, 21 in.
Weight, 26 lbs.
Bell Diam., 23".

The Conn Ltd. Orchestra Grand Bass is used by many of our celebrated bass players of the Symphony and Opera orchestras.

Front Action,
BBb Orchestra Grand—34-J.
CC Orchestra Grand—36-J.
JOHN KUHN (Red Cloud)

Mr. Kuhn is world-wide renowned as a Sousaphone Virtuoso whose performances have been equalled in passionate long rendition, his tech-

nique and power of his tone always full and rich, is equal to any of bass performers of the day. Mr. Kuhn has been engaged with Conway, Koyal and Sousa at first base player. Mr. Kuhn is a member of the Sousa-Tribute of Indians and was born in Missor, Mont. He at-

tended the Fort Shaw school, the Harlan school and later the Carver Institute. Widely known and leading member of the football squad as oboe. Throughout the entire career he has played on Sousaphone except for a short period. His greater honer than John Kuhn can be found for Sousaphone.

"No need of my telling you what I think of Sousaphone. That have been built that can survive with them in each and every item of valuable nature. I am sure that the best basses are in general more valuable, more marvellous, more superior, more beautiful, more ornate, more ornamental, more smoothness of scale and everness of regular tone, and there are others and really start where others finish, in my opinion."

FRED E. PFANN

Mr. Pfann of Quakertown, Pa., a member of the Bass section of Sousaphone Band dur-

ing the season of 1912-13 and later playing under the baton of Mr. Kuhn, has used Sousaphone as his choice over others. Mr. Pfann had been using another make until he had occasion to try a Sousaphone and he tried immediately surprised him that the Sousaphone would be his future instru-
mant.

"The Bass arrived and to state that it is fine is but a light expression of my actual value. It is a great bass and I am more than pleased with it in every particular."

JOS. T. PARK, JR.

Young Sousaphone Band, has recently purchased a new Sousaphone Grand. Mr. Park of the age of sixteen was Bassist with his father's Southern Manitoba Band, which went overseas in the War and won great honors. He has also been engaged on Sousaphone, and recently with the Gus Edwards Novelty Orchestra.

"It is with pleasure that I say I am well pleased with your Sousaphone Grand. Basses. They possess a rich full tone, and respond very quickly to either a piano or forte passage. I played one of your Dehont Bassey's in my father's hand, and was quite pleased when a boy of sixteen, that gave me perfect satisfaction, yet I am more than pleased with the new Sousaphone Grand."

FRANK M. ESTEP

In Bass section with the Conn-Sanders Orpheum "Rugby Hawks" Orchestra of Kansas City, Mo. This orchestra uses a complete set of Conn-instruments, and by the E. E. Guild Music Company, Conn band instrument distributors of that city, Mr. Estep heartily endorses the Conn Bass and believes it to be the best that can be produced.

"I wish to advise you that my Conn Sousaphone absolutely surpasses any Bass which I have ever owned hitherto, in every quality, design, value, quality, design, and one of playing. I am sure that I endorse this Instrument and believe it to be the best that can be produced."

DAVID DAPIFER

Sousaphonist with Jack Denny's and the Metropolitan Orchestras of New York, the former now touring the Orpheum Circuit. A scene here with little "Bilby" in the ball of the great Conn Bass. Both these artist enjoy the Conn Sousaphone.

"Am very well satisfied with my new Sousaphone Grand. It is perfect in tone and easy to play. My leader, Mr. Jack Denny, is certainly very well pleased with it. The little "Bilby" in the ball is Vander-

ville's newest headline. "Little Bilby," who is making the Orpheum tour with us."
FIGURE A-5, CONTINUED

WM. J. BELL
Among the younger Bass Artists of the day is Mr. Bell who has been and is now engaged with the Sousa Band as first bass. Although a man just recently out of his teens he has pleased Mr. Sousa to the utmost of his capacity as a musician. During his career as a recognized Artist he has played a Conn Bass; first a Flat, lastly a Contra. His remarkable ability with the aid of a Conn Bass is admired by all. In fact, we might say that Mr. Bell's personality is a source of admiration from his fellow musicians.

"The Bass received and I just want to say that it is a revelation to me through his ease of playing, and his ability to produce the proper tone and volume. I am pleased to be able to say that it is a Conn bass."

Win. J. Bell

ARTHUR GRISWOLD
Mr. Griswold has for a number of years enjoyed the reputation as one of the best Bass players in New York. He is a member of the Sousa Band for a number of seasons and it was during that time when the bass was taken. Mr. Griswold is often heard expressed himself as highly satisfied with Conn Basses. The fact that he plays a Conn is sufficient to demonstrate his preference.

"Conn Basses are excellent in every detail. They rank the highest."

Edw. J. Burant

EDW. J. BURANT
Cleveland, Ohio, boasts of a number of fine musicians, among whom is mentioned Mr. Burant, the Bass artist. Mr. Burant was engaged by Mr. Sousa as a member of the band the season of 1922-23 and needless to state that the Conn Bass is the favored as it is that of the other Sousa Bass performers. Mr. Burant has just recently purchased a new Connophone Grand about which he writes as follows:

"I received the bass in first-class condition and I can only compliment you on the way you make your instruments. I am very much pleased with the bass. You can rest assured that I boast the Conn instrument in every opportunity."

Arthur Griswold

JACK W. RICHARDSON
one of the ablest members of Sousa's Band, who for some years gave up the Sousa tours, is again with the organization and as usual plays the big Conn Sousaphone known as the Jumbo. This bass was recently sent to him and many are the compliments received on this fine instrument. Mr. Richardson has had considerable experience with engagements with Sousa. His standing among Bass artists ranks among the highest.

"I have had considerable experience with different makes of Basses but I think this one is the best instrument I have ever had. I have had a chance to see all the adapters made during my tenure, and some that were not standard, but have never yet found one that would compare favorably with the Conn."

Arthur Griswold

JOHN RODOMONTE
Mr. Rodomonte is a very prominent musician of New York City, He is associated with Yowell's Band playing at the steel Pier, Atlantic City, N. J., and the 55th Infantry Band, under the direction of Lieut. Matt. The latter organization does considerable recording for various phonograph companies. Mr. Rodomonte uses and endorses the Conn Basses.

I am very much obliged to you for recommending your double bass to me. I have played with Yowell's Band at Steel Pier, Atlantic City, N. J., for three years and then toured the States for two years. During this time I had an opportunity to play on practically every make and find yours far superior in every way, particularly in recording. At present I use with the Gregory's Orchestra at the Olympic Carnival at 6th Street and Broadway, New York."

John Rodomonte

Dan J. Markert

DAN J. MARKERT
associated with the Sousa section of the Sousa Band for some time, was the latest model Sousaphone. Mr. Markert resides in Watertown, Conn., where he enjoys a fine reputation as a Bass player of exceptional ability.

"The Sousaphone is a very easy blowing and an unusually fine Bass. It responds to the slightest attack and gives the extreme EE and FF without any extra effort. Your reputation as making fine basses is fully demonstrated by those used in this Band."

Dan J. Markert

99
FIGURE A-5. CONTINUED

FREDERICK GEIS  AUGUST HELLERBERG

is one of the best known Bass artists among the Symphony and Grand Orches-

tral, Volksbund, and Concert Band musicians of the world. Mr. Geis is at

present engaged in New York Symphony Orchestr

a and the Grand Thea-

tre of the same city. He is also a leading light as a

Tubaist with the phonograph companies. For the

past nine years he has

been under contract with one of the leading phonograph com-

panies. Mr. Geis has used Bass Bases for a number of

years and they have given

him the highest degree of satisfaction. Their plumpness and rich sound are a

pleasure to the ear. He uses the Bass with such satisfaction that he has not

had occasion to use any other instrument.

OSCAR COTT

Mr. Cott has been a

conductor for many years in the上演 and chamber music world. Some

years ago Mr. Cott was

especially engaged for the Bass section with which he acquired himself most

adequately. Recently Mr. Cott has

moved to southern California where he contin-

ues enjoying his music. He

has at all times used the Bass Bases

for his music and has always been very satisfied with the same.

ARTHUR E. STORCH

formerly premier BB Bass

player of Sousa's Band, now with the San Francisco Symphony Orches-

tra, can tell you as much as you would like to know about the Conn Basses

as any other bass player in the world for he has been using them for the

past ten years or more, pronouncing them as absolutely necessary for his

class of work. Those who know of his

ability, will readily recognize the weight of his testi-

mony, for his reputation as an artist is beyond question.

J. A. HUSTON

The Cincinnati Symphony Orchestra is using a num-

ber of Conn instruments, as well as those of the

prominent concert orchestras of America. Mr. J. A. Huston is the Bass

player of this organization and is highly regarded among the Bassists of his

Conn Bass.

W. M. WEBSTER

Formerly of Sousa's Band and later of the Detroit Symphony Orchestra, in

which he is located, is a Conn Bass enthusiast in every sense of the word.

Mr. Webster has

used Conn Basses for a number of years and de-

clares they are unequal-

less.

"I have played Conn Basses for many years in hand and orchestra and

always, when any are in requisition, there are no Bases to equal those of

Conn. For or-

chestra work, my new Conn is a wonder in every sense."

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FIGURE A-5. CONTINUED

HARRY K. BARTH

Mr. Del Negro is a great Basso Profondo of various famous bands, such as Sousa’s and Conway’s as well as Symphony Orchestras of New York City. He is also engaged as solo bass at the celebrated Capitole Opera House which is considered the greatest picture house in New York, where a very fine symphony orchestra renders the most classic programs. Mr. Del Negro is an old friend and admires the Conn Basses which he uses exclusively.

Your Basses are wonderful and their superior.

It is generally recognized by bass players with whom I come in contact. I find that their produce results of the highest order with the greatest ease and the string and tone are equally superior to any of my choice. I can afford them and take great pleasure in so doing.

LAKE DEL NEGRO

FIGURE A-5. CONTINUED

GEORGE O. FREY

The Boston Symphony Orchestra is now starting its forty-third year as a musical organization of the highest class. This fact establishes it as an American institution of unquestioned ability. Mr. Max Kuntz, bass player of this wonderful organization, says and endorses the Conn Basses. He is a Basso BASS with which he is highly pleased. The Conn Basses are noted for their quality of blending with all other instruments used in the Symphony orchestras of today. Mr. Kuntz is one of our most prominent Bass Artists and maintains his symphony orchestra and musical organizations.

GEORGE O. FREY

This capable and unusually clever artist and bassist has made marked strides in the music world. He was formerly connected with the Washington Marine Band and recently he has been directing the Philadelphia City Band in their park concerts. Mr. Frey is today recognized among his fellow musicians as one of the most effective bassists in the country. He is also bassist with the Philadelphia Symphony Orchestra.

MAX KUNTZ

“Just a line to tell you that I still think of the wonderful time I had in Elkhart with the rest of the Ted Lewis Band. Believe me, our store did enjoy it. I have used the big Sousaphone over a year now and am still enjoying it over the quality of tone.”

MAX KUNTZ

LORENZO BILELLO

Bass player with the Philharmonic Symphony Orchestra of New York City, also of the Metropolitan Grand Opera Orchestra. Mr. Billello has played on the most famous recording bands and orchestras of New York, has played Conn Basses for many years and finds them most desirable for his highest work. The demand for Conn Basses is way above the supply and we are gradually endeavoring to take care of this demand.

“Mr. Conn Basses more than satisfy me and suit my thorough work in Symphony work. It is a genuine delight to play those marvelous Tubas and you are to be congratulated on your excellence.”

CARMELO RISO

Bass player with Jules Goldberg’s Princess Serenaders, which organization is completely equipped with Conn instruments. Mr. Riso, one of Chicago’s distinguished converts in the Conn Sousaphone. He has excellent reasons for his choice of a Conn. There are more Conn Sousaphones in use than any other make, which in itself attests the Conn superiority. The position that those instruments command in the dance orchestras of today cannot be estimated; one is placed in the instrumentation. Mr. Riso puts the pep into the Band and makes you want to dance continually.

“Is there not an instrument for quality of tone in this world. I have found my desire in the Conn Sousaphone.”

CARMELO RISO
FIGURE A-5, CONTINUED

JACK J. PIERCE

is known to every prominent musician in America as one of the best Bass artists of the present day. A number of years ago he discovered the superiority of the Conn Bass and immediately adopted it for his use in Grand Opera, Symphony Orchestras, Concert Bands and Phonograph Record assemblages. Mr. Pierce is connected with Sousa, Fedora, Conn, Conway, Metropolitan Opera, New York Symphony and like organizations. Mr. Pierce is located in New York City.

"In regard to the bass, I can not as I have before, that it is the most perfect instrument I have ever played. If my signature goes for anything that will prove the instrument, you are at liberty to use it for it is without question a wonderful instrument and I am only too glad to tell this to my friends."

FRANK RANDAZZO

was formerly solo BBt. Bass player with Serenata’s Banda Rossa, Cremona’s and other famous bands. He is a very fine Tubaist and is one of the most progressive of the Italian American musicians. He was with the above named organizations for a number of years. He now resides in New York City.

"My Conn BBt. Bass is a grand instrument, perfect in every way. I am surprised to find that I would enjoy results herefore unknwon to me on my old instrument. It is fine and deserves much praise. It is the best Bass I have ever played."

WALTER LUSTIG

Tubaist with the Dunbar Orchestra, playing at the Globe Theatre, New York, in George White’s "Showboat of 1915." A fine old-time Conn player. Last season, he was connected with a very fine saxophone sextet appearing in Broadway, which organization is entirely equipped with Conn saxophones.

"No question in my mind about the superiority of Conn instruments, and I buy the basses. There is nothing like them."

SIGNORE DI SALLI

The Signor is a very popular Bass player of New York City. He was formerly in Liberati’s Concert Band, having served for many years with this organization. He claims that he had a very fine instrument before I bought this one. The latest model Conn is the finest that you can obtain; it is a marvelous instrument and is connected with a superior orchestra and then I was made a grand instrument in this new model."

LOUIS EPESTEIN

Mr. Epstein is Sousaphonist, with Ray Miller’s Orchestra which appears at some of the most popular dance places in New York City. Mr. Epstein is a great advocate of Conn instruments. He writes in part as follows:

I have everything in Conn except a recording Tuba. Make up one in brass. The boy of the Conn Instruments. My brother tried the Conn Baritone and liked it and now he has a real one. Read the Conn catalog, we have no harmonoes, but we have Conn instruments."

NORMAN McPHERSON

Mr. McPherson resides at Rochester, N. Y., and he is, very great- ly in demand as a Bass artist. He is touring the Keith Vaudre with his new set. He is the finest Bass artist with Paganis Symphony Orchestra in the city. Mr. McPherson has one of the finest Basses in the world which he declares will last a lifetime.

"I cannot express my great appreciation of the wonders of the Conn Tuba. For the first time in my career I am equipped with Conn instruments. I have purchased from you. If I am not pleased, I will return it. I am not without a legion of fans and the best of them think that this is the best bass I have ever used. It is admired by everyone wherever I go. It will last a lifetime."

Emil Mix

Formerly with Sousa and later with various Symphony Orchestras of New York and where he is at present engaged has been a strong admirer of Conn basses. He is the principal Tuben in the Orchestra of the N. Y. Symphony Orchestra which tours the U. S. at various intervals.

"It is a source of gradual gratification to me to submit to you the photographic evidence of my pleasure in the latest model Conn Bass which I possess. It is fine."

Frank Randazzo

Louis Epstein

Norman McPherson
FIGURE A-5, CONTINUED

JAMES KANAKEL
Mr. Kanakel is the base player of Cape Harvey's White City Orches-
tra of Chicago and is more than enthused about his Conn Bas-
sphone. The members of this or-
chestra all use Conns and all the
members are just as enthused
about the Sousaphone as is Mr.
Kanakel.

Wunderbar are the Conn Sousaphones, wonder-
ful and the Conn brass—brilliant in
stroke, beautiful in tone, all of
quality. As for myself, I am con-
vinced there is nothing like them.

EDWARD NELL
one of the best known String
and Basse players in the State of
Wisconsin. He is a member of Milwaukee's
concert organizations. Mr. Nell has
been appearing this season with Strick's Orchestra at the Bijou,
the Auditorium, and by Conni's Orchestra at the West-
field Ballroom of that city.

NICK SECOSH
Mr. Secosh has been prominent for years as one of Milwaukee's lea-
ding performers in string and brass
music. He has been appearing this
season with the famous Sym-
phonists Orchestra at the Strand.

VERR F. CAMPESE
of Nenawa, Ohio, has recently
purchased a Conn Cornet. He
is a young Basse player of
real ability. I feel that I can re-
commend the Conn Cornet to
any Basse player desiring to
have a Cornet that is neither
expensive nor cheap, and that is a
very good instrument.

TONY KRANTZ
is one of Milwaukee's best known
Basse players and a very promi-
nent performer with Milwaukee's
concert bands. Mr. Krantz is now
using the fourth Conn Basse, a
new 4-flat Conn tenor Cornet.

ROBERT McCONACHIE
Mr. McConachie is Basse soloist
of the Municipal Band at Winne
péo, Man., Canada. He has used six
Conn Basses and finds Conn the
best Basse he ever had.

GEORGE DE KARKE
Basse player with Bill Ronning's
famous M. A. C. Orchestra at the
Milwaukee Athletic Club, has been
prominent in the city for years
as a Basse soloist. He is an ex-
tremely expert and critical musician who insists
on perfection in the instrument he
uses and who is, for this reason, a
rashness booster for Conn With-
mannship.

I have used Conn Basses for
thirty years and have always been
well pleased with every one that
I have had. Recently, I tried out
for a few months another well
known make of Basse but found it
holding in many ways the inferior
that I desire. I now have a Conn
Basse and find it to have a very
superior quality of tone—in fact it
is all that could be asked for in
every respect.
FIGURE A-5, CONTINUED

EMILIO BIANCO
This Bass player has been connect-
ed with the best organizations in
New York City. He was with the
Conway Band at Atlantic City at
which time he joined his new
Commm Coos. Later he accepted a
position with the Victor Talking
Machine Company’s Band and Orches-
tara by which company he is still
engaged. Mr. Bianco has also been
engaged with the Russian and
former Russian Symphony Orchestra.
I have heard all kinds of “Bas-
s” in the past but your BCC ex-
cesses them all. The instrument is
about as perfect as it could pos-
ibly be. The valve action is “right
on the job” for quick response. The
tone production is very marked
and it is a distinct pleasure to
play on such an instrument.

PAUL E. BLANCHARD
formerly manager and Bass solist of
the Stanford University Military
Band of Palo Alto, Calif., has
purchased a BCC Commphone Bass,
which is giving him much satisfac-
tion.

"After a year’s continuous use I
am also in fact that my Comm-
phone Bass is the most wonderful
instruments ever made. After five years of almost constant Bass
work it must be tried down to a
rich piantone or fairly lift the
entire band if one is at the
pleasure of the player and in both
cases has the same rich lay of
one which I have never seen
approached in any other instrument."

GORA YOUNGBLOOD CORSON
Miss Corson is perhaps the best
known lady Bassist in the
world today. She has traveled the
United States, Canada, Mexico and
Europe for the past two and a
more years, demonstrating the
beautiful tone and musicality condi-
tions have placed her in the front rank
as an exponent of the Bass. Her
latest model is the CMM Comm-
phone Grand which is seen in the
accompanying photo. Miss Corson
owns and manages her own musi-
cal company of lady musicians
known as “The Girls of the Golden
West.” The newspaper comments
we have received from all parts of
the globe where Miss Corson has
been heard have been uniformly
praise for her artistry and we can add
that she is one of the arrangest
and most ardent admirers of the
Comm instruments throughout.

"My Commphone Bass has pro-
voked a revolution in me. It is so
gigantic, yet plays as easily as a
flute. The tone is so soft, mellow
and beautiful that it is impossible
to imagine any other Bass or any
other instrument having the same
rich lay of tone which I have never
seen approached in any other instrument."

CHAS. W. HARRIS
former Commphone player in
Hoff’s Colonial Sextette and Sau-
ice’s Band, is at the present time
located in New York City where
he is engaged with the best or-
drachet of that city playing va-
tets and harmonies. Mr. Harris
owns a Commphone which makes a
hit wherever he appears.

"The Commphone makes a hit at
every performance. It possesses a
beautiful, rich, orchestra quality
of tone and we could not dispense
with it in this act. It is a won-
perful instrument.”

E. CLATE FAIR
This veteran player started his ca-
ere in Middlebora, Ohio, under
the direction of Wilt Hill, in
1917. Mr. Fair is now playing the
Commphone Grand in the Mid Con-
mitral Band of Independence,
Kansas, which, we understand, is
“some band.”

"I am very proud of my Comm-
phone Bass—it is just right.”

WILLIAM KYLE
Mr. Kyle is the Bass player of the
10th Infantry U. S. Army Band,
which has appeared in several re-
table parades in New York City.

"The Commphone Bass, which I
purchased through your New York
office, is unquestionably the bet-
best Bass that ever played upon.
Such a grand quality of tone
and so remarkably easy to play, in
fact, easier than any other Bass
of smaller makes. It simply de-
mands my greatest admiration.”

Paul E. Blanchard
E. Clate Fair
William Kyle
FIGURE A-5, CONTINUED

H. A. PANCRAZ
Bass player of the Fireman's Band of Ketchikan, Alaska; purchased one of the newest model Conn Basses. There is a number of Bands in Alaska that are using the new Conn instruments and this is one of them.

"About a month ago I bought one of your Basses and find it is perfect in every way. The valve action works like that of a cornet."

PAUL B. HARADON
The Conn Sousaphone has been greatly in demand during the past year and with very good reason. Writing letter from Mr. Haraden, Bass soloist of the Moline (Ill.) Concert Band. I want to say that this is the finest Bass I have ever had the pleasure of seeing. The Conn Sousaphone is the only one that will respond to the phonograph tones or Bass Viol Pizzicato tones with equal ease. On account of the injured fingers on my right hand, I could not play a Bass without the lightest valve action but I find no trouble at all in manipulating these valves in solo playing."

R. T. HIRCH
President and Bass soloist of the Concert Band at Tripp, Okla. Recently purchased one of the Conn E8 Sousaphone Grand Basses, which is giving him a great deal of pleasure. False bowing Mr. Hirsh's example, and you will find that you will soon make a great improvement in your playing.

"The Conn Sousaphone Bass is given. The bowing is performed in the same manner as the various other Conn instruments, and gives the bass player a great deal of advantage over all who use it. Those who have had occasion to try these new instruments have a wonderful treat awaiting them."

J. J. ROLL
Director and Bass soloist of the Great Western Indian Band at Pratt, Kansas. An organization comprising fifty musicians, splendidly uniformed. "You are at liberty to use my name to parties who are interested in the purchase of instruments. I have been using one of your Tubas for a number of years and it has given me perfect satisfaction. If I were to purchase a new instrument, I would send to C. G. Conn Ltd., for it."

W. L. GERSDORF
Director, manager and Bass soloist of the concert company bearing his name, which has toured the United States.

"The Conn Sousaphone Grand creates a sensation wherever we appear. It is exceedingly easy to play, responds more readily and produces a much greater volume with much less effort than the ordinary small size 'Bass' of other makes. Every band should possess a Conn Sousaphone Grand."

Paul B. Haraden
J. J. Roll
W. L. Gersdorff
FIGURE A-5, CONTINUED

H. H. BRUNER

Director and Bass artist of the Moose Band, No. 109, Warren, Pa., and formerly first-chair Sousaphone with the famous Zem-Zem Temple Band of Cleveland, Ohio. Mr. Bruner is considered one of the best Sousaphone players in the Eastern States and has had many opportunities to associate himself with bands of national reputation. He uses a Conn Sousaphone.

“I attribute all of my success as a Bass player to the use of your Sousaphones. I have tried to use a number of other makes but can truthfully say, Conn is the best in tone, valve action perfect and enthusiastically endorsed. When better made instruments are made, Conn Ltd. will build them.”

Chas. J. Sibersauer

CHAS. J. SIBERSAUER

is first bass and president of the New York Police Band and a member of the famous Mecca Temple Senior Band of New York City. Each band is made up of about seventy-five first-class musicians and possesses Conn Ltd. instruments because they are fully convinced of their superiority. Mr. Sibersauer recently purchased a new Sousaphone Grand which is giving him perfect satisfaction.

“My Bass is the most easy blowing instrument I ever saw. It is perfect in tone. The action is like the pad of an eagle. The valve action is very short and rapid and the basses are graceful. It is a pleasure to play on an instrument like this one.”

Anthony Sophia

ANTHONY SOPHIA

one of the leading musicians and prominent Bass player of Buffalo, N. Y., favor. This factory with a visit some time ago and after carefully trying the Basses, decided that the Conn Bass was the instrument for him.

“I cannot find words enough to praise Mr. Bb bass and also wish to say that I am the most satisfied musician in Buffalo.”

Harold St. Clair

HAROLD ST. CLAIR

Mr. St. Clair is the Bass player of Fry’s Million Dollar Pier Opera, playing at Atlantic City, N. J., this season. Mr. St. Clair’s headquarters are in Philadelphia where he is very popular with the musical fraternity of that city. He uses and endorses the Conn Sousaphone as will be seen from the excerpt of his letter below.

“I am delighted with the Conn Sousaphone. It possesses a beautiful tone of great volume, plays easily, is nearly perfect in tone as can be seen, by me and in short, is everything that a discriminating Bass player could ask. What more can I say?”

William Thornton

WILLIAM THORNTON

one of the prominent Bass players of England residing at Leicester, has purchased a Conn Giant Eb Bass. Mr. Thornton, at the age of fourteen, was employed in the Victoria Flute Band and Orchestra and has at different times conducted various organizations. We are pleased to have Mr. Thornton on the Conn Band Wagon.

“It affords me the greatest pleasure to write that I am also conversant relative to your Bass. I am very proud of this Bass. It gives me the utmost satisfaction and I shall speak to all my friends continuously relative to the superiority of your instruments.”

Anthony Sophia

William Thornton
FIGURE A-5, CONTINUED

BEN DUGDALE

now with Ernie Young's Marigold Garden Orchestra at Chicago, was for two years with Saxrey's Symphonic Band in vaudeville and was Bass player with Roose and Book in the Navy. In Chicago he has played with Marigold Garden, Drake Hotel, Garden and other leading bands and orchestras. As a Conn Sousaphone enthusiast he expresses himself in these words:

"The Conn Sousaphone gives me more than pleasure. It is such a wonderful instrument that I have always used it as a standard. I have never found a better Bass in all my years of experience. I am entirely satisfied.""

Wm. E. (Jack) Frost

WM. E. (Jack) FROST

formerly of the New York Symphony, New York Philharmonic, Los Angeles Philharmonic Orchestra, Prison Band, and many other leading orchestras, is now located in Los Angeles where he enjoys the best engagements of that city. Mr. Frost has used a Conn Bass in all his fifteen years of experience, and to his entire satisfaction.

"I have had all the best Tubas players in the east try out the Conn Sousaphone which I recently purchased and every one pronounces it the best Bass they have ever played and all remark about its graceful construction."

Ben Dugdale

JACK BASSY

formerly Tubas player with Paul White-man's Orchestra and now with the Paul Siegel Orchestra playing at the Bijou in Los Angeles, Calif., has recently pur-chased a Junior Sousaphone which is a wonderful horn according to Mr. Bassy and his friends. They say it is: 

"The Junior Sousaphone is the best. I have ever tried. I can play from the softest to the loudest. I am satisfied that there is not an instrument that has more power of lower notes than any other Bass I have ever used before. The horns are as light as a feather and the low ones like a pipe organ."

Ben Dugdale

BEN FINGER

Sousaphone soloist with Harry Stoddard and his Orchestra, which was engaged at the popular Sherry Restaurant on Broadway, New York City, during the summer last, is now touring the U. S. A. in vaudeville. Mr. Finger uses a Conn Sousaphone Grand which he finds very well pleased. The dog shown is also an important part of the act.

"My Sousaphone Grand is a wonder. The dog, which you see in the box, eats the wonderful tone and tune of this Sousaphone. I heartily endorse it as a Bass that cannot be beaten."

Ben Finger

MICHAEL PERRONE

formerly Bass soloist with the Paul Siegel Orches-tra of Chicago and at present associated with other prominent organizations of that city, uses a Conn Sousaphone which creates much comment and admiration from the patrons of his various engagements.

"The tone of that remarkable Sousaphone gives me a remarkable instrument. In our performances, for its tone is rich and smooth, full and is really superior to a string bass for ballet work. I feel it is a great work and we could not do without it in our Orchestra."

Ben Finger

MICHAELE PERRONE

formerly Bass soloist with the Paul Siegel Orches-tra of Chicago and at present associated with other prominent organizations of that city, uses a Conn Sousaphone which creates much comment and admiration from the patrons of his various engagements.

"The tone of that remarkable Sousaphone gives me a remarkable instrument. In our performances, for its tone is rich and smooth, full and is really superior to a string bass for ballet work. I feel it is a great work and we could not do without it in our Orchestra."

Ben Finger
Cleoara Miller

One of the most remarkable lady Bass Virtuoses, who by the way is quite a young lady in her teens, is ad-
ditionally an Artist on the Bass of exceptional ability. Her Bass Solos consist of heavy numbers demanding
rapid technique, which she executes with perfect ease
and assurance on her Conn Bassophone. The audience
ever fails to marvel at the versatility of Cleora Miller for
she is so "tiny" and yet handles the Monster instru-
cement with such apparent ease, that one gets the
idea that the other instruments on the stage are
all her own. Cleora Miller is the daughter of Mr. and Mrs. Miller, McShin, in Conn, the only Conn in the
City which is considered as one of the highest
calls musically on the stage of all time.

"My new Conn bassophone is wonderful in its ease of
driving and tone quality. It plays an equally as a
trumpet and has proven a blessing to me for
bass bass playing another make, in my opinion, is
trumpeting. The big Model Conn and its Conn
saxophones are both perfection in every detail. All our instru-
cents are Conn and we believe that the best we have ever used
and we shall recommend them."

Al Ross

Manager and Instrumental Solist of the Ross and
Ross Music Act playing high-grade vaudeville and at present in the
National Tour in the U.S. This man is the most
skillful bass player in the world. All the bass players in the orchestra use a
complete set of Conn instruments. One of the many Conn
instruments in the band is the Big Saxo-
phone, which creates a marvelous impression upon the stage and Mr. Ross declares that it is more enjoyable with
every performance. The Headquarters of
Ross and Ross are in New York.

"All our instruments are Conn. They sound wonderful and we make every
performance with them. We want the tone perfect, the instrument
just right, and the tone producing.
We cannot say anything bad
for them. They are simply perfection."

C. L. Organ

and his Conn Giant Ed Bass are here illustrated. Mr. Organ is a national
exponent and manager of the Organ Evangelistic Company located at Des
Moines, Iowa.

"For years I have used your make of
instruments but this bass suits me best of all. I use it on our church tours
and I find it is the perfect bass in the
world. The Conn is the instrument of
the orchestra it always makes a profound
effect. The tone is mellow and
rich, the volume mighty nothing. Every
everywhere it makes a flash. Those who have not used your instruments in chorus
work do not know what the Lord is
loving."

William Woods

Bassophonist and Bass saxophonist with
Patterton’s Casino Orchestra at Asbury
Park, N. J., this past summer, is now
associated with the Glenshaw Saxophone
Sextette and Orchestra of New
York, playing Bass saxophone in the Sextette
and Bassophone in the Orchestra. Mr. Woods is well pleased with his Conn
Bassophone as they play in perfect harmony
with the other instruments in the or-
chestra with Conn instruments.

"In regards to my Conn Saxophone, I
find there is not a better bass made. They blend perfectly with the other instru-
ments whenever you use them. Rapid
execution is a pleasure on a Conn. Your
next trumpet should be a Conn if you want the best."

William Gustie

was formerly Bass soloist and later band-
master of the Leisering Hungarian
Band of Lawrence, Pa. His organiza-
tion is equipped with Conn instruments,
and Mr. Gustie credits the fact that
they are highly essential to the success of
his band.

"My new Conn Bass which I bought
about two years ago is string valuable
indeed. It has been my pride to use two
or more musical instruments in those “days of dance”
becoming a necessity in order to secure a position
with our best orchestras.

I have used a Conn Bass for eleven years and I
wish to tell you that for tone quality, pitch, execution
that must be had for that solo work, a Conn Bass
cannot be surpassed."

Paul Giersdorf

Paul Giersdorf

of New York City, formerly with the Giersdorf Sym-
phonettes and at present Bass soloist with the Ban
Moorin Band, touring the States in high-class vaude-
ville, has used a Conn Bass for fifteen years and de-
clares that it cannot be surpassed. Mr. Giersdorf’s
services as an artist on the Bass instruments of to-
day are greatly in demand for he is also a very pro-
ducient Bass exponent. Being able to operate on two
or more musical instruments in these “days of dance”
becoming a necessity in order to secure a position
with our best orchestras.

I have used a Conn Bass for eleven years and I
wish to say that for tone quality, pitch, execution
that must be had for that solo work, a Conn Bass
cannot be surpassed."

William Gustie

C. L. Organ
EUGENE BRAUDSFORD

Everyone who has heard the Detroit Symphony Orchestra broadcasting from Station WWJ, has heard Eugene Braudsford play on his Conn Sousaphone. Mr. Braudsford is known as one of the greatest trumpet players in the country today, as well as to the Detroit News Radio Orchestra, in nationally known. The ability and record of Mr. Braudsford is an asset to the Conn Sousaphone. The demand and reputation for the Conn Sousaphones are becoming so great that it is impossible to fill all orders with any degree of immediacy. Orders are still being filled from one to two months for their Sousaphones.

GASTON BROWN

Bass player at the Detroit Symphony Orchestra possesses a Conn Sousaphone and is more than pleased with it. Mr. Brown has had considerable experience with various makes of Basses and is exceptionally well qualified to judge the merits of the several makes of Basses with which he has come in contact.

“I want you to know that I am more than satisfied with my Conn Sousaphone, which you sent me some time ago. In my observation of the various makes of brass instruments I have come to the conclusion that the Conn Sousaphone is superior to any other make. In fact, I believe that the Sousaphone is unequal in possessing such a beautiful spring-like quality of tone.”

HELEN BROWN

Sister of E. L. Brown, whose photograph appears on this page also, is a young and attractive Bass player doing solo work in and around St. Louis, Mo. Mrs. Brown, although very small, fills the Sousaphone Grand with perfect ease. She highly recommends Conn Sousaphones.

“T am using one of your BBB Sousaphone Grand Basses and highly recommend it to my friends. Although rather small in stature, I can fill this horn with ease. My brother, E. L. Brown, and I are highly elated over your Basses.”
FIGURE A-5, CONTINUED

EARL W. FIELD

is at present with Sousa's Band with which organization he is playing the Conn Soprano. He was formerly with Krug's Band as Bass soloist and later with the Seattle Symphony Orchestra during all of which time he played the Conn Brass of various models. He has just recently placed his order for a Conn Concert Grand. That's what he thinks of Conn.

"The Sopranoone you made for me has proven absolutely perfect in every respect. The tonal qualities and valve works are superb and the craftsmanship cannot be beaten. It exceeds my expectations."

C. M. FREMSTEAD

Mr. Fremstead is a well known Bass player of Jacksonville, Fla. He has also been Bass Soloist with several of the best bands around Arvinsville and Jackson and his judgment is worthy of consideration by prospective Bass buyers.

"I am being complimented on the beautiful sound qualities of my Sopranoone, not mentioning its magnificent appearance, and I am able to speak of a good lead for the Conn Instruments."

J. G. TOMPKINS


"The Eb Sopranoone Bass which I purchased from you has given me perfect service. I have used the instrument in woodwind, wood bands and concert bands and have no trouble whatever. I have played every standard make Bass that I could get my hands on and have found none equal to the Conn. It is a 'bear' and anyone who gets a Conn Sopranoone should consider himself lucky."

HERMAN CONRAD

(formerly Bass soloist with Sousa's and Pryor's Bands and more recently soloist with the Victor Talking Machine Company's Band, doing recording work in New York City, uses and recommends Conn Basses for this excellent work.

"After seeing your Sopranoone I am decided to say that it is the most perfect instrument I have ever played."

J. G. Tompkins

HERMAN CONRAD

JAMES J. TORTORIELLO

Bass soloist with Joe Bass's Masonic Square Garden Band of New York City, handles the Conn BB Bass with the same ease and grace as one who handles a Conn Victor Cornet. We take great pleasure in quoting Mr. Tortoriello's compliments on Conn Basses.

"My Conn Bass is the easiest playing instrument I have ever played. Its tone is rich and resonant and it responds to the slightest effort as I play it with the most perfect ease imaginable. I can change with it and never miss a note. What more could one wish?"

BERT L. STRUNK

Bass soloist and manager of the Metropolitan Band of Philadelphia, Pa., is in the Conn Band wagon safe and sound. He purchased a Conn Sopranoone Bass which is giving the best of satisfaction to himself, director and the public.

"I am in the Conn Band Wagon to stay. Am one of the many thousand Conn Boys."

HENRY WAACK

was for several seasons featured with the E. A. Rolfe acts and high-class productions in Keith Vaudeville as well as Kirya, Kitty's, Liberati's and other well known bands. At present he is one of the features with the Vincent Lopez Orchestra playing at the Pennsylvania Hotel, New York City.

"The Sopranoone received and wish to say that it is a wonderful instrument. I can do anything on it with perfect ease. I congratulate you on turning out such a remarkably fine-toned instrument."
FIGURE A-5, CONTINUED

John F. Jensen

The Bass players of Chicago’s leading orchestras at the principal amusement palaces and gardens prefer Conn Basses, which have come into vogue in the orchestras, among them being Frank Westphal’s Reitman Garden Orchestra. Mr. Jensen is a member of this organization and uses a Conn Sousaphone Grand.

"It had been raining a year and a half since I bought the Orchestra Grand and Sousaphone and my family and friends were not pleased with the purchase. I am always on the lookout for a new instrument and have been very pleased with the Conn Sousaphone Grand. I am highly pleased."

Tom Curran

Sousaphonist with Sel Wagner and his Musical Alorsite, one of Chicago’s most popular dance orchestras, has adopted the Conn Sousaphone and he declares there is none better.

"The best Sousaphone was the one I bought from my present employer. I have played for many years with Sel Wagner and his Musical Alorsite. The Conn Sousaphone is the best Sousaphone I have ever played. It is very responsive and I receive many compliments on it."

Nicola Ferrara

With Sousaphone, the winter season of 1932, is a well-known Sousaphone player of New York City. He is shown with his photo and the following relative to the Conn Bass.

"Enclosed you will find photo taken while with Sousaphone, Band. I wish to state that the Conn Bass was a revelation to me through its ease of playing, intonation, tone and volume."

Frank A. Marsales

In a remarkable Sousaphone player of Los Angeles who has recently purchased a Conn Bass with which he is highly pleased.

"If there was a perfect Bass made I would have it, and not a cent to it, and a wonderful tone. Too much credit cannot be given the Bass Department for the work. I have never worked on an easier playing instrument and never expected to get better ever. Let me know if I can be of service to you."

O. R. Harrell

Here is a Conn enthusiast who has owned more Conn Basses than any other man of which we know and he has always liked them all. Mr. Harrell is the first Bass player of the Golden Gate Park Band of San Francisco.

"This is the twenty-fourth Tube I have owned. I was only six years of age, and I have been playing ever since. I play all types of instruments and I find the Conn Bass is the best instrument for all types of music."

Frank Tritton

This able Sousaphonist, recently with the Keyan Concert Band of Chicago, has had much experience with various Bases and now writes about the Conn Sousaphones.

"I wish to advise that my Conn Sousaphone absolutely surpasses any Bass that I have ever played elsewhere. It is of the best quality, smooth, excellent tone and intonation. I have found it is the best instrument for all types of music."

Lieutenant Clarence G. Carr

Lieutenant Carr, head of the traffic squad of the Seattle police is also first Bass of Niles Temple Band. The band recently purchased a Sousaphone Grand Bass for Lieutenant Carr and he is very enthusiastic over the wonderful qualities it possesses.

"In my twenty-five years experience in the music business I have continually been on the lookout for the best instrument that could be obtained and I have always played Conn Instruments which prove that I consider them the best. The Sousaphone Grand Bass is a remarkable instrument, an easy to play, and it has a quality tone that is different from any other Bass. It is also an ideal instrument for orchestra."
New York Police Band Bass Section,
is here presented fully equipped with Conn Basses of various models. This fine organization is high-class in
every respect and enlists the best men obtainable for its membership. It is under the very able directorship of
Walter Rogers, celebrated cornet soloist and director. Charles A. Silberbauer, saxophonist of this group, has
just ordered another late model Conn Bassophone.

Bass Section Kable Brothers Band, Mt. Morris, Ill.
The Kable Brothers Company, printers and engravers of Mt. Morris, Ill., maintains one of the largest and best
equipped industrial bands in the country. Some of our best musicians are members of this band and the Conn
instruments are very popular with this organization. The Bass section as pictured above is completely supplied
with Conn Basses which are most pleasing to these discriminating Bass artists.
Upright Alto in E♭—2C

THIS is the ideal alto for marching and military bands, both because it is lighter and more compact to carry, and because it has the brilliant tone desired by military bands. On the march its three and one-half pounds are carried easily and the extra pound or more on the other altos becomes noticeable to the player used to this light model. The bell is not only smaller, but it opens and flares in a manner which brings out a bright, military tone.

While built chiefly for the brass and military band, this alto can be used in the concert band and orchestra in the absence of French horns. Being the least expensive of the altos, this model is preferred where price is an important consideration.

The valves are top action and of the same light, snappy action as are used on all Conn piston valve instruments.

<table>
<thead>
<tr>
<th>Model</th>
<th>Pitch</th>
<th>Weight</th>
<th>Length</th>
<th>Width</th>
<th>Bell Diameter</th>
<th>Factory Number</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Action Upright</td>
<td>Low</td>
<td>3½ lb.</td>
<td>20½&quot;</td>
<td>8&quot;</td>
<td>8½&quot;</td>
<td>2-C</td>
<td>3-C</td>
</tr>
<tr>
<td>Top Action Upright</td>
<td>High</td>
<td>3½ lb.</td>
<td>20½&quot;</td>
<td>8&quot;</td>
<td>8½&quot;</td>
<td>2-C</td>
<td>3-C</td>
</tr>
</tbody>
</table>
THE types of Altos illustrated on this page are most popular for marching and other outdoor engagements. The Wonderphone model, shown at the right, has been designed to serve as well in concert work, for the curved and adjustable bell makes it possible to throw the tone in any desired direction. Conn® Altos are unequalled for brilliancy of tone and ease of blowing because the taper branches are shaped to exact dimensions by the patented expansion process, and the valves are quick acting and smooth in operation because they have been designed and built after fifty years of experience in this work.
THE New Wonder Tenors here presented have been especially designed and voiced for military bands. They possess a powerful, sonorous quality of tone, which makes them superior to Slide Trombones for tenor parts in bands. In foreign countries the Tenor horn is an important band instrument, and many Tenors are shipped abroad.

Attention is called to the way in which the valve slides turn upward from the orifices in the valve casings. This prevents the accumulation of water in the valves. The water key is situated at the bottom curve of the mouthpiece, which enables the performer to drain his instrument completely and easily.
FIGURE A-7
Conn Band and Orchestra Instruments, Catalog and Price List – Sept. 1940

SHORT ACTION RECORDING BASS — 20-J
SHORT ACTION SOUSAPHONE — 20-K
Conn made the first sousaphone in 1898 expressly for the Sousa band and has been the headquarters for fine basses and sousaphones for forty years. The newest achievement is the exclusive, patented short action Clickless Crysteel valves, found only on the 20J, 22J, 24J, 26J Recording basses and 20K sousaphone. All other Conn basses and sousaphones have the regular long action, but they have the exclusive Crysteel feature, which gives a valve which is “smooth as crystal and hard as steel.” The Clickless feature uses a pin guide instead of the old key in a slot, thereby eliminating much of the noise in old type valves. The short action feature reduces the stroke from 65/64th’s to 44/64th’s, thereby cutting down the work of the player and speeding up his technique nearly 33%. The patented off-center valve stem of the short action valves allows the finger tips and moves them 5/32nds closer together, thus the natural position of the fingers and assisting in better performance.

### Table of Short Action Values

<table>
<thead>
<tr>
<th>Model</th>
<th>Cat. No.</th>
<th>Fin. 20</th>
<th>Fin. 21</th>
<th>Fin. 3</th>
<th>Fin. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cymbal, BBb, 3 valves, top. 24&quot; bell</td>
<td>20J</td>
<td>$330</td>
<td>$330</td>
<td>$330</td>
<td>$300</td>
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<tr>
<td>Bass, BBb, 3 valves, front. 24&quot; bell</td>
<td>22J</td>
<td>330</td>
<td>330</td>
<td>330</td>
<td>300</td>
</tr>
<tr>
<td>Bass, BBb, 4 valves, top. 24&quot; bell</td>
<td>24J</td>
<td>330</td>
<td>330</td>
<td>330</td>
<td>430</td>
</tr>
<tr>
<td>Bass, BBb, 4 valves, front. 24&quot; bell</td>
<td>26J</td>
<td>330</td>
<td>330</td>
<td>330</td>
<td>410</td>
</tr>
<tr>
<td>Sousaphone Grand, BBb, 3 valves, 26&quot; bell</td>
<td>30K</td>
<td>330</td>
<td>330</td>
<td>335</td>
<td>350</td>
</tr>
<tr>
<td>Sousaphone Grand, BBb, 3 valves, 26&quot; bell</td>
<td>38X</td>
<td>330</td>
<td>330</td>
<td>335</td>
<td>355</td>
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<tr>
<td>Light-weight sousaphone, BBb, 3 valves, 24&quot; bell</td>
<td>33K</td>
<td>260</td>
<td>260</td>
<td>275</td>
<td>250</td>
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<tr>
<td>Sousaphone Grand, EB, 3 valves, 24&quot; bell</td>
<td>36K</td>
<td>275</td>
<td>275</td>
<td>290</td>
<td>255</td>
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<tr>
<td>Bass, Eb, 2 valves, front. 22&quot; bell</td>
<td>16J</td>
<td>290</td>
<td>290</td>
<td>310</td>
<td>350</td>
</tr>
</tbody>
</table>

Prices do not include case. See page 35.
APPENDIX B

C.G. CONN TUBA-RELATED PATENTS

PATENTS IN CHRONOLOGICAL ORDER
FIGURE B-1
PATENT FOR MODIFIED STÖLZEL PISTON VALVES

C. G. CONN.

PISTON VALVE MUSICAL INSTRUMENT.

No. 249,012.

Patented Nov. 1, 1881.
FIGURE B-1, CONTINUED

UNITED STATES PATENT OFFICE.

CHARLES G. CONN, OF ELKHART, INDIANA.

PISTON-VALVE MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 249,012, dated November 1, 1881.
Application filed April 2, 1881. (Model.)

To all whom it may concern:

Be it known that I, CHARLES G. CONN, a citizen of the United States, residing at Elkhart, in the county of Elkhart and State of Indiana, have invented a certain new and useful Improvement in Piston-Valve Musical Instruments, of which the following is a specification.

The object of my invention is to produce an instrument with a perfect clear-bore valve and a lighter and better valve-action than instruments of ordinary construction. To this end I construct my valve with a longitudinal bore, using the bottom of the valve-piston for one of the wind-passage apertures; but instead of connecting the adjacent valve-casings by a bead leading from the bottom of one valve to the bottom of the next, as has heretofore been done, I employ a pipe connected longitudinally with the bottom of one valve-casing and delivering transversely into the body of the next, and a pipe connected longitudinally with the bottom of the second valve-casing and delivering transversely into the body of the third, as hereinafter described.

In the accompanying drawings, Figure 1 is a side view of a trombone-a-piston illustrating the invention. Fig. 2 is a vertical section of the three valves thereof, the first valve being shown depressed and the other two in their upper or normal position. Fig. 3 is a vertical section through the first valve at 33, Fig. 1. Fig. 4 is a vertical section of the second valve at 4, Fig. 1. Fig. 5 is a side elevation of the central portion of a cornet embodying the invention. Fig. 6 is a side elevation of a bass-horn embodying the invention.

The ingress from the mouth pipe is shown at I, and the egress to the bell at E. A, B, and C are, respectively, the first, second, and third valves, and a, b, e their respective casings. The ingress-pipe I opens into the body or central part of the casing a, and the egress-pipe E leads from the bottom of the third casing, c.

G, H are the direct air pipes or passages communicating from the bottom of the first valve-casing, a, to the body or central part of the second casing, b, and from the bottom of the second casing, b, to the center or body of the third casing, c.

The valves A, B, and C are, respectively, made, as shown, with a transverse air-passage, d, passing directly through from side to side, as in Fig. 3, or in knuckle form in and out on the same side, as shown in Fig. 4, as preferred or as the form of the piping may require, and a longitudinal passage, f, opening below through the bottom or lower end of the valve and above through a curved port in its side, so as in the normal or upper position of the valves to take the wind, which is delivered horizontally through the body of the casing by the pipe G, H, or I, and deliver it downward through the pipe G, H, or E, as the case may be.

J, K, and L are the valve-heads connected with the respective valve-casings for producing the valve-tones when the valves are depressed, at which time the wind, entering the casing horizontally, as before, instead of passing directly downward to the next communicating pipe, is carried through the passage d to the first end of the valve-heads J, K, or L, and after passing through this is delivered to the lateral opening or port of the longitudinal passage f, to be conducted to the next connecting-pipe G or H or the egress E.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

The combination, with valve-casings a, b, e, of the connecting-pipes G and H, leading from the bottom of one valve-casing to the body or central part of the next, and from the bottom of the second to the body or center of the third, and the valves A, B, C, formed with transverse or knuckle and longitudinal passages d, f, the latter being arranged to communicate at their upper and lower ends with the upper and lower ends, respectively, of the connecting-pipes G and H, all substantially as shown and described.

CHARLES G. CONN.

Witnesses:
HENRY C. DODGE,
O. H. MAIN.
FIGURE B-2
PATENT FOR MODIFIED PÉRINET PISTON VALVES

C. G. CONN.
CORNET.

No. 343,888.
Patented June 15, 1886.

Inventor:
Charles G. Conn.

Attested:
Geo. T. Smallwood
Patrick Star

N. PETER.
Printed at Washington, D. C.
FIGURE B-2, CONTINUED

UNITED STATES PATENT OFFICE.

CHARLES G. CONN, OF ELKHART, INDIANA.

CORNET.


To all whom it may concern:

Be it known that I, CHARLES G. CONN, a citizen of the United States, residing at Elkhart, in the county of Elkhart and State of Indiana, have invented certain new and useful Improvements in Cornets and other Piston-Valve Musical Instruments, of which the following is a specification.

My improvements have in view the increasing of the directness of passage of air from one valve to another of a cornet or other piston-valve musical instrument. With this end in view I employ, in combination with a curved connecting pipe between the first and second valve-cylinders, a straight diagonal pipe connecting the second and third valve-cylinders, starting on about the level of the first connecting pipe and ending on about the level of the air-pipe.

In order that my invention may be more fully understood, I will proceed to describe it with reference to the accompanying drawing, which represents in section longitudinal of the valve-cylinders a portion of a cornet embodying my improvement.

The cornet is constructed with customary air-pipe, A, valve-bends B, and valve-cylinders 1 2 3. Connecting the valve-cylinders are pipes D D', the first curved, as shown, to present at 45 degrees angles, so as to interrupt as little as possible the passage of the air, while the second, D', is made straight and arranged diagonally between the cylinders 2 3 from opposite the valve-opening to pipe D to opposite the valve-opening to pipe A. These openings being arranged diagonally, the connecting-pipe D forms a direct continuation thereof, and thus offers no angles resisting the passage of the air.

It will be observed that the position of the connections D D' may be reversed from that here shown, the diagonal connections D' being arranged between the first and second valve-cylinders, and the curved connection D between the second and third valve-cylinders, 45 without materially injuring the effectiveness of the connections as means of preventing the breaking up of the air passing therethrough. It will be seen that two of the valve-apertures are made in one direction with an upward inclination, and the third valve is made in the same direction with a downward inclination. This permits me to shorten the valve-piston one-half the width of the aperture, or nearly half an inch.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

In a cornet or other piston-valve musical instrument, in combination with a curved connecting-pipe between the first and second valve-cylinders, a diagonal connecting-pipe between the second and third valve-cylinders, both connecting-pipes lying in the plane of said cylinders and arranged substantially as 65 and for the purpose set forth.

CHARLES G. CONN.

Witnesses:

E. C. BICKEL.
C. W. FISH.
FIGURE B-3:
PATENT FOR AMERICAN MODEL BAND INSTRUMENTS – FRONT-ACTION
FIGURE B-3, CONTINUED
FIGURE B-3, CONTINUED

UNITED STATES PATENT OFFICE.

CHARLES G. CONN, OF ELKHART, INDIANA.

MUSICAL WIND-INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 405,305, dated June 18, 1889.

To all whom it may concern:

Be it known that I, CHARLES G. CONN, a citizen of the United States, residing at Elkhart, in the county of Elkhart and State of Indiana, have invented certain new and useful Improvements in Musical Wind-Instruments; and I do hereby declare that the following description of the invention, and the accompanying drawings, of which the one hereunto annexed is a part, are sufficient to enable any person to practice the same.

Be it further known that I have invented a new and useful Improvements in Musical Wind-Instruments, which Improvements relates to two improvements—first, a new and more convenient disposition and arrangement of the piston-valves and keys, which inclines the bell of the instrument to the left, leaving the view unobstructed for reading music or marching; and, second, the forming of a direct and nearly vertical passage from the mouth-piece to the water-key in the tuning-slide, to facilitate the easy passage and removal of water. The first of these objects is accomplished by arranging the piston-valves in planes nearly perpendicular to the other tubes and diagonally across the piece, and the second by having the ports of all the valve-pistons opening upward, reference being had to the instrument in the position it assumes while being played.

In order that the invention may be fully understood, I will proceed to describe the same with reference to the accompanying drawings, in which—

Figure 1 represents a front view of an instrument, with my improvements attached, in the position it assumes while being played.

Fig. II represents a detached portion of the piece, broken away in part, showing the direct passage from the mouth-piece to the water-key.

Like letters of reference in both the figures indicate the same parts,

a, b, c, and d are valve-cases arranged in planes nearly perpendicular to the other tubes and diagonally across the piece.

e is a tube leading from valve-case d to 55 tuning-slide f, in which is a water-key g.

A is the mouth-piece, and B the tube leading from A to the first valve-case a.

D is the tube extending from the tuning-slide f to the bell E. Referring to Fig. 3, it will be seen that the passage from the mouth-piece A to the tuning-slide f is very nearly vertical and very direct.

By the use of this new system I am enabled to make a shorter and lighter piston, because the tuning-slide is placed so low in the tubing of the instrument, instead of having it in the tubing before the valves are reached. Consequently the valves are smaller in diameter and the instrument more regularly come, as it should be.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent is—

1. A musical wind-instrument having 75 valves placed diagonally across the piece, for the purpose set forth.

2. A musical wind-instrument having a direct air-passage from the mouth-piece through the diagonally-arranged valves to the water-key in the tuning-slide, as and for the purpose set forth.

3. The combination of a musical wind-instrument having valves placed diagonally across the piece with a direct air-passage through said valves from the mouth-piece to the water-key in the tuning-slide, substantially as set forth.

WITNESSES:

CHARLES G. CONN.

E. C. BICKEL.

C. W. FISCH.
FIGURE B-4
PATENT FOR WONDER MODEL BAND INSTRUMENTS – TOP-ACTION

C. G. CONN.
MUSICAL WIND INSTRUMENT.
No. 436,696. Patented Sept. 16, 1890.
To all whom it may concern:

Be it known that I, CHARLES G. CONN, a citizen of the United States, residing at Elkhart, in the county of Elkhart and State of Indiana, have invented certain new and useful Improvements in Musical Wind-Instruments; and I do hereby declare that the following, taken in connection with the drawings which accompany and form a part of the specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

In Letters Patent of the United States No. 405,305, granted to me June 30, 1889, for improvements in musical wind-instruments, I have shown and described an instrument having a direct air-passage from the mouth-piece through the valves to the water-key in the tuning-slide, whereby the greater part of the water accumulating in the instrument is led directly to said water-key. This arrangement has produced very satisfactory results, but does not obviate one of the greatest objections performers make to the use of the instrument—that is, the accumulation of water in the valve-slides.

The object of my present invention, which is an improvement on my patent above referred to, is to remedy this great defect in wind-instruments of the larger class by excluding all the water from the valve-slides, which will thereby more effectively accumulate in the tuning-slide. To accomplish this result I so construct the valve-slides that when the valves are depressed the air is made to enter said slides in an upward direction, so that it is impossible for any water which may be in the valves to run into the slides.

I have represented my improvement applied to the common form of piston-valve instrument, in which the valves are arranged parallel with the length of the piece; but the improvement can be applied to other forms of instruments equally as well; such, for example, as illustrated in my patent above referred to.

In order that my invention may be fully understood, I will describe the same more particularly, with reference to the accompanying drawings, in which—

Figure I represents a front view of an instrument embodying my improvement. Fig. II represents a detached portion of the piece, part being in section, showing the passage through the valve-slides when the valves are depressed.

Like letters of reference indicate the same parts in both figures.

a, b, c are the valve-cases, having the ordinary valve-pistons a', b', c' working in them to throw the valve-slides into and out of play.

A is the mouth-piece, and B the tube leading from A to the first valve-case a.

f is the tuning-slide, having situated at its lowest point the customary water-key g, and e is the tube leading from valve-case c to the tuning-slide.

Thus far the instrument is the same as described in my former patent, there being (when the valves are in their normal or outer position) a direct air-passage from the mouth-piece through the valves to the tuning-slide.

Referring now to Fig. II of the drawings, which relates more particularly to the present improvement, M, N, and O are the valve-slides attached, respectively, to the valve-cases a, b, and c. When the valve-pistons are depressed, air enters the valve-slides M, N, and O through inlet-ports m, n, and o, respectively, and passes out of said slides through exit-ports m', n', and o', respectively. In each case the valve-slide is formed with an upward crook or turn at its inlet-end, so as to avoid the possibility of water passing from the valves to the valve-slides.

The direction of the air through the valve-slides when the valves are depressed is indicated by arrows in Fig. II.

Instruments formed according to my improvement have a better wind-passage and shorter valve-action than ordinarily, for the reason that the tuning-slide is placed in the body or main tube of the instrument, thereby affording the opportunity of using a smaller bore through the valves, and consequently a shorter action.

Having thus fully described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. A musical wind-instrument having an upwardly-extending connection between the valve and valve-slide, as herein set forth.

2. A musical wind-instrument having the valve-slides so arranged relatively to the
valves that the air passing from the valves to the valve-slides is made to flow in an upward direction, whereby water is excluded from the valve-slides, as herein set forth.

3. The combination of a musical wind-instrument having a direct air-passage from the mouth-piece to the water-key in the tuning-slide with valve-slides having upwardly-extending entry-connections between the valves and valve-slides, whereby all water is excluded from the valve-slides and led directly to the water-key in the tuning-slide, as herein set forth.

CHARLES G. CONN.

Witnesses:

GEO. T. BARNEY,
ROYAL MORRIS.
APPENDIX C

DIAGRAMS OF MEASUREMENT POINTS ON FRONT-ACTION TUBAS
FIGURE C-1

FRONT-ACTION/CONN AMERICAN MODEL

Figures C-2 through C-9 (with the exception of Figure A-3) will be drawn from this reference image.
1. Diameter of interior of mouthpiece receiver

2. Diameter of exterior of mouthpiece receiver

3. Length of lead-pipe from termination of receiver to either valve entry or primary tuning slide
4. Length of 1st valve casing
5. Length of 2nd valve casing
6. Length of 3rd valve casing
7. Diameter of 1st valve piston
8. Diameter of 2nd valve piston
9. Diameter of 3rd valve piston
10. Diameter of 1st valve port
11. Diameter of 2nd valve port
12. Diameter of 3rd valve port
13. Length of 1\textsuperscript{st} section of 1\textsuperscript{st} valve tubing
14. Length of 2\textsuperscript{nd} section of 1\textsuperscript{st} valve tubing
15. Length of 3\textsuperscript{rd} section of 1\textsuperscript{st} valve tubing
16. Length of 1\textsuperscript{st} section of 2\textsuperscript{nd} valve tubing
17. Length of 2nd section of 2nd valve tubing (located behind the 1st section in this image)

18. Length of 1st section of 3rd valve tubing

19. Length of 2nd section of 3rd valve tubing

20. Length of 3rd section of 3rd valve tubing
21. External diameter of 1\textsuperscript{st} valve tuning slide between ferrules

22. External diameter of 2\textsuperscript{nd} valve tuning slide between ferrules

23. External diameter of 3\textsuperscript{rd} valve tuning slide between ferrules
FIGURE C-6
FRONT-ACTION MEASUREMENT POINTS 24 – 26

24. Length of the 1<sup>st</sup> valve tuning slide, taken along the innermost curve
25. Length of the 2<sup>nd</sup> valve tuning slide, taken along the innermost curve
26. Length of the 3<sup>rd</sup> valve tuning slide, taken along the innermost curve
27. Length of 1st valve tuning slide, from ferrule to ferrule
28. Length of 2nd valve tuning slide, from ferrule to ferrule
29. Length of 3rd valve tuning slide, from ferrule to ferrule
30. Internal diameter of 1st valve tuning slide casing bore
31. Internal diameter of 2nd valve tuning slide casing bore
32. Internal diameter of 3\textsuperscript{rd} valve tuning slide casing bore
33. External diameter of the 1\textsuperscript{st} ferrule of the primary tuning slide
34. External diameter of the 2\textsuperscript{nd} ferrule of the primary tuning slide
35. Length of primary tuning slide from ferrule to ferrule
36. Interior diameter of 1st section of primary tuning slide
37. Interior diameter of 2nd section of primary tuning slide
38. Interior diameter of 1st section of primary tuning slide casing bore
39. Interior diameter of 2nd section of primary tuning slide casing bore
FIGURE C-9
FRONT-ACTION MEASUREMENT POINTS 40 – 47
40. Circumference of 1st section of the 2nd bough at ferrule
41. Circumference of 2nd section of the 2nd bough at ferrule
42. Circumference of 1st section of the primary bough at ferrule
43. Circumference of 2nd section of the primary bough at ferrule
44. Length of primary bough taken along bough plate from ferrule to ferrule
45. Circumference of bell at ferrule
46. Length of bell from ferrule to rim
47. Bell diameter
APPENDIX D

DIAGRAMS OF MEASUREMENT POINTS ON TOP-ACTION TUBAS
FIGURE D-1

TOP-ACTION/CONN WONDER MODEL

Figures D-2 through D-9 (with the exception of Figure D-3) will be drawn from this reference image.
FIGURE D-2

TOP-ACTION MEASUREMENT POINTS 1 – 3

1. Diameter of interior of mouthpiece receiver
2. Diameter of exterior of mouthpiece receiver
3. Length of lead-pipe from termination of receiver to either valve entry or primary tuning slide
4. Length of 1$^{\text{st}}$ valve casing
5. Length of 2$^{\text{nd}}$ valve casing
6. Length of 3$^{\text{rd}}$ valve casing
7. Diameter of 1$^{\text{st}}$ valve piston
8. Diameter of 2$^{\text{nd}}$ valve piston
9. Diameter of 3$^{\text{rd}}$ valve piston
10. Diameter of 1$^{\text{st}}$ valve port
11. Diameter of 2$^{\text{nd}}$ valve port
12. Diameter of 3$^{\text{rd}}$ valve port
FIGURE D-4

TOP-ACTION MEASUREMENT POINTS 13 – 20

13. Length of 1\textsuperscript{st} section of 1\textsuperscript{st} valve tubing

14. Length of 2\textsuperscript{nd} section of 1\textsuperscript{st} valve tubing

*15. Length of 3\textsuperscript{rd} section of 1\textsuperscript{st} valve tubing is not present on top-action Eb tubas

16. Length of 1\textsuperscript{st} section of 2\textsuperscript{nd} valve tubing

17. Length of 2\textsuperscript{nd} section of 2\textsuperscript{nd} valve tubing (located behind the 1\textsuperscript{st} section in this image)

18. Length of 1\textsuperscript{st} section of 3\textsuperscript{rd} valve tubing
19. Length of 2\textsuperscript{nd} section of 3\textsuperscript{rd} valve tubing

*20. Length of 3\textsuperscript{rd} section of 3\textsuperscript{rd} valve tubing is not present on top-action Eb tubas
FIGURE D-5

TOP-ACTION MEASUREMENT POINTS 21 – 23

21. External diameter of 1\textsuperscript{st} valve tuning slide between ferrules

22. External diameter of 2\textsuperscript{nd} valve tuning slide between ferrules

23. External diameter of 3\textsuperscript{rd} valve tuning slide between ferrules
24. Length of the 1\textsuperscript{st} valve tuning slide, taken along the innermost curve

25. Length of the 2\textsuperscript{nd} valve tuning slide, taken along the innermost curve

26. Length of the 3\textsuperscript{rd} valve tuning slide, taken along the innermost curve
27. Length of 1st valve tuning slide, from ferrule to ferrule
28. Length of 2nd valve tuning slide, from ferrule to ferrule
29. Length of 3rd valve tuning slide, from ferrule to ferrule
30. Internal diameter of 1st valve tuning slide casing bore
31. Internal diameter of 2nd valve tuning slide casing bore
32. Internal diameter of 3rd valve tuning slide casing bore
33. External diameter of the 1st ferrule of the primary tuning slide
34. External diameter of the 2nd ferrule of the primary tuning slide
35. Length of primary tuning slide from ferrule to ferrule
36. Interior diameter of 1st section of primary tuning slide
37. Interior diameter of 2nd section of primary tuning slide
38. Interior diameter of 1st section of primary tuning slide casing bore
39. Interior diameter of 2nd section of primary tuning slide casing bore
FIGURE D-9

TOP-ACTION MEASUREMENT POINTS 40-47
40. Circumference of 1\textsuperscript{st} section of the 2\textsuperscript{nd} bough at ferrule
41. Circumference of 2\textsuperscript{nd} section of the 2\textsuperscript{nd} bough at ferrule
42. Circumference of 1\textsuperscript{st} section of the primary bough at ferrule
43. Circumference of 2\textsuperscript{nd} section of the primary bough at ferrule
44. Length of primary bough taken along bough plate from ferrule to ferrule
45. Circumference of bell at ferrule
46. Length of bell from ferrule to rim
47. Bell diameter
APPENDIX E

PHOTOGRAPHS OF PROCEDURES AND INSTRUMENTS
FIGURE E-1

BOUGH CIRCUMFERENCE MEASUREMENT
FIGURE E-2

BELL DIAMETER MEASUREMENT
FIGURE E-3

BELL LENGTH MEASUREMENT
FIGURE E-4

FRONT-ACTION VALVE APPARATUS
FIGURE E-5

UPPER TUBING OF FRONT-ACTION VALVE APPARATUS
FIGURE E-6

TOP-ACTION VALVE APPARATUS
FIGURE E-7
EXAMPLE OF BOUGH DAMAGE
FIGURE E-8
EXAMPLE OF COMMON BELL DAMAGE
FIGURE E-9

EXAMPLE OF BELL WIDENING (DAMAGE)
APPENDIX F

MEASUREMENTS AND FIELD RESEARCH DATA
This spreadsheet represents the initial spreadsheet after collecting measurements at an accuracy of 0.001 inches. Blank cells represent an area that was inaccessible due to instrument damage.
# FIGURE F-3

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This spreadsheet represents the identical matches found at an accuracy of 0.001 inches. These matches are organized by row, and the different shades indicate which measurements match. The percentage of identical matches found at this level of accuracy is 19.55%.
This spreadsheet represents the identical matches found at an accuracy of 0.01 inches. These matches are organized by row, and the different shades indicate which measurements match. The percentage of identical matches found at this level of accuracy is 46.99%.
FIGURE F-5
DEFINITIONS OF ABBREVIATIONS

1. Receiver Diameter Int – Diameter of the interior of the mouthpiece receiver
2. Receiver Diameter Ext – Diameter of the exterior of the mouthpiece receiver
3. Lead-pipe Length - Length of lead-pipe from the termination of the mouthpiece receiver to either the valve entry or the primary tuning slide
4. Piston Casing Height 1 – Length/Height of the 1st valve casing
5. Piston Casing Height 2 – Length/Height of the 2nd valve casing
6. Piston Casing Height 3 – Length/Height of the 3rd valve casing
7. Piston Diameter 1 – Diameter of the 1st valve piston
8. Piston Diameter 2 – Diameter of the 2nd valve piston
10. Port Diameter 1 – Diameter of the 1st valve port
11. Port Diameter 2 – Diameter of the 2nd valve port
12. Port Diameter 3 – Diameter of the 3rd valve port
13. 1 Valve length 1 – Length of the 1st section of the 1st valve tubing
14. 1 Valve length 2 – Length of the 2nd section of the 1st valve tubing
15. 1 Valve length 3 – Length of the 3rd section of the 1st valve tubing
16. 2 Valve length 1 – Length of the 1st section of the 2nd valve tubing
17. 2 Valve length 2 – Length of the 2nd section of the 2nd valve tubing
18. 3 Valve length 1 – Length of the 1st section of the 3rd valve tubing
19. 3 Valve length 2 – Length of the 2nd section of the 3rd valve tubing
20. 3 Valve length 3 – Length of the 3rd section of the 3rd valve tubing (present on front-action Eb tubas but is not present on top-action Eb tubas)

21. Valve ferrule diameter 1 – External diameter of the 1st valve tuning slide between the ferrules

22. Valve ferrule diameter 2 – External diameter of the 2nd valve tuning slide between the ferrules

23. Valve ferrule diameter 3 – External diameter of the 3rd valve tuning slide between the ferrules

24. Valve slide length 1 – Length of the 1st valve tuning slide, taken along the innermost curve of the entire slide

25. Valve slide length 2 – Length of the 2nd valve tuning slide, taken along the innermost curve of the entire slide

26. Valve slide length 3 – Length of the 3rd valve tuning slide, taken along the innermost curve of the entire slide

27. Short V. slide length 1 – Length of the 1st valve tuning slide, from ferrule to ferrule along the innermost curve

28. Short V. slide length 2 – Length of the 2nd valve tuning slide, from ferrule to ferrule along the innermost curve

29. Short V. slide length 3 – Length of the 3rd valve tuning slide, from ferrule to ferrule along the innermost curve

30. 1 Valve bore – Internal diameter of the 1st valve tuning slide casing’s bore
31. 2 Valve bore – Internal diameter of the 2\textsuperscript{nd} valve tuning slide casing’s bore

32. 3 Valve bore – Internal diameter of the 3\textsuperscript{rd} valve tuning slide casing’s bore

33. PTS ferrule diameter 1 – External diameter of the 1\textsuperscript{st} ferrule of the primary tuning slide

34. PTS ferrule diameter 2 – External diameter of the 2\textsuperscript{nd} ferrule of the primary tuning slide

35. PTS length (fer to fer) – Length of the primary tuning slide from ferrule to ferrule

36. PTS diameter entrance – Interior diameter of the 1\textsuperscript{st} section of the primary tuning slide

37. PTS diameter exit – Interior diameter of the 2\textsuperscript{nd} section of the primary tuning slide

38. PTS casing diameter entrance – Interior diameter of the 1\textsuperscript{st} section of the primary tuning slide casing’s bore

39. PTS casing diameter exit – Interior diameter of the 2\textsuperscript{nd} section of the primary tuning slide casing’s bore

40. 2\textsuperscript{nd} bow circumference 1 – Circumference of the 1\textsuperscript{st} section of the 2\textsuperscript{nd} bough at its ferrule

41. 2\textsuperscript{nd} bow circumference 2 – Circumference of the 2\textsuperscript{nd} section of the 2\textsuperscript{nd} bough at its ferrule

42. Prime bow circumference 1 – Circumference of the 1\textsuperscript{st} section of the primary bough at its ferrule

43. Prime bow circumference 2 – Circumference of the 2\textsuperscript{nd} section of the primary bough at its ferrule
44. Primary bow length – Length of the primary bough taken along the bough plate from ferrule to ferrule

45. Bell circum at ferrule – Circumference of the bell at its ferrule

46. Bell section length – Length of the bell section from ferrule to rim

47. Bell diameter – The bell diameter across the rim
APPENDIX G

SUPPLEMENTAL IMAGES
FIGURE G-1

AUTHOR’S CONCEPT SKETCH OF INTERCHANGEABLE STRUCTURES
MIRRORED AT BELL

177
INNER WORKINGS OF THE CONN WONDER MODEL VALVE APPARATUS AS SEEN FROM THE PLAYER’S PERSPECTIVE
APPENDIX H

PERMISSION LETTERS
FIGURE H-1
PERMISSION TO USE PHOTOGRAPHS OF INSTRUMENTS AND MEASUREMENTS

from: Clint Spell <orimister@gmail.com>
to: David Earll <dmearl@asu.edu>
date: Wed, Aug 20, 2014 at 6:56 PM

subject: Re: Use of Photographs from the National Music Museum Research in Doctoral Research Project

Dear Dave,
I do certainly grant you permission to use the photographs. Best of luck with your research! Let me know if there's anything else that I can do.
Sincerely,
Clint Spell

On Mon, Aug 18, 2014 at 1:54 PM, David Earll <dmearl@asu.edu> wrote:
Dear Clint Spell,
I am writing you in regards to our previous discussion about using several photographs from our time working together at the National Music Museum in my doctoral research project. In particular, I would like to include several photographs that you took of me taking measurements of C.G. Conn tubas using my digital camera while conducting my on-site research at the National Music Museum.

May I have your permission to use these photographs of my measurement procedures for my doctoral research project? I have included a copy of each of the images that will be used in my document.

Thank you for your time and consideration.
Sincerely,
David M. Earll
FIGURE H-2
PERMISSION TO USE IMAGES FROM THE KEN DROBNAK’S ARTICLE

from: Drobnak, Kenneth <kpdrobnak@nwosu.edu>
to: David M Earll <dmearl@asu.edu>
date: Mon, Aug 18, 2014 at 3:52 PM
subject: Re: Use of Images from ITEA Journal Article, 38:1 in Doctoral Research Project

YES
-------------------------
Ken Drobnak, D.M.A.
Director of Bands & Low Brass
Northwestern Oklahoma State University

office: 580-327-8191
mobile: 361-219-4567
Fax: 580-327-8514


On Aug 18, 2014, at 3:42 PM, David Earll <dmearl@asu.edu> wrote:

Hello Dr. Kenneth Drobnak,

I am writing you in regards to our previous discussion about using several images from your article in the ITEA Journal, issue 38:1, in my Doctoral Research Project. I would like to use two images from this article to demonstrate the difference between several Holton tuba designs and C.G. Conn tuba designs in this research project.

May I have permission to use the following images for comparison in my doctoral research project?
-NMM 11754 Front 2, found on page 94 of the ITEA Journal, issue 38:1
-NMM 134 Holton Tuba Front, found on page 92 of the ITEA Journal, issue 38:1

Thank you again for your time and consideration!

Sincerely,
David M. Earll