

Sept. 24, 1929.

E. A. COUTURIER

1,729,568

VALVED BRASS INSTRUMENT

Filed June 26, 1928

2 Sheets-Sheet 1

Fig. 1.

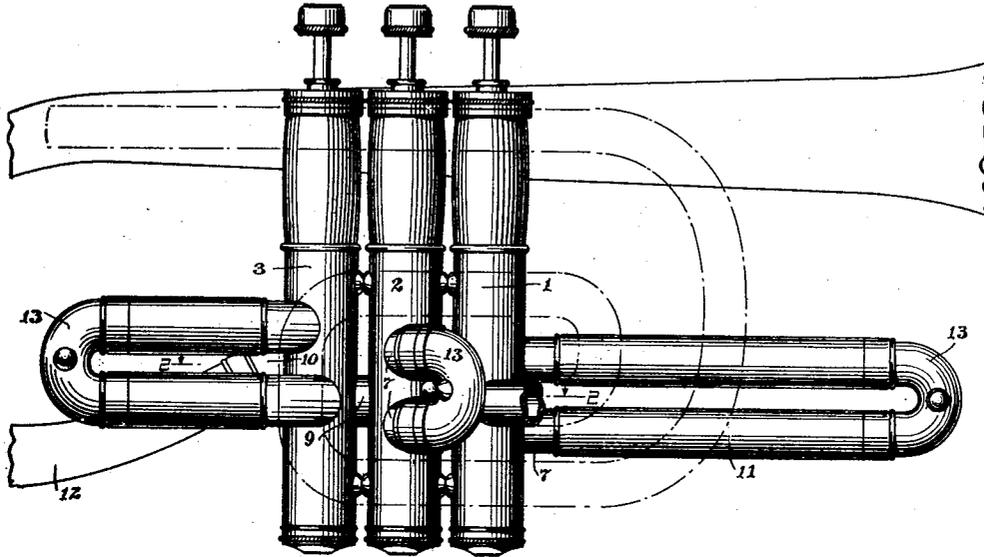
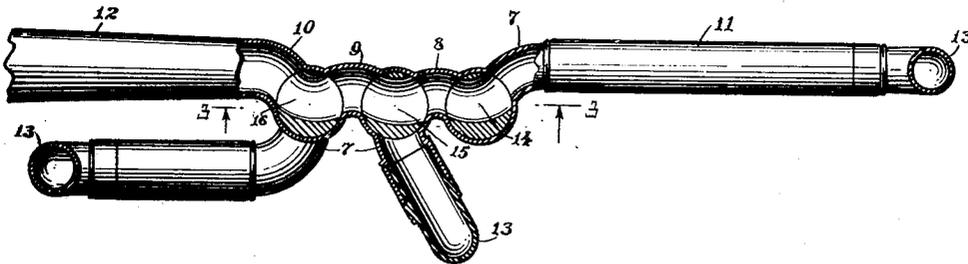


Fig. 2.



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Fig. 3.

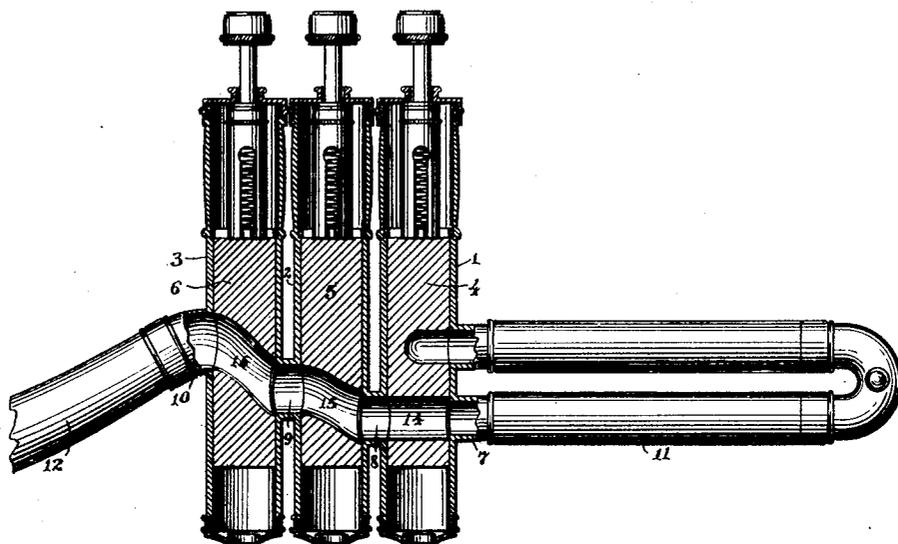
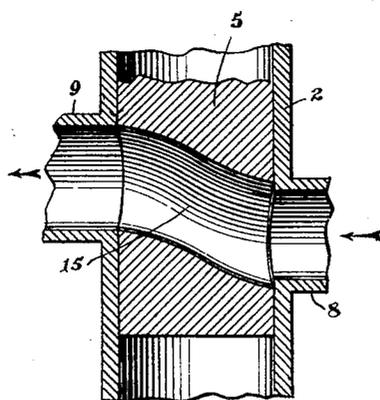


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE

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VALVED BRASS INSTRUMENT

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This invention relates to valved brass instruments, the primary object of the invention being to provide a valve or series of valves for use in connection with wind instruments such as are commonly known as brass instruments, as cornets, horns and the like, in which round, resilient tones retaining their full resonances are produced, with every interval in perfect tune in all keys, and preventing what is known in the art as wolves on the entire instrument and at the same time producing a perfectly even quality of tone throughout the entire chromatic scale.

Referring briefly to the prior art, it will be found that originally brass instruments were built in ten keys, this applying to trumpets, French horns and similar musical instruments. As these instruments were used in the orchestra it was physically impossible to play all keys on one instrument. The band arrangements in the early days were all made in a flat key because of the miserable intonation of the instruments.

The instruments in general use today is what may be termed a cylindrical type, that is, at the end of the mouth pipe the bore is met and carried on through the entire valve system inclusive of its subsidiary tubes. These instruments are badly out of tune. Certain keys are impossible as are certain intervals even by the greatest performer. Today the symphony orchestra brass player is compelled to force many tones, either higher or lower as the case may be, or resort to artificial fingering in order to play in tune with the orchestra.

On September 23, 1913, Patent No. 1,073,593 was granted to me, in which is disclosed a system of brass instrument construction having a continuous conical bore. The instrument was a great improvement in the art and had an increased caliber from the opening of the mouth pipe to the end of the bell, extending through the valves and valve tubes. It was a great step forward in intonation on brass instruments but lacked resonance, thereby causing the tone to lose its resiliency.

In my present invention I provide a non-constrictive valve system which can be applied to any brass valved instrument of the

entire family. This valve system entirely eliminates distortion of the sound wave in its journey through the valves and their respective tubes. It, however, retains its resonance and produces a full, round, resilient tone; every interval in perfect tune in all keys; no wolves on the entire instrument; and of perfectly even quality of tone throughout the entire chromatic scale. This overcomes what I have found to be a source of great trouble in the construction of brass valved instruments, in that such instruments have a constriction of the sound wave in the short, abrupt turns through the pistons and knuckles of the valve system.

In my present invention, the bore on entering the third valve casing takes a sudden drop or jump to a larger size. The port-holes, pump linings, knuckles and slide attached to this casing are all of the same size, say, for illustration, ten thousandths of an inch larger than the bore at the end of the mouth pipe where it enters the third valve casing.

The tubing or bore in the valve and third valve slide and knuckles all maintain the same accurate cylindrical size. The knuckle connecting the third valve casing with the second valve casing also retains the same size as the third valve.

The second valve, however, takes an immediate drop of say ten thousandths of an inch, which mechanically speaking is an increase in diameter, and this size prevails through the portholes and half-tone slide and connection with the first casing.

The first valve takes another drop or increase of diameter, say ten thousandths of an inch, and this size is maintained through the portholes and first valve slide and knuckles. Also the outlet of the first valve knuckle maintains the same size but has the regular expansion ratio as it connects with the bell branch.

While I refer to three valves, such as are particularly applicable for use in connection with a cornet, it is to be understood of course that I do not wish to limit myself to any number of valves nor to any particular instrument, but in any event there will be a regular increase in diameter of the portholes

in the respective valves as they are arranged in series.

In the accompanying drawings I illustrate an arrangements of valves and tubes which are especially adapted for use on a cornet and have eliminated from the drawings all such parts as might confuse and which are not necessary to illustrate the features of the invention.

Figure 1 is a view in side elevation;

Figure 2 is a view in longitudinal horizontal section on the line 2—2 of Figure 1, the view being somewhat staggered;

Figure 3 is a view in vertical longitudinal section on the line 3—3 of Figure 2, the view being somewhat staggered, illustrating a continuous passage through the three valves;

Figure 4 is an exaggerated view in longitudinal section through a fragment of valve and its casing to illustrate my invention.

In the drawings, 1, 2 and 3 represent the valve casings and 4, 5 and 6 the valves in the casings 1, 2 and 3, respectively. 7 represents an inlet knuckle communicating with valve casing 1. 8 represents a knuckle connecting valve casings 1 and 2. 9 represents a knuckle connecting valve casings 2 and 3. 10 represents a knuckle at the outlet side of casing 3.

The knuckle 7 communicates with an inlet tube 11, and the outlet knuckle 9 with a tube 12, and the several tubes may have slides 13 and be constructed and arranged in any way desired in accordance with the particular musical instrument.

I shall not attempt to go into detail as to the various tubes and air passages through the valves but shall merely describe one sequence which will be illustrative of my invention and which may be duplicated as many times as desired.

Referring particularly to Figure 3, which shows a complete sequence through the valves, I have given the portholes in the respective valves 4, 5 and 6 the reference characters 14, 15 and 16, respectively.

It will be noted that the porthole 14 is of larger diameter than the internal diameter of the inlet knuckle 7 but is of the same diameter as the internal diameter of the knuckle 8 connecting valve casings 1 and 2. The porthole 15 of the valve 5 is of larger diameter than the internal diameter of knuckle 8 but of the same diameter as knuckle 9 connecting valve casings 2 and 3. The porthole 16 in valve 6 is of larger diameter than the internal diameter of knuckle 9 but is of the same internal diameter as the outlet knuckle 10 and the tube 12.

Thus we have a series of valves having portholes of different diameters, and it will be noted that these diameters are uniform, and in a real sense the portholes and passages are cylindrical although there may be any

sort of distortion in the curvature and shape of the portholes; and I call particular attention to this to distinguish my invention from a conical or gradually increasing diameter, as with my invention I do not desire a gradually increasing diameter but an abrupt increase in diameter at the several stages of the valve so that full resonance may be had.

It is this broad idea of a valve or series of valves in which the portholes or passages through the valves are of an increased diameter over the knuckles or pipes communicating therewith and of the same diameter as the outlet passages therefrom, which constitutes the broad idea of my invention and gives the results which I desire, and which broad idea I desire to cover by a patent.

While I have illustrated and described my invention in connection with a particular type of valve it is of course to be understood that the invention may be employed with various types of valves, either reciprocating, rotary or otherwise movable, and I do not wish to be limited to the specific details of construction but desire to make such changes and alterations as fairly fall within the spirit and scope of the appended claims.

I claim:

1. In combination with a musical instrument, a valve having a porthole or passage therein of uniform diameter throughout and of greater diameter than the inlet knuckle or pipe communicating therewith.

2. In combination with a musical instrument, a valve having a porthole or passage therein of uniform diameter throughout and of greater diameter than the inlet knuckle or pipe communicating therewith, and of the same diameter as the outlet knuckle or pipe communicating therewith.

3. In a musical instrument, a series of valve casings having inlet pipes communicating with the casing at one end of the series, an outlet pipe communicating with the casing at the other end of the series, knuckles connecting the valve casings of the series, said valves having portholes or passages of the same diameter throughout and of greater diameter than the inlet openings communicating therewith, and of the same diameter as the knuckle constituting the outlet valve whereby each valve provides a sound chamber of greater diameter than the inlet communicating therewith.

4. In a musical instrument, a series of valve casings having inlet pipes communicating with the casing at one end of the series, an outlet pipe communicating with the casing at the other end of the series, knuckles connecting the valve casings of the series, said valves having portholes or passages of the same diameter throughout and of greater diameter than the inlet openings communicating therewith and of the same diameter as the knuckle constituting the outlet valve,

whereby each valve provides a sound chamber of greater diameter than the inlet pipe communicating therewith, said diameter of the valve being continued in the knuckle or pipe at the outlet side thereof whereby the chamber is of the length and diameter to permit full resonance.

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5. A valved brass instrument having a movable valve with a porthole or passage therein of uniform diameter, and of greater diameter than the pipe or knuckle communicating therewith, and of the same diameter as the knuckle or pipe communicating with the outlet therefrom.

6. In combination with a brass musical instrument, a valve having a passage there-through constituting a chamber of uniform diameter throughout and of greater diameter than the inlet with which it communicates.

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