

No. 670,365.

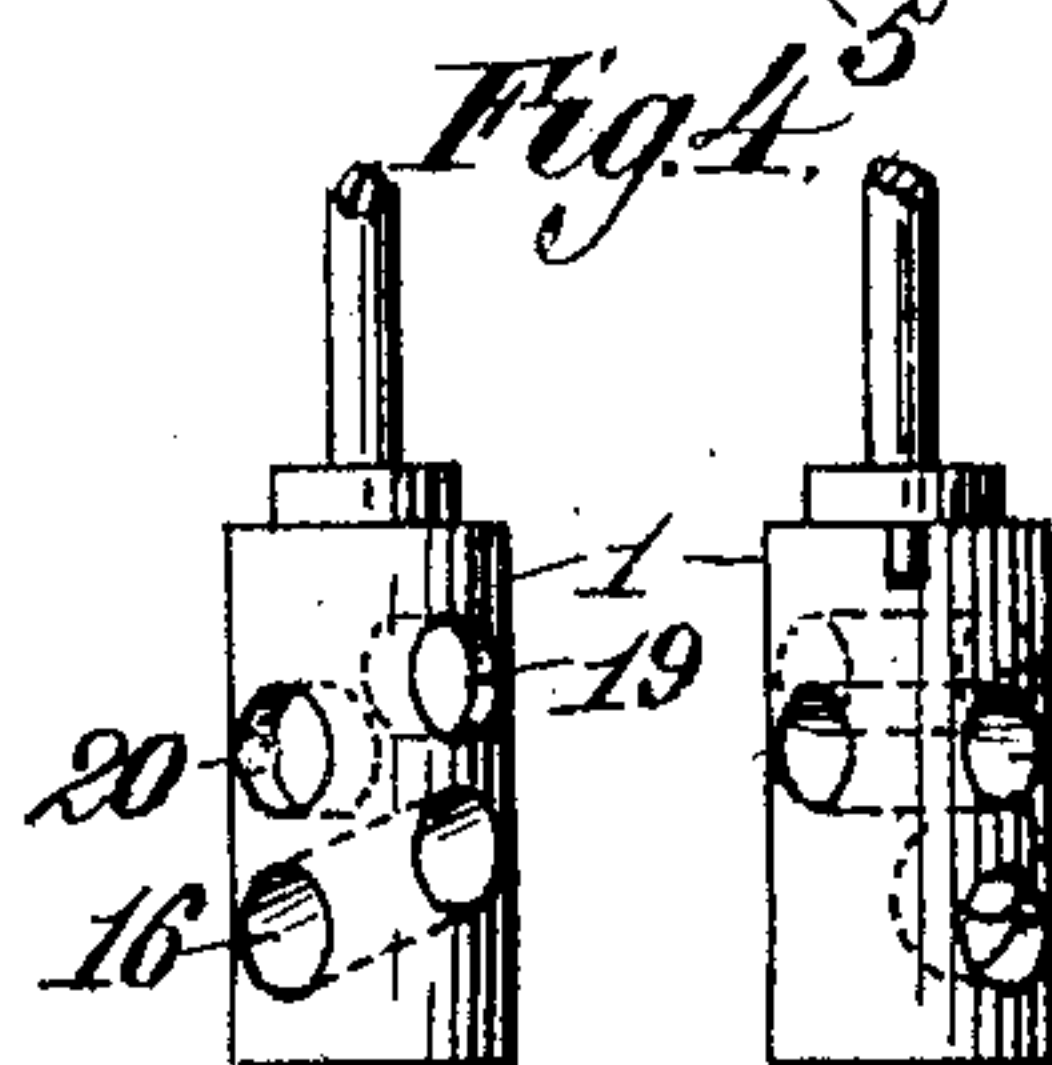
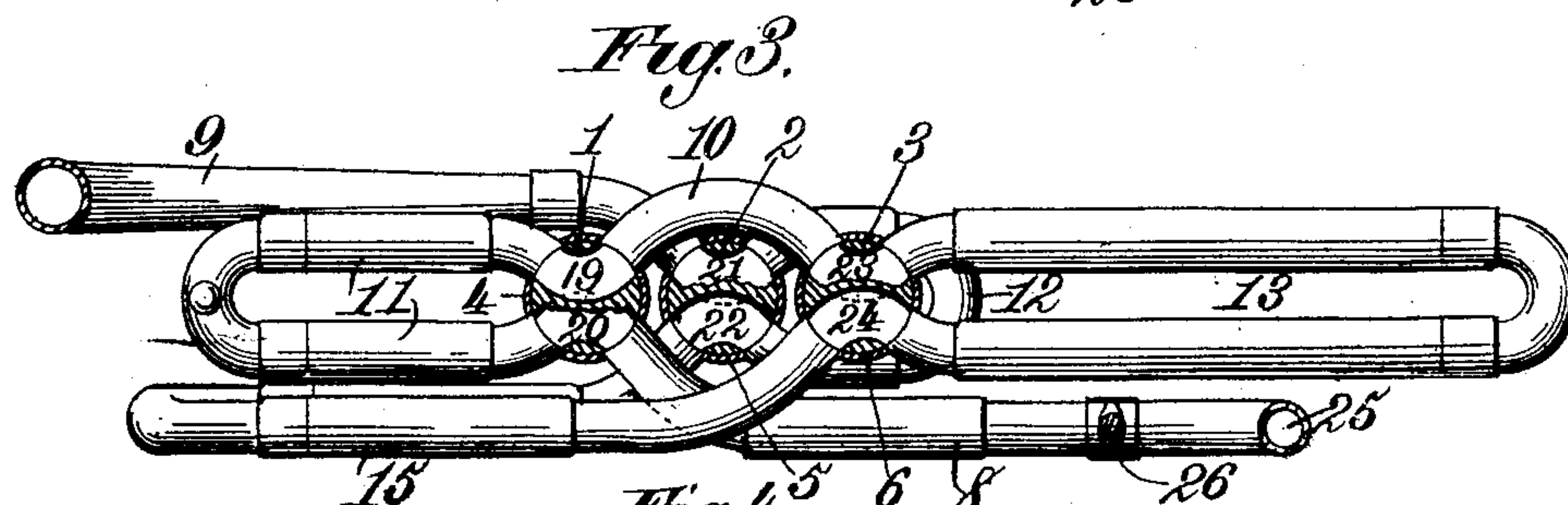
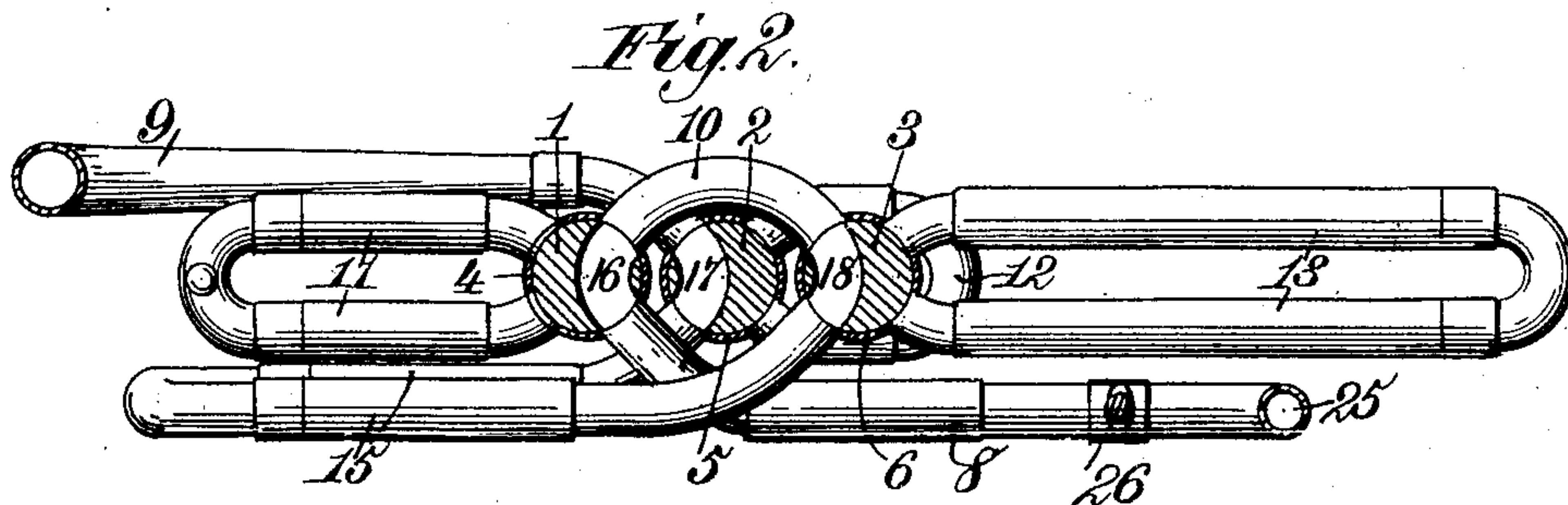
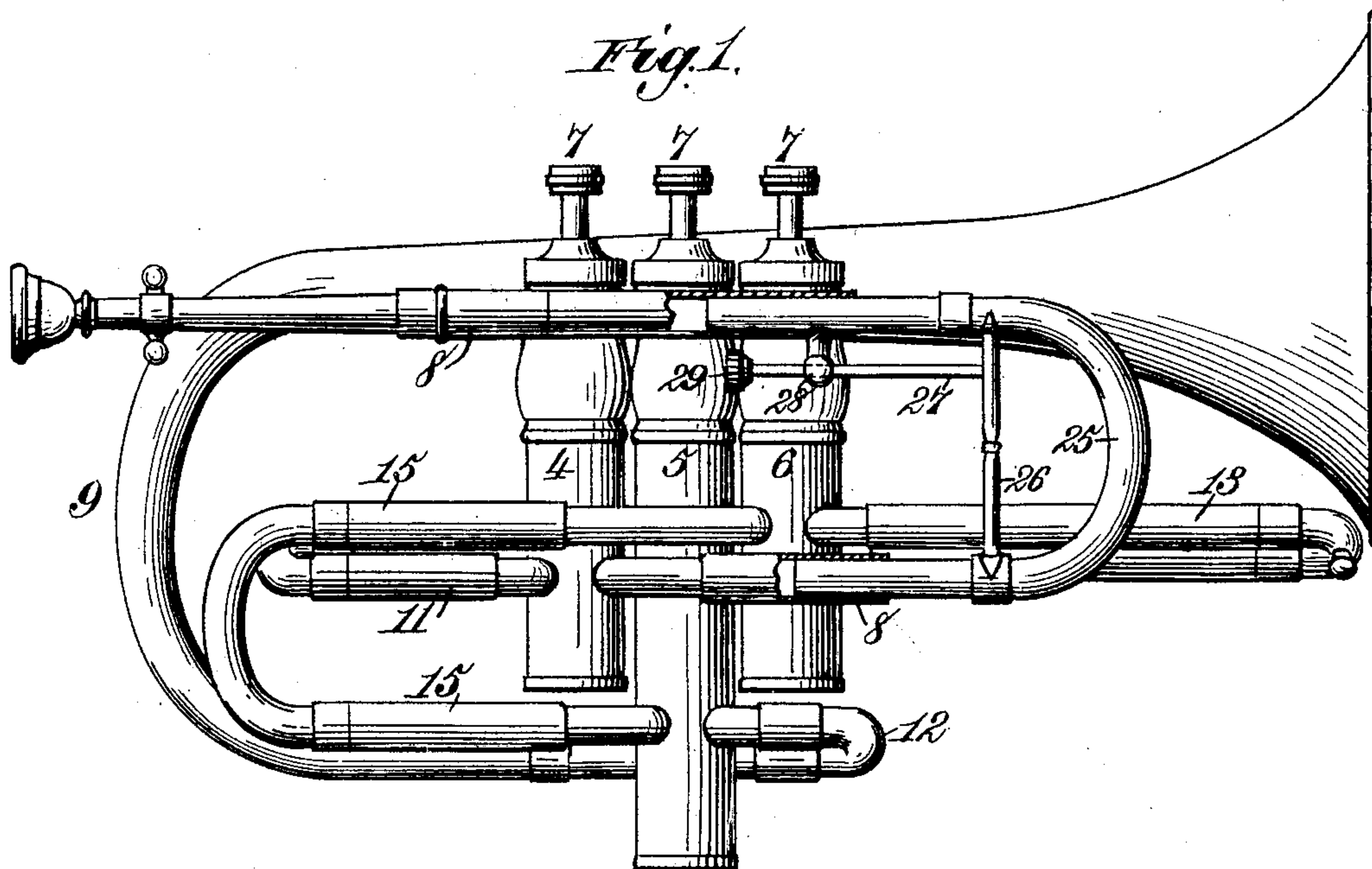
Patented Mar. 19, 1901.

F. A. BUESCHER.
WIND MUSICAL INSTRUMENT.

(Application filed Oct. 20, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.
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No. 670,365.

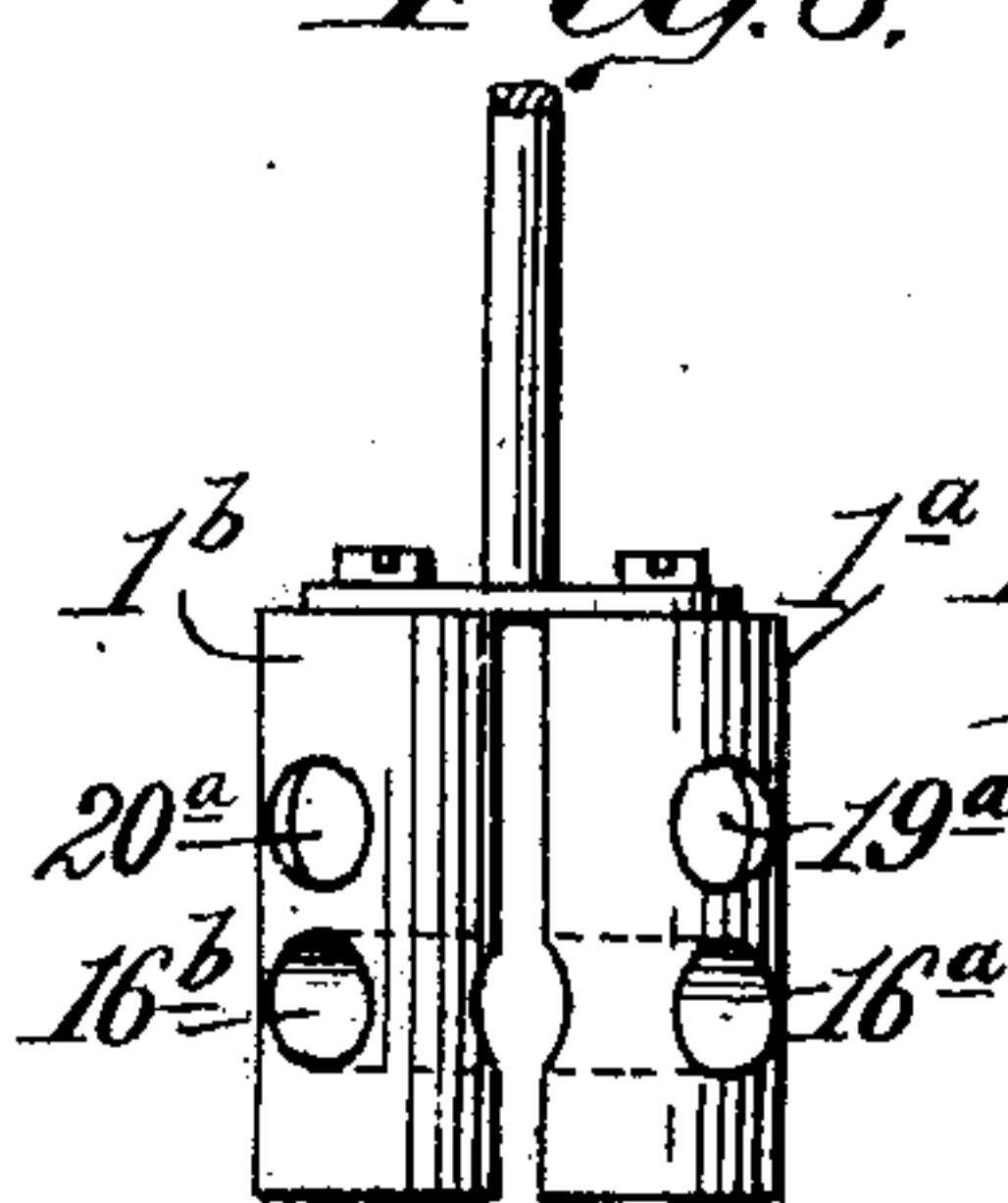
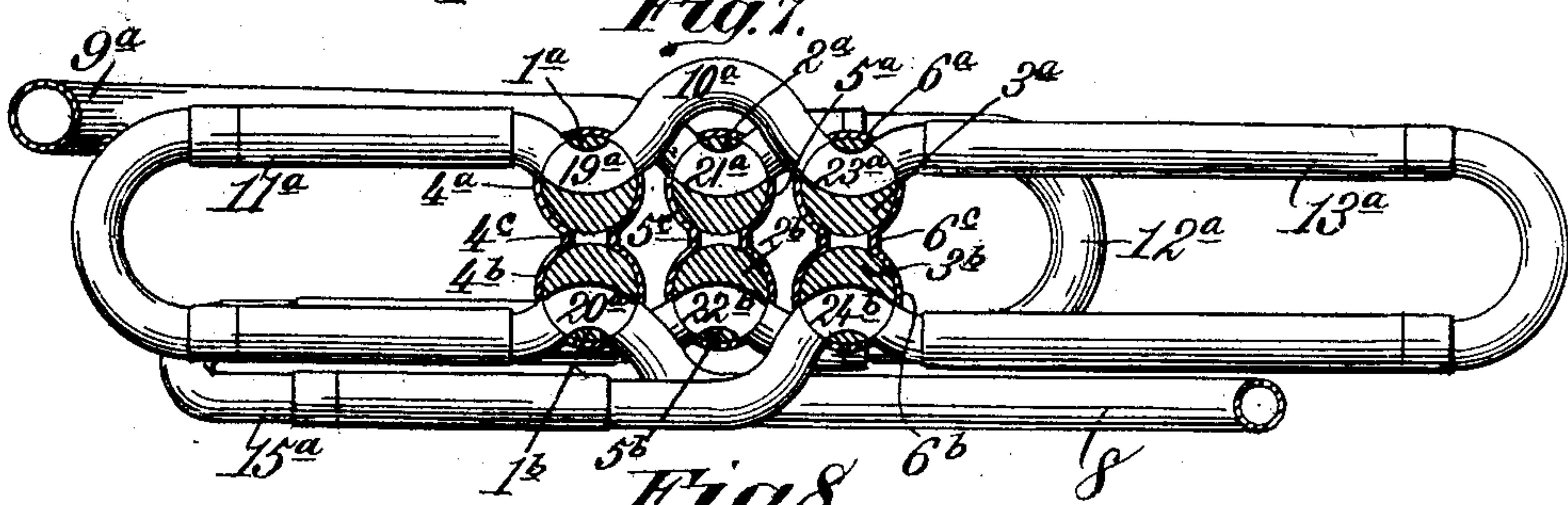
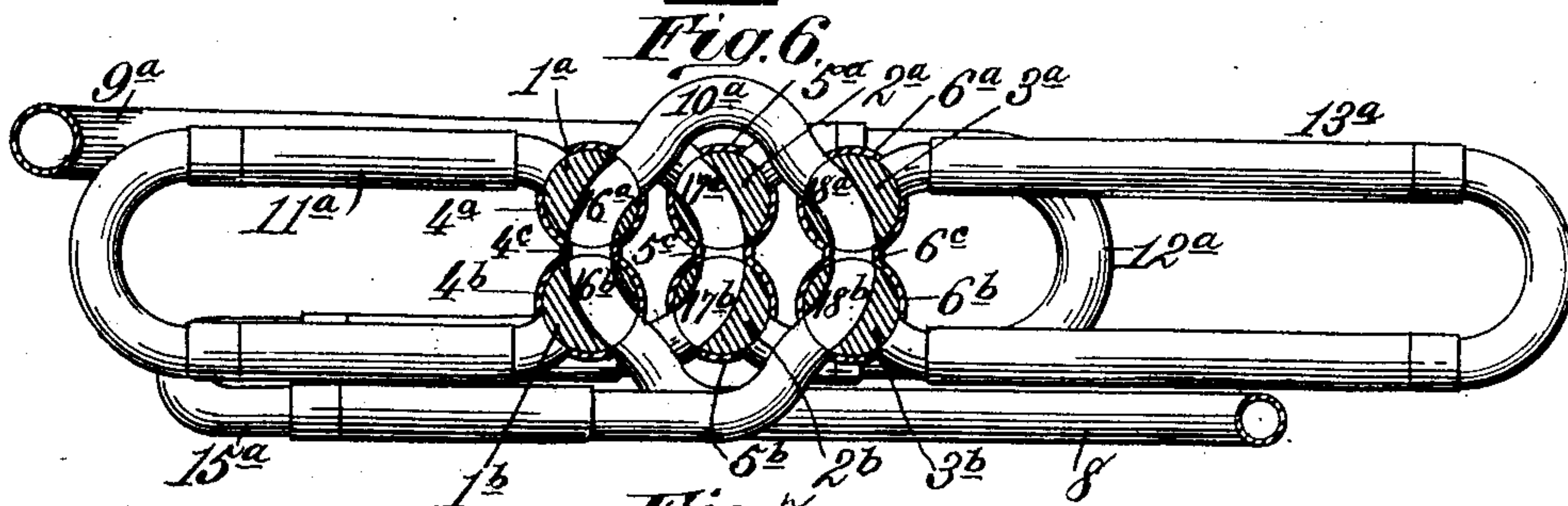
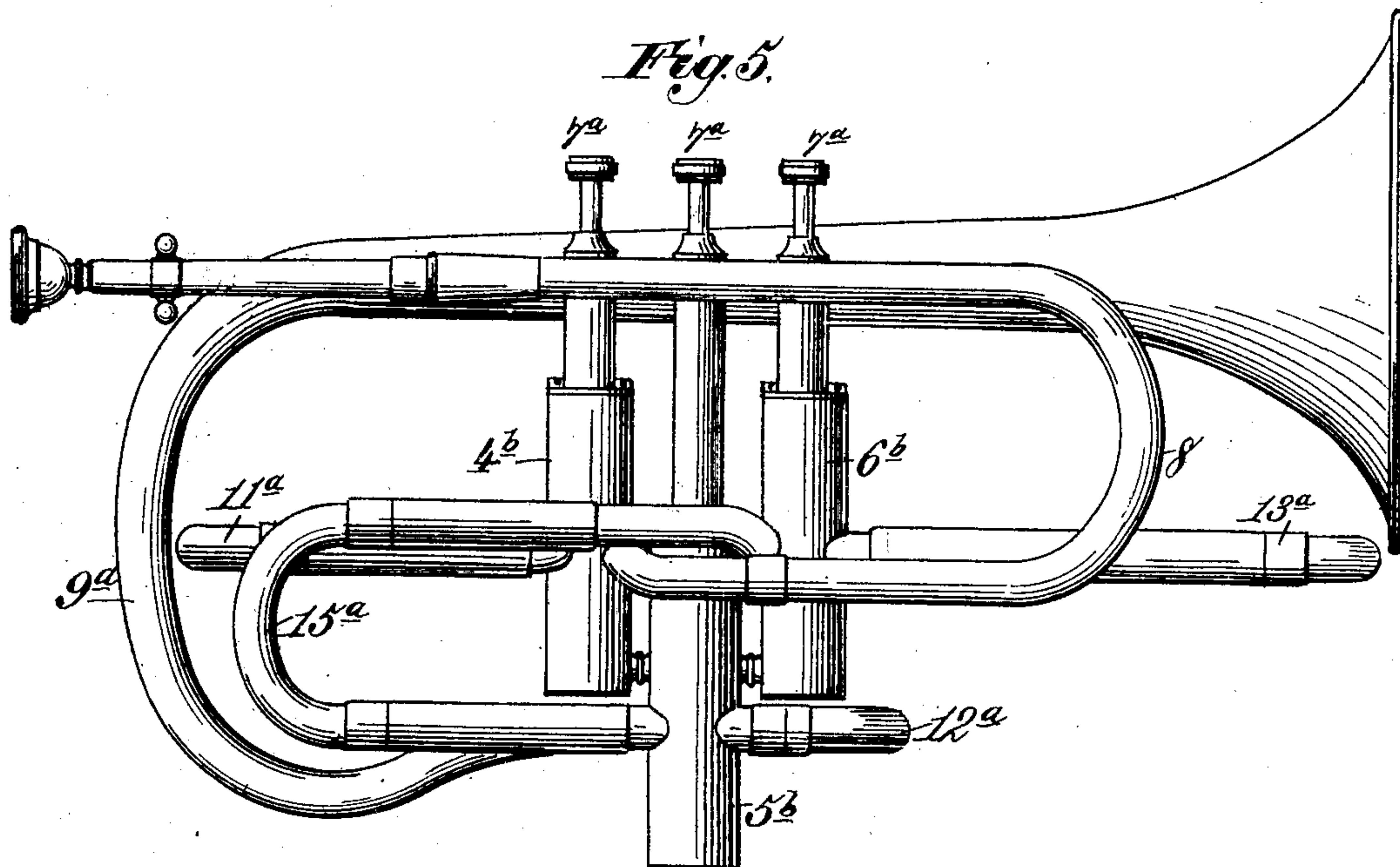
Patented Mar. 19, 1901.

F. A. BUESCHER.
WIND MUSICAL INSTRUMENT.

(No Model.)

(Application filed Oct. 20, 1900.)

2 Sheets—Sheet 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

FERDINAND A. BUESCHER, OF ELKHART, INDIANA, ASSIGNOR TO THE
BUESCHER MANUFACTURING CO., OF SAME PLACE.

WIND MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 670,365, dated March 19, 1901.

Application filed October 20, 1900. Serial No. 33,751. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND A. BUESCHER, a citizen of the United States, residing at Elkhart, in the county of Elkhart and State of Indiana, have invented new and useful Improvements in Wind Musical Instruments, of which the following is a specification.

My invention relates to valved wind musical instruments, one object of the same being to eliminate many and make easy all curves in the wind-passage and to produce an absolutely clear bore free from any obstructions in the pipes or tubes, whereby a perfect equality in the valve and open tones throughout the entire register may be obtained.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be set forth in the claims.

In the drawings forming a part of this specification, Figure 1 is a side elevation of a cornet embodying my invention. Fig. 2 is a sectional view of the valves, showing the same in their normal positions. Fig. 3 is a similar view of the valves, showing the same depressed in position for a valve tone. Fig. 4 represents two detail views of the lower end of the valves. Fig. 5 is a side elevation of a modified construction. Fig. 6 is a sectional view of the valves employed therein. Fig. 7 is a similar view of the valves, showing the same in depressed position; and Fig. 8 is a detail view of one of the valves employed in the construction shown in Figs. 5, 6, and 7.

Like reference-numerals indicate like parts in the different views.

My invention has been illustrated as applied to a cornet; but it is obvious that it may be used in connection with any other valved wind instrument.

The piston-valves 1, 2, and 3 are mounted to be reciprocated in the valve-cylinders 4, 5, and 6, each being provided at its upper end with a finger-tip 7, by means of which it may be depressed. The cylinder 5 of the second valve projects down below the lower ends of the cylinders 4 and 6 for a purpose which will appear later. The mouth-pipe 8 communicates with the cylinder 4 of the first valve 1 and the bell-pipe 9 leads upon a curve from the cylinder 5 of the second valve 2. The end of the mouth-pipe adjacent to its point

of connection with the cylinder 4 is curved around the cylinder 5 and enters said cylinder 4 on the side near the cylinder 5. Connecting the cylinders of the first and third valves 1 and 3 is a short curved pipe 10, cut upon substantially the same curve as the curved end of the mouth-pipe 8 and extending around the cylinder 5 of the second valve 2 on the side of the instrument opposite the mouth-pipe. A valve-slide 11 communicates at its opposite ends with the cylinder of the first valve 1, a valve-slide 12 communicates at its opposite ends with the cylinder 5 of the second valve 2 and preferably lies at a point beneath the lower end of the valve-cylinder 6, and a third valve-slide 13 communicates at its opposite ends with the cylinder 6 of the third valve 3. Leading from the cylinder 6 of the third valve 3 is a tuning-slide 15, which communicates at its opposite end upon a curve with the cylinder 5 of the second valve 2. The end of the tuning-slide 15 adjacent to its point of connection with the cylinder 6 is curved around the cylinder 5 and enters the cylinder 6 above the curved end of the mouth-pipe 8 on the side of the instrument opposite the pipe 10. The ends of each of the valve-slides 11 12 13 enter the respective cylinders with which they communicate upon a curve substantially the same as that at the end of the mouth-pipe 8, and the opposite ends of each slide are shown as entering the respective valve-cylinders in different planes, but it is obvious that they may enter said cylinders in the same plane. One end of the valve-slide 11 enters the cylinder 4 at a point in the same plane with the point of entrance of the pipe 10 with said cylinder, while the other end of the valve-slide 11 enters said cylinder 4 at a point in the same plane with the point of entrance of the mouth-pipe 8 with said cylinder. One end of the valve-slide 12 enters the cylinder 5 at a point in the same plane with the point of entrance of the tuning-slide 15 with said cylinder, while the other end of the valve-slide 12 enters the cylinder 5 at a point in the same plane with the point of entrance of the bell-pipe 9 with said cylinder. One end of the valve-slide 13 enters the cylinder 6 at a point in the same plane with the point of entrance

of the tuning-slide 15 with said cylinder, while the other end of the valve-slide 13 enters said cylinder 6 at a point in the same plane with the point of entrance of the pipe 10 with said cylinder. The result of this arrangement is that when one or more of the valve-slides are thrown into the wind-passage there is no upward or downward deviation in the course of the air in passing through the valve or valves into or out of said slides. This is an important feature of construction, as it avoids the abrupt turns at the points named, which are present in the old instruments of this class.

Each of the valves 1, 2, and 3 is formed near its lower end with a single curved port 16 17 18, respectively, and when said valves are in their normal raised positions the port 16 connects the mouth-pipe 8 with the pipe 10 upon a continuous unbroken curve, the port 18 in the valve 3 connects the pipe 10 with the tuning-slide 15 in a similar manner, and the port 17 in the valve 2 connects the tuning-slide 15 with the bell-pipe 9, also in a similar manner. It will thus be seen, as illustrated in Fig. 2 of the drawings, that a complete substantially circular passage is produced which completely surrounds the cylinder 5 of the second valve and includes the curved end of the mouth-pipe 8, port 16 in valve 1, pipe 10, port 18 in valve 3, and curved end of tuning-slide 15, adjacent to the cylinder 6. All of the different parts of this passage register with each other without break and without the production of obstructions or abrupt bends therein. This passage is an important feature of construction of my invention, and as it completely surrounds the second valve 2 it will hereinafter be referred to as the "circular passage," although this term is used in a relative and not a literal sense. I do not desire to be limited to a passage in the exact form of a circle, as the same is not shown in this form, but I intend the term to include a passage in substantially circular shape. The valves are now in position for an open-tone note, and it will be observed that the passage of air through the instrument is from the mouthpiece through mouth-pipe 8, circular passage around the second valve 2, tuning-slide 15, and port 17 of valve 2 to the bell-pipe 9. This wind-passage through the instrument, as will be noted, has no sharp turns or abrupt curves, but, on the other hand, the turns and curves are long and easy ones.

Above the port 16 in the valve 1 are two transverse curved ports 19 20, each lying in a plane at right angles to the direction of the length of said valve—that is to say, the points of entrance and exit of the port 19, as well as of the port 20, are directly opposite each other. Similar ports 21, 22, 23, and 24 are formed in the valves 2 and 3, respectively, above the ports 17 and 18 therein. The upper ports above referred to in the valves 1, 2, and 3 are designed when said valves are depressed to open communication between the first slide

11, the second slide 12, and the third slide 13 and the valve-cylinders 4, 5, and 6, respectively, and to throw the slides 11 and 13 into the circular passage around the second valve 2. The valves 1, 2, and 3 are shown in this depressed position in Fig. 3 of the drawings. The passage through the instrument is now from mouth-pipe 8, through port 20 of valve 1, valve-slide 11, port 19 of valve 1, pipe 10, port 23 in valve 3, valve-slide 13, port 24 in valve 3, tuning-slide 15, port 22 in valve 2, valve-slide 12, and port 21 in valve 2 to bell-pipe 9. This passage through the instrument includes all portions of the circular passage around the second valve 2 except the ports 16 and 18 in the valves 1 and 3, respectively, for which ports are substituted the ports 19 and 20 of the valve 1 and the ports 23 and 24 of the valve 3. The ports 19 and 20 and 23 and 24 of the valves 1 and 3, respectively, serve as the means for throwing the valve-slides 11 and 13 into the circular passage around the valve 2. In any position of the valves therefore the column of air passing through the instrument is caused to traverse the circular passage above referred to and makes no more reverse turns than when the instrument is in position for the open tones. The instrument is now adapted for the production of valve tones, and it will be observed that throughout the entire circuitous wind-passage above traced not a single sharp curve or additional reverse turn from that used for the open tones exists. A number of the usual reverse turns are entirely eliminated, and there are fewer of these turns in the production of the valve tones than are employed in the ordinary instrument. The result is that a perfect equality is obtained in both the valve and open tones and a volume and carrying power is provided for which has never been approached in any other instrument. In the ordinary instrument of this kind when the valves are depressed tubing is added and the air-passage is completely reversed, making very short and abrupt turns and adding more turns. This is what causes the valve tones to be badly out of tune and wanting in volume. According to my construction, when one or more of the valves are depressed a tube or tubes is added to the wind-passage, which does not change the course of the air in the opposite direction more times than when said valves are in their normal positions. There is thereby obtained the same purity and volume in the valve tones as in the open tones. It should be stated in this connection that the ports described in the different valves are circular in cross-section at all points. In many, if not all, of the instruments of the kind described which have preceded mine all ports through the valves are diagonally arranged, and by reason of the fact that one port overlaps the other lumps or flattened portions are formed in each of the said ports. In such cases the air-passage is not of clear

bore, whereas in my construction it is perfectly clear and free from obstructions throughout its entire length. If the diagonally-arranged tubes in prior constructions were placed far enough apart to avoid the lumps or projections referred to, the action on the keys or finger-pieces of the valves would be so long as to render the instrument impractical. By forming the ports 19, 20, 21, 22, 23, and 24 through the valves in horizontal planes at right angles to the direction of length of said valves, as is done according to my invention, all upward or downward deviation in the course of the wind-passage at the valves into and out of the valve-slides is avoided, and a valve action is obtained which is considerably shorter than can be obtained by any of the prior constructions with which I am familiar.

In Figs. 5, 6, 7, and 8 of the drawings I have shown a modified construction, which may be termed a "six-valve instrument." In reality, however, there are employed three double valves and three double cylinders therefor, instead of three single valves, as are shown in the remaining figures of the drawings. In this form of my invention the valve-cylinders 4^a, 4^b, 5^a, 5^b, 6^a, and 6^b are arranged in pairs, as shown, and each pair contains a double valve similar in construction to the valves 1, 2, and 3, heretofore described, the two members of each valve being connected together at their upper ends and adapted to be operated by a single fingertip 7^a, similar to the tip 7. (Shown in Fig. 1 of the drawings.) The cylinders 4^a and 4^b are connected together by a short pipe 4^c, the cylinders 5^a and 5^b are connected together by a short pipe 5^c, and the cylinders 6^a and 6^b are connected together by a short pipe 6^c. The first valve-slide 11^a communicates at its opposite ends with the valve-cylinders 4^a and 4^b, the second valve-slide 12^a communicates at its opposite ends with the valve-cylinders 5^a and 5^b, the third valve-slide 13^a communicates at its opposite ends with the valve-cylinders 6^a and 6^b, and these valve-slides are similar in all respects to the slides 11, 12, and 13, heretofore referred to. The valve-cylinders 6^a and 4^a are connected by a curved pipe 10^a, similar to the pipe 10, above described, and the tuning-slide 15^a leads from the valve-cylinder 6^b, the latter slide communicating at its opposite end with the valve-cylinder 5^b. From the valve-cylinder 5^a leads the bell-pipe 9^a. The two members 1^a and 1^b of the first valve, which fit and move, respectively, in the valve-cylinders 4^a and 4^b, are provided near their lower ends with transverse ports 16^a 16^b, similar in all respects to the port 16 in the valve 1. Above the port 16^b in the member 1^b of the first valve, however, is formed a port 20^a, similar to the port 20 in the valve 1, and above the port 16^a in the member 1^a of the first valve is a port 19^a, similar in all respects to the port 19 in the valve 1. Corresponding ports 17^a and 17^b are formed, respectively, in

the members 2^a and 2^b of the second valve similar in all respects to the port 17 in the valve 2. The members 2^a and 2^b of the second valve are further provided above the ports 17^a and 17^b with ports 21^a and 22^b, similar to the ports 21 and 22 in the valve 2. In the members 3^a and 3^b of the third valve are formed, respectively, the ports 18^a and 18^b, similar to the port 18 in the valve 3, and above these ports are formed the additional ports 23^a and 24^b, similar in all respects to the ports 23 and 24 in the valve 3. In this modified construction it will be observed that the same circular passage completely surrounding the central or second valve 2^a 2^b is provided, the same including the curved end of the mouth-pipe 8, port 16^b of member 1^b of the first valve, pipe 4^c, port 16^a of member 1^a of the first valve, pipe 10^a, port 18^a of member 3^a of the third valve, pipe 6^c, port 18^b of member 3^b of the third valve, and the curved end of tuning-slide 15^a adjacent to valve-cylinder 6^b. When the valves are in their normal positions, as shown in Fig. 6, and adapted for the production of an open tone, the wind-passage through the instrument is as follows: mouth-pipe 8, circular passage around the second valve 2^a 2^b, tuning-slide 15^a, port 17^b in member 2^b of second valve, pipe 5^c, port 17^a in member 2^a of second valve, and thence out to bell-pipe 9^a. When all the valves are depressed, as shown in Fig. 7, for the purpose of producing one of the valve tones, the air passage through the instrument is as follows: mouth-pipe 8, port 20^a in member 1^b of the first valve, valve-slide 11^a, port 19^a in member 1^a of first valve, pipe 10^a, port 23^a in member 3^a of third valve, valve-slide 13^a, port 24^b in member 3^b of third valve, tuning-slide 15^a, port 22^b in member 2^b of second valve, valve-slide 12^a, port 21^a in member 2^a of second valve, and thence to bell-pipe 9^a.

In the construction shown in Figs. 5, 6, 7, and 8, as in the construction shown in the remaining figures, all abrupt turns and sharp curves are avoided and a clear unobstructed passage is provided through the instrument, whereby a brilliancy and equality of tone may be produced throughout the entire register. Furthermore, there are no more reverse turns in the wind-passage when the valves are depressed for the production of a valve tone than when the valves are in their normal positions. By providing the double valves and duplicate valve-cylinders therefor, according to the construction shown in Figs. 5, 6, 7, and 8, even less abrupt turns are made in the wind-passage than in the construction shown in the remaining figures.

As the cylinders 4^a and 4^b, 5^a and 5^b, and 6^a and 6^b are arranged in pairs, the members of which are in communication with each other, the said pairs may be considered as single-valve cylinders.

The different valves heretofore referred to have been shown and described as piston-valves. It is obvious, however, that rotary

valves may be used in lieu thereof, and my invention contemplates the substitution of one for the other. I therefore do not limit myself to either kind of valve except where
5 it is expressly done in the claims.

As heretofore stated, the cylinder 5 of the second valve 2 extends down below the ends of the cylinders 4 and 6 of the first and third valves 1 and 3. To the projecting lower end
10 of the cylinder 5 the valve-slide 12 is connected on one side and one end of the tuning-slide 15 and the bell-pipe 9 are connected on the other side. The valve-slide 12 is located beneath the lower end of the cylinder 6 of
15 the third valve 3 and the tuning-slide 15 and the bell-pipe 9 enter the cylinder 5 at points below the lower end of the cylinder 4 of the first valve 1. In this way a convenient location for these parts is provided for; but in
20 addition, and more important, it enables one end of the valve-slide 12 to be located in the same plane with and directly opposite one end of the tuning-slide 15 and the other end of the valve-slide 12 to be located in the same
25 plane with and practically opposite the end of the bell-pipe 9. While the extension of the cylinder 5 below the lower ends of the cylinders 4 and 6 is my preferred form of construction, I do not desire to limit myself
30 thereto, as all of the cylinders 4, 5, and 6 may be made of the same length. In such case, however, it is necessary that the valve-slide 12, which is connected with the cylinder 5 of the second valve 2, project laterally from said
35 cylinder, and the angles between the points of entrance of the ends of said slide to said cylinder and the points of entrance of the tuning-slide 15 and bell-pipe 9 with said cylinder are sharper or more acute than are produced by the preferred arrangement above
40 described.

In the first bend or crook of the mouth-pipe 8 I locate a supplemental tuning-slide 25, designed for the purpose of enabling a
45 cornet or other wind instrument to be changed from one pitch to another without withdrawing the instrument from the lips of the operator. For example, a cornet or other wind instrument made originally in B-flat may by
50 this arrangement be changed to the pitch of A-natural by simply drawing the slide 25 outwardly or to the rear. The slide 25 consists, as usual, of a curved coupling-piece telescoping into two parts of the mouth-pipe 8 and
55 movable longitudinally of the instrument. Connecting the two side members of the slide 25 is a supporting and bracing bar 26, to which is connected a guide-rod 27, extending through a loop or eye 28, secured to the upper
60 part of the mouth-pipe 8. Upon the free end of the rod 27 is a head 29, adapted to engage the loop 28 when the slide 25 is drawn outwardly, the said head serving as a stop-piece for limiting the outward or rearward
65 movement of said slide and also serving as a thumb-engaging portion for operating the slide. When the slide 25 is in its normal po-

sition, as shown in Fig. 1 of the drawings, the key of the instrument may be readily and quickly changed from, say, B-flat to A, without withdrawing the instrument from the lips, by the operator simply applying pressure with the thumb of the right hand upon the head 29 and forcing said slide outwardly until the said head 29 comes into engagement
75 with the loop 28 on the mouthpiece 8.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a wind musical instrument, means for adding tubing to the wind-passage without
80 producing additional reverse turns therein.

2. In a wind musical instrument, valve-slides, and means for throwing said slides into the wind-passage without producing additional reverse turns in said passage.
85

3. A wind musical instrument having three valves and a circular passage surrounding the second valve and including the first and third valves, and valve-slides adapted to be thrown into said passage by said valves.
90

4. A wind musical instrument having three valves, a circular passage surrounding the second valve and including ports in the first and third valves, and valve-slides whose ends respectively lie in the same planes with the
95 adjacent portions of said circular passage, and are adapted to be thrown into said circular passage by said valves.

5. A wind musical instrument having three valves provided with a plurality of transverse ports, a circular passage surrounding the second valve and including ports in the first and third valves, and valve-slides whose ends respectively lie in the same planes with the adjacent portions of said circular passage,
100 and are adapted to be thrown into said circular passage by said valve, the ports in said valves through which said slides are thrown into the circular passage lying in planes at right angles to the direction of the length of
105 said valves.

6. A wind musical instrument having three piston-valves provided with a series of transverse ports, the upper two of which ports each have their points of entrance and exit
115 in the same plane, a circular passage, included in the wind-passage through the instrument, surrounding the second valve and including the lowest ports in the first and third valves, and valve-slides whose ends respectively lie in the same planes with the adjacent portions of said circular passage, and are adapted to be thrown into said circular passage when said valves are depressed and the upper two ports of said valves are brought
120 opposite the ends of said slides.

7. In a wind musical instrument, a series of piston-valves, cylinders for said valves, a curved pipe connecting the cylinders of the first and third valves and extending around
130 the cylinder of the second valve, a mouth-pipe communicating on a curve with the cylinder of one of the end valves, a tuning-slide communicating on a curve with the cylinder

of the other end valve and also communicating with the cylinder of the second valve, the curved ends of said mouth-pipe and said tuning-slide forming with ports in the first and third valves and with said curved pipe a circular passage which completely surrounds said second valve, valve-slides communicating at their ends with the cylinders of the first, second and third valves, respectively, and a bell-pipe leading from the cylinder of the second valve, each of said valves being provided with a plurality of curved ports designed to throw said valve-slides into and out of the wind-passage through the instrument.

8. In a wind musical instrument, a series of piston-valves, cylinders for said valves, a curved pipe connecting the cylinders of the first and third valves and extending around the cylinder of the second valve, a mouth-pipe communicating on a curve with the cylinder of the first valve, a tuning-slide communicating on a curve with the cylinder of the third valve and also communicating with the cylinder of the second valve, the curved ends of said pipe and tuning-slide forming with ports in the first and third valves and with said curved pipe a circular passage completely surrounding said second valve, a bell-pipe leading from the cylinder of the second valve, a valve-slide communicating at its ends with the cylinder of the first valve, one of its ends lying in the same plane with the adjacent end of said curved pipe and the other of its ends lying in the same plane with the adjacent end of said mouth-pipe, a valve-slide communicating at its ends with the cylinder of the second valve, one of its ends lying in the same plane with the adjacent end of said tuning-slide and the other of its ends lying in the same plane with the adjacent end of said bell-pipe, and a third valve-slide communicating at its ends with the cylinder of the third valve, one of its ends lying in the same plane with the adjacent end of said curved pipe and the other of its ends lying in the same plane with the adjacent end of said tuning-slide, each of said valves being provided with a plurality of curved ports arranged in parallel planes at right angles to the body of the valve and designed to throw said valve-slides into and out of the wind-passage through the instrument.

9. A wind musical instrument having three double piston-valves and a circular passage surrounding the second valve and including the first and third valves, and valve-slides adapted to be thrown into said passage by said valves.

10. A wind musical instrument having three double valves, a circular passage surrounding the second valve and including ports in both members of the first and third valves, and valve-slides whose ends respectively lie in the same planes with the adjacent portions of said circular passage and are adapted to be thrown into said circular passage by said valves.

11. A wind musical instrument having three double valves, each member of each valve being provided with a plurality of transverse ports, a circular passage surrounding the second valve and including one port in each member of the first and third valves, and valve-slides whose ends respectively lie in the same planes with the adjacent portions of said circular passage and are adapted to be thrown into said circular passage by said valves, the ports in each member of each of said valves through which said slides are thrown into the circular passage lying in a plane at right angles to the length of said valves.

12. A wind musical instrument having three double piston-valves, each member of each of said valves being provided with a plurality of transverse ports, the upper port in each member of said valves having its points of entrance and exit in the same plane, a circular passage included in the wind-passage through the instrument, surrounding the second valve and including the lower port in each member of the first and third valves, and valve-slides whose ends respectively lie in the same planes with the adjacent portions of said circular passage and are adapted to be thrown into said circular passage when said valves are depressed and the upper port of each member of the first and third valves is brought opposite the end of the slide adjacent thereto.

13. In a wind musical instrument, a series of double piston-valves, a series of cylinders for said valves arranged in pairs, the members of each pair communicating one with the other, a curved pipe connecting the cylinder of one member of the first valve with the cylinder of one member of the third valve and extending around one of the cylinders of the second valve, a mouth-pipe communicating on a curve with one of the cylinders of one of the end valves, a tuning-slide communicating on a curve with one of the cylinders of the other end valve and also communicating with one of the cylinders of the second valve, a bell-pipe leading from the other cylinder of the second valve, the curved ends of said mouth-pipe and tuning-slide forming with ports in both members of the first and third valves and with said curved pipe a circular passage which completely surrounds said second valve, and valve-slides communicating at their ends with the two members of each pair of cylinders of the first, second and third valves, respectively, each of said valves being provided with a plurality of ports designed to throw said valve-slides into and out of the wind-passage through the instrument.

14. In a wind musical instrument, a series of double piston-valves, a series of cylinders for said valves arranged in pairs, the members of each pair communicating one with the other, a curved pipe connecting the cylinder of one member of the first valve with

the cylinder of one member of the third valve and extending around one of the cylinders of the second valve, a mouth-pipe communicating on a curve with one of the cylinders of the first valve, a tuning-slide communicating on a curve with one of the cylinders of the third valve and also communicating with one of the cylinders of the second valve, a bell-pipe leading from the other cylinder of the second valve, the curved ends of said mouth-pipe and tuning-slide forming with ports in each member of the first and third valves and with said curved pipe a circular passage which completely surrounds the second valve and forms a part of the wind-passage through the instrument, a valve-slide communicating at its ends, respectively with the cylinders of both members of the first valve, one end of said slide lying in the same plane with the adjacent end of said curved pipe and the other end of said slide lying in the same plane with the adjacent end of said mouth-pipe, a valve-slide communicating at its opposite ends with the cylinders of both members of the second valve, one end of said slide lying in the same plane with the adjacent end of said tuning-slide and the other end of said slide lying in the same plane with

the adjacent end of said bell-pipe, and a third valve-slide communicating at its opposite ends with the cylinders of both members of the third valve, one end of said slide lying in the same plane with the adjacent end of said curved pipe and the other end of said slide lying in the same plane with the adjacent end of said tuning-slide, each member of each valve being provided with a plurality of curved ports one of which has its points of entrance and exit in the same plane at right angles to the body of the valve and designed to throw the adjacent valve-slide into and out of the wind-passage through the instrument.

15. A wind musical instrument having a series of piston-valves, and cylinders therefor, the cylinder of the second or middle valve projecting at one end beyond the cylinders of the first and third valves, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FERDINAND A. BUESCHER.

Witnesses:

SAMUEL HOKE,

FREDERICK A. REED.