

No. 885,880.

PATENTED APR. 28, 1908.

F. W. STAHL.  
CLARINET.

APPLICATION FILED APR. 12, 1904.

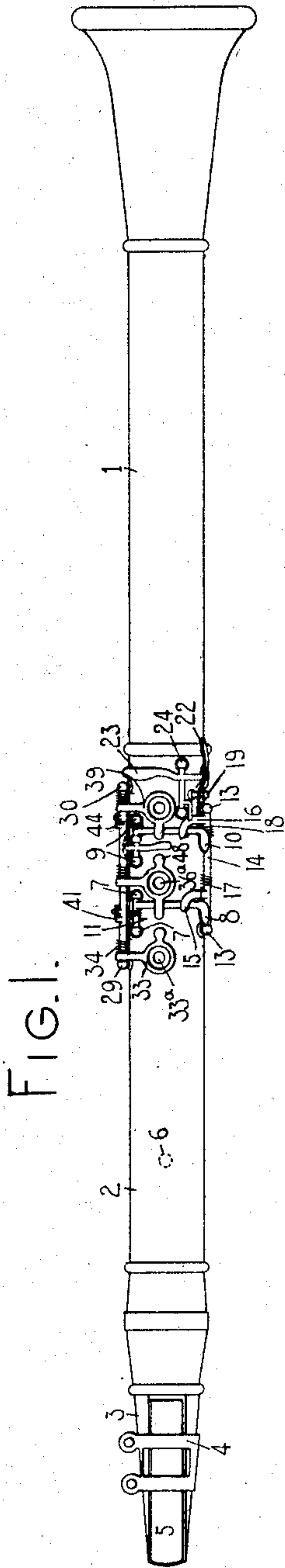
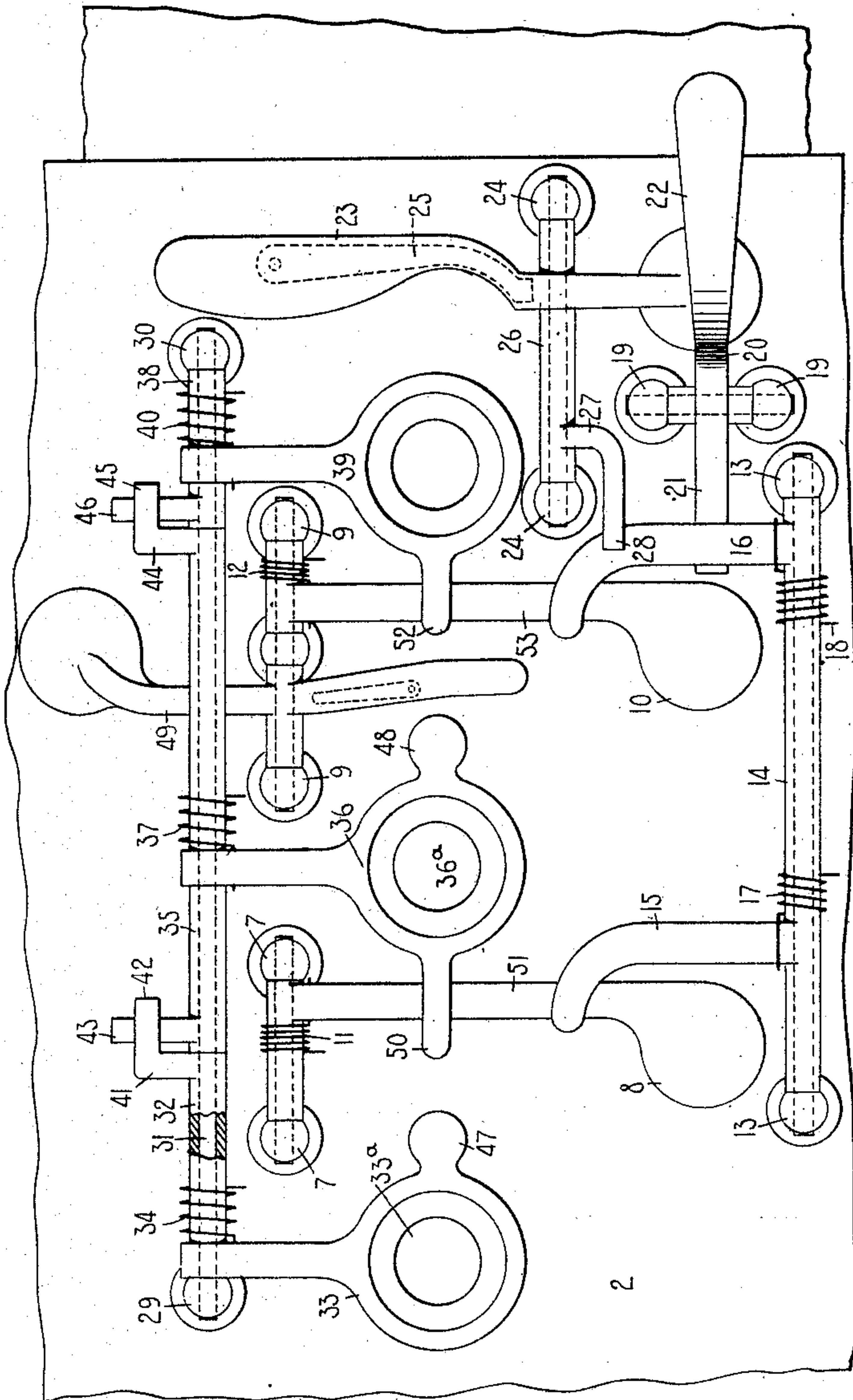


FIG. 2.



WITNESSES:

E. M. Velle.

M. F. Hammer.

INVENTOR:

Frank W. Stahl

by M. W. Pool

HIS ATTORNEY



# UNITED STATES PATENT OFFICE.

FRANK WINTHROP STAHL, OF DENVER, COLORADO.

## CLARINET.

No. 885,880.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed April 12, 1904. Serial No. 202,755.

*To all whom it may concern:*

Be it known that I, FRANK WINTHROP STAHL, citizen of the United States, and resident of Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Clarinets, of which the following is a specification.

My invention relates to musical instruments and more especially to that class known as "reed" and particularly to the clarinet, and has for its object an improved mechanism for producing notes whereby the fingering is much simplified, and certain passages and trills heretofore very difficult or impossible of execution may be effected with correctness and facility. For example, by providing a method of taking the D-flat with the right-hand first finger, the trill from C to D-flat may be easily made with said finger instead of in the awkward manner with the little finger of the left-hand, as in the usual construction; and the slurs from low E-natural or G-flat to D-flat are readily accomplished. The clarinet, it may be stated, has no set number of keys; additional keys are added for the purpose of rendering certain fingerings easier, or for providing a way of making a certain note with either the right or the left-hand.

In the drawings, I have shown my device applied to a clarinet of an ordinary style, having three rings on the upper joint, but it should be understood that this is only one of many forms to which my invention might be applied, and further that I do not limit myself to the particular construction in which my invention is herein embodied.

Figure 1 shows a clarinet with my invention applied thereto, with such keys and other parts omitted as are not material. Fig. 2 shows an enlarged plan view, somewhat flattened, of so much of the instrument as is necessary to illustrate my invention.

In the drawings in which like numerals are employed to designate like parts throughout, 1 is the lower joint; 2, the upper joint; 3, the mouth-piece; 4, the reed holder, and 5, the reed.

At the back of and at about the center of the upper joint is the thumb hole 6, which in playing is covered by the left thumb. When this is closed and the instrument blown, the note F-sharp is produced. Mounted in the usual form of posts or bearings 7 in the rela-

tive position shown in the drawings is the F-natural cover or valve 8. Similarly mounted in posts or bearings 9 below the F-natural cover is the E-flat cover or valve 10. Spring 11 tends to keep the F-natural cover 8 in a raised position normally, and spring 12 tends to keep the E-flat cover 10 in a raised position normally. Mounted in posts or bearings 13 on the barrel of upper joint 2, and to the right of the F-natural and E-flat covers, is the piece 14 which is substantially U-shaped, comprising a sleeve portion bearing on a rod supported on the posts 13 and two arms. The upper arm 15 of the U-shaped piece 14 is vertically above the middle part of the arm of the F-natural cover 8, and the lower arm 16 is vertically above the middle part of the arm of the E-flat cover 10. Springs 17 and 18 are coiled about the U-shaped piece 14 near the bearings 13, and tend to keep the arms 15 and 16 in a depressed position. While one spring might be employed in lieu of springs 17 and 18, it is preferred to employ the two so as to distribute the pressure more evenly. The springs 17 and 18 are stronger than the springs 11 and 12 and since arm 15 is vertically above the middle portion of F-natural cover 8, and arm 16 vertically above the middle portion of E-flat cover 10, the tendency of springs 11 and 12 to keep the said covers raised from their respective holes is overcome, and they are forced down upon the barrel of the upper joint 2 and cover the holes, which latter it is not deemed necessary to represent in the drawings. The U-shaped piece 14 thus serves as a restraining member for the F-natural and E-flat covers. Pivoted in the usual manner in bearings 19 is a member or lever 20, the upper end 21 of which passes beneath the lower arm 16 of the U-shaped piece 14, and the lower arm of which is shaped to form a key-like part referred to herein as a finger-portion or piece 22 which is adapted to be actuated by the first finger of the right-hand.

The regular D-flat key 23 is pivoted in posts or bearings 24 and is kept depressed to cover its hole by flat spring 25 in a manner well known in the art. Integral with the tubular bearing portion 26 of D-flat key 23 is the L-shaped portion 27, the upper end 28 whereof is vertically above lower arm 16 of the U-shaped piece 14, and to the left of upper arm 21 of actuating lever 20.



Supported in posts or standards 29 and 30 is the bearing rod 31. Surrounding the upper portion of this rod and bearing thereon is the sleeve or tubular bearing portion 32 of upper ring 33, the said ring being held normally in a raised position by spiral spring 34. Surrounding bearing rod 31 below the tubular portion 33 is the sleeve or tubular bearing portion 35 of middle ring 36, which ring is held normally raised from the barrel of the clarinet by spiral spring 37. The lower end of rod 31 serves as a bearing for the sleeve or tubular portion 38 of lower ring 39, which is held normally raised by spiral spring 40. Integral with bearing portion 32 is the L-shaped piece 41, whose lower end 42 is adapted to be actuated by the lug 43 projecting from and integral with bearing portion 35; and integral with bearing portion 35 is L-shaped piece 44 whose lower end 45 is adapted to be actuated by the lug 46 integral with bearing portion 38 and passing beneath and in juxtaposition to the portion 45 of said L-shaped piece 44. It will be apparent from this construction that the depression of ring 39 will serve to depress ring 36 through the action of lug 46 upon the portion 45 of the L-shaped piece 44, and that this movement downward of middle ring 36 will serve in turn to depress upper ring 33 through the action of lug 43 tending to lift the portion 42 of L-shaped piece 41, which is integral with the bearing portion 32 of said upper ring 33. It will likewise be clear that upper ring 33 may be similarly depressed upon the depression of middle ring 36 without the depression of lower ring 39, and that such depression of said middle ring 36 will not move lower ring 39 from its normal raised position. Upper ring 33 may be depressed against the action of its spring 34 without moving either of the lower rings. When all three rings are depressed in the fingering of the instrument, the lower ring 39 may be released and allowed to return to its normal raised position while the two upper rings still remain depressed by the fingers; and thereafter middle ring 36 may likewise be released and allowed to return to its normal raised position, ring 33 still remaining depressed.

The use of the rings may be briefly adverted to, although their purpose is one well understood in the art. Integral with and projecting from the lower part of upper ring 33, as seen in Fig. 2, is the circular extension 47 normally lying above a small hole which is bored into the barrel of the instrument slightly below the hole 33<sup>a</sup> encircled by ring 33; and integral with middle ring 36 is the circular extension 48 adapted to close a small hole below the hole 36<sup>a</sup> which is encircled by ring 36. The upper and middle rings are employed for the purpose of giving a correct F-sharp without using the F-natural key, the thumb hole 6, solely, being stopped

for that purpose. The reason why the hole 33<sup>a</sup> could not have been made larger to sharpen the tone and thus avoid the necessity of employing the supplemental hole under the circular extension 47 is that there is a note C made in the upper register of the instrument by what is called the fork fingering (that is, the second finger of the left-hand is dropped on middle ring 36, stopping the hole 36<sup>a</sup> and the supplemental hole under 47 while the first finger of the left hand is kept raised from upper ring 33), and if the hole beneath upper ring 33 were made large enough to give a correct F-sharp, it would make the note C by the fork fingering too sharp. Hence it is that the hole under the first finger must be kept the proper size to make the note C in tune. The third ring is employed to make another tone in tune by the fork fingering, namely, B-flat in the upper register, which is made by pressing down upper ring 33 and lower ring 39 with the first and third fingers respectively of the left hand, thus stopping the holes beneath, and raising the middle finger from middle ring 36. Without lower ring 39 the tone by the fork fingering is too sharp, but it is brought into tune by making the hole 36<sup>a</sup> smaller and then adding an extra hole (not shown) covered by the circular projection 48. The effect of this construction and mode of operation is that when the second finger of the left hand is off the middle ring 36 and the latter is then raised by its spring 37, the supplemental hole beneath circular projection 48 brings the tone up to the same pitch as would have been obtained had the hole under middle ring 36 not been made smaller.

As ordinarily constructed, clarinets with three rings on the upper joint have the upper ring separately mounted and controlled by an independent spring, while the two lower rings are mounted on the same bearing and held normally raised by the same spring. It may be stated that it is not necessary that the two lower rings should be so connected; what is required is that the three rings should work in a certain way, namely, the middle ring should close the upper one and the lower ring should close the middle one. The mechanism of the three rings described above fulfils these requisites.

As ordinarily constructed, the E-flat key, cover or valve corresponding to the one designated as 10 in my construction is independently mounted and is fingered by the fore finger of the right hand; in addition there is a second E-flat key corresponding to the one designated as 49 in my construction and designed to be fingered by the third finger of the left hand. This latter E-flat key 49, as I have shown it, in no wise differs from the ordinary construction.

The F-natural key corresponding to the F-natural key, cover or valve designated as 13c



8 in my construction is independently mounted in the ordinary and usual clarinet, and is designed to be fingered by the first finger of the right hand. The regular D-flat key is likewise independently mounted ordinarily and is fingered by the fourth finger of the left hand. Thus it will be seen that to make D-flat with the usual and ordinary instrument, the D-flat key is opened with the fourth finger of the left hand and then to make E-flat, either one or the other of the two E-flat keys must be opened, employing either the first finger of the right hand or the third finger of the left hand; and to make F-natural, the F-natural key is opened with the first finger of the right hand. In other words, it takes three separate keys to make these three notes which follow each other in the scale in the key of four flats.

Considering now the construction embodying my invention as illustrated in the drawings, suppose the second and third fingers of the left hand be raised from rings 36 and 39, thus allowing them to be lifted by their springs 37 and 40, and that finger key portion 22 of lever 20 be pressed with the first finger of the right hand, then the upper end 21 of lever 20, pressing against the underside of the lower arm 16 of the U-shaped piece 14, will tend to raise said U-shaped piece 14 about its pivots against the influence of its springs 17 and 18, and arms 15 and 16 will be raised. The rising of arm 15 permits F-natural cover 8 to rise under the influence of its spring 11, and the rising of lower arm 16 of U-shaped piece 14 permits E-flat cover 10 to rise and uncover its hole (not shown) under the influence of its spring 12. In its upward movement, arm 16 acts upon the upper end 28 of L-shaped projection 27 which is integral with the bearing portion 26 of D-flat key 23, thus causing said key 23 to unstop its hole. Thus it will be seen that pressure on the finger key portion 22 of lever 20 opens F-natural cover 8, E-flat cover 10 and D-flat key 23. The tone is given by the uppermost hole, and this being F-natural, the tone of F-natural is produced. Now if finger key or piece 22 of lever 20 be still held down with the first finger of the right hand, and the second finger of the left hand be pressed upon ring 36, the lug 50, which is a slight projection integral with ring 36, acting upon the straight portion or arm 51 carrying the F-natural cover 8, will overcome the influence of spring 11 and close said cover 8. The two lower holes (not shown) under the E-flat cover 10 and D-flat key 23 still remain open and the tone of the higher hole, E-flat, is produced. Still keeping the lever 20 open by the depression of finger piece 22 and pressing the third finger of the left hand upon lower ring 39, the lug 52 (which is a slight projection on ring 39 and integral therewith) is caused to press upon the straight arm or

portion 53 carrying the E-flat cover 10, overcoming the influence of spring 12 and closing the E-flat hole. Only the lower hole which gives D-flat now remains open, and the tone D-flat is produced. It is apparent, therefore, that the three notes, F-natural, E-flat and D-flat, are produced by the depression of the single finger key or piece 22 and the raising of its lever 20 acting in conjunction with the rings. Further, that the two covers or valves, F-natural and E-flat, are closed in either of two ways; namely,—first, by the arms 15 and 16 of U-shaped piece 14, which are normally pressed down by the springs 17 and 18; or second, by the middle ring 36 and lower ring 39. When the covers or valves 8 and 10 are depressed by the arms 15 and 16, the rings 36 and 39 may rise independently without the covers 8 and 10 coming open, and may be used for the ordinary purposes of giving a correct F-sharp without the F-natural key and a correct B-flat by the forked fingering.

It will be noted that I provide means operatively connected with the rings 36 and 39 for actuating the F-natural and E-flat covers, said means in the present instance being the lugs 50 and 52 extending respectively from the rings 36 and 39. It will be understood however that other means operatively connected with the rings may be employed for this purpose and that said other means may or may not be integral with the rings 36 and 39 as preferred.

Various other changes besides those referred to may be made within the scope of my invention.

What I claim as new and desire to secure by Letters Patent, is:—

1. In a clarinet or similar instrument, the combination of a plurality of covers some of which are normally closed, a finger piece, means mounted independently of said finger piece for opening a plurality of said normally closed covers when the finger piece is actuated, and means for closing certain of said normally closed covers after said finger piece has been actuated and before it is released.

2. In a clarinet or similar instrument, the combination of a plurality of covers some of which are normally closed, a finger piece, means mounted independently of said finger piece for opening three of said normally closed covers when the finger piece is depressed, and means for closing one of said normally closed covers while said finger piece is held depressed.

3. In a clarinet or similar instrument, the combination of a plurality of covers including normally-closed F-natural, E-flat and D-flat covers, a finger piece, means for opening the F-natural, E-flat and D-flat covers when the finger piece is actuated, and means for closing the F-natural cover while said E-flat and D-flat covers remain open.



4. In a clarinet or similar instrument, the combination of a plurality of covers including F-natural and E-flat covers, a finger piece, a restraining member normally closing said F-natural and E-flat covers and operative when said finger piece is actuated to permit of the opening of the F-natural and E-flat covers, rings, means connected with said rings and adapted to close said F-natural and E-flat covers after said finger piece has been actuated to allow them to open and before said finger piece is released, and means for opening said covers.

5. In a clarinet or similar instrument, the combination of a plurality of covers including normally-closed F-natural, E-flat and D-flat covers, a finger piece, means for opening the F-natural, E-flat and D-flat covers when the finger piece is actuated, and means whereby the F-natural and E-flat covers may be closed while said D-flat cover remains open.

6. In a clarinet or similar instrument, the combination of a plurality of covers including normally-closed F-natural, E-flat and D-flat covers, a finger piece, means for opening the F-natural, E-flat and D-flat covers when the finger piece is actuated, and means whereby the F-natural and E-flat covers may be further actuated in any desired order after said finger piece has been actuated to permit the opening of said covers and before said finger piece is released.

7. In a clarinet or similar instrument, the combination of a plurality of covers including normally-closed F-natural, E-flat and D-flat covers, a finger piece, means for opening the F-natural, E-flat and D-flat covers when said finger piece is actuated, a ring, and means operatively connected with said ring for closing the F-natural cover after said finger piece has been actuated and before it is released.

8. In a clarinet or similar instrument, the combination of a plurality of covers including normally-closed F-natural and E-flat covers, a finger piece, a restraining member normally closing said F-natural and E-flat covers, said member being controlled by said finger piece when actuated and being operative to permit of the opening of the F-natural and E-flat covers, and means for closing said F-natural and E-flat covers after the actuation of said finger piece and before it is released.

9. In a clarinet or similar instrument, the combination of a plurality of covers including normally closed F-natural, E-flat and D-flat covers, a finger piece, means for opening the F-natural, E-flat and D-flat covers when the finger piece is actuated, rings, and means connected with said rings and operating when they are depressed to close the F-natural and E-flat covers after the actuation of said finger piece and before it is released.

10. In a clarinet or similar instrument, the

combination of a plurality of covers including normally closed F-natural, E-flat and D-flat covers, a finger piece, means for opening the F-natural, E-flat and D-flat covers when the finger piece is actuated, a spring-pressed restraining member normally closing the F-natural and E-flat covers, said restraining member being operative by said finger piece to permit of the opening of the F-natural and E-flat covers, rings, and means connected with said rings and operating when they are depressed to close the F-natural and E-flat covers while the D-flat cover remains open.

11. In a clarinet or similar instrument, the combination with a plurality of covers, the middle finger ring and the third finger ring, of a finger piece, an F-natural cover, means controlled by said middle finger ring for moving said F-natural cover in one direction, means for moving said F-natural cover in the opposite direction when said finger piece is actuated, an E-flat cover, means controlled by said third finger ring for moving said E-flat cover in one direction, means for moving said E-flat cover in the opposite direction when said finger piece is actuated, a D-flat cover, and means controlled by said finger piece for moving said D-flat cover in one direction.

12. In a clarinet or similar instrument, the combination of an F-natural cover, an E-flat cover, means tending constantly to open said covers, a spring-pressed restraining member normally closing said covers, a finger operated lever for actuating said restraining member to free said covers, a plurality of rings normally held away from said covers, and means connected with said rings and operating when they are depressed to hold said covers closed, and means whereby one of said rings is operative to assist in producing the note F-sharp and another of said rings is operative to assist in producing B-flat in the upper register when said finger operated lever is in normal position.

13. In a clarinet or similar instrument, the combination of a plurality of valves or covers, springs tending to open said valves, a spring-pressed restraining member normally closing said valves, finger-operated means for actuating said restraining member to free said valves, and a plurality of rings normally spring pressed away from said covers and which when depressed hold said covers closed.

14. In a clarinet or similar instrument, the combination of a plurality of covers including an F-natural cover, a spring constantly tending to open said F-natural cover, an E-flat cover, a spring constantly tending to open said E-flat cover, a D-flat cover, a spring-pressed restraining member which normally maintains said F-natural and E-flat covers in closed position, said member being operative to release said F-natural and E-flat covers, finger operated means for

actuating said restraining member and said  
D-flat cover, rings, and means connected  
with said rings operable to close said F-  
natural and E-flat covers after they have  
5 been released from the control of said re-  
straining member.

Signed at Denver, in the county of Denver,

and State of Colorado, this fourth day of  
April A. D. 1904.

FRANK WINTHROP STAHL.

Witnesses:

F. J. CAMPBELL,  
WILLIAM A. RIME.