

Sept. 12, 1933.

L. LEBLANC

1,926,489

KEY MECHANISM FOR WOOD WIND INSTRUMENTS

Filed June 1, 1932

3 Sheets-Sheet 1

Fig. 1.

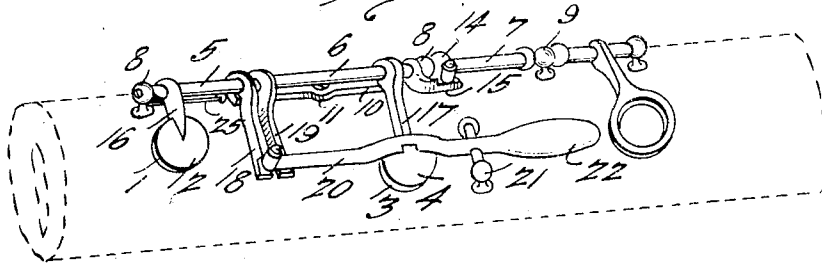


Fig. 2.

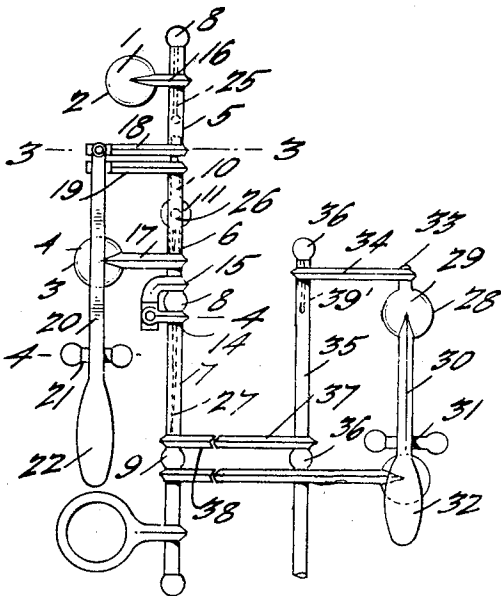


Fig. 6.

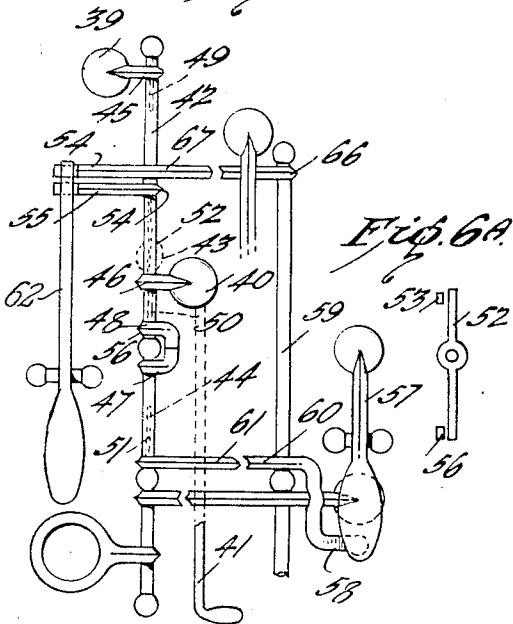


Fig. 6A.

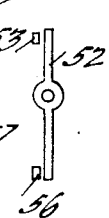


Fig. 3.

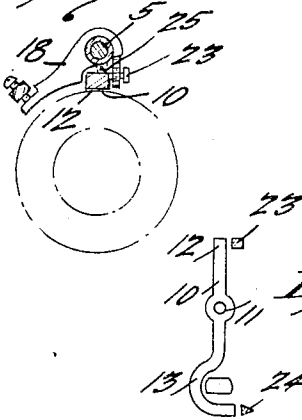


Fig. 4.

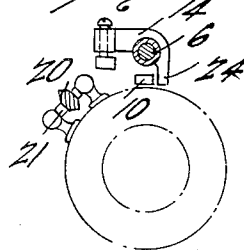
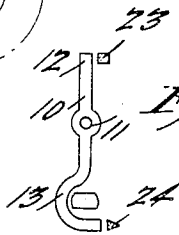


Fig. 5.



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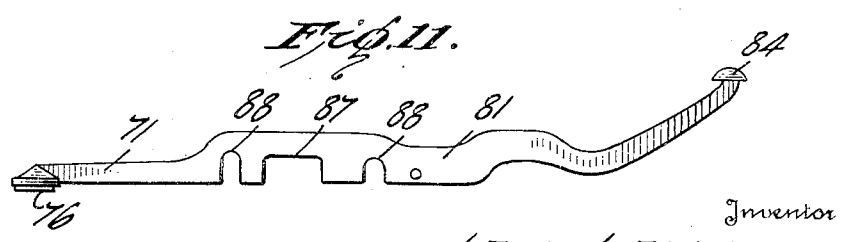
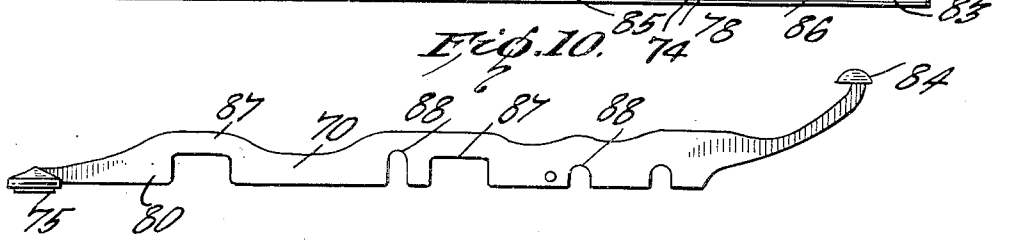
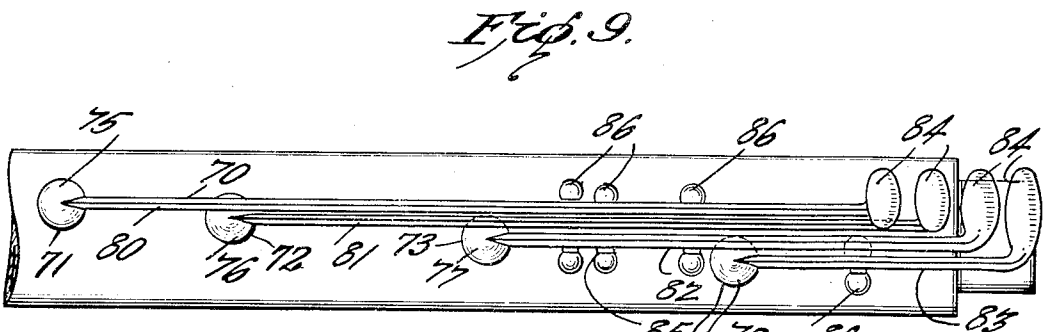
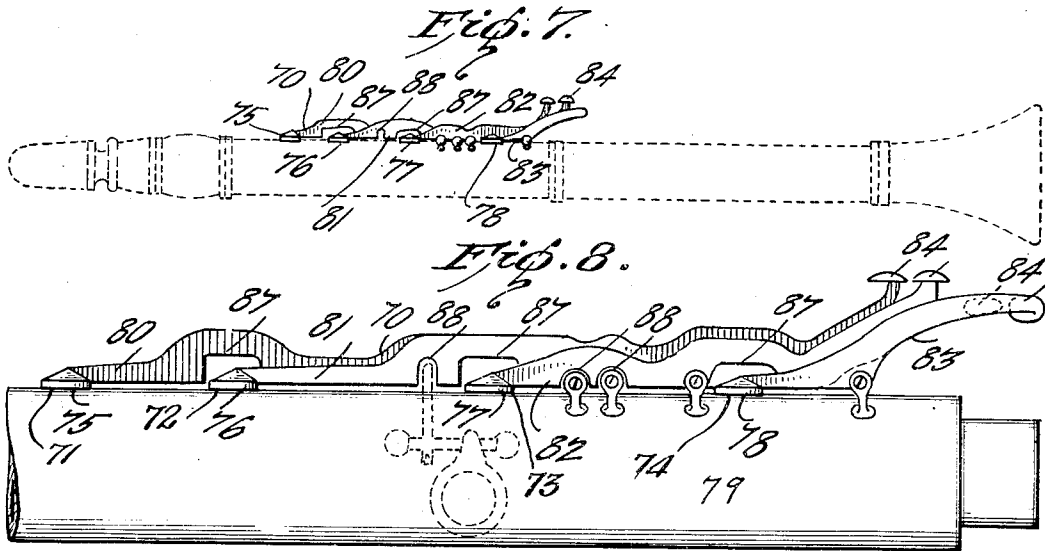
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3 Sheets-Sheet 2



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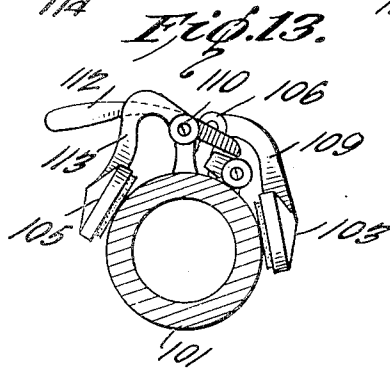
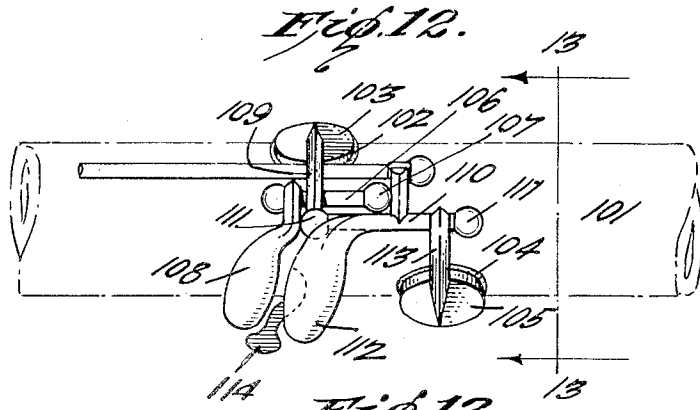
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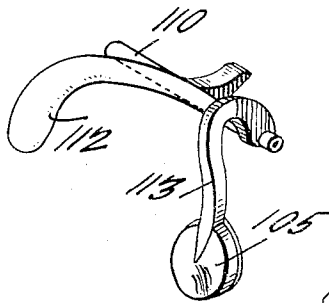
KEY MECHANISM FOR WOOD WIND INSTRUMENTS

Filed June 1, 1932

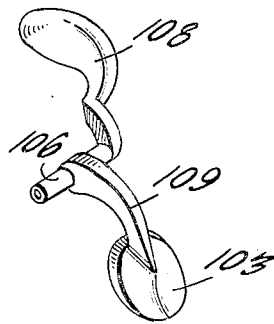
3 Sheets-Sheet 3



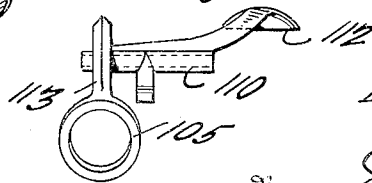
*Fig. 14.*



*Fig. 15.*



*Fig. 16.*



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# UNITED STATES PATENT OFFICE

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## KEY MECHANISM FOR WOOD WIND INSTRUMENTS

Leon Leblanc, Paris, France

Application June 1, 1932. Serial No. 614,775

11 Claims. (Cl. 84—382)

This invention is directed to a wood wind instrument of the clarinet type, with particular regard to key mechanism for particular control of the octave hole and the B flat hole when such 5 holes are segregated.

Conventionally, in order to reduce the difficulty of playing a clarinet, the octave hole has been made to serve also for playing the note B flat in the middle line of the treble clef, but by reason of the combined use of the single hole, the resonance of the B flat tone is inferior to that of any other note of the clarinet. 10

The primary object of the present invention is the segregation of the octave hole and B flat hole in the provision of a key for selectively controlling either hole, with such key, when independently operated, serving to permit opening of the octave hole and when operated in connection with the key for the adjacent A natural hole serving 20 to control the B flat hole.

A further object of the invention is the provision of the control mechanism which, under selective operation, will open the octave hole to that degree best suited for the production of the overtone, while at the same time providing for that 25 degree of opening of the B flat hole as will insure a full, clear and true note.

The invention is further directed to an improvement in trill keys of wind musical instruments of the type referred to, the invention in this particular being more directly concerned with the openings controlled by the trill keys. The trill keys and openings are at present so arranged with regard to the upper side of the 35 instrument when in playing position that the water due to the condensation of the vapor blown in the instrument and also the saliva of the musician tends to leak through and accumulate in these holes, with the effect of interfering with the proper sound and requiring special attention 40 by the musician from time to time to clear these openings.

Furthermore, as at present constructed, the keys for controlling the openings are not completely independent, as ordinarily two of such keys are supported upon a single axle. This has the effect of interfering with the sensitiveness of the key and ordinarily requiring a slightly different muscular effort in operating the keys so 45 mounted upon a single axle than where the keys are mounted on independent axles. Furthermore, as the keys when in proper position are offset from the line of openings in the body of the instrument, the keys are provided with lateral 55 arms which carry the opening controlling pads,

The primary object of the present invention is to arrange the trill key openings in the body of the instrument substantially in line, each with its respective key, and to arrange these openings so nearly in line with the extreme upper plane of the body of the instrument that the disadvantages 60 incident to the accumulation of saliva from the mouth of the musician or the condensation of the vapor blown into the instrument is, as experience has proven, entirely avoided. 65

A further object of the invention is to provide the trill keys of single lever construction and to mount the pad for the particular opening at the free end of the key and directly in line therewith, this arrangement of the keys and pads materially simplifying the construction of the lever 70 as compared with the ordinary lever, and as the invention also contemplates the mounting of each lever upon an independent pivotal support, each key is identically responsive to the opening pressure and thus the entire control is more uniform and sensitive than in the ordinary construction. 75

As the trill key levers are arranged side by side in close order, it is, of course, apparent that the pads of any one lever will in effect underlie the adjacent lever and the particular trill levers of the present invention are recessed within the region overlying a particular pad of an adjacent 80 lever to thereby permit free movement of the pad in response to its lever without interference from the adjacent lever. Furthermore, the levers are 85 appropriately recessed to cooperate with the pivotal mounting supports of the other levers where such would ordinarily interfere with the closing operation of the levers. 90

The invention is also directed to providing for the mounting of the keys of the low F and low A flat in order to avoid false bearing and permit the easier manipulation of the low A flat key and a more energetic action of the pad controlled by 95 that key.

The primary object of this detail of the invention is to provide independent parallel pivotal supports for the respective keys of the low F and low A flat, which keys as conventionally constructed are mounted on a single axis. 100

The invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a perspective of a part of the upper end of the clarinet, illustrating particularly 105 the application of the present invention, it being understood that the control mechanism for other notes incident to this part of the clarinet are omitted for the sake of clearness.

Figure 2 is a plan of the same. 110

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is a section on the line 4—4 of Figure 2.

5 Figure 5 is a plan of the controlling lever of the key mechanism, the relation of the particular limiting abutments being indicated in section.

Figure 6 is a plan of a modified arrangement.

10 Figure 6a is a detail showing the lever for use in connection with a modified form of Figure 6, together with the stops controlling and controlled by the lever.

15 Figure 7 illustrates diagrammatically a clarinet without fittings other than the trill keys, the view being designed to show the relation of the trill keys with the upper plane of the body of the instrument as the latter is in use.

Figure 8 is an enlarged broken side elevation of a portion of the instrument showing particularly the arrangement of the trill keys and opening controlling pads.

Figure 9 is a plan of the same.

Figure 10 is a side elevation of one of the levers.

25 Figure 11 is a side elevation of another of the levers.

Figure 12 is a broken plan showing the mounting of the particular keys with relation to the body of the instrument.

Figure 13 is an end view of the same.

30 Figure 14 is a perspective view of the low F key.

Figure 15 is a perspective view of the low A flat key.

35 Figure 16 is a bottom plan view of the low F key. In the detail of the invention directed to the control of the octave hole, and with particular reference to Figures 1 to 6 of the drawings, the octave opening is indicated at 1 and controlled by a pad 2, while the B flat opening is indicated at 3 and controlled by a pad 4. Conventional 40 pivot mountings are arranged lengthwise the body of the instrument, including for the purposes of the present invention three independent aligned sleeve sections 5, 6 and 7, the sections 5 and 6 being mounted in the end posts 8 and connected for independent movement by an interfitting post 9, while the section 7 is mounted in one of the posts 8 and the post 9.

45 Pivotaly supported on the body of the instrument underlying the pivot section is a control lever 10 pivotaly supported at 11, with a straight terminal 12 extending to and terminating adjacent one end of the pivot mounting 5 and an opposite curved terminal 13 which extends around the post 8 and underlies the end of 50 the pivot section 7. The pivot section 7 is provided with a curved arm 14 fixed to the end of the pivot section and extending partially around the adjacent post 8 and overlying and bearing upon a similar curved section 15 which is connected to the adjacent end of the pivot section 6, so that on rocking the section 7 in one direction, the section 6 is correspondingly rocked.

55 The octave opening pad 2 is carried by an arm 16 rigid with the pivot sleeve 5, while the pad 4 for the B flat hole is carried by an arm 17 rigid with the pivot section 6. The proximate ends of the pivot sections 5 and 6 are provided with arms 18 and 19 rigid with respect to the sections and projecting laterally therefrom in 60 spaced parallel relation, the terminals of the arms 18 and 19 being slightly reduced in thickness and underlying the free end of a key lever 20 supported upon a pivot section 21 and terminating at the opposite end in the usual finger 65 piece or spatula 22. The arm 18, which is rigidly

connected to the pivot sleeve 5, is at its connection with that sleeve provided with a depending extension forming an abutment 23 which normally rests immediately adjacent the end 12 of the control lever 10, while the curved element 14 80 which is rigidly connected to the pivot section 7 is provided with a depending projection forming an abutment 24 which lies immediately adjacent the free end of the pivot portion 13 of the lever 10. 85

A conventional spring 25 is arranged to meet the pivot section 5 and serves when free to act as a means for raising the octave hole control pad 2. A spring 26 underlies the pivot section 6 and serves when free to act to operate the arm 17 90 and thereby raise the pad 4 for the control of the B flat hole. A spring 27 underlies the pivot section 7 and is designed to operate the section to normally cause the curved section 14 to bear upon the section 15 and maintain the B flat hole pad 4 closed, it being understood that the spring 27 is superior to the spring 26. 95

100 It is an essential characteristic of the present invention that the octave hole and the control mechanism therefor are so arranged that the pad controlling the hole is permitted to raise itself but slightly in order that the execution of the passage is net and the emission of the harmonics greatly improved. As the opening of 105 this octave hole pad under the influence of the spring 25 is limited by contact of the abutment 23 with the straight end 12 of the control lever 10, it is apparent that the relation of these parts may be such that the pad may, when operated, be permitted only the desired raising. Of course, 110 under these conditions, a swinging movement of the lever 10 is prevented because the opposite end of the lever engages the abutment 24 and hence the octave hole pad is permitted to raise only the distance allowed by the normal spacing between the abutment 23 and the free end of the portion 12 of the lever 10. 115

120 In connection with and as an essential part of the present mechanism, it is to be understood that in playing the B flat tone, the natural A hole is opened. This natural A opening is shown at 28, with the controlling pad 29 mounted on a key lever 30 pivotaly supported at 31, having the usual finger piece or spatula 32. The pad 29 is provided with a projection 33 over which lies 125 the free end of an arm 34 projecting from a pivot section 35 supported between posts 36 on the instrument and having an arm 37, the free end of which overlies and bears upon an arm 38 projecting from pivot section 7. A spring 39' connected to the post 36 serves to normally maintain the arm 34 in position to bear upon the pad 29 and maintain the hole 28 closed. 130

135 With the key mechanism arranged as described, if it is desired to open the octave hole, the key 20 is rocked by pressure on the spatula end 22 to raise the free end from contact with the arms 18 and 19. The pivot section 5 is immediately freed to the influence of the spring 25 and the pad 2 is raised by corresponding movement of the arm 18 140 to the extent permitted by the contact of the abutment end 23 of that arm 18 with the end 12 of the control lever 10. Under these conditions, the pad 4 of the B flat hole 3 is not opened, because 145 while the arm 19 is free from restrictive influence, the section 14 of the pivot section 7 is overlying and bearing upon the section 15 of the pivot section 6, and as the spring 27 is superior to the spring 26, the movement of the pivot section 6 150

and, therefore, movement of the arm 17 carrying the pad 4 of the B flat hole is prevented.

If it is desired to open the B flat hole, that is, permit the pad 4 to raise, the natural A key 30 is rocked to open the hole 28 which, lifting the free end of the arm 34, rocks the pivot section 35 and through the arm 37 engaging and depressing the free end of the arm 38, rocks pivot section 7 against the influence of the spring 27. This frees the underlying connecting element 15 of the pivot section 6 and so frees the pivot section 6 to the influence of the spring 26. Of course, this movement of the pivot section 7 moves the abutment 24 into contact with the free end of the curved terminal 13 of the control lever 10 and rocks such lever 10 slightly on its pivot 11 to move the free end of the portion 12 of such lever 10 into contact with the abutment 23. Thus the pivot section 5 is not permitted to move and the octave hole is not opened.

Of course, as so far described, neither pivot section 5 nor 6 can move because the free end of the key 20 is bearing upon the ends of the arms 18 and 19. Therefore, in continuation of the movement necessary to open the B flat hole, the key 20 is rocked to free the arms 18 and 19. Under the operation of the key 30 opening the natural A hole as described, the simultaneous or successive movement of the key 20 frees the pivot section 6 to the influence of the spring 26 and the pad 4 controlling the B flat hole 3 opens. The pivot section 5 is, of course, also free so far as the key lever 20 is concerned, but such pivot section 5 would not move because the abutment 23 of the arm 18 is engaged by the free end of the portion 12 of the pivot lever 10. Therefore, under these operative conditions, the B flat hole is opened, while the octave hole is maintained closed.

In connection with Figure 6, the construction is substantially similar to that previously described, except that the B flat hole utilized is the one employed in connection with trill keys so that there is but a single hole for the particular B flat tone. In this form, the octave control pad 39 is arranged as in the preferred form, while the B flat control pad 40 is for the control of the fundamental B flat hole under the influence of the usual trill key 41. The construction includes the pivot sections 42, 43 and 44, pivot section 42 being provided with the arm 45 connected to the octave control pad 39, while the section 43 of the arm 46 is connected to the control pad 40 of the B flat. The section 44 has a curved member 47, the terminal of which overlies a curved member 48 projecting from the pivot section 43. The pivot section 42 is operated by a spring 49 to open the octave hole when free to act, while the pivot section 43 is controlled by a spring 50 which is inferior to a spring 51 for operating the section 44.

A control lever 52 is pivotally supported on the body of the instrument below the pivot section 43, one end being in the path of an abutment 53 forming part of an arm 55 projecting from the pivot section 42, a second arm 54 projecting from the pivot section 42 in spaced parallel relation to the arm 55. The opposite end of the pivot lever is arranged adjacent an abutment 56 forming the terminal of the curved member 48 of the pivot section 43. The natural A control lever 57 when depressed operates an arm 58 on a pivot sleeve 59, which pivot sleeve carries an arm 60 underlying an arm 61 projecting from the pivot section 44. By the same movement, the arm 66, which is carried by the pivot sleeve 59, is raised and is

adjacent to the arm 67 which is the terminal of the arm 54. A B flat key 62 pivotally supported on the instrument has a free end overlying the arms 54 and 55.

The operation of this form is identical with that described in connection with the preferred form. The operation of the key 62 permits the octave hole pad 39 to open under the influence of the spring 49 to the limit permitted by the co-operation of the abutment 53 with the end of the lever 52. During this time the superiority of the spring 51 and the bearing of the curved element 47 on the element 48 prevents raising of the B flat pad 40. On simultaneous depression of the keys 57 and 62, the section 44 is permitted to turn under the influence of the spring 51, freeing the section 43 and permitting the B flat pad 40 to open. In this movement of the section 43, the abutment 56 moves the control lever 52 so as to prevent movement of the arm 54 and hence the octave hole pad is not raised.

In both forms of the above invention, it will be apparent that the octave hole and the B flat are segregated and independently controlled. Thus, there is not only a rational fundamental B flat which is very clear and very true, but the harmonics are rendered more perfect and the emission easier through the relative governing of the openings for the octave hole and the B flat hole, as above described.

With particular reference to that detail of the invention directed to the trill keys, and referring to Figures 7 to 11, the trill key openings, indicated at 71, 72, 73 and 74 are, of course, designed for giving out the usual note and are controlled in the usual manner by pads 75, 76, 77 and 78 respectively. As ordinarily provided, and in order that the respective pads of the levers may be properly operated without interference, these openings have been arranged in a body 79 of the instrument materially to one side of the extreme upper plane of the instrument when in playing position. This offset or substantially lowered position of these openings leads to a serious disadvantage well known to all musicians playing these instruments. That is to say, the moisture incident to the condensation of the vapor blown through the instrument and the saliva from the mouth of the musician collects in these openings, with the result of very imperfect rendition of the particular note or requiring, as in practice, periodic efforts on the part of the musician to clear these openings by blowing through them from the exterior or into the openings with the pads raised. This necessary operation incidental to the present location of these openings is, of course, a serious objection, but owing to the necessity, as believed, of offsetting these openings to provide for clearance of the controlling pads with respect to the operating levers, the objection was considered a necessary evil.

The present invention overcomes this objection, and as a salient and important part of such invention it is to be noted and understood that these openings are arranged substantially in line with the uppermost or highest plane of the surface of the instrument when in playing position. As a matter of fact, the openings are aligned at an extremely slight angle to the longitudinal plane of the instrument, the offsetting of one opening from the adjacent opening being simply that incident to the thickness of the trill lever controlling the opening.

The pads 75, 76, 77 and 78 are mounted directly on the ends of controlling levers 80, 81, 82 and 83

respectively, each lever having the usual terminal finger piece or key 84 which is wholly conventional, both in form and arrangement, and indicated more particularly in Figure 3. Each lever 85 is mounted upon a sleeve element 85 rotatably supported between posts 86 secured in the body of the instrument, this type of mounting being also conventional. Of course, the respective levers are of different lengths in order to control the openings properly located, as is well known, and an important detail of the mounting of the levers is that each lever is mounted on an independent sleeve 85. Thus, each lever has its own pivotal support and the support of one lever has no relation whatever to any other lever, so that the operative sensitiveness of all levers may be the same. This distinguishes materially from the conventional mounting of these levers wherein in the ordinary construction the levers 80 and 81 have been supported upon a single sleeve or axle.

As the pads are carried directly on the ends of the levers in order to permit the openings controlled by the pads to be more nearly in line with the extreme upper plane of the instrument, it is apparent that without such provision an attempt to raise one pad other than the pad 75 would be prevented by one of the adjacent levers. In order to overcome this, each lever is formed in its under surface with a recess 87, the recesses in the respective levers being so located as to provide a space for the free movement of the pad of any lever which might be otherwise interfered with. For example, as shown, lever 80 is provided with two such recesses 87 in order that the pad which would be otherwise interfered with may be freely moved without interference from the lever 80. The remaining levers, except lever 83, is provided with a single recess 87 for permissible movement of the pad of the adjacent lever. The lower portions of the levers are also formed with recesses 88 to bridge the mountings of adjacent levers or of cooperating keys for other parts of the instrument. These recesses 88 permit the respective levers to move so as to insure the closing of the opening controlled by their pads, the recesses 88 being arranged to freely bridge the intervening mountings or other necessary instrumental connections.

Thus the improvements in the particular instance include, first the arrangement of the trill key openings substantially in line with the extreme upper plane of the instrument when in playing position in order to avoid the objectional partial chokings of these openings from the condensation of the vapor introduced into the instrument or from the saliva from the mouth of the musician. Second, the pads for controlling the openings are carried directly at the ends of the respective key levers, thereby avoiding the lateral projection heretofore deemed necessary for supporting the pads and which lateral projection required that offsetting of the openings which resulted in the objections noted. Third, the provision of each key lever on an independent pivotal mounting so that the sensitiveness of each lever when properly regulated will be unaffected by the operation or contiguity of any other lever.

Incidental to the arrangement of the pads at the ends of the levers and the material advantage gained through this arrangement in permitting the openings to be disposed in the extreme upper plane of the instrument, the levers are recessed within the operative region of each pad of an adjacent lever to permit the operation of such pad without interference from any of

the levers. Therefore, for playing purposes the instrument is more sensitive and more responsive than the conventional instrument by reason of the independent mounting of the levers and by reason of the disposition of the pads at the extreme ends of and in direct alignment with the levers, and as a result of this permissible arrangement of the pads, the openings may be arranged in the positions described with the decided advantageous result of such arrangement.

In connection with the detail of the present invention directed to the mounting of the keys of the low F and low A flat, and shown more particularly in Figures 12 to 16, the instrument body 101 is formed with the usual low A flat opening 102 controlled by a pad 103 and the low G opening 104 controlled by pad 105.

As ordinarily constructed, the levers controlling these respective pads have been mounted upon a single axle or sleeve between the conventional pivot posts rising from the instrument, with the result that the low G is ordinarily slightly false and the low A flat insufficiently rigid, for reasons which will be pointed out.

For the purpose of the present invention, the low A flat key is supported upon a sleeve 106 arranged between pivot post 107, with the finger piece 108 projecting in one direction from the sleeve and a bar 109, to the outer end of which the pad 103 is directly connected projecting in the opposite direction. The low G key is also mounted upon a sleeve 110 wholly independent of the sleeve 106, with such sleeve 110 mounted between pivot posts 111 and carrying the usual finger piece 112 and 113 projecting from the sleeve in the same direction as the finger piece and directly carrying at its free end the pad 105.

The sleeves 106 and 110 are arranged in parallel relation longitudinally of the instrument, with the sleeve 106 closer to the low A flat opening than was possible under the arrangement wherein these keys are mounted upon the same axle, for in the latter instance the bar 109 was necessarily longer than in the present construction and the finger projection 108 necessarily shorter than in the present projection. Therefore, as a result of the single axle mounting, there was a tendency for low G to render a somewhat false note and the low A flat, by reason of the shorter length of finger piece and the greater length of pad carrying bar, to permit such elasticity as tended to a somewhat ineffective action of the pad 103.

By the present arrangement, that is, the mounting of these respective key levers on independent parallel axles with the respective finger pieces and pad carrying bars of substantially similar lengths, there is more effective action of the pad controlling the low A flat and a greater rigidity and less elasticity in the key lever controlling the low G. The greater length of the finger piece of the low A flat control and the relative shortening of the pad carrying bar of this control incident to the arrangement and mounting according to this invention provides a more easy manipulation of the key controlling the low A flat and a much more energetic action of the pad 3 controlling the low A flat opening. A projection 114 secured to the under side of the F key lever 112 underlies the conventional F sharp key (not shown), keeping in constant touch the two keys controlling the low F and F sharp.

The essential characteristic of this invention is the mounting of these particular keys on independent, spaced, parallel axles, with the axles so

arranged as to insure a proper control of the low G and a more energetic and easier manipulation in the control of the low A flat. It is understood, of course, that the disposition of the openings and the relations of the respective finger pieces for the control of the openings is identical with that in the conventional instrument and, therefore, no change either in the fingering or manipulation of the keys is necessary as a result of the present improvement.

I claim:—

1. A key mechanism for wood wind instruments of the type wherein there is formed segregated octave hole and tone holes, with pads for each hole, spring means for opening the pad of the octave hole when free to act, spring means for opening the pad of the tone holes when free to act, a manually operable key lever normally holding all pads in hole-stopping position, a second key controlling one of the other tone holes, means responsive to the independent operation of the first mentioned key lever to permit opening of the octave hole, and means responsive to the operation of both key levers to permit opening of the tone holes while preventing opening of the octave hole.

2. A key mechanism for wind instruments of the type formed with segregated octave hole and tone holes and having pads for the closing of the respective holes, spring means for opening the tone holes and the octave hole when free to act, spring means for opening the tone holes when free to act, each of said means including a laterally extended arm, a key lever overlying and preventing spring responsive movement of the arms, and means controlled by a second key of the instrument for normally holding one of said arms against movement without interfering with the movement of the other of said arms in the operation of the first mentioned key lever.

3. A key mechanism for wood wind instruments of the type including segregated octave hole and tone holes, a spring mechanism for opening the octave hole when free to act and including a laterally projecting arm, spring mechanism for opening the tone holes when free to act and including a laterally projected arm, a key lever overlying both said arms and normally preventing their movement under their respective spring mechanisms, means normally preventing movement of the spring mechanism controlling the tone holes without regard to the operation of the key lever, and means for relieving the spring mechanism for controlling the tone holes from the influence of the preventing means in the operation of another key of the instrument.

4. A key mechanism for wood wind instruments of the type including segregated octave hole and tone holes, a spring mechanism for opening the octave hole when free to act and including a laterally projecting arm, spring mechanism for opening the tone holes when free to act and including a laterally projected arm, a key lever overlying both said arms and normally preventing their movement under their respective spring mechanisms, means normally preventing movement of the spring mechanism controlling the tone holes without regard to the operation of the key lever, and means for relieving the spring mechanism for controlling the tone holes from the influence of the preventing means in the operation of another key of the instrument, the operation of said relieving means serving to prevent operation for the control of the

octave hole under the influence of its spring mechanism.

5. A key mechanism for wind instruments of the type wherein the octave hole and tone holes are segregated and having pads for controlling said holes including a spring operated element serving when free to act to move the pad of the octave hole for opening said hole, an arm projecting laterally from said element, a second spring operated element serving when free to act to open the pad of the tone hole, said second element having an arm projecting in spaced parallel relation to the first mentioned arm, a key lever overlying the ends of both arms and normally preventing operative movement thereof, a third spring operated element having means for overlying and preventing movement of the second spring operated element regardless of the movement of the key lever, and means actuated through the operation of an additional key lever for permitting movement of the third spring operated element and thereby relieving the second spring operated element for actuation.

6. A key mechanism for wind instruments of the type wherein the octave hole and tone holes are segregated and having pads for controlling said holes including a spring operated element serving when free to act to move the pad of the octave hole for opening said hole, an arm projecting laterally from said element, a second spring operated element serving when free to act to open the pad of the tone hole, said second element having an arm projecting in spaced parallel relation to the first mentioned arm, a key lever overlying the ends of both arms and normally preventing operative movement thereof, a third spring operated element having means for overlying and preventing movement of the second spring operated element regardless of the movement of the key lever, means actuated through the operation of an additional key lever for permitting movement of the third spring operated element and thereby relieving the second spring operated element for actuation, and means actuated in the relieving movement of the third spring element for locking the first spring element against movement.

7. A key mechanism for wind instruments of the type wherein the octave hole and tone holes are segregated and having pads for controlling said holes including a spring operated element serving when free to act to move the pad of the octave hole for opening said hole, an arm projecting laterally from said element, a second spring operated element serving when free to act to open the pad of the tone hole, said second element having an arm projecting in spaced parallel relation to the first mentioned arm, a key lever overlying the ends of both arms and normally preventing operative movement thereof, a third spring operated element having means for overlying and preventing movement of the second spring operated element regardless of the movement of the key lever, means actuated through the operation of an additional key lever for permitting movement of the third spring operated element and thereby relieving the second spring operated element for actuation, and a lever operated in the movement of the third spring element for locking the first mentioned spring element against operation.

8. A key mechanism for wind instruments of the type wherein the octave hole and tone holes are segregated and having pads for controlling said holes including a spring operated element



serving when free to act to move the pad of the  
 octave hole for opening said hole, an arm pro-  
 jecting laterally from said element, a second  
 spring operated element serving when free to  
 5 act to open the pad of the tone hole, said sec-  
 ond element having an arm projecting in spaced  
 parallel relation to the first mentioned arm, a  
 key lever overlying the ends of both arms and  
 normally preventing operative movement there-  
 10 of, a third spring operated element having means  
 for overlying and preventing movement of the  
 second spring operated element regardless of the  
 movement of the key lever, means actuated  
 15 through the operation of an additional key  
 lever for permitting movement of the third spring  
 operated element and thereby relieving the sec-  
 ond spring operated element for actuation, and a  
 control lever pivoted on the instrument and hav-  
 20 ing one end in the path of movement of the ter-  
 minal of the arm carried by the first spring ele-  
 ment and the opposite end in the path of move-  
 ment of an abutment carried by the third spring  
 element, the relation of the lever compelling  
 25 movement thereof in the movement of the third  
 spring element to force the opposite end of the  
 lever in a position to prevent movement of the  
 first spring element.

9. A wind instrument of the clarinet type hav-  
 30 ing trill key openings arranged in substantial

alignment in the upper plane of the instru-  
 ment when in playing position, a key lever for  
 each opening, and a controlling pad for the  
 openings carried directly by the end of the lever,  
 each lever being recessed to receive and thereby  
 80 permit the operation of pads of adjacent key  
 levers without interference.

10. A wind instrument of the clarinet type  
 having trill openings substantially in line in the  
 upper plane of the instrument, key levers and  
 85 independent mountings for each key lever on  
 the instrument, a pad carried directly by the free  
 end of the key lever for controlling the particular  
 opening, said pad underlying the lever, the low-  
 90 er edge of certain of the levers being recessed to  
 receive and thereby permit movement of ad-  
 jacent pads without interference from that lever.

11. In a wind instrument of the clarinet type,  
 a key control for the low G, a key control for the  
 low A flat, and independent axle mountings for  
 95 the respective key controls, the axle mounting  
 of the low A flat control being arranged closer to  
 the opening of the low A flat than is the axle  
 mounting of the low G key control, whereby the  
 100 finger piece of the low A flat control is length-  
 ened, and the pad carrying bar of this control  
 shortened with respect to conventional construc-  
 tion.

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