

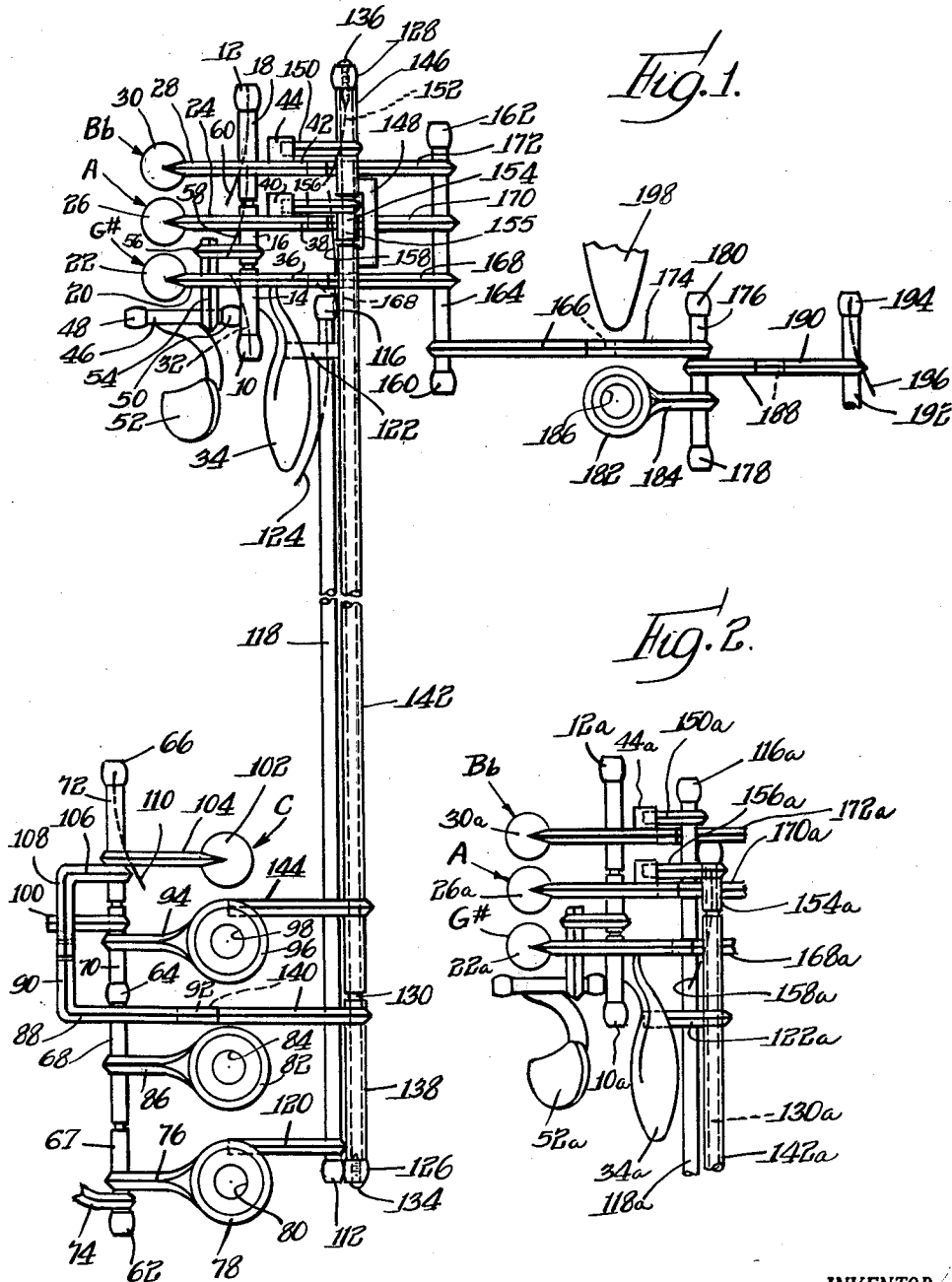
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CLARINET

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CLARINET

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This invention is concerned with a clarinet, and more particularly with an improved mechanism for slurring between the overblown register and notes normally played with the left index finger and thumb.

As is well known, the fingerings of the notes G#, A and Bb are usually taken with the left index finger and the thumb, which also are used for producing the upper or overblown register, thereby rendering slurring (particularly in the case of students) among these notes and the overblown register difficult.

Accordingly, it is an object of this invention to provide a clarinet of any system or tonality having mechanisms simplifying slurring the passage from the above mentioned fundamentals to the higher harmonics.

Specifically, it is an object of this invention to provide mechanism which allows for normal fingering of the notes G#, A and Bb, and yet which provides an auxiliary fingering in addition thereto, greatly facilitating slurring, as aforesaid.

As indicated heretofore, in the realization of the present invention, the pads for the G#, A and Bb holes are connected in the usual manner to spatulas and rings for normal operation of these pads. Additionally, there are additional elements mounted on the body of the clarinet and operable by the right hand, which elements are connected to the aforesaid G#, A, and Bb holes, whereby these notes are capable of being played by either the left or the right hand, or a combination thereof.

The invention will best be understood, along with other objects and advantages, with reference to the accompanying drawing wherein:

FIG. 1 is a layout view of certain mechanisms on a clarinet illustrating the principles of the invention; and
FIG. 2 is a modification of a portion thereof.

Referring now particularly to FIG. 1 of the drawings, the heads of a pair of parallel posts 10 and 12 will be seen spaced apart and positioned adjacent the upper portion of the upper body joint of a clarinet (not shown). As will be understood, the lower joints may be integral, if so desired. With the clarinet held in the usual playing position, the posts 10 and 12 are positioned relatively adjacent the upper surface of the clarinet, as will be understood. Hinge rods 14, 16 and 18 are supported by the posts 10 and 12, and are independently pivotable. As is known, such hinge rods actually comprise tubes mounted on a pin. However, they are conventionally spoken of as hinge rods. A lever arm 20 is fixed on the hinge rod 14 for pivoting therewith, and carries at its outer end a key cup 22 having the usual pad for covering the G# hole. Similarly, an arm 24 is fixed on the hinge rod 16, and carries a key cup 26 containing a pad adapted to cover the A hole. In like manner, an arm 28 is fixed on the hinge rod 18, and carries at its outer end a key cup 30 adapted to close the Bb hole.

The pad and key cup 22 are urged away from hole closing position over the G# hole by the usual needle spring 32. This spring is overcome by a stronger spring to hold the pad and key cup in hole closing position as will be disclosed shortly. A spatula 34 is fixed on the hinge rod 14 for manual opening of the G# hole by raising of the key cup 22 upon depression of the spatula 34. In addition, there is a rearward extension or heel 36 on the arm 20.

Similarly, the arm 24 has an integral, oppositely pro-

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jecting heel 38. This heel is provided with a spur 40 projecting generally in the direction of the post 12. In like manner, the arm 28 is provided with an oppositely projecting heel 42 having a spur 44 thereon.

A transverse hinge rod 46 is pivotally carried by a pair of posts 48 and 50. The transverse hinge rod 46 carries a spatula 52 projecting downwardly thereof (i.e., toward the bell of the clarinet), and further carries an arm 54 projecting oppositely thereof. The arm 54 at its upper or outer end underlies a lateral arm 56 fixed on the hinge rod 16. The pad carried by key cup 26 is urged away from the A hole by means of a needle spring 58. The pad carried by the key cup 30 is likewise urged away from hole closing position over the Bb tone hole by a needle spring 60. The normal overcoming of the springs 58 and 60 by stronger springs, and also opening of the A and Bb holes will be discussed hereinafter.

On the lower joint of the clarinet body, and aligned longitudinally thereof, there are three posts 62, 64 and 66, which pivotally support hinge rods 67, 68, 70 and 72, the hinge rods being pivotal independently of one another. The hinge rod 67 has fixed thereon a stop 74 and a tail or lever arm 76 securing a ring 78 concentric with the hole 80.

The hinge rod 68 has a ring 82 about a tone hole 84 secured thereon by a tail 86. In addition, a right angle lever 88 having a longitudinal arm 90 and a heel 92 is fixed on the hinge rod 68. A tail 94 mounts a ring 96 on the hinge rod 70 with the ring 96 encircling a tone hole 98. An arm 100 extends in the opposite direction from the hinge rod 70.

The key cover 102 of the C(do) hole is carried by a lever arm 104 fixed on the hinge rod 72. In addition, there is a right angle lever 106 fixed on the hinge rod 72, the right angle lever having a longitudinal arm 108 overlying the longitudinal arm 90 of the lever 88. The longitudinal arm 108 overlies the arm 100 on the hinge rod 70. A needle spring 110 tends to hold the key cup 102 in raised position, whereby the key hole will be open. As in the classic fingering of the clarinet, the cover or cup 102 is lowered when the ring 96 is depressed, this time through the arm 100 and right angle lever 106, instead of by virtue of mounting on a common hinge rod, as is conventionally done.

A pair of posts 112 and 116 pivotally mounts a hinge rod 118. The post 112 is on the lower joint of the clarinet body while the post 116 is on the upper joint. When the two joints of the body are integral, then the rod 118 simply is a straight-through, integral rod. As is known, clarinets are frequently made with the bodies in two sections. In the case of a two section body, the hinge rod 118 is a two piece hinge rod, additional posts being provided on the two joints adjacent the juncture thereof, and suitable interconnecting linkage being provided between the two rods, all in accordance with conventional practice. The hinge rod 118 is provided near its lower end with a laterally extending arm 120 underlying the ring 78, and is provided adjacent its upper end with a laterally extending arm 122 underlying the spatula 34. A needle spring 124 biases the hinge rod 118 so as normally to tend to raise the arms 120 and 122. The spring 124 is stronger than spring 32. Hence, the arm 122 is held up beneath the spatula 34 with sufficient force to overcome the force of the spring 32 and thereby normally to hold the pad and key cup 22 in closing position on the G# hole.

A pair of posts 126 and 128 pivotally mounts a hinge pin or stem 130. Like the posts 112 and 116, the posts 126 and 128 are respectively mounted on the lower and upper body joints. When the two body joints of the clarinet are integral, then the stem 130 is integral. When

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the joints are separable, then the stem is likewise separable, in the conventional manner. The stem 130 is pivoted on the pointed tips of screws 134 and 136 respectively threaded through the posts 126 and 128.

A hinge sleeve 138 is fixed on the stem 130, as by soldering, and has a laterally extending arm 140 which engages under the arm 92 for lifting the same upon raising of the arm 140.

A relatively long sleeve 142 is freely pivotal on the stem 130, and may be interrupted and operatively interconnected in the case of a clarinet having separable upper and lower body joints, it being understood that the sleeve 142 extends from the lower joint to the upper joint. A laterally extending arm 144 on the sleeve 142 underlies the ring 96.

An uppermost or fourth sleeve 146 is freely pivotable on the stem 130, adjacent the upper post 128. This sleeve is spaced from the sleeve 142, but is pivotal therewith through the intermediary of a U-shaped link 148, the legs of which are respectively soldered to the sleeves 142 and 146. A laterally extending arm 150 on the sleeve 146 underlies the spur 44. A needle spring 152 biases the sleeves 146 and 142 so as to tend to raise the arms 144 and 150. The spring 152 is stronger than the spring 60, and hence the arm 150 bearing up under the spur 44 lifts the arm 42 and depresses the key cup 30 to effect closing of the Bb hole. Similarly, the arm 144 raises beneath ring 96, whereby to lower the arm 100 below the arm 108. The needle spring 110 keeps the arm 108 against the arm 100, whereby the cup 102 normally is raised to leave open the C hole.

A short sleeve 154 is fixed on the stem 130, as by means of a pin 155, between the sleeves 142 and 146. A laterally extending arm 156 on this short sleeve underlies the spur 40. A spring 158 urges the arm 156 up, and is stronger than the spring 58. Accordingly, the arm 156, acting beneath the spur 40, raises the arm 38, and hence lowers the key cup 26 to close the A hole.

A pair of posts 160 and 162 is aligned longitudinally of the clarinet body and is disposed on the opposite side of the stem 130 relative to the posts 10 and 12. These posts pivotally support a hinge rod 164. The hinge rod is provided with a relatively long arm 166 extending to the right from near the lower end thereof, and with three arms 168, 170, and 172 extending to the left. The arms 168, 170 and 172 respectively engage beneath the heels 36, 38 and 42 for lifting these heels. The arm 166 engages beneath an arm 174 fixed on a hinge rod 176 pivoted between a pair of longitudinally aligned posts 178 and 180.

The hinge rod 176 carries a ring 182 on a tail 184, and encircling a tone hole 186. Conventionally, this is the F# hole. The hinge rod 176 also has fixed thereon an arm 188 which underlies an arm 190 fixed on a hinge rod 192. One of the pivot posts 194 for the hinge rod 192 is shown. The needle spring 196 associated with the hinge rod 192 forces the arm 190 down on the arm 188, thereby to raise the ring 182 and the arm 174.

Actually, as will be apparent, the arm 174 does not physically raise the arm 166, but allows it to raise up as any of the opposite arms 168, 170 or 172 is depressed by the associated parts.

There are, as will be apparent, additional mechanisms associated with the hinge rod 192. However, they do not form a part of the present invention, and do not adversely react on nor affect the function of the parts disclosed. Hence, a showing thereof would be superfluous.

When the clarinetist presses on the ring 182 with his left thumb, the arm 174 is depressed. This positively depresses the arm 166, and raises the arms 168, 170 and 172. This blocks the three heels 36, 38 and 42, whereby positively to hold closed the G#, A and Bb tone holes. This is necessary to shift to the upper or overblown register or harmonics, as will be apparent.

In the absence of such positive holding closed of the

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three last mentioned tone holes, the tone holes are normally (at rest position) held closed by the springs 124, 158, and 152, respectively.

Now if it is desired to play the note G#, the classic method of fingering is to depress the spatula 34 with the index finger of the left hand. In accordance with the present invention, the note G# also can be played (alternative finger) by pressing on the ring 78 with the fourth finger of the right hand. This pivots the hinge rod 118 overcoming the force of the spring 124 and lowering the arm 122. Thus, the spatula 34 is released, and the spring 32 raises the pad and key cup 22 to open the G# hole.

If it is desired to sound the A note, according to the classic method of fingering the spatula 52 is depressed by the index finger of the left hand. However, alternatively, in accordance with the present invention, the ring 82 is depressed by the third finger of the right hand. This causes the arm 92 to depress the arm 140, resulting in overcoming of the spring 158 and depressing of the arm 156, thereby freeing the spur 40, and allowing the spring 58 to raise the pad and key cup 26, thereby opening the A hole.

In playing the A note in accordance with the present invention, the ring 78 is maintained lowered by the fourth or little finger of the right hand, whereby the G# hole is open along with the A hole. As will be apparent, when the A note is played by the classic fingering, the arm 54 directly raises the arm 20, and hence lifts the pad and key cup 22 from the G# hole at the same time as the A hole is opened.

To play Bb with the classic fingering, the register or thumb spatula key 198 is depressed along with the A key spatula 52, alternatively, as will be understood, the side Bb key (not shown) may be used.

In accordance with the present invention, the Bb is played by pressing with the right index finger on the ring 96, the rings 82 and 78 being held depressed by the third and fourth fingers of the right hand respectively. This pivots the sleeve 142, and hence the sleeve 146 to overcome the force of the spring 152, thereby freeing the spring 60 to allow the pad and key cup 30 to raise, whereby to open the Bb tone hole along with the previously opened A and G# tone holes.

Thus, the G#, A and Bb fingering can be effected in a normal or classic manner with the left hand, or it can be effected with the right hand, thereby greatly facilitating slurring the passage from these fundamentals to the higher harmonics. As aforementioned, in going to the harmonics, depression of the ring 182 positively maintains closed the G#, A and Bb tone holes.

A modification of the invention is illustrated in FIG. 2. In this figure, the disposition of the arm 150a is changed (similar parts in this figure being identified by numerals similar to those heretofore used, with the addition of the suffix a, to avoid unnecessary duplication of description). The distinguishing feature of the embodiment of FIG. 2 is that the rod 118a is extended upward far enough that the arm 150a is mounted thereon. This allows the stem 130a to be shortened, and to have only three sleeves thereon, the one corresponding to the sleeve 146 being omitted. The connections of the arms at the lower ends of the rod 118a and of the stem 130a and sleeves thereon remains as heretofore. This reverses the action to some extent. Complementary to the shift of the arm 150a to the rod 118a, the arm 122a underlying the spatula 34a is fixed on the second (now the center) sleeve 142a. Thus, when the ring 78 is depressed, rather than lowering the arm 122 to permit opening of the G# hole, the arm 150a is depressed to allow opening of the Bb tone hole. Similarly, when the ring 96 is depressed, rather than lowering the arm 150 to allow opening of the Bb tone hole, the arm 122a is lowered to permit opening of the G# tone hole. Thus, the only functional difference between FIG. 2 and FIG. 1 is in a reversal of the results produced by the index and fourth fingers of the right hand.

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As will be understood, rings 78, 82 and 96 are generally used on the smaller sizes of clarinets, such as Bb soprano and smaller size clarinets. On the other hand, key cups and pads are generally used instead of the rings on alto and larger clarinets, although they have been used also on soprano clarinets. Whether rings or key cups and pads are used is immaterial insofar as the present invention is concerned, and it will therefore be understood that the rings as illustrated herein are exemplary only. Obviously, this applies also to the thumb ring 182.

The specific examples of the invention as herein shown and described will be understood as being set forth for purposes of illustration only. Various changes in structure will no doubt occur to those skilled in the art, and will be understood as forming a part of this invention insofar as they fall within the spirit and scope of the appended claims.

The invention is claimed as follows:

1. In a musical instrument, such as a clarinet, including a body having adjacent the upper portion thereof a plurality of tone holes, for producing the notes G#, A and Bb, the combination comprising: a plurality of closure members respectively for closing said tone holes, means mounting said plurality of closure members for movement between hole closing position and hole opening position away from said body, a plurality of spring means normally holding said hole closure members in hole closing position, a plurality of levers pivotally mounted adjacent the upper portion of said body and manipulable by fingers of the left hand, means operatively interconnecting said levers and said hole closure members for selectively moving said hole closure members to hole open position upon selective manipulation of said levers by fingers of the left hand, said body having a plurality of additional tone holes in a lower portion of the body and closed by movement of fingers of the right hand toward said body, a plurality of members respectively positioned adjacent said additional tone holes and normally spring biased away from said body and selectively movable toward said body by fingers of the right hand upon movement thereof toward hole closing position, and means operatively interconnecting said last mentioned plurality of members and said closure members for selectively moving said closure members to hole open position independent of said levers upon selective manipulation of said last mentioned members by fingers of the right hand.

2. The combination as set forth in claim 1 wherein the body has adjacent the upper portion thereof a thumb hole, and further including a thumb ring, means mounting said thumb ring about said thumb hole for movement toward and away from said body, spring means normally urging said thumb ring away from said body, and means operatively interconnecting said thumb ring and the first mentioned plurality of tone holes whereby positively to hold the plurality of closure members in hole closing position upon depression of said thumb ring by the thumb of the left hand.

3. In a musical instrument, such as a clarinet, including a body having a plurality of tone holes adjacent the upper portion thereof for producing the notes G#, A and Bb, the combination comprising: a plurality of closure members respectively for closing said tone holes, means mounting said plurality of closure members for movement between hole closing position and hole opening position away from said body, a plurality of relatively weak springs respectively tending to move said closure members to hole opening position, a plurality of relatively strong springs, means operatively interconnecting said relatively strong means and said hole closure members and overcoming said relatively weak springs whereby relatively to hold said closure members in hole closing position, a plurality of levers pivotally mounted adjacent the upper portion of said body and manipulable by fingers of the left hand, means operatively interconnecting said levers and said hole closure members for selectively moving said hole

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closure members to hole open position upon selective manipulation of said levers by fingers of the left hand, said body having a further plurality of tone holes in the lower portion of the body and closed by movement of fingers of the right hand toward said body, a plurality of members respectively positioned adjacent said further plurality of tone holes and operatively interconnected with said relatively strong springs and being biased away from said body, said last mentioned plurality of members being selectively movable towards said body upon movement of fingers of the right hand toward hole closing position, such movement of said last mentioned plurality of members selectively overcoming said relatively strong springs and allowing the relatively weak springs respectively to move the closure members to hole opening position.

4. The combination as set forth in claim 3 wherein said body further includes a thumb hole and a member adjacent said thumb hole pivotable toward said thumb hole upon movement of the thumb to hole closing position, and means operatively interconnecting said last mentioned member and said plurality of tone hole closure members for positively maintaining said tone hole closure members in hole closing position upon such movement of said last mentioned member.

5. The combination as set forth in claim 4 wherein the means operatively interconnecting the members adjacent the second plurality of tone holes and the relatively strong springs comprises a plurality of pivot shafts disposed longitudinally of the clarinet body and extending from a position adjacent the tone holes in the lower body portion to a position adjacent the tone holes adjacent the upper body portion.

6. In a musical instrument, such as a clarinet, including a body having adjacent the upper portion thereof and aligned longitudinally thereof a G# tone hole, an A tone hole and a Bb tone hole, the combination comprising: relatively short longitudinal pivot rod means oriented longitudinally of said body and to one side of said tone holes, three levers independently pivotally mounted on said hinge rod means, each of said levers having a hole closure member thereon movable upon pivoting of said levers between hole closing and hole opening position, each of said levers having a heel projecting oppositely of said hinge rod means from said closure members, three relatively weak springs acting on said levers and urging said hole closure members toward open position, a plurality of key members operatively interconnected with said levers and manipulable by fingers of the left hand to pivot said levers to move said closure members to hole opening position, three additional tone holes adjacent the lower portion of said body, a pair of relatively long pivot shafts disposed longitudinally of said body and running from the vicinity of the first three mentioned tone holes to the last mentioned tone hole, one of said shafts comprising a stem and a concentric cylinder mounted thereon and pivotable independently thereof, all of said shafts being pivotal, three projections on the pivot shafts and pivotal independently of one another, three relatively strong springs acting on said pivot shafts and projections, said projections being operatively interconnected with the closure member mounting levers, whereby said relatively strong springs overcome the relatively weak springs and hold the hole closure members in hole closing position, a plurality of arms on the pivot shafts equal in number to the projections thereof and respectively movable with the projections, said arms being disposed in the vicinity of the tone holes in the lower body portion and pivotal toward the body upon movement of fingers of the right hand to hole closing position on the tone holes in the lower body portions, such pivoting of said arms overcoming the relatively strong springs and freeing the hole closure levers to permit movement of the hole closure members to open position by the relatively weak springs.

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7. The combination as set forth in claim 6 wherein the body further includes toward the upper portion thereof a thumb hole, and further including a pivotally mounted thumb lever in the vicinity of the thumb hole, said thumb lever being pivotable toward said body upon movement of the thumb to hole closing position, a plurality of blocking members for positively blocking the closure member levers against pivoting to hold the closure members in hole closing position, and means operatively interconnecting the thumb lever and the blocking members for movement of said blocking members to blocking

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position upon the aforesaid pivoting of the thumb lever toward the body.

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