Jan. 1, 1963 D. H. DANLEY 3,071,155

ROTARY VALVE FOR FLUID OPERATED MUSICAL INSTRUMENTS

Filed Aug. 15, 1961 2 Sheets-Sheet 1

Fig. 1.

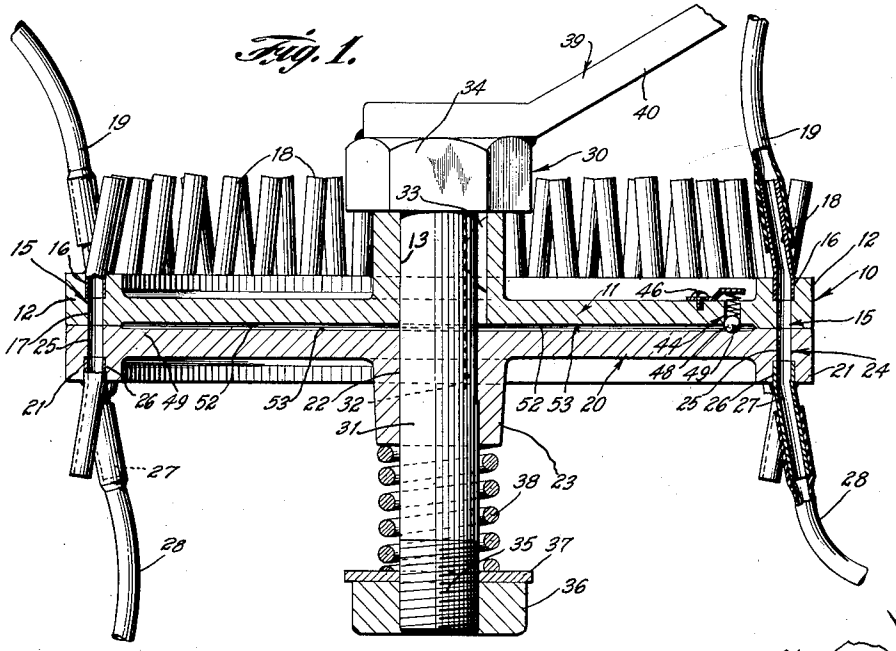
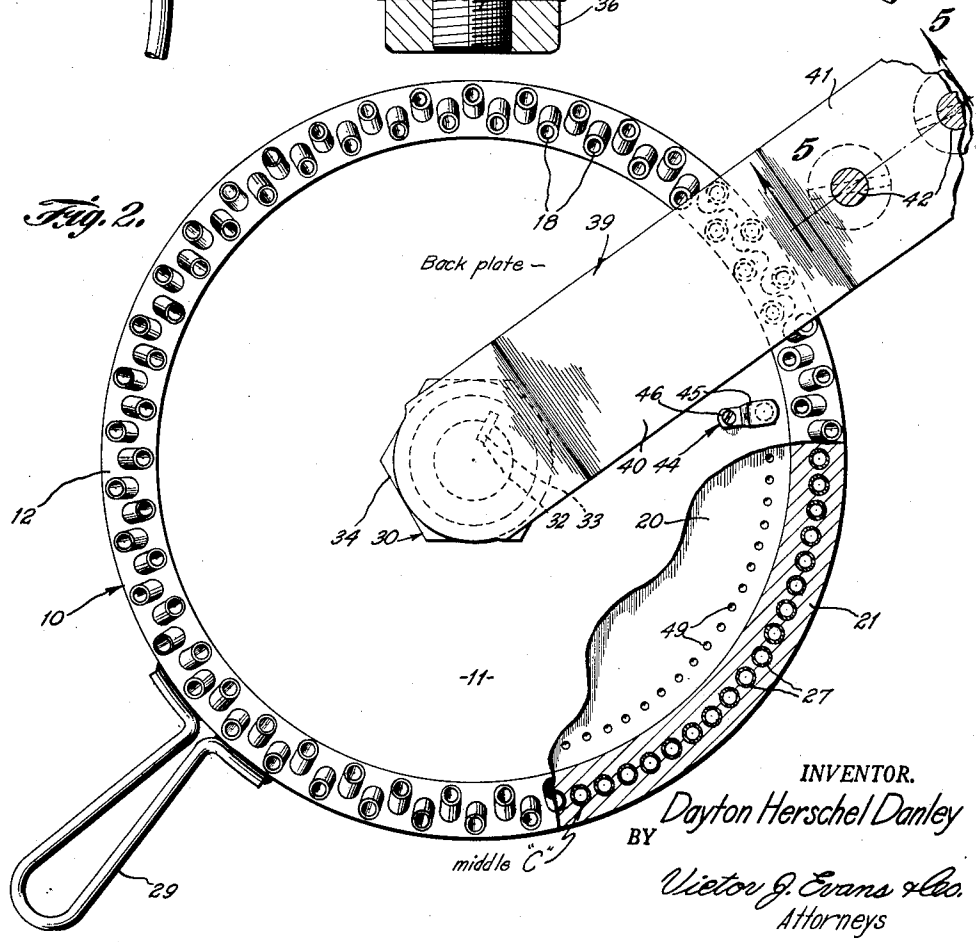


Fig. 2.



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Fig. 3.

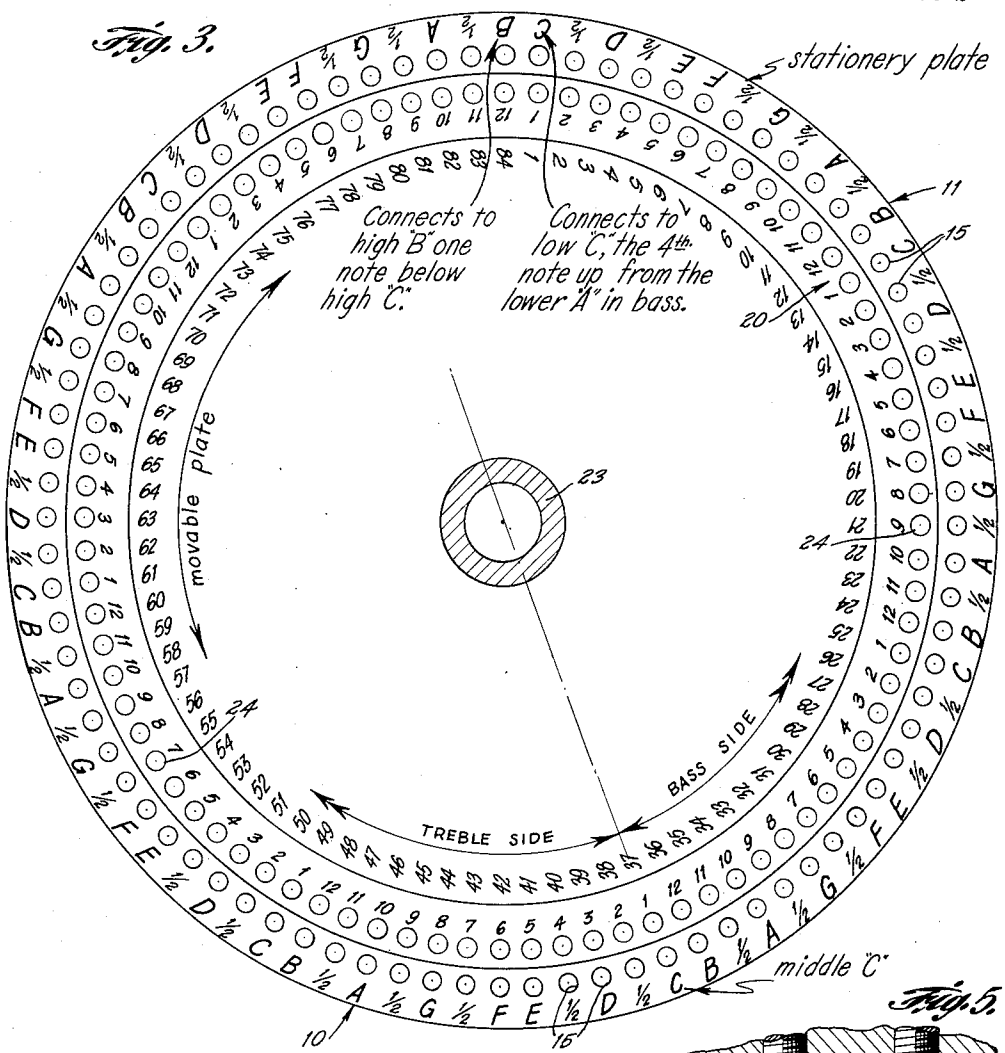


Fig. 5.

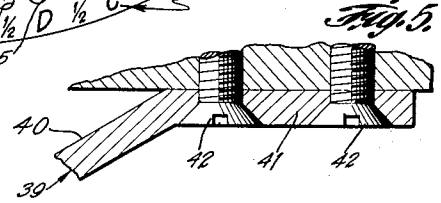
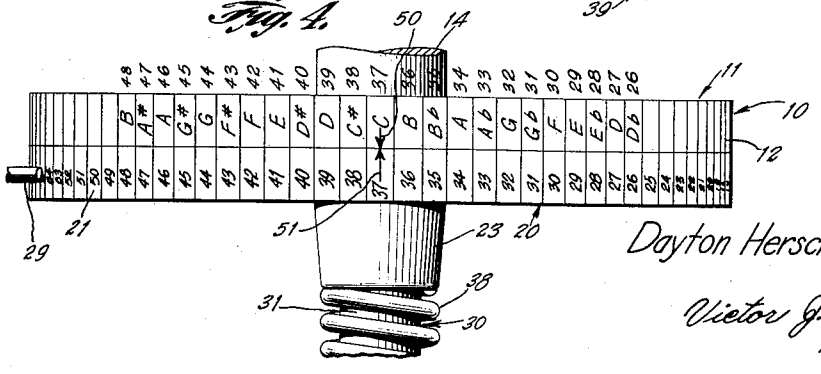


Fig. 4.



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ROTARY VALVE FOR FLUID OPERATED MUSICAL INSTRUMENTS

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1 Claim. (Cl. 137—625)

The present invention relates to a rotary valve for a fluid operated musical instrument such as a player piano, and more particularly to a transposer for such a musical instrument.

An object of the present invention is to provide a musical tone transposer which is adapted to be used for enabling the operator of a player piano to change the key from the natural key that the player roll is cut in, to any key either eleven notes higher or eleven notes lower without shifting the tracker bar from its position that is fixed in, and wherein according to the present invention a pair of discs are provided which are arranged and constructed and provided with accessories to permit the desired result to be readily accomplished.

Another object is to provide a transposer which is a mechanical device that can be readily installed on a piano so as to permit the operator to readily transpose or change the key as desired or required in order to make the musical instrument more versatile and convenient to use.

Another object is to provide a device of the character described that may be utilized speedily and with precision by even inexperienced operators.

Further objects and advantages are to provide improved elements and arrangements thereof of a device of the character described that is economical to produce, durable in form, and conductive to the most economical use of material and uniformity of members formed therefrom.

Still further objects and advantages will become apparent from the subsequent description and specification.

In the drawings:

FIGURE 1 is a sectional view taken through the transposer of the present invention.

FIGURE 2 is a plan view of the transposer, with parts broken away and in section.

FIGURE 3 is a diagrammatic view illustrating the present invention.

FIGURE 4 is a side elevational view, showing certain parts of the transposer diagrammatically.

FIGURE 5 is a sectional view taken on the line 5—5 of FIGURE 2.

Referring in detail to the drawings, the numeral 10 indicates the transposer of the present invention which comprises a rotary valve including a first disc 11 that is provided with an annular rim 12 which is adjacent its outer periphery, FIGURE 1, and the disc 11 is provided with a central opening 13, and there is provided a shoulder 14 which extends outwardly from the disc 11, and the shoulder 14 is contiguous to the opening 13. The rim 12 is provided with a plurality of spaced apart ports or openings 15, and as shown in the drawings the ports 15 include outer portions 16 of increased size or diameter, as well as inner portions 17 of reduced size or diameter. A plurality of nipples 18 has end portions thereof arranged in engagement with the portions 16 of the ports 15, and tubes 19 are connected to the nipples 18. The nipples 18 may be arranged in somewhat staggered or offset relationship with respect to each other for a purpose to be later described.

The transposer 10 further includes a second disc which is indicated generally by the numeral 20, and the disc 20 has a construction that is somewhat similar to the first disc 11. Thus, the second disc 20 includes an annular rim 21 adjacent its outer periphery, and the disc 20 is further provided with a central opening 22 as well as an outwardly extending shoulder 23. The disc 20 is arranged in face to face relation with respect to the disc 11. There is provided in the rim portion 21 of the disc 20 a plurality of spaced apart ports 24 which are shaped to include inner portions 25 of reduced size as well as outer portions 26 of increased size, and nipples 27 have their inner ends snugly seated in the portions 26 of the ports 24.

Tubes 28 are connected to the nipples 27, as for example as shown in FIGURE 1.

The numeral 29 indicates a lever or handle which is secured as by welding to the disc 20 adjacent the outer periphery thereof, FIGURE 2.

As shown in the drawings, there is provided a securing element or bolt which is indicated generally by the numeral 30, and the securing element 30 includes a shank 31 which extends through the registering openings 13 and 22 in the discs 11 and 20, and the securing element 30 is provided with a key way 32 for receiving a key 33 that extends inwardly from the shoulder 14 whereby the disc 11 is fixedly secured or keyed to the securing element 30. The securing element 30 further includes on one end thereof an enlarged head 34, and the opposite end of the securing element is threaded as at 35, and the numeral 36 indicates a nut or fastener which is arranged in threaded engagement with the portions 35, there being a washer or stopper piece 37 contiguous to the fastener 36. The numeral 38 indicates a coil spring or resilient means which is circumposed on the shank 31, and the coil spring 38 is interposed between the shoulder 23 and the stop piece 37.

The numeral 39 indicates a hanger which includes a generally straight portion 40 that is secured as by welding to the head 34 of the securing element 30, and the hanger 39 further includes an angularly arranged end portion or offset end portion 41 which is secured as at 42 to a supporting structure 43, and the supporting structure 43 may be a suitable part of a player piano or the like.

The transposer of the present invention further includes a detent mechanism which is indicated generally by the numeral 44, and the detent mechanism 44 includes a holder 45 which is secured as at 46 to the disc 11, and the numeral 47 indicates a spring member which is engaged by a portion of the holder 45, and the spring member 47 is arranged in a suitable opening in the disc 11, and there is provided a ball member or retainer 48 which is suitably secured to the spring member 47, and the retainer 48 is adapted to selectively engage one of the recesses or indentations 49 in the adjacent face of the disc 20.

From the foregoing, it is apparent that there has been provided a transposer for a musical instrument such as a player piano, and in use with the parts arranged as shown in the drawings, it will be seen that the hanger 39 is adapted to be fixedly secured in place as at 42, while the other end of the hanger 39 is secured as by welding to the head 34 of the securing element 30, and since the disc 11 is keyed as at 33 to the securing element 30, it will be seen that the disc 11 will not rotate on the securing element 30. However the disc 20 is free to rotate on the securing element 30, and the disc 20 can be rotated by manually gripping and moving the handle 29. The spring 38 serves to bias or urge the disc 20 towards the disc 11 whereby the discs will be maintained in their proper contiguous relationship when the parts are properly assembled, and by tightening the nut 36 the tension exerted by the spring 38 can be varied or regulated as desired or required. The detent mechanism 24 helps prevent accidental shifting of the disc 20 relative to the disc

11. However when sufficient manual force is applied to the handle 29, the holding power of the detent mechanism 44 can be overcome in order to permit the disc 20 to be shifted to the desired location relative to the disc 11. The detent mechanism 44 includes the retainer or ball member 48 which is urged into engagement with respect to an indentation or recess 49 in the disc 20, by means of the spring 47.

The disc 11 includes a plurality of ports 15, and the disc 20 includes the similar ports 24, and by manually moving the disc 20 through the medium of the handle 29, the ports 24 can be moved into and out of registry with the ports 15, so as to achieve the desired results. Nipples 18 are connected to the ports 15, and the nipples 27 are connected to the ports 24, and these nipples have the tubes 19 and 28 connected thereto as shown in the drawings.

As shown in FIGURE 4 the disc 11 may be provided with an indicator mark or index line or arrow as indicated by the numeral 50, and the disc 20 is adapted to have a corresponding index mark or pointer 51.

The parts can be made of any suitable material and in different shapes or sizes.

It will be seen that according to the present invention there has been provided a musical tone transposer wherein the transposer is a mechanical device for enabling the operator of a player piano to change the key from the natural key that the player roll is cut in to any key either eleven notes higher or eleven notes lower without shifting the tracker bar from its fixed position.

The transposer can be used in reproducing electrically operated grand pianos or other types of instruments. The transposer is constructed so that none of the notes that should be heard will be lost. For example when the operator has lowered the pitch so many keys down that an extremely low note on the paper roll ordinarily would be out, this does not happen since it is played in the perfect key as perfect harmony in the extreme high range of treble and vice versa, and if the operator has shifted the number 37 on the transposer so many keys to the right that some of the high notes on the roll would be out, they are not at all out, and they register in the bass on the right key and in perfect harmony. With reference to the "Schulz Grand Reproducer" for example, using the aria divina action electrically operated, by counting the basic notes which includes the seven white keys and the five black keys which total twelve basic notes, it is to be noted that there are seven octaves of the key of C on the piano key board and seven times twelve equal eighty-four notes. Thus, the discs have eighty-four ports or openings spaced equal distance apart, and eighty-four would be the number of a B natural key and number 1 would control the low C and thus no notes are lost which should be heard.

According to the present invention there is combined eighty-four ports or holes equally spaced on two circles five and one-half inches in diameter on the two six inch flat steel discs which have ground joint air tight seats for the eighty-four holes. These discs use a common axle, as indicated by the numeral 30. The disc 11 is stationary on the axle 30, and the other disc 20 can be rotated several degrees to the right or left of a centrally located point known as number 37 and this is indicated by the numeral 51 in FIGURE 4, and this marks the air tube that operates the key of middle C.

According to the present invention two circular discs which may be three-eighths of an inch thick and six inches in diameter with hubs or shoulders protruding from the back side of the disc one-inch in diameter three-quarters of an inch long as shown in the drawings, are provided, and the openings 13 and 22 are provided with the hubs of the discs. The eighty-four ports are drilled or formed equal distances apart and these ports extend clear through the discs or plates. The front face of each of the discs is under cut as at 52 and 53, and the ports are counterbored as at 16 and 26. The disc 11 is keyed to the shaft or axle 30, and the other disc 20 is a movable disc which

may be referred to as the front disc, and the control lever 29 is affixed to the peripheral portion or edge of the front disc 20. The short nipples 18 and 27 may be made of a suitable material such as copper tubing and may have the following dimensions, five-thirty-seconds of an inch O.D. by one and one-eighth inches long, and these nipples must be soldered in place. As shown in FIGURE 2 for example, the nipples are arranged so that they are bent or positioned off center alternately in and out to make it easier to put the rubber tubing 19 and 28 on the nipple, and each nipple is opened for air passage.

The spring 38 serves to exert the proper pressure on the discs.

The transposer of the present invention can be installed on a piano by first locating a convenient place to mount the hanger 39 to one of the heavy beams below the sounding board, and then by locating the small key bellows that operates the middle C hammer, this bellows is number 37, and then it is only necessary to follow the suction tube from this bellows to the tracker bar, and mark the copper nipple on the tracker bar that the tube is slipped on to, and this is number 37 nipple. The treble is on one side thereof number 37 and the bass in the opposite side, and it is then only necessary to take each tube in rotation on the tracker bar beginning with the middle C going up and the middle C going down, this number 37 rubber tube is chased over to the back disc of the transposer with one inch slack, and the tube can be cut at this point and the end from the tracker bar slipped onto the number 37 nipple on the back disc. It may be necessary to use an additional piece of tubing to connect the number 37 key bellows to the number 37 nipple on the front movable disc because it is sometimes necessary to have several inches surplus to permit the front disc to move about one hundred degrees of the circle. With further reference to the tracker bar, it is necessary to locate the next nipple above number 37 on the tracker bar, that is number 38, chase the rubber tube over to the back disc, cut the tube about an inch long and slip the end thereof on the nipple 38 on the back disc. A new piece of tubing can be used to connect up the number 38 bellows with the nipple number 38 on the front disc. And this procedure is adapted to be followed until all eighty-four nipples on both front and back discs are used. Do not bother the expression tubes, since they and the automatic control tubes must be left alone. After connecting all of the tubes to their proper nipples, a player roll is placed in position in the piano, and the piano is started, and the transposer of the present invention is set with number 37 on the front disc, in line with the arrow on the back disc. The roll is playing in its natural key. To lower the tone four keys, it is only necessary to put the finger on the control lever 29 and align number 33 with the arrow. Then, if the roll is cut in the key of C and the user has lowered it four tones, it would be in the key of A flat or G sharp. If the roll was cut in G and number 40 was aligned with the arrow on the back disc, then since number 40 is three tones above number 37, it would be G, G sharp, A, A sharp. Three tones above G is B flat or A sharp. Any player roll that has been cut in the key that is too high for a person to sing and harmonize with, may be used as follows. By transposing it down where the accompanist can reach the high notes with ease, that have become readily available, and the operator may play guitar, banjo, violin and has only mastered one or two keys and it will therefore be seen that the transposer of the present invention is a very valuable tool or accessory.

As shown in the drawings, the number 37 on the back plate is the position of the index pointer, and whatever number is put in front of this pointer will tell how many notes higher or lower the user has changed it from the natural key that the roll was cut in. For example if number 41 is placed in front of the index, the key of C will

be changed to the key of E. If the roll is cut in the key of G, four tones higher would be B natural.

The transposer of the present invention can be used in various useful manners, as for example, it can transpose the key of C to C sharp, D, D sharp, E, F, F sharp, G, G sharp, A, A sharp, B, or it can go lower from the key of C to B, B flat, A, A flat, G, G flat, F, E, E flat, D, D flat, in the major scales. However, a roll has to be cut in a minor scale before the transposer can transpose to another minor key, and if the roll has been cut in a minor key or scale, it will transpose it eleven keys up or eleven keys down and give perfect harmony. The musical transposer is constructed on the principle that there are twelve basic notes in music and there are seven complete octaves of the key of C totaling eighty-four notes. Any sub-standard keyboard with seventy-two keys or sixty keys or forty-eight keys can use this type of transposer as long as the multiple twelve is used.

The transposer utilizing the principles set forth herein which utilize the circle and the multiple of twelve (the number of basic notes in music) times the number of octaves used, can be constructed electrically so it could be used on electric organs, or on pipe organs or the like. Many fine musicians readily admit that transposing is something that they have not mastered or learned, and such musicians are able to play it in the key in which a piece is written in on the sheet music, but this is also not low enough for the soloist. With the transposer of the present invention built into the instrument, it is only necessary to set the transposer to the right key for the soloist and the musician plays it in the key it is written in so that there will be no difficulty.

Minor changes in shape, size and rearrangement of details coming within the field of invention claimed may be resorted to in actual practice, if desired.

What is claimed is:

A rotary valve for a fluid operated musical instrument comprising a first disc provided with an annular rim adjacent its outer periphery, there being a central opening in said first disc, a shoulder extending outwardly from said

first disc adjacent said opening, there being a plurality of spaced apart ports in said rim, said ports including inner portions of reduced size and outer portions of increased size, nipples engaging the outer enlarged portions of said ports; a second disc arranged in face to face relation with respect to said first disc, a rim on the outer peripheral portion of said second disc, there being a central opening in said second disc, a shoulder extending outwardly from said second disc adjacent said last named opening, there being a plurality of spaced apart ports in the rim of said second disc, said ports including inner portions of reduced size and outer portions of enlarged size, other nipples engaging the outer enlarged portions of the ports of the second disc; a handle connected to said second disc, an axle extending through the central openings in said first and second discs, and said axle having an enlarged head on one end thereof and said axle further including a shank including a threaded end portion, the shoulder of the first disc being keyed to said shank, a fastener arranged with threaded engagement with the said threaded end portion of said shank, a stop piece contiguous to said fastener, a coil spring circumposed on said shank and interposed between said stop piece and the shoulder of said second disc biasing said second disc toward said first disc, and a hanger having one end affixed to the head of said axle and having the other end adapted for attachment to a fluid operated musical instrument.

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