A. F. LARSON.

EXPRESSION LEVER FOR AUTOMATIC PIANOS.

APPLICATION FILED MAY 21, 1910.

**996,775.** **Patented July 4, 1911.**

Fig. 1.

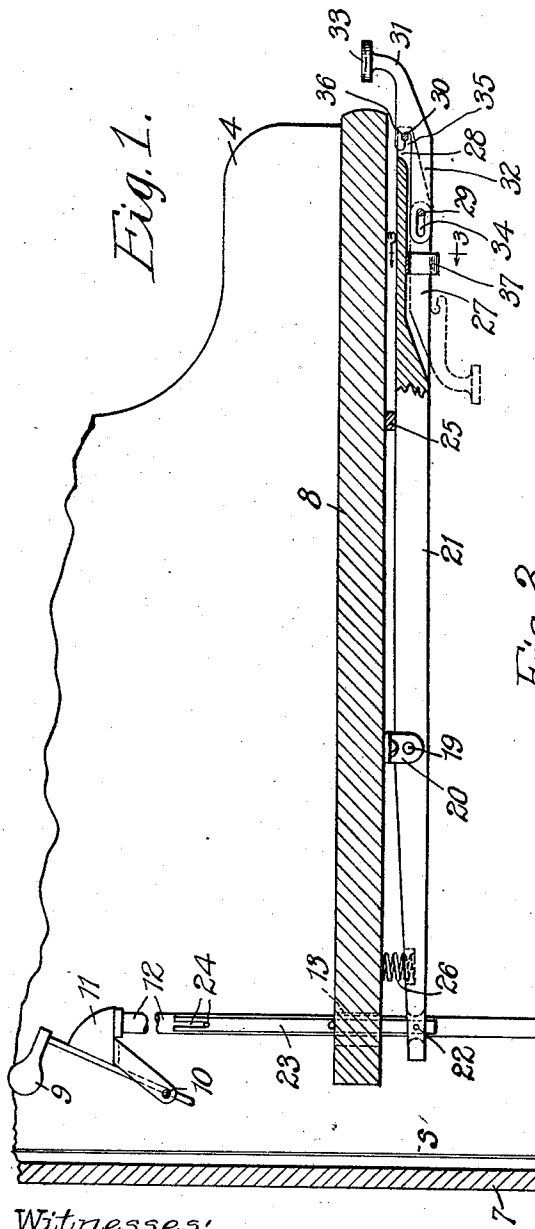



Fig. 2.

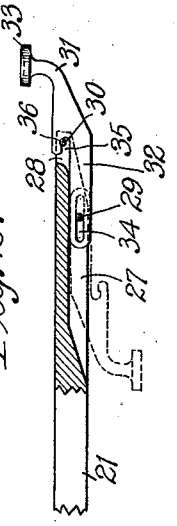
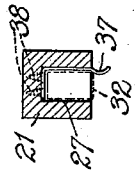



Fig. 3.

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# UNITED STATES PATENT OFFICE.

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## EXPRESSION-LEVER FOR AUTOMATIC PIANOS.

996,775. Specification of Letters Patent. Patented July 4, 1911.

Application filed May 21, 1910. Serial No. 562,615.

*To all whom it may concern:*

Be it known that I, AXEL F. LARSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Expression-Levers for Automatic Pianos, (Case 9,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to automatically playing pianos and, more specifically, to improved means for operating the expression mechanism therefor.

The class of instruments with which my invention has to do is that in which an automatic piano action is disposed within the casing and operatively associated with the hammers of an otherwise ordinary piano. It is, of course, well known that in ordinary pianos, expression means is provided, first for shifting all the hammers nearer the strings so as to moderate the tone, and, second, to remove the dampers from the strings, these means being respectively operated by the so-called "soft" and "loud" pedals. Since, in automatically playing pianos, it is common for an operator to be busily and constantly engaged actuating the pedal mechanism, in the way of pumping mechanism for instance, it is impossible for him to operate the expression mechanism in the ordinary way at the same time. It has been common in the art, therefore, to provide means whereby the expression mechanism could be operated manually, precisely as if operated by the ordinary pedals of the piano proper. This has been done in various ways, and most conveniently by means of lever mechanism connecting the expression mechanism in some suitable way with one or more finger pieces at the front of the piano. It is furthermore well known that it is frequently desirable to place the automatic action mechanism entirely out of use so that the piano may be played in the ordinary manner, and at such time it is desirable to have all the parts incident to the automatic mechanism concealed from view so far as possible.

It is with this last-named feature that my invention is concerned, since its object is to provide improved means whereby a finger piece may occupy two positions, one an operative position at the front of the piano, and the other an inoperative position underneath the bed thereof. I am aware that devices have heretofore been provided for broadly securing this result, and my invention is therefore confined to the improved construction whereby the desirable advantages of simplicity of construction and effectiveness of operation, which are the ends of my invention, are secured.

My invention is embodied in the structure illustrated in the accompanying drawing, in which—

Figure 1 is a cross-sectional view of a piano, only those parts with which this invention is concerned being illustrated however; Fig. 2 is a fragmentary view, similar to the corresponding portion of Fig. 1, illustrating a different method of retaining the finger piece in its inoperative position; and Fig. 3 is a cross-sectional view taken on the line 3—3 of Fig. 1.

The piano casing is shown at 4, the baseboard at 5, the toe rail at 6, the sounding board at 7, and the keyboard at 8. The strings are indicated at *s*. The hammers are indicated at 9, as substantially pivoted at 10, and as resting against the hammer rail 11, which is engaged upon its under side by a vertically movable rod 12 which passes through a convenient opening 13 in the key bed 8 and rests upon the end of a lever arm 14 secured upon a pivot shaft 15 set in a bearing 16. Also secured with this pivot shaft is the arm 17 which passes through a suitable opening in the toe rail 6 and terminates in the pedal 18, which, in the ordinary playing of the piano proper, is adapted to be actuated by the foot of the player.

Mounted upon a pivot member 19, set in a suitable bracket 20 secured at a suitable point to the under side of the key bed 8, is a lever 21, to the end of the rear arm of which is pivoted, at 22, an upwardly extending rod 23 which has pin and slot connection 24 with the rod 12. The arrangement is such that downward movement of the forward arm of the lever 21 will result in upward movement of the rod 23, and simultaneous similar movement of the rod 12. The particular arrangement illustrated is for the purpose of shifting all the hammers toward the strings, but it is, of course, apparent that the arrangement of my invention may be as well applied to the mecha-

nism for removing the dampers from the strings. The lever 21 is held in its normal position, with the forward arm raised against a suitable stop 25 by means of a spring 26 disposed between the bed 8 and a recess in the rear arm of the lever, as clearly indicated in the drawing.

The forward end of the lever 21 is slotted, as indicated at 27, and its free end is bifurcated, as indicated at 28. Extending transversely of the lever piece and bridging the tongues thus formed, are the pins 29 and 30 which are offset considerably horizontally for a purpose which will presently appear. As shown in the drawings, the lever 21 does not extend forwardly beyond the bed 8, so, of itself, it is effectively concealed. For the purpose of effective manipulation, however, it is supplemented by a finger piece 31 which consists of the flat body portion 32 and the button 33. The body portion of the finger piece is provided, near its end, with a longitudinal slot 34 through which the pin 29, hereinbefore mentioned, passes, and it is clear that this arrangement provides for longitudinal movement of the finger piece relative to the movement of the lever proper. The body portion of the finger piece is also provided with a notch 35 which is so disposed relative to the slot 34 that it may receive the pin 30 hereinbefore mentioned, at the same time that the pin 29 is toward the forward end of the slot in which it engages. The notch 35 is supplemented by the depression 36 so that the parts may be positively locked in place when once brought into position. The various parts just described have sufficient play relative to each other so that the finger piece may be raised slightly in order that the pin 30 may be released from engagement in the depression, and then drawn outwardly so that it may be removed from the notch, the slot 34 permitting of this movement. Once drawn to its outer position, the finger piece may be swung about the pin 29, which is then disposed at the rear end of the slot 34, the rear end of the body part 32 being rounded off concentric with the pin 29, as indicated, so that this movement may be permitted without any additional slotting of the lever piece 21. It is clear that the finger piece may then be swung into the position shown in dotted lines in Fig. 1, and may be held in this position by means of a leaf spring 37 secured by means of screws 38, 38 in the slot 27, as clearly shown in Figs. 1 and 3. The spring 37 has a cam surface at its end so that the finger piece may be properly held. This is the position that the finger piece will occupy when it is desired to play the piano in the ordinary manner and without the use of the automatic action mechanism. When it is desired to bring the automatic action mechanism into use, and, therefore, to again operate the expression mechanism manually, the finger piece is swung about the pivot 29 approximately to the extent of one hundred eighty degrees, and is then pushed inwardly toward the piano so that the pin 30 may enter the notch and depression as hereinbefore described. It is clear that the two points of contact secure the proper leverage and that, so far as depression of the finger piece is concerned, there is positive locking engagement between the finger piece and the lever which is to be operated. The pins 29 and 30 being offset horizontally to a considerable extent, the leverage obtained is a considerable one, and neither pin is subjected to a severe strain.

In Fig. 2 I have shown a method of holding the finger piece in its inoperative position without the use of a spring like the spring 37 previously described. The operation of the parts is precisely the same, the only difference being that, when the finger piece has been thrown to its hidden position, the movement is supplemented by a slight outward pull so that the pin 29 may not be concentric with the rounded end of the finger piece. When brought into such position, the end of the finger piece engages the lever proper, as shown, so as to prevent dropping of the finger piece until the pin 29 has again been made to occupy the end of the slot nearest the end of the finger piece.

I claim as new and desire to secure by Letters Patent:

1. In an automatic piano, a member to be actuated by depression, a pin carried by said member, a finger piece having a slot through which said pin may pass, and a part on said member and a part on said finger piece which may engage each other to hold said finger piece in rigid relation to said member when the pin is at one end of the slot, said parts being released from each other when the pin is at the other end of the slot.

2. In an automatic piano, a member to be actuated by depression, two pins carried by said member, and a finger piece having a slot through which one of said pins passes and having a part for engagement with the other of said pins to hold said finger piece rigid relative to said member.

3. In an automatic piano, a member to be actuated by depression, two pins carried by said member, and a finger piece having a slot through which one of said pins passes, said finger piece thus having rotary movement, said finger piece having a part for engagement with the other of said pins to hold said finger piece rigid relative to said member.

4. In an automatic piano, a member to be actuated by depression, two pins carried by said member, a finger piece having an elongated slot through which one of said

pins passes and a notch into which the other of said pins may extend when said first-named pin is approximately at one end of said slot, said second-named pin being free from said notch when said first-named pin is at the other end of said slot.

5. In an automatic piano, a lever having its end slotted and bifurcated, a pin extending across the slotted portion, a pin extending across the bifurcated portion between the tangs, and a finger piece having a slot through which said first-named pin passes and a notch which said second-named pin may enter, said finger piece being rigidly connected with said lever for the purposes of depression when said pins are in respective engagement with said slot and notch and said slot being of sufficient length to allow the finger piece to slide on the lever for the removal of said finger piece from said second-named pin, to permit the finger piece to be swung an appropriate half-circle about said first-named pin.

6. In an automatic piano, a lever having its end slotted and bifurcated, a pin extending across the slotted portion, a pin extending across the bifurcated portion between the tangs, and a finger piece having a slot through which said first-named pin passes and a notch which said second-named pin may enter, said finger piece being rigidly connected with said lever for the purposes of depression when said pins are in respective engagement with said slot and notch and said slot being of sufficient length to allow the finger piece to slide on the lever for the removal of said finger piece from said second-named pin, to permit the finger piece to be swung an approximate half-circle about said first-named pin, the end of said finger piece bearing against a part of said lever, when said finger piece is slightly withdrawn, to hold it in position.

7. In an automatic piano, a member to be actuated by depression having two pins thereon, a finger piece having a slot through which one of said pins passes and a notch for receiving the other pin, said notch being supplemented by a depression whereby said pin may be locked therein to hold said finger piece in position.

8. In an automatic piano, an actuating member, a finger piece having a slot therein and a hook thereon, and pins on said member for respective engagement in said slot and under said hook, the hook being removable from one pin so that the finger piece may be swung about the other pin as a pivot.

9. In an automatic piano, an actuating member, a finger piece having a slot therein and a hook thereon, pins on said member for respective engagement in said slot and under said hook, the hook being removable from one pin so that the finger piece may be swung about the other pin as a pivot, and a spring for holding said finger piece in position after the hook is released from the associated pin.

10. In an automatic piano, two associated members, a pin on one of said members extending into a slot in the other of said members, and parts on said members respectively which may engage to hold them rigid relative to each other when the pin is at one end of the slot, said parts being released from each other when the pin is at the other end of the slot.

11. In an automatic piano, two associated members, one having reciprocating motion and rotary motion relative to an axis in the other, and parts on said members respectively which may engage to hold them in rigid relation to each other when the one member is near one end of its reciprocating travel, said parts being released from each other when the said one member is near the other end of its reciprocating travel.

12. In an automatic piano, two associated members, one having reciprocating motion and rotary motion relative to an axis in the other, parts on said members respectively which may engage to hold them in one position in rigid relation to each other when the one member is near one end of its reciprocating travel, said parts being released from each other when the said one member is near the other end of its reciprocating travel, and parts on said members respectively which may engage to hold said members in another rigid position relative to each other when the pin is in the first-named end of said slot.

In witness whereof, I hereunto subscribe my name, this 28th day of April, 1910.

AXEL F. LARSON.

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