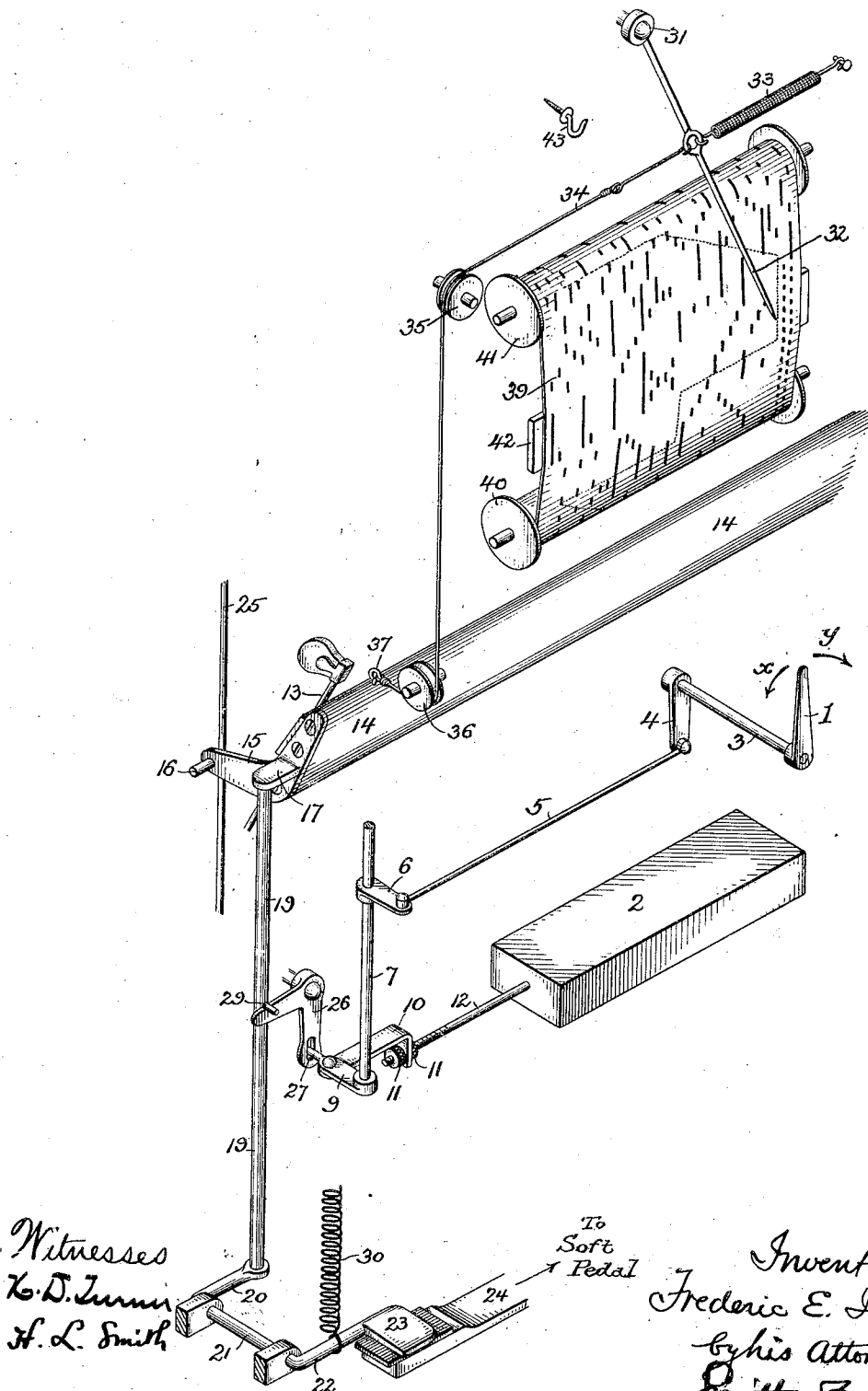


F. E. IVES.
 SELF PLAYING PIANO.
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UNITED STATES PATENT OFFICE.

FREDERIC E. IVES, OF WOODCLIFFE-ON-HUDSON, NEW JERSEY.

SELF-PLAYING PIANO.

No. 901,908.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FREDERIC E. IVES, a citizen of the United States, residing in Woodcliffe-on-Hudson, New Jersey, have invented certain Improvements in Self-Playing Pianos, of which the following is a specification.

The object of my invention is to provide a mechanical piano player with simpler and more efficient means than have heretofore been proposed for varying simultaneously, the force imparted to the hammer and the length of the hammer stroke, and to combine therewith an automatic indicator which will follow the expression line on the perforated music sheet as the latter passes over the tracker board. This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawing, which represents, in perspective, the devices constituting my invention and so much of the ordinary mechanism of a mechanical piano player as is necessary for the illustration of my invention.

My invention relates to that class of devices in which the stroke of the hammers is shortened simultaneously with a decrease in the power of the hammer pneumatics, and is increased simultaneously with an increase of such power, in order to effect a more delicate control of the expression than when increase or decrease of the power of the hammer pneumatics is alone relied upon for this purpose.

In the drawing, 1 represents the usual expression lever of a mechanical or self-playing piano, and 2 the valve box whereby the force of the hammer-actuating pneumatics is governed by regulation of the flow of air to or from the same, movement of the expression lever 1 in one direction, say in the direction of the arrow *x*, causing a decrease in the power of these pneumatics, and a consequent decrease in the force with which the hammers are actuated, while movement in the opposite direction, indicated by the arrow *y*, increases the power of the pneumatics and the force applied to the hammers.

Movement is transmitted from the expression lever 1 to the valve or valves in the box 2 by means of a rock shaft 3 having an arm 4 which is connected by a rod 5 to an arm 6 on a vertical rock shaft 7, the latter having an arm 9 to which is pivoted a bar 10 having a bent end confined between adjusting nuts

11 on the threaded portion of the valve rod 12, all of these parts being common in mechanical piano players as now constructed.

The hammer stems 13, when said hammers are retracted, bear upon a rest bar 14, this bar having, at each end, a carrier 15 with pivot pin 16 and one of these carriers also having a lug or finger 17 upon which bears the upper end of a vertical rod 19 resting at its lower end upon an arm 20 on a rock shaft 21, the latter having another arm 22 with enlarged end 23 upon which acts a lever 24 connected to the soft pedal of the piano, whereby, when the rod 19 is lifted the hammers resting upon the bar 14 are moved towards their respective wires 25, and the throw of the hammers thereby shortened, the force with which they strike the wires diminished and a softer tone produced. These parts are also common to ordinary piano construction, and in order to connect the soft pedal devices and the pneumatic controlling devices I simply provide a bell crank lever 26, suitably mounted on the piano structure and having one arm with a slot 27 for the reception of an extension of the arm 9 and another arm engaging a pin 29 on the lifter rod 19, whereby, when the expression lever 1 is moved to restrict the flow of air to or from the hammer pneumatics, and thereby decrease the force with which the hammers are actuated, the lifter rod 19 will be simultaneously raised and will cause the rest bar 14 to swing towards the wires of the piano and thereby lessen the throw of the hammers.

A spring 30, connected at its lower end to the arm 22 and at its upper end to any suitable fixed support, serves to counterbalance the weight of the rest rail and its operating appurtenances, and thus permits of the operation of the expression lever 1 without the application of any more force thereto than is now required for the operation of the governing valve in the controller box 2.

In order to provide, in connection with the expression controlling mechanism of the piano, an automatic indicator which will follow the expression line on the music sheet as the expression-controlling devices are actuated, I pivotally mount, as at 31, upon any available portion of the piano structure, preferably at the highest point practicable within the case, a pointer 32 which is connected to one end of a coiled spring 33, having its opposite end connected to any fixed

point on the piano structure, said pointer being also connected to one end of a wire, cord, chain, or like device 34, which passes over suitably disposed guide pulleys 35 and 36, and is connected at the opposite end to an eye 37 or equivalent fastening on the rest bar 14, whereby, as said rest bar is raised to decrease the stroke and soften the blow of the hammers, the pointer will be caused to travel from the fortissimo to the pianissimo side of the perforated music sheet 39, the spring 33 being expanded by such movement, so that, when the rest bar 14 moves back from its elevated position, the tension of the spring will cause the pointer to travel from the pianissimo to the fortissimo side of the sheet, and the person playing the piano can, by causing the end of the pointer to follow the expression line on the music sheet, accurately control the expression as indicated by said line.

The music sheet is wound upon the usual roll 40, and in order to permit of the application of the forward end of the sheet to the winding roll 41 necessary to cause the sheet to travel properly over the tracker board 42, the pointer 32 must be moved out of the way, and it may therefore be swung to one side by hand and engaged by a hood 43 or other suitable retainer, until the music sheet has been properly applied, after which it can be disengaged from said retainer and permitted to drop down in front of the sheet, as shown in the drawing.

I claim:—

1. The combination, in a self playing piano, of the valve-controlling mechanism having an arm, the expression lever operating the same, the soft pedal mechanism, the hammer rest bar, connections between said soft pedal mechanism and hammer rest bar, including a lifter rod, and a bell crank lever interposed between said rod and the arm of said valve controlling mechanism and engaging with each.

2. In a self playing piano, the combination with the hammer action of the music

roll and its supports, and the tracker board all located above the hammer action, an expression indicating pointer pivotally mounted above the music roll and having a lower end movable across the front of the tracker board, the soft pedal mechanism, and a connection between said soft pedal mechanism and the indicating pointer.

3. The combination with the hammer action, in a self-playing piano, of the music sheet rolls, and the tracker board all located above the hammer action, the hammer rest bar, a pointer mounted above and overlying the music sheet, and a connection between said pointer and the rest bar whereby the movement of said rest bar is transmitted to the pointer.

4. The combination with the hammer action, in a self-playing piano, of the music sheet rolls, and the tracker board all located above the hammer action, the hammer rest bar, a pointer mounted above and overlying the music sheet, a connection between said pointer and the rest bar whereby movement of the rest bar is transmitted to the pointer, and a spring connected to the pointer and tending to move the same in one direction.

5. The combination, in a self-playing piano, of the valve-controlling devices, an expression lever for operating the same, a hammer rest rail, a soft pedal mechanism, connections between said hammer rest rail and the soft pedal mechanism, including a lifter rod, a connection between said lifter rod and the valve operating devices, a pointer operating in conjunction with the music sheet, and a connection between said pointer and the hammer rest rail, whereby movement of the latter is imparted to the pointer.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

FREDERIC E. IVES.

Witnesses:

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