

2 Sheets—Sheet 1.

Patented Jan. 21, 1890.



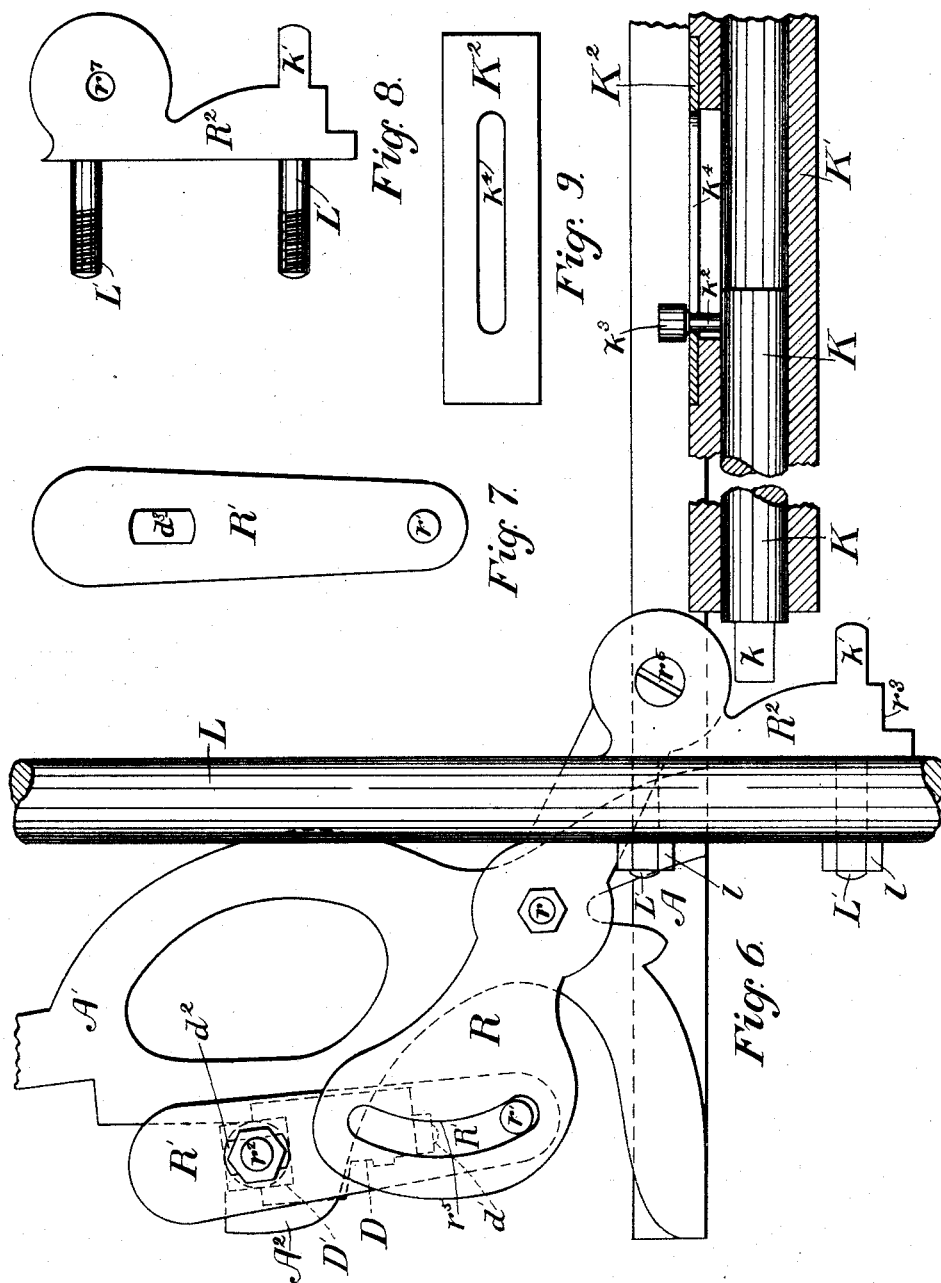
(No Model.)

2 Sheets—Sheet 2.

E. N. CUMMINGS.
PIANO ACTION.

No. 420,007.

Patented Jan. 21, 1890.



Witnesses

Albert E. Leach -
M. H. Thompson.

Inventor

Edward N. Cummings
by his atty.
Wm. H. Dwyer.

UNITED STATES PATENT OFFICE.

EDWARD N. CUMMINGS, OF LYNN, MASSACHUSETTS.

PIANO-ACTION.

SPECIFICATION forming part of Letters Patent No. 420,007, dated January 21, 1890.

Application filed March 14, 1889. Serial No. 303,211. (No model.)

To all whom it may concern:

Be it known that I, EDWARD N. CUMMINGS, a citizen of the United States, residing at Lynn, in the county of Essex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Upright-Piano-Forte Actions, of which the following is a full specification.

Of the accompanying drawings, Figure 1 is a front elevation of the parts embodied in my improvements. Fig. 2 is an end view from the inside of the outer standard supporting the parts. Fig. 3 is a section on $y y$, Fig. 2. Fig. 4 is a section on $x x$, Fig. 1. Fig. 5 shows a portion of the supporting-rod for the lower rail. Fig. 6 shows, on a larger scale, an end elevation of the mechanism shown in Fig. 1; and Figs. 7, 8, and 9 are detail views on the same enlarged scale, Fig. 7 showing the crank, Fig. 8 the slotted lever and pedal-rod connection, and Fig. 9 the slotted plate for the block in which slides the regulating-stop.

My invention consists of improvements in the construction of the lower rail in upright-piano-forte actions and in mechanism for operating the same, as hereinafter fully described. An application for United States Letters Patent was filed January 14, 1889, by Robert M. Hutchinson, Serial No. 296,265, for improvements in upright-piano-forte actions, whereby the sound of the piano may be rendered wholly or partially inaudible and the dip and touch of the keys always remain the same. A movable lower rail is therein shown, which, with its connections, is especially useful in keeping the movable parts of the action always in contact, whatever be the position of the pedal-rod, as therein fully explained. My improved lower rail and mechanism for moving the same may be used in place of the corresponding parts shown in said application, the other parts of the action being preferably similar to those therein shown.

$A' A' A' A^3$ are the standards supporting the working parts of the action, (not shown,) and A is the base of the piano-frame.

My improved lower rail D is made in a number of sections, all of which are secured to a single supporting-rod D' , preferably of metal, running the entire length of the frame.

I have here shown the rail as made in three sections included between four standards. The supporting-rod D' is preferably made square in section, excepting where it is supported by the standards, the rod being rounded off at such places, as at d , to form a circular journal, whereby the entire rod, with the sections of the lower rail secured thereto, may swing or move rotatively around the central axis of the rod. These sections are firmly secured to the rod in any desired manner, as by screw-bolts d' , passing through both rod and section, as shown.

The standards A' are made with the bearing portions A^2 , into which fit the journaled portions d of the supporting-rod D' , open at the top, so that the rod may be raised therefrom, while the end standard A^3 , farthest removed from the pedal-rod L , has the plain circular bearing d' , in which turns the outer end of the rod D' . By this construction the supporting-rod D' and the entire lower rail secured thereto may be easily removed from the frame without detaching therefrom any of the swing-flanges with which the lower rail is provided.

L is the pedal-rod, moved up and down in the ordinary manner, the position of which determines the volume of the sound, in a manner fully explained in the aforesaid Hutchinson application.

To the inner end of the supporting-rod D' is rigidly secured the crank R' in any desired manner, as by providing the end of the said rod which projects beyond the inner-end standard A' with the cut-down portion d^2 , of such size and shape as to fit the hole in the crank, and by threading the extreme end r^2 of the rod, so that a nut may hold the crank in place, in a manner easily understood by reference to Fig. 6. The crank R' is provided near its lower end with the pin or roller r' , which works in the cam-shaped slot r^3 in the lever R , the said lever being pivoted at r to the standard.

The rear end of the slotted lever R is pivotally secured at r^4 to the piece R^2 , which I have termed the "lever-and-pedal-rod connection," and which is provided with the threaded pins $L' L'$. These pins fit corresponding holes in the pedal-rod L , and by means of

nuts l the connection R^2 is bolted to the said rod. In this way, as the pedal-rod L moves up and down, the lower rail D swings back and forth around the central axis of the supporting-rod D' through the influence of the slotted lever R and the crank R' , so that for each position of the pedal-rod there is a corresponding position of the lower rail.

K is the sliding stop, which regulates the position of the pedal-rod, and which slides in any suitable block K' , so as to be operated from the outside of the key-board. In the top of the block K' is set the slotted plate K^2 , the slot k^4 of which guides the shank k^2 of the knob k^3 , which is attached to the sliding stop K .

The lever-and-pedal-rod connection R^2 is provided with the projection k' and the step r^3 to engage with the tongue k on the end of the stop K . In Fig. 6 the parts are shown in position for playing the piano at its normal tone. When, however, it is desired to play softly, the pedal-rod L is pressed up until the upper surface of the projection k' comes in contact with the tongue k of the stop K , when the parts will be in position for playing softly, and at the same time the lower rail D is swung outwardly for a slight distance. The sound of the piano may be still further reduced in volume, or, if desired, rendered wholly inaudible while fingering the keys by first drawing back the stop K , then raising the pedal-rod, and pushing in the stop again, so that either the under surface of the projection k' or of the step r^3 , whichever may be desired, shall rest on the tongue k of the stop K , the parts being so arranged that with the projection k' resting upon the tongue k the volume of sound is very slight, while when the step r^3 rests upon the tongue k the sound is wholly inaudible, each position of the pedal-rod L in producing these results having a corresponding position of lower rail D by reason of the action of the cam-shaped slot r^5 on the crank-pin r' . The action of pedal-rod L in reducing the throw of the hammer as it is raised, and thus diminishing the sound as well as the action of the movable lower rail D in taking up the looseness of action between the joints, and thus equalizing the dip and touch of the keys for the various positions of the parts, will be readily understood by reference to the above-mentioned Hutchinson application.

The under portion of the connection R^2 may be provided with any desired number of steps to further grade the difference in tone of the piano, and, furthermore, as in said Hutchinson application, by withdrawing the

stop K , so that it cannot interfere with the motion of the pedal-rod, and by operating the latter independent of said stop, the player may grade the volume of sound from the normal tone of the piano to the very faintest sound in a very delicate manner, while the dip and touch on the keys remain always the same whatever be the volume of the sound. By thus making the lower rail in sections, each secured to a single metallic rod running the entire length of the frame, all tendency of the lower rail to warp out of shape is effectually counteracted, while at the same time less care in the selection of the stock is required, and the rail may be much more easily manufactured than if made in one piece.

I claim—

1. An upright-piano action provided with a lower rail movable rotatively around the central axis of a rod secured thereto, substantially as described.

2. An upright-piano action provided with a lower rail consisting of sections, each independently secured to one rod running the entire length of said sections, substantially as described.

3. In an upright-piano action, the combination, with end and intermediate standards, of a lower rail consisting of sections, each independently secured to a single square rod provided with rounded journals supported in bearings in said standards, substantially as described.

4. In an upright-piano action, a lower rail movable rotatively around a rod secured thereto and provided with a crank in combination with a lever, a pedal-rod, and a piece connecting said pedal-rod and lever, substantially as and for the purposes described.

5. In an upright-piano action, a lower rail movable rotatively around a rod secured thereto and provided with a crank, in combination with a pedal-rod-operated lever, substantially as described.

6. In an upright-piano action, a sliding regulating-stop, in combination with a pedal-rod provided with a piece R^2 , engaging with said stop, whereby the position of the pedal-rod is determined, substantially as and for the purposes described.

In witness whereof I have hereunto set my hand.

EDWARD N. CUMMINGS.

Witnesses:

W. B. H. DOWSE,
ALBERT E. LEACH.