

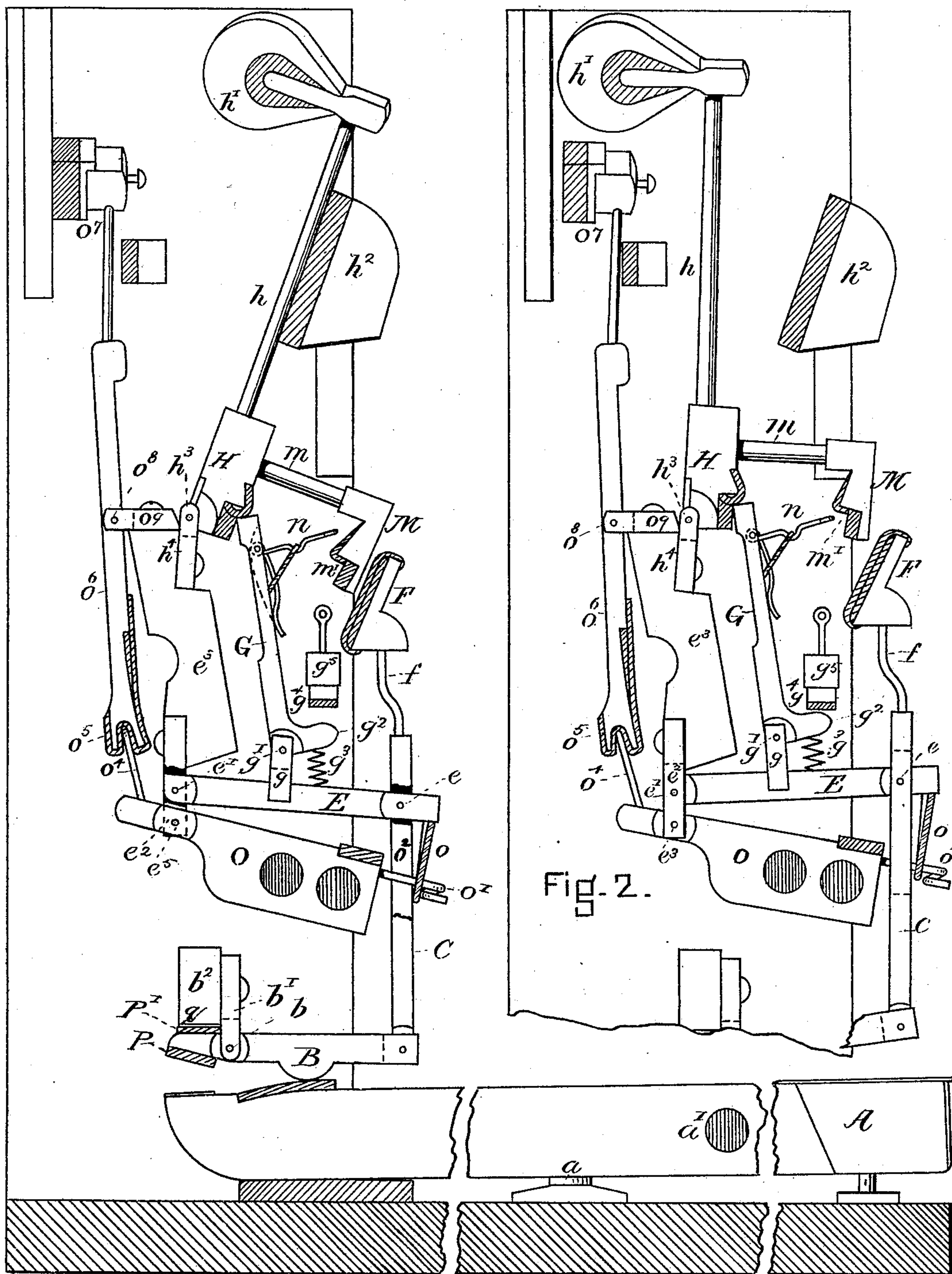
(No Model.)

2 Sheets—Sheet 1

I. BULLARD.
UPRIGHT PIANO ACTION.

No. 251,348.

Patented Dec. 27, 1881.



WITNESSES.

A. C. Fogg
W. J. Oetinger

Fig. 1.

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2 Sheets—Sheet 2.

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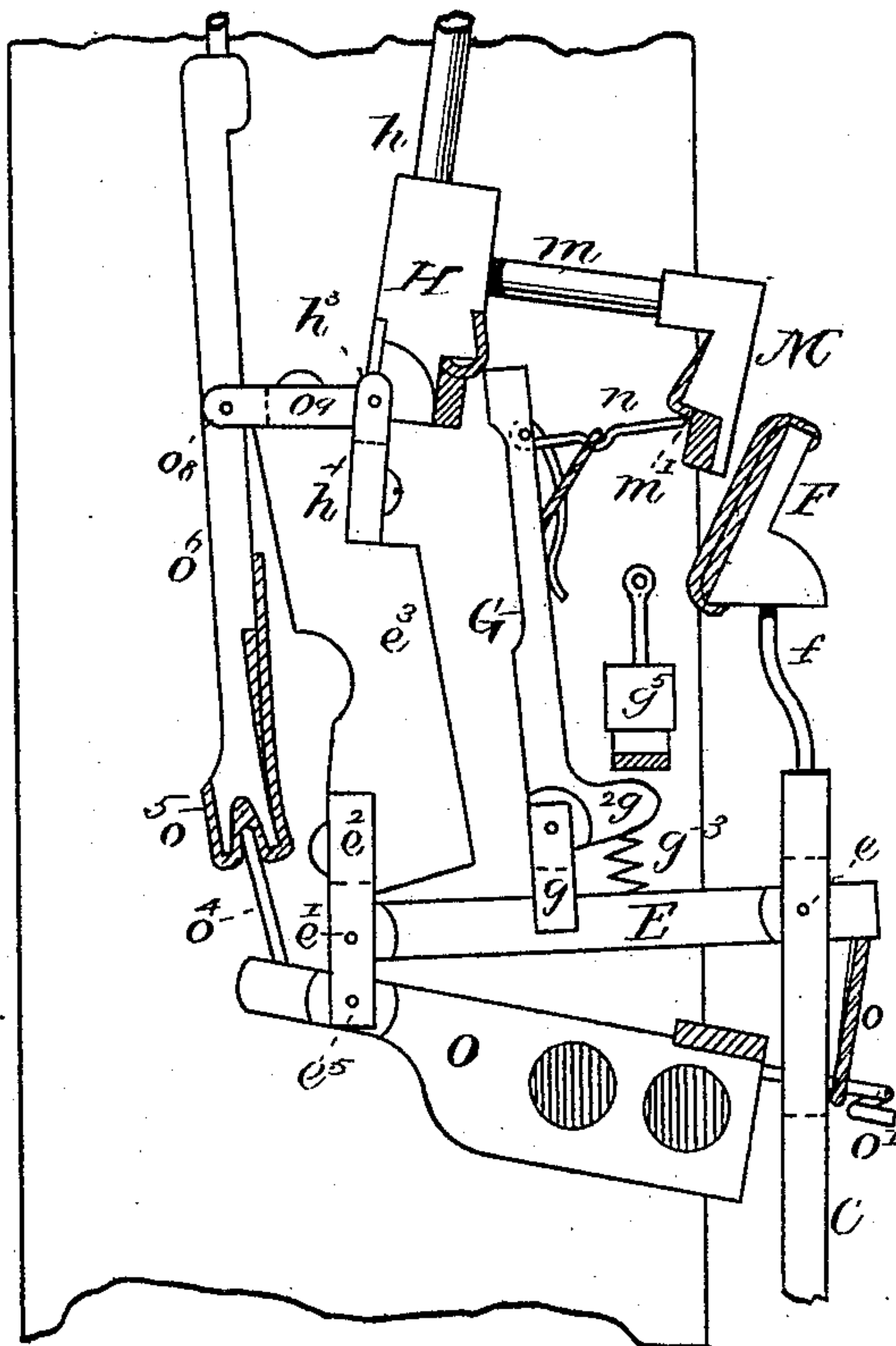
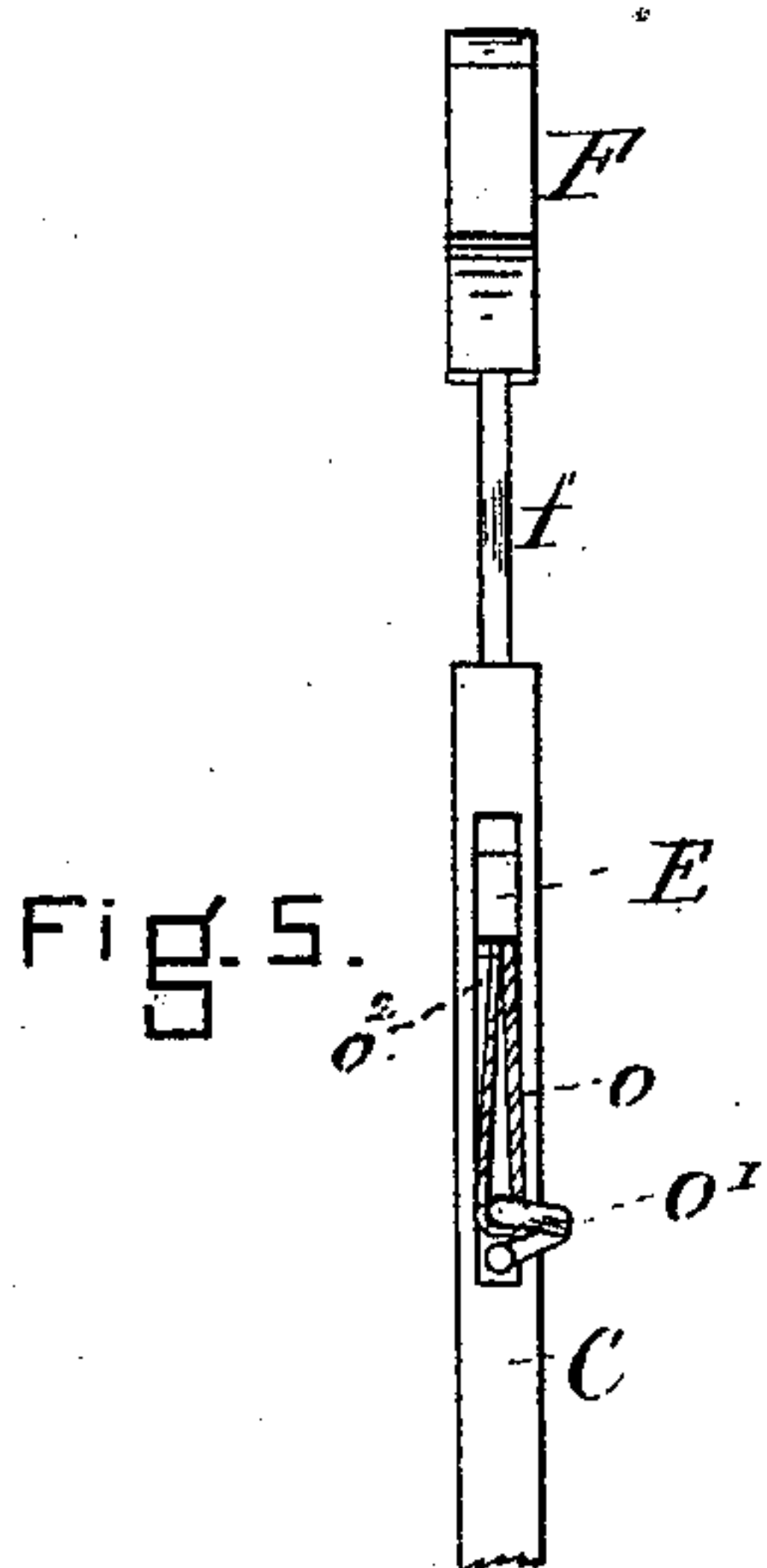


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

ISAAC BULLARD, OF READVILLE, MASSACHUSETTS.

UPRIGHT-PIANO ACTION.

SPECIFICATION forming part of Letters Patent No. 251,348, dated December 27, 1881.

Application filed April 19, 1881. (No model.)

To all whom it may concern:

Be it known that I, ISAAC BULLARD, of the village of Readville, town of Hyde Park, county of Norfolk, State of Massachusetts, a citizen of the United States, have invented a certain new and useful Action for Upright Pianos, of which the following is a full, clear, and exact description, reference being made to the accompanying drawings, forming a part of this specification, in explaining its nature, in which—

Figure 1 is a side elevation of my improved action, representing the position of the parts when the key is in its highest position. Fig. 2 represents the position of the principal parts of the action while the key is being depressed in striking a note and immediately before the jack rides over the knuckle. Fig. 3 represents, in elevation, the relative position of the parts after the note has been struck; and Fig. 4 represents the parts immediately before the jack is returned under the knuckle, showing the bumper supported for an instant by the repeating-spring, as hereinafter will be more fully described; and Fig. 5 is a detail view.

The object of this invention is to improve the action of upright pianos, whereby the hammer, after being once operated to strike a string, is caught or prevented from rebounding to its normal position during the upward movement of the key, and the mechanism connecting the key with the hammer set, thereby enabling the hammer to be again immediately operated and the note to be repeated without the key having risen to its original position. This manipulation is called "repeating," and the mechanism by which it is accomplished the repeating action or device.

The invention further relates to the hereinafter-described means of operating the damper, and also to the manner of hanging the key and balancing the action, whereby the movement of the key is rapid, prompt, easy, and uniform, and whereby the pressure in moving the key is not increased during the continuance of its downward motion.

In the drawings, A is the key. It is pivoted at a , and is weighted by means of lead plugs a' , or other suitable device, so that if the action were not supported by its inner end the key would fall to its lowest position.

B is the rocker. It is pivoted at b to the flange b' , attached to the rail b^2 . The opposite

end of the rocker carries the extension C, which is pivoted thereto and to the jack-bed E at e , and serves to oscillate the same vertically. The jack-bed is pivoted at e' to the flange e^2 , depending from the rail e^3 . The extension supports the back-check F by means of the vertical connecting-rod f . The jack-bed supports the block g , to which the jack G is pivoted at g' . The jack is provided with the extension or foot g^2 , which performs two offices in connection with the spring g^3 and the stop g^4 , which is adjustably secured to the rail g^5 —namely, with the addition of the spring it maintains the end of the jack in contact with the knuckle H during its upward movement, and in returning it to that position during its downward movement, and the foot with the stop trips the end of the jack from the knuckle immediately before the end of its upward movement, causing it to ride over the edge of the knuckle. The knuckle supports the hammer-stem h and the hammer h' , as in the ordinary form of action, and the hammer-stem is arranged to fall back against the rail h^2 when the key is in its highest position.

The bumper M is supported upon the end of the rod m , which is secured to the knuckle. The knuckle is pivoted at h^3 to the flange h^4 , projecting upwardly from the rail e^3 . The bumper is provided with the notch m' upon its lower inner side, and a repeating spring or spring-arm, N, projecting outwardly from the jack, is arranged to engage therewith, as hereinafter described. This spring or spring-arm is arranged to yield downwardly, and it is prevented from moving upwardly by any suitable means.

The form of repeating-spring which I prefer to employ is that shown in the drawings, consisting of the long horizontal arm coiled about the pivot, and having the long vertical arm extending downwardly from the pivot and bearing upon the side of the jack.

The jack-bed E is connected with the weighted lever O, operating the damper, by means of the cord o and the rod o' , which passes through the long slot o^2 in the extension, and which is provided with an open eye, into which the cord may be slipped, and from which it may be detached without removing the rod from the lever or the ends of the loop from the jack-bed.

The weighted lever is hinged at o^3 to the

flange e^2 , and carries at its end the upwardly-extending tongue o^4 , which projects into the V or other similar shaped recess, o^5 , in the end of the damper-lever o^6 , the tongue and recess making a loose joint, whereby the damper-lever may be moved to and from the rail e^3 and the damper o^7 to and from the string, according as the weighted lever O is moved up or down by the jack-bed. The damper-lever is pivoted at o^8 to the flange o^9 , projecting from the rail e^3 .

In operation, upon the downward movement of the outward end of the key the rocker is lifted, thereby lifting the extension, the jack-bed, the jack, operating the hammer, locating the back-check in position to receive the bumper, and moving the bumper from the string. Immediately before the hammer strikes the string the jack is tripped, rides over the knuckle, and the end of the repeating-spring closes into the notch in the bumper and the bumper rests upon the back-check. The key being allowed to rise a very little, the rocker, extension, and jack-bed move downwardly, thereby moving the back-check from the bumper and allowing the bumper to fall upon the end of the repeating-spring. The key still rising, the repeating-spring holds the bumper stationary for an instant, and thereby the hammer and knuckle, while the jack is being returned under the knuckle by the spring g^3 , and this is accomplished before the key has risen to any extent from its lowest position, thereby insuring the return of the jack in the quickest possible interval to a position under the knuckle, thus providing for an immediate repetition of the note, if desired. The weight of the lever O and the action is such that the key will automatically resume its normal position upon the removal of pressure therefrom.

A stop, P, is arranged upon the lower surface of the rocker, near its end, to come in contact with the upper surface of the inner end of the key, thereby limiting the movement of the key and the throw of the rocker; and another stop, P', is arranged upon the upper surface of the rocker to come in contact with the lower surface, q , of the rail b^2 , to support the rocker in a longitudinal position after the key is removed, thus doing away with the necessity of connecting the knuckle with the jack-bed by a strap, as is now the practice, before the key is removed. When the key is in position the stop P' does not contact at any time with the rail. The method of connecting the back-check with the extension provides a more positive movement of the check, and one upon a direct vertical line in relation to the line of movement of the bumper, instead of upon an arc of a circle, and affords a firmer support.

In lieu of attaching the back-check to the extension it may be attached to another upright support, having a vertical movement communicated to it by either the rocker or jack-bed, or both, and jointed or hinged to the one or the other, or to both, so that the back-check shall have the movement in relation to

the bumper herein described. This method of moving the back-check is considered to be a great improvement over the old method of moving it over the arc of a circle, as it operates more efficiently in connection with the bumper, which in every instance moves upon the arc of a circle, because it provides a more solid check and a longer-continued check, thereby preventing the hammer from falling as quickly as it otherwise would.

Of course any equivalent lever, or lever for operating the back-check, as herein described, may be used in lieu of the jack-bed or rocker, or both, without departing from the spirit of the invention.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In an action for upright pianos, the weighted lever O, pivoted to the action and operated by the jack-bed, as described, and adapted to reciprocate the damper-lever, substantially as and for the purposes set forth.

2. The combination of the weighted lever O, the jack-bed E, extension C, having the slot o^2 , the rod o' , and the flexible connection o , all substantially as and for the purposes set forth.

3. The combination of the weighted lever O, the tongue o^4 , and the damper-lever o^6 , provided with the recess o^5 , into which the tongue projects, all substantially as and for the purposes set forth.

4. A back-check for an upright-piano action, arranged upon its support substantially as described, and adapted to have a straight movement tangential to the arc described by the bumper, substantially as and for the purposes set forth.

5. The back check F, in combination with the extension C, pivoted in the manner described, whereby the back-check is adapted to have a vertical movement in relation to the damper, substantially as specified.

6. The combination of the bumper M, attached to the hammer-knuckle, with the back-check F, constructed and adapted to have a straight movement tangential to the arc described by the bumper, and carried by the extension, all substantially as and for the purposes set forth.

7. The combination of the rocker B, provided with the stop P, and the key A, all substantially as described.

8. The combination of the rocker B, having the stop P', with the rail b^2 , all substantially as described.

9. The combination of the key, balanced as described, with the rocker B, pivoted as described, and resting upon the end of the key and supporting the action, whereby the weight of the action operates to automatically lift the key to its normal position, all substantially as described.

Witnesses: ISAAC BULLARD.
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