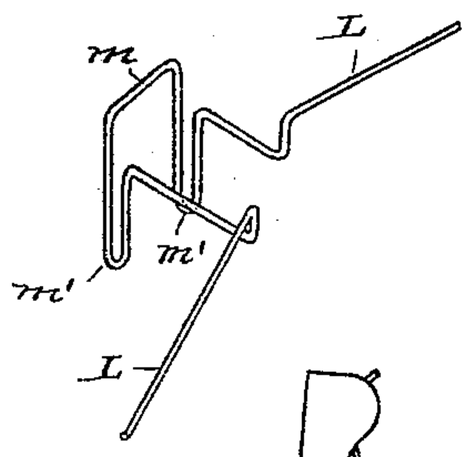
(No Model.)

J. H. PHELPS.

PIANOFORTE.

No. 543,505. Patented July 30, 1895.

FIG. 4



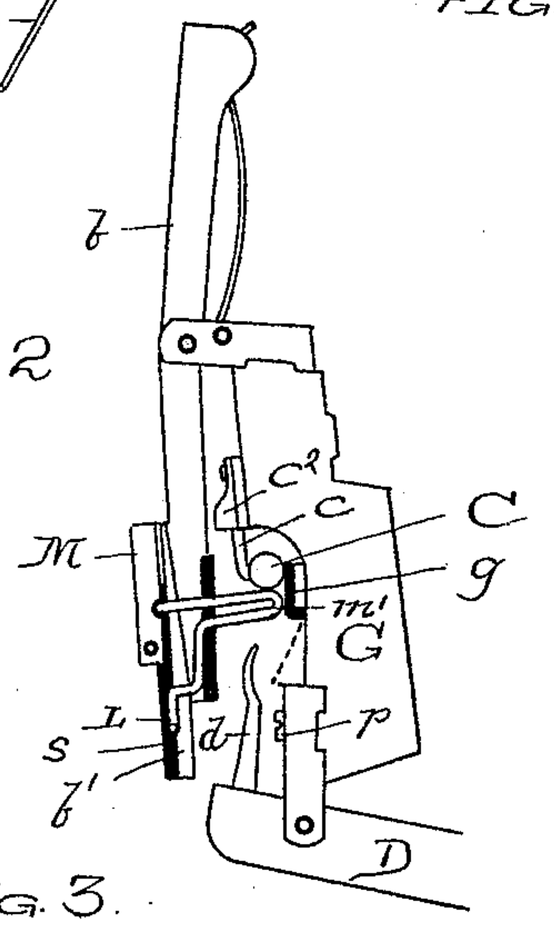
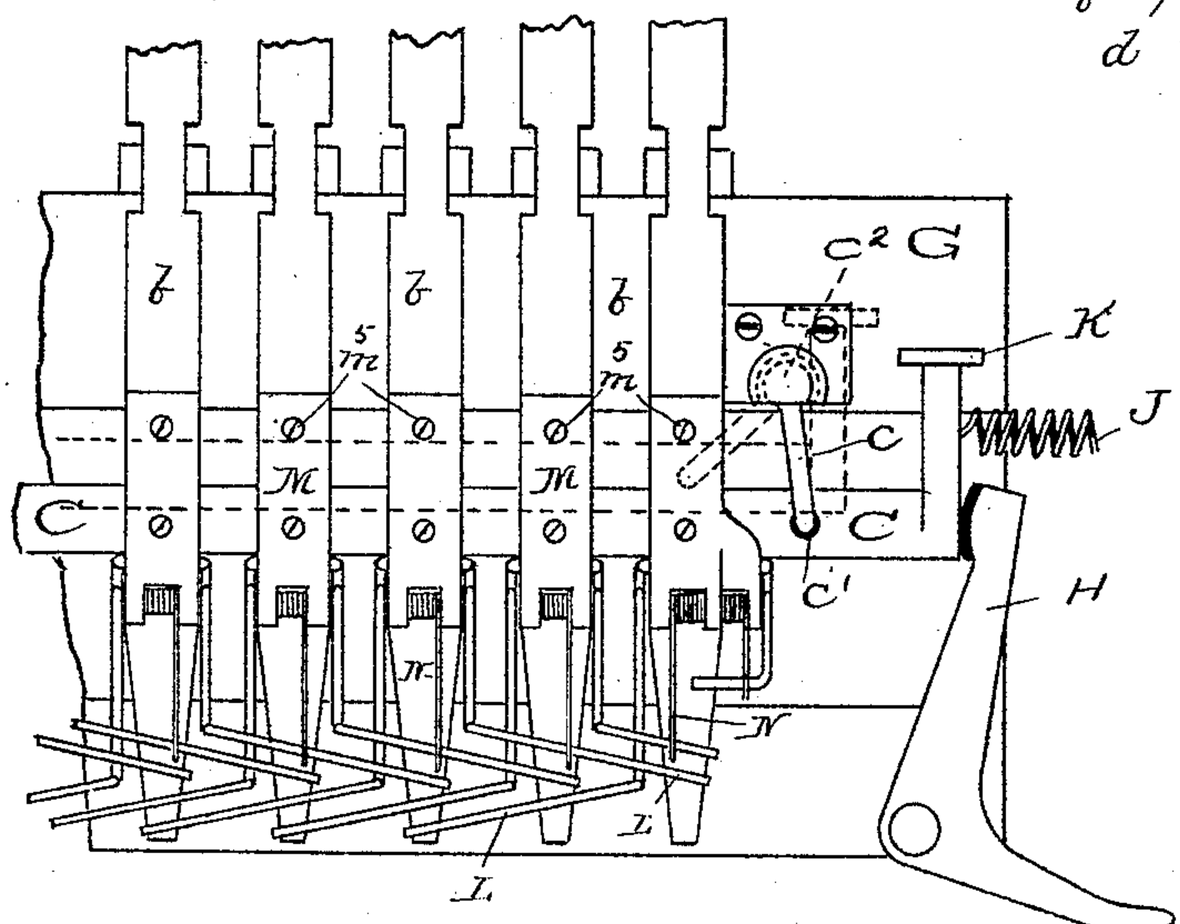


FIG. 2

FIG. 3.



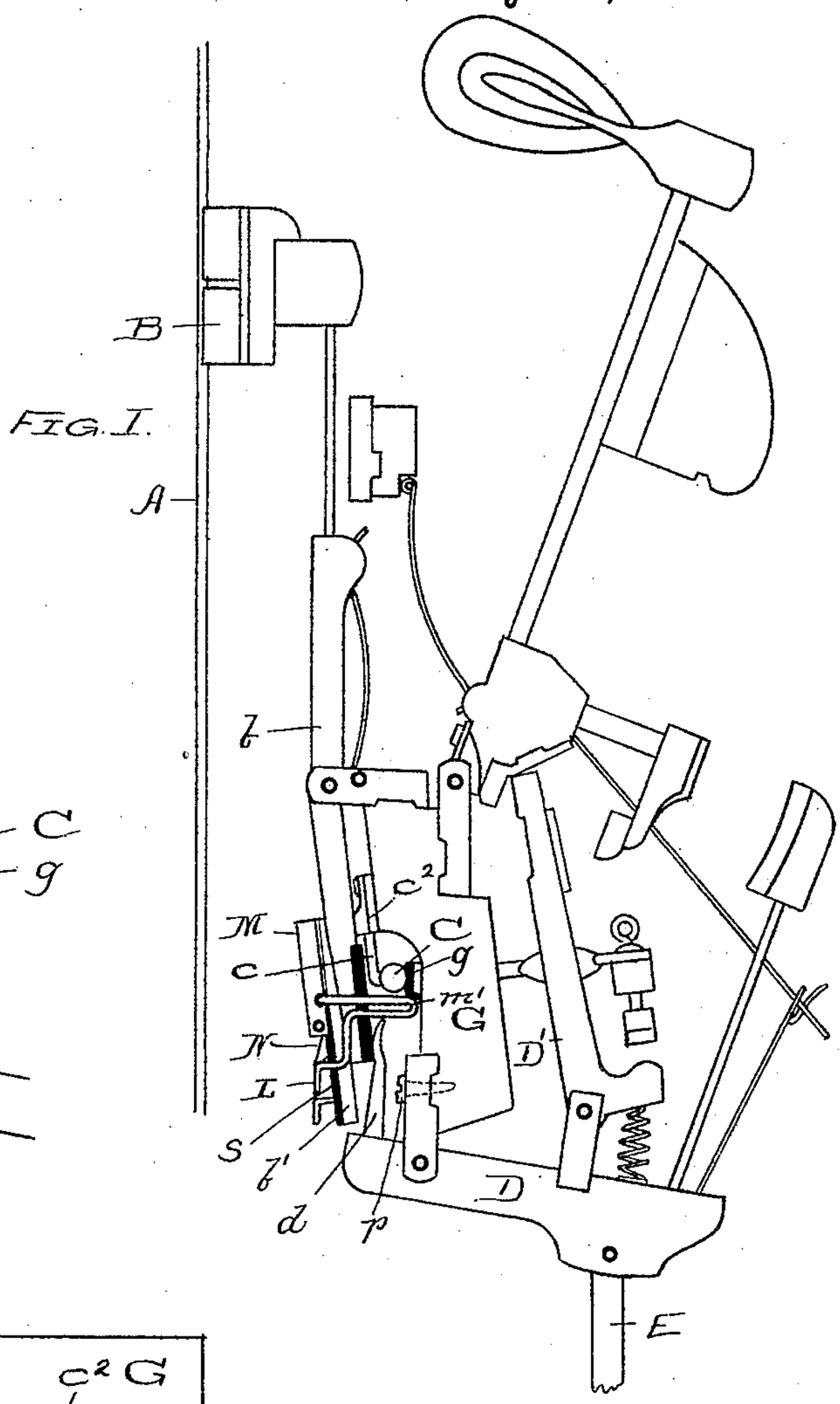


FIG. I.

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PIANOFORTE.

SPECIFICATION forming part of Letters Patent No. 543,505, dated July 30, 1895.

Application filed February 15, 1895. Serial No. 538,492. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. PHELPS, a citizen of the United States, residing in Sharon, in the county of Walworth and State of Wisconsin, have invented a new and useful Improvement in Pianofortes, of which the following is a specification.

In the patent granted to me on the 22d of December, 1891, No. 465,494, I show means whereby when any particular key of the piano is struck the damper of that key is automatically held open, while the dampers of the adjacent keys not harmonizing therewith will be closed. These devices consisted of laterally-extending arms applied to the stickers, pivoted levers operated by said arms, and wire extensions secured to the damper-levers and extending into position where they were actuated by the pivoted levers.

My present invention is an improvement upon the construction shown in said patent, is simpler in construction and less expensive, and may be applied to smaller pianos and to pianos having what is known as the "dowel" or "capstan" action, whereas the former construction could not well be used except in comparatively large pianos having the sticker or extension action.

My present improvement is fairly within the scope of the invention of my said patent, and the object sought therein is identical with that of the patent, and, as in the patent, while I find it necessary in practice to simply provide each key with means for closing the dampers of the two adjacent keys on either side of its own, a greater or less number may be so controlled if desired.

In my improved construction I have modified somewhat the form of the action-rail by changing a portion of the rear face thereof, and the damper-lever is increased in length until it nearly touches the rear end of the jack-rocker, and the lower portions thereof are tapered at the ends to give room for the entrance of a screw-driver between them in working the flange-screws. The laterally-extending arms of the patent I now apply to the rear face of the damper bars or levers, instead of affixing them to the stickers, and of course I cover such portions of the action as come in contact with the arms with cloth to prevent noise.

My invention is readily applicable to existing pianos by attaching to the damper-levers a separate piece, which will give them the length necessary.

These and other features of the invention will be fully understood from the accompanying drawings, wherein—

Figure 1 is a partial side elevation of an action embodying my present improvement. Fig. 2 is a similar view of a portion of the action, showing the parts in different positions. Fig. 3 is a partial rear elevation of that portion of the action embodying my improvement, and Fig. 4 is a perspective of one of the wires which form the laterally-extending arms.

In said drawings, A represents the piano-string; B, the damper; *b*, the damper-lever; C, the forte pedal-rod for throwing all the dampers out; *d*, the usual arm for operating the damper when the key is struck; D, the jack-rocker supporting the jack; D′, the jack, and E the sticker or extension.

G is the action-rail, which differs from the ordinary action-rail only in the cutting away of the dotted portion of its lower rear face and applying a raised cushioned surface, as shown at *g*.

The forte pedal-rod, in addition to the swinging movement heretofore given it, I now support in such manner that it may swing longitudinally. For this purpose the arms *c*, which carry it, are flexibly joined to the rod at *c′* and to the action-rail by universal joints, as indicated at c^2. A bell-crank lever H, operated by connection *h*, leading to one of the foot-pedals, serves to impart this longitudinal movement to the bar in one direction and the spring J to operate it in the opposite direction. When moved by the lever the effect is to raise the rod vertically, and when thus actuated it moves away from the wires which control the laterally-extending arms hereinafter mentioned, and when operated in the ordinary manner (which is done by actuating the crank K through one of the foot-pedals) it presses back all the dampers and removes them from the strings. The rod C should be covered with soft material to prevent noise. The lateral arms, by means of which the dampers of the keys adjacent to the one struck are closed, are made in pairs and in one piece of wire, as particularly illus-

trated at Fig. 4. When applied to the dampers the arms L of the wires project laterally in both directions, as shown. The wires are pivotally attached to the rear faces of the damper-levers by means of blocks M, which confine the portions *m* of the wires and allow the arms to rock upon that portion as a pivot. The looped portions *m'* of the wires form stops, for the purpose hereinafter explained, and project in front of the damper-levers sufficiently so that they will be operated by the rod C when the latter is lowered from its upper to its lower position. The arms L are also swung upon their pivots *m* by springs N, of which one is confined in each of the blocks M and has one free end bearing upon one of the arms L, the spring being in each case located in the block of the damper next adjacent to the damper carrying the arm actuated by it. The constant action of the spring is to move the arm in the direction which will raise the stops *m'* and cause them to rest against the under surface of the cushion *g*, this being their normal position when the dampers are closed. As soon, however, as the key to which the damper belongs is struck and the damper opened the stops *m'* will rise and rest against the vertical face of cushion *g*, as seen at Fig. 2, and in this position the damper of that key is held open by the stops and the arms L of the same key press lightly against the rear faces of the damper-levers of each of the two adjacent keys at either side. The parts remain in this position until one of said adjacent keys over which the arms L extend is struck, when the damper-lever of that key, by its pressure against said arm L, causes the wire to rock on its pivot *m* and carry its stops below the cushion *g*, thus releasing the damper which was held open by the stops and allowing it to close. At the same time the damper of the key last struck is locked open in the same manner as in the case of the key first struck. Whenever rod C is lowered by releasing its pedal, the stops *m'* of all the dampers which may be locked open at the time are pressed below the cushion *g* and the dampers are allowed to close.

During such of the playing as may take place while the forte pedal-rod is in its lowermost position the arms L and stops *m'* cannot act, because the rod prevents the stops from being lifted upon the cushion *g*, and any motion imparted to the arms and stops at such times is consequently a mere idle rocking upon their pivots *m* and without effect upon the dampers.

The damper-levers are shown in the drawings as made in two parts *b* and *b'*, the former being the damper-lever as ordinarily made and the latter being the added length or extension thereof made necessary by my invention. In the case of pianos already existing this is a convenient construction, as the old dampers may be thus pieced out or lengthened and the extensions be secured to them by the same screws which are used in attaching the blocks M, so that my invention may be readily applied to all such pianos. They may, however, be made in one piece. As will be seen at Fig. 3, the extensions are tapered upon their adjacent sides for convenience in putting in the screws *p*.

The blocks M may be tightened or loosened upon the pivotal portions of the wires L if the cushion-cloth *s*, applied to the rear face of damper extensions *b'*, be extended under the blocks M for only a portion of the length of the latter, as seen in the drawings. A limited adjustment of the block is allowed by this, which may be effected by moving the upper screw m^5 of the block in or out, according as the adjustment required is a tightening or loosening. The stops *m'* are preferably formed in each half of wires L. One of them may, however, be omitted in the case of each wire, if desired.

The sockets of the universal joints at c^2 are preferably made of sheet metal pressed to the required shape, and should be lined with cloth to prevent noise. The joint *c'*, made by bending the wire *c* at right angles and passing the crank portion through rod C, may also be bushed with cloth for the same purpose.

I claim—

1. The combination with a piano forte key and an adjacent key not harmonizing therewith, and their respective dampers, of devices applied to the damper of said last mentioned key and adapted when the first key is struck, to close the damper of the non-harmonizing key, substantially as specified.

2. In a piano action, the combination with two adjacent keys not harmonizing with each other, of devices applied to the damper of each key adapted when either key is struck to hold open the damper of that key and to close the damper of the other key, substantially as specified.

3. The combination with the dampers of a piano forte action, of arms extending laterally from each damper across the neighboring dampers and adapted to be operated by said neighboring dampers in closing the dampers by which the arms are carried, substantially as specified.

4. In a piano forte action, the combination with the dampers and devices whereby each damper locks itself open and closes its neighbors when its key is struck, of a rod adapted to move said damper operating devices out of their acting positions, and means for moving said rod in the performance of this duty, substantially as specified.

5. In a piano forte action, the combination with the dampers and devices whereby each damper locks itself open and closes its neighbor dampers when its key is struck, of a device adapted to hold said damper locking and closing devices out of action, and means for moving it so as to give these devices freedom to act, substantially as specified.

6. The combination with the dampers and the devices whereby each damper closes its

neighbor damper, of a rod adapted both to move and hold said closing devices out of action, and means for actuating said rod in these functions, substantially as specified.

7. The combination with the dampers and the devices whereby each damper locks itself open and closes its neighbor dampers when its key is struck, of a rod supported upon pivoted arms and adapted to control said damper operating devices, and means for moving said rod longitudinally, substantially as specified.

8. The combination with the dampers and the devices whereby each damper closes its neighbor dampers, of a forte pedal rod supported upon arms which are pivotally secured to the rod and are attached to the action rail by universal joints, whereby said rod is adapted both to be swung to open the dampers, and to be raised and lowered to control said damper closing devices, substantially as specified.

9. The combination with the dampers and the devices whereby each damper is locked open and also closes its neighbor dampers, when its key is struck, of the action rail having a raised surface *g*, and the forte pedal rod hung upon arms supported from the rail by universal joints, and pivotally secured to the rod, substantially as specified.

10. The combination in a piano action, of the dampers, the lateral arms and stops carried by the dampers, and a forte pedal rod adapted to operate said stops, substantially as specified.

11. The combination in a piano action, of the dampers, lateral arms and stops carried by the dampers, the cushion *g* adapted to act with the stops in locking the dampers open, and a device for throwing the stops off the cushion, substantially as specified.

12. The combination with the dampers and a rod moved by the foot pedal, of the wires L and springs N, both carried by the dampers, substantially as specified.

13. The laterally projecting arms L and the stops *m'*, formed of one piece of wire, and combined with the dampers, substantially as specified.

14. The combination with the dampers of the laterally projecting wires L, stops *m'*, and pivots *m* formed of one piece of wire, substantially as specified.

15. The combination with the dampers of the laterally projecting wires L, stops *m'*, and pivot *m* formed of one piece of wire, and the blocks M, substantially as specified.

16. The combination of the dampers, the wires L having pivots *m*, blocks M and cloth *s*, substantially as specified.

JAMES H. PHELPS.

Witnesses:
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