

M. J. MATTHEWS & J. P. RICHARDSON.

Attachment for Musical-Instruments.

No. 216,429.

Patented June 10, 1879.

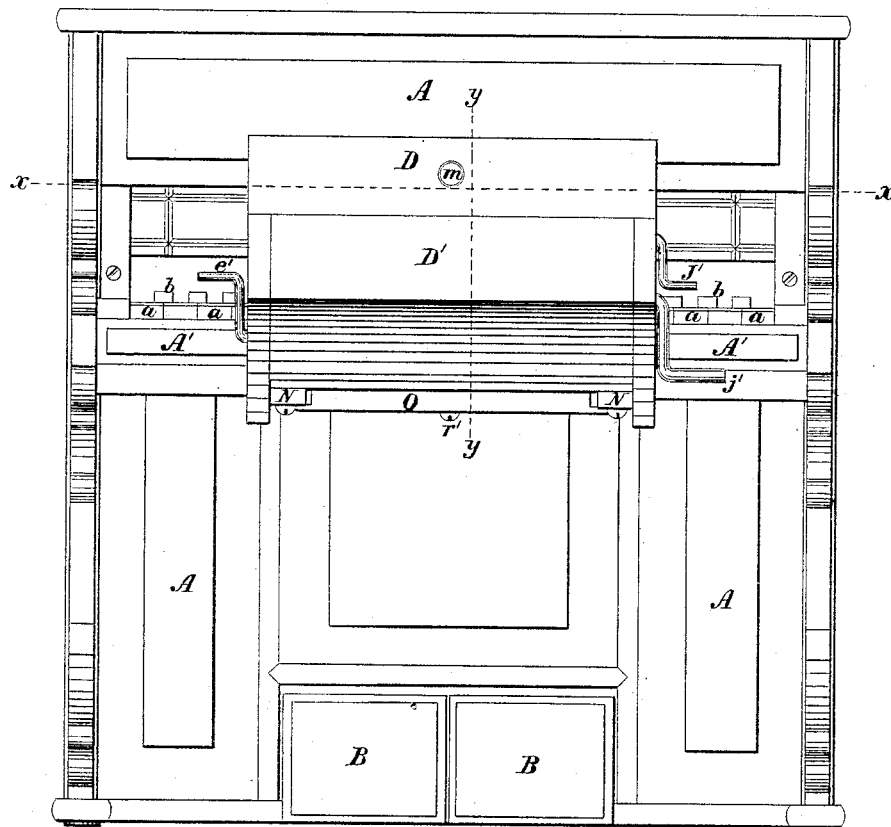


Fig. 1.

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Inventors:

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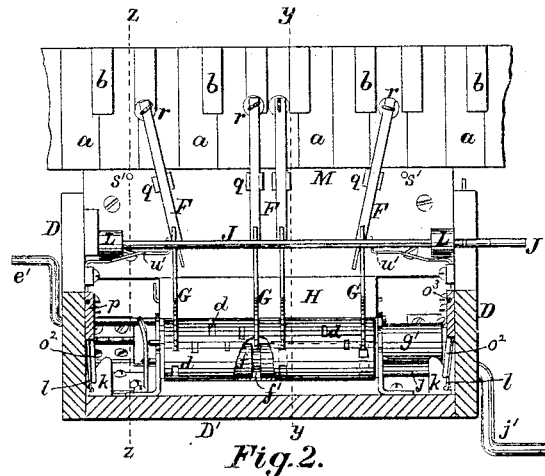


Fig. 2.

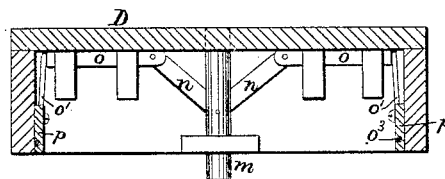


Fig. 5.

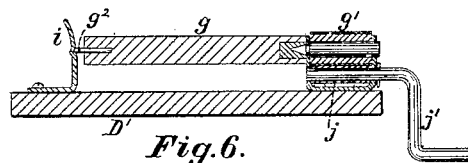


Fig. 6.

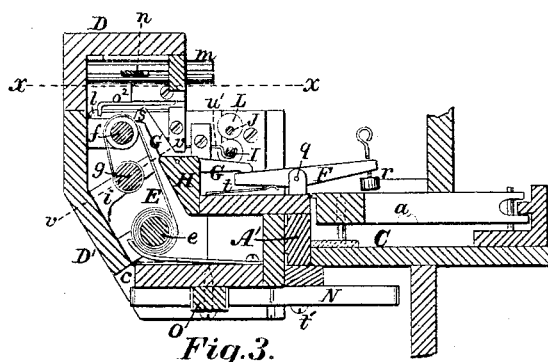


Fig. 3.

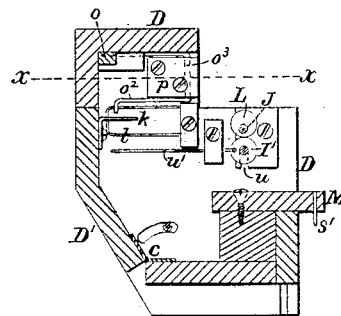


Fig. 4.

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UNITED STATES PATENT OFFICE.

MASON J. MATTHEWS, OF BOSTON, AND JOHN P. RICHARDSON, OF CAMBRIDGEPORT, ASSIGNORS TO MASON & HAMLIN ORGAN COMPANY, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN ATTACHMENTS FOR MUSICAL INSTRUMENTS.

Specification forming part of Letters Patent No. **216,429**, dated June 10, 1879; application filed March 13, 1879.

To all whom it may concern:

Be it known that we, MASON J. MATTHEWS, of Boston, in the county of Suffolk, and JOHN P. RICHARDSON, of Cambridgeport, in the county of Middlesex, both in the State of Massachusetts, have invented a new and useful Attachment for Musical Instruments, of which the following, taken in connection with the accompanying drawings, is a specification.

Our invention relates to a mechanical apparatus for operating the keys of organs, melodeons, pianos, and other like instruments, whereby a person not skilled in the art of music can, by simply turning a crank, produce excellent music upon either of said instruments; and it consists, first, in the combination, with the key-board of a musical instrument, of a series of pivoted hammer-levers provided with springs adapted to move said hammers in one direction, a strip, sheet, or band of paper, cloth, or other thin flexible material having cut therein a series of openings of varying lengths arranged to correspond to the various notes of a tune, and a mechanism adapted to move said perforated strip, sheet, or band past the ends of said hammer-levers, or a series of secondary levers connected therewith in such a manner that when one of the openings in the moving strip, sheet, or band passes the end of a lever the tension of the spring on the hammer-lever will cause its hammer to strike a blow upon a key of the instrument, depress it, and thus cause a musical tone to be produced from the organ, piano, or other musical instrument.

It further consists in the combination, with the key-board of an organ, piano, or other musical instrument, of a portable frame or case adapted to be readily attached to, detached from, and supported by the instrument-casing, and having mounted thereon a series of compound levers adapted to be moved in one direction about their pivots by springs, a sheet, strip, or belt of paper, cloth, or other thin flexible material having cut therein a series of openings of varying lengths arranged to correspond to the various notes of a tune, and suitable feed or winding rolls adapted to cause said perforated sheet, strip, or belt to

move past the ends of said levers in such a manner that one end of each of said levers will at the proper time fall into one of the perforations in said sheet, strip, or belt, and permit the tension of the spring connected therewith to cause the opposite end of said compound lever to strike a blow upon a key and depress it in substantially the same manner that it would be done by the finger of a skillful operator.

It further consists in the combination, with the key-board of an organ, piano, or other musical instrument, of a portable frame or case adapted to be readily attached to, detached from, and supported by the instrument-casing, and made in two parts hinged together, a series of levers mounted upon one portion of said frame or case, and adapted to act upon the keys of the instrument by the force of springs, and a moving sheet, strip, or belt of perforated paper, cloth, or other thin flexible material, and mechanism for moving the same, mounted upon the other or hinged portion of said frame or case, all so arranged that the sheet, strip, or belt of perforated material may be readily swung away from the levers for the purpose of removing the perforated sheet and supplying its place with another.

It further consists in the combination, with said portable case or frame made in two parts and hinged together, of a novel locking or latching device for securing the hinged portion of said frame or case in position, which will be best understood by reference to the description of the drawings hereinafter contained.

It further consists in a peculiar arrangement of the paper-winding roll, whereby the perforated sheet, strip, or belt may be readily and easily removed or inserted without disturbing the operating mechanism, as will be described.

It further consists in the combination, with a perforated sheet, strip, or band of thin flexible material, mechanism for moving said sheet, strip, or band in the direction of its length, and a series of levers operated by the joint action of said perforated sheet, strip, or band, and springs, of a bar or rod extending across the instrument above said levers to limit their

upward movement, springs connected therewith and adapted to raise said bar or rod after it has been depressed, and a crank-shaft provided with eccentrics or cams adapted to act upon said bar or rod and depress it, and with it the whole series of levers, so as to remove them from contact with the sheet of perforated material when it is desired to rewind said sheet preparatory to repeating the tune, as will be described.

It further consists in two pivoted arms or bars attached to and adapted to be swung under the casing of the instrument, just below the key-board of an organ, piano, or other musical instrument, or to project therefrom at right angles to the front of said instrument-casing and parallel with each other, in combination with a portable mechanical apparatus for operating the keys of said instrument adapted to be supported upon said bars or arms, and provided with a pivoted latch-bar adapted to engage at each end with one of the first-named bars or arms, and one or more dowel-pins arranged in a vertical position and connecting said portable mechanical apparatus with the casing of the musical instrument and adapted to prevent said mechanical apparatus from being accidentally displaced.

Figure 1 of the drawings is a front elevation of a cabinet-organ with our attachment in position thereon. Fig. 2 is a sectional plan of the attachment, the cutting-plane being on line *xx* on Figs. 1, 3, and 4, and showing the keys in plan. Fig. 3 is a transverse vertical section through the attachment and the key-board on line *yy* on Figs. 1 and 2. Fig. 4 is a vertical section of the attachment on line *zz* on Fig. 2. Fig. 5 is a horizontal section on line *xx* on Figs. 1, 3, and 4, looking upward, and Fig. 6 is a longitudinal section on line *vv* on Fig. 3.

A is the casing of a cabinet or reed organ provided with pedals B, for operating the bellows, (not shown,) and the key-board C, upon which are arranged in the usual order the keys *a* and *b*, as shown.

D D' is the casing of our improved attachment, made in two parts and hinged together at *c*, so that the part D' may be swung open to facilitate the introduction or removal of the paper or other flexible band E, through which is cut a series of openings, *d d*, of varying lengths, arranged in the proper order to represent the different notes of a tune. Upon the portion D' of the casing are mounted the three rolls *e*, *f*, and *g* in such a manner that they may be revolved about their axes when desired.

The rolls *e* and *f* are permanently mounted in fixed bearings secured to the inner face of the hinged portion, D', of the casing, and the shaft of *e* is prolonged beyond its bearing at one end, and extends through a curved slot in the left-hand end of the casing D, and has its end formed into a crank, *e'*, as shown in Figs. 1 and 2, by which it may be revolved to wind the perforated flexible band or strip E thereon preparatory to being wound therefrom onto

the roll *g* for the purpose of playing the instrument.

One end of the perforated strip or band E is secured to the roll *e*, and the other end to the roll *g*, so that it may be readily disconnected therefrom when it is desired to change the tune, the devices for attaching said paper band or strip not being shown, as it is intended to use substantially the same devices as are shown and described in Letters Patent No. 211,634, granted to me January 28, 1879.

The roll *g* is provided at one end with a square socket, which engages with the squared pyramidal-shaped end of the shaft of the short roll *g'*, and at its other end with the conical center *g''*, which fits into and revolves in the detent in the side of the spring *i* in such a manner that by pushing said spring *i* away from said center the roll *g* may be removed, as shown in Fig. 6.

The short roll *g'* and the roll *g* are revolved by the friction-roll *j*, provided with the crank *j'* upon the outer end of its shaft, which projects through the end of the casing D, an open slot being formed therein to permit said shaft to move with the hinged portion D' of the casing when it is desired to change the tune. One or both of the rolls *g'* and *j* are covered with rubber.

The portion D' is held in position, when closed, by means of the catches *k k*, secured thereto, which engage with the spring-latches *l l*, secured to the inner surfaces of the ends of the casing D, as shown in Figs. 2 and 4.

When it is desired to open D', the latches *l l* are released from the catches *k k* by pressing or pulling the rod *m* toward the operator, which, carrying with it the inner ends of the toggle-links *n n*, the opposite ends of which are connected to the bars *o o*, causes said bars *o o* to be moved endwise away from each other, and said bars bearing upon the lever *o'*, formed in one piece with the lever *o''* and rocker-shaft *o'''*, having its bearing in the block *p*, cause the levers *o''* to move the latches *l l* out of engagement with the catches *k k*, and thus enabling D' to be opened.

F are a series of levers pivoted to suitable flanges *q*, set in the casing D, and projecting in opposite directions therefrom, and provided at their outer ends with the adjustable hammer-buttons *r*, as shown in Figs. 2 and 3. G are a series of elbow or crooked levers pivoted to the rail H, and each bearing at one end upon one end of a lever, F, and at its other end upon the surface of the flexible band E, at a point where it rests upon the roll *f*, said lever being provided with a V-shaped projection, *s*, the point of which bears upon said band, as shown in Fig. 3.

The roll *f* has cut in its periphery a series of circumferential grooves, *f'*, corresponding in number with, and each directly beneath, one of the levers G, into which the V-shaped projection *s* of said lever falls when an opening, *d*, passes said point, said lever being com-

pelled to move about its pivot by the tension of the spring *t*, attached to the lever *F*, as shown in Fig. 3.

I is a shaft extending across the casing *D* from end to end above the horizontal arms of the levers *G*, its ends fitting into vertical slots *u*, in the upper ends of which it is held by the springs *u'* until forced downward, as will be hereinafter described, said shaft serving as a stop to limit the upward motion of the contiguous ends of the levers *F* and *G* when the point *s* of the lever *G* falls into an opening, *d*, as before described.

When the perforated flexible band *E* has been all wound off from the roll *e* and onto the roll *g* in playing the tune through once, and it is desired to repeat it, it is first necessary to rewind the perforated band onto the roll *e*; and to do this it is necessary to prevent the operation of the hammer-levers, or else the tune would be played backward, and, besides, there would be danger of injuring the perforated band were the levers allowed to bear upon it while it was being moved in that direction. To this end a second shaft, *J*, is placed above and parallel with the shaft *I*, and mounted in fixed bearings in the ends of the casing *D*, through one end of which it projects, and has formed thereon or secured thereto the crank *J'*, by which it may be revolved; and said shaft has secured thereon just inside the casing *D*, near each end thereof, an eccentric, *L*, which, acting upon the shaft *I*, or collars or rolls *I'* secured thereon, when the shaft *J* has imparted thereto a semi-revolution, causes the shaft *I* to be bodily forced downward upon the levers *G* and depress the horizontal arm of said lever and lift their other arms away from the perforated band in an obvious manner.

The casing *D* of the mechanical attachment is provided with a rearwardly-projecting lip, *M*, in which are the two dowel-pins *s'*, firmly secured therein in a vertical position and projecting from the lower side thereof, as shown in Fig. 4, said pins engaging with corresponding holes in the upper edge of the front board, *A'*, of the instrument-casing when the attachment is placed in position upon the musical instrument, said attachment being supported by the arms *N*, pivoted at *t'* to the under side of the key-board *C*, and adapted to be swung under said key-board when the attachment is removed.

O is a fastening bar or button pivoted at *r'* to the under side of the casing *D*, and adapted to engage with the under side of the arms *N* to secure the attachment in position, as shown in Fig. 1.

We do not claim, broadly, an attachment to pianos or other musical instruments supported entirely by the casing of said instrument, and adapted to mechanically operate the keys of said instrument irrespective of the mechanism by which said operation is performed, for we are aware that several devices have been used to some extent for that purpose; but

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In combination with the key-board of an organ, piano, or other musical instrument, a mechanical apparatus adapted to be readily secured to or removed from said key-board, and provided with the following elements—viz: a series of spring-actuated hammer-levers, each adapted to be vibrated about a pivotal center and to strike a blow upon one of the keys of the instrument, a strip, sheet, or band of paper, cloth, or other thin flexible material having cut therein a series of perforations of varying lengths arranged to represent the different notes of a tune, and a mechanism for feeding said strip, sheet, or band of perforated material slowly past the ends of said levers, all arranged and adapted to operate as herein set forth, to mechanically strike in succession the proper keys of the instrument to produce musical chords and tunes, substantially as described.

2. In combination with the key-board of an organ, piano, or other musical instrument, a series of compound levers, *F G*, provided with hammers *r* and springs *t*, the perforated sheet or band of flexible material *E*, rolls *e, f*, and *g*, and suitable means of imparting to said rolls a rotary motion, all mounted upon an independent frame or casing adapted to be readily attached to or detached from, and to be supported by, the casing of said instrument, and adapted to operate substantially as and for the purposes described.

3. In combination with the keys of an organ, piano, or other key-board musical instrument, a portable frame or case made in two parts hinged together, and adapted to be readily attached to or detached from, and to be supported by, the casing of said instrument, a series of spring-actuated hammer-levers, mounted upon the fixed or stationary portion of said frame or case, and a strip, sheet, or band of perforated paper, cloth, or other thin flexible material, and mechanism for moving said strip, sheet, or band in the direction of its length, mounted upon the hinged or movable portion of said frame or case, all arranged and adapted to operate substantially as and for the purposes described.

4. In combination with the two parts *D* and *D'* of the casing, hinged together as set forth, the catches *k k*, spring-latches *l l*, rod *m*, links *n n*, bars *o o*, levers *o'* and *o''*, and rocker-shaft *o'''*, all arranged and adapted to operate substantially as and for the purposes described.

5. The paper-winding roll *g*, provided with a rectangular or polygonal socket at one end and a conical center at the other end, in combination with the pyramidal-shaped end of the shaft *g'* and the spring-detent bearing *i*, all arranged and adapted to operate substantially as and for the purposes described.

6. The combination of the removable roll *g*, short roll *g'*, and the friction-roll *j*, provided with the crank *j'*, all arranged and adapted to operate substantially as described.

7. The combination, with a series of hammer-levers, a series of springs for moving said levers in one direction, a strip, sheet, or band of perforated flexible material adapted to move said levers in the other direction, of a spring-supported bar or rod placed above said levers, and adapted to limit their movement in one direction, and a secondary shaft provided with one or more eccentrics adapted to engage with, and by a semi-rotation thereof depress, said said spring-supported rod or bar and said levers, substantially as and for the purposes described.

8. In combination with the key-board of an organ, piano, or other musical instrument and a mechanical apparatus to be attached

thereto or removed at will the two supporting-arms N N, pivoted to the under side of the projecting portion of the casing of the instrument, the bar O, pivoted to the under side of the frame or casing of the mechanical apparatus and adapted to engage with the arms N N, and the dowel-pins *s'*, adapted to engage with the upper side of the casing, substantially as and for the purposes described.

Executed at Boston, Massachusetts, this 7th day of March, A. D. 1879.

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Witnesses:

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