

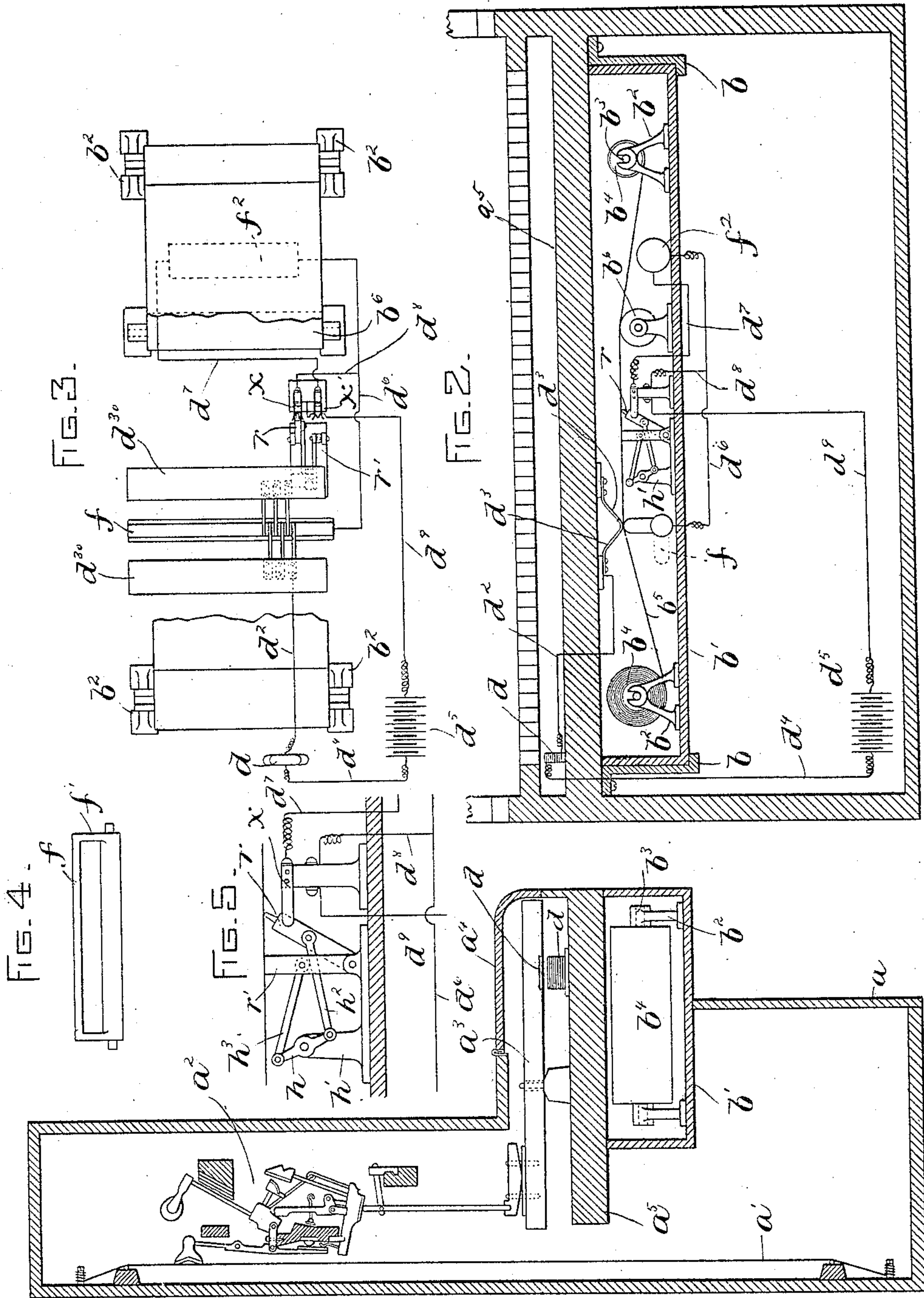
(No Model.)

E. J. SIMPKINS.

ELECTRICALLY OPERATED PIANO ATTACHMENT.

No. 575,072.

Patented Jan. 12, 1897.



WITNESSES:

D. Baichelder  
A. S. Adams.

FIG. 1.

INVENTOR:

Ernest J. Simpkins  
By Wright Brown & Quincy



# UNITED STATES PATENT OFFICE.

ERNEST J. SIMPKINS, OF TOLEDO, OHIO.

## ELECTRICALLY-OPERATED PIANO ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 575,072, dated January 12, 1897.

Application filed December 26, 1895. Serial No. 573,276. (No model.)

*To all whom it may concern:*

Be it known that I, ERNEST J. SIMPKINS, of Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful  
5 Improvements in Electrically-Operated Piano Attachments, of which the following is a specification.

This invention relates to a new and useful improvement in electrically-operated piano  
10 attachments; and it consists in the novel features of construction and relative arrangement of parts hereinafter fully described in the specification, clearly illustrated in the drawings, and particularly pointed out in the  
15 claims.

Reference is to be had to the accompanying sheet of drawings, forming a part of this application, in which like characters are used to indicate like parts wherever they occur.

20 Figure 1 represents in vertical cross-section the casing of an upright piano, showing my attachment mounted therein. Fig. 2 represents in front elevation my improved attachment mounted in position in the piano-casing, the latter appearing in cross-section.  
25 Fig. 3 represents a top plan view of my attachment. Fig. 4 represents a detail view of the bar. Fig. 5 represents a detail view of the mechanism by which the volume of tone  
30 is controlled.

My invention has in view an attachment whereby any particular key may be operated to give a predetermined tone, and at the same time the hammer mechanism may be controlled to give the desired volume of tone, as  
35 forte, piano, &c.

While my invention may be carried out in several ways, I prefer, for simplicity of construction and certainty of operation, the mechanism shown in the drawings. The kind of  
40 piano, whether square or upright, and particular make, are unimportant. The case  $a$ , the strings  $a'$ , the hammer mechanism  $a^2$ , keys  $a^3$ , and hinged cover  $a^4$  may be and preferably  
45 are of the ordinary construction and arrangement.

$b$  represents brackets secured in any desired way to the lower side of the board  $a^5$ , upon which the keys are mounted. These  
50 brackets serve to support a sliding drawer  $b'$ , that extends practically the whole width of the piano, or the portion of the piano occu-

ried by the keys. Arranged at either side of the sliding drawer are castings  $b^2$ , arranged to act as bearings for the spindles  $b^3$  of rolls  
55  $b^4$ , upon which is adapted to be wound a perforated strip  $b^5$ . This perforated strip or music-strip  $b^5$  is provided with holes or apertures in the common and well-known way, these apertures serving to control the particu-  
60 lar key it is desired to operate, the strip being wound from one roll to the other.

$b^6$  represents a roll over which the strip passes in going from one of the rolls  $b^4$  to the other, and is designed to support the strip  
65 for the mechanism by which the volume of tone is controlled.

$d$  represents magnets, one being secured beneath each key, as shown in Figs. 1 and 2. A piece of metal  $d'$  on the under side of the  
70 key acts as a keeper for the magnet, so that when the latter is vitalized by the passage of the current the keeper  $d'$  will be drawn by the magnet, thereby drawing down the key  
75  $a^3$  to operate the hammer mechanism.

Each of the magnets  $d$  is connected by a wire  $d^2$  to a spring conducting-finger  $d^3$ , secured to insulating-plate  $d^{30}$  on the lower side of the board  $a^5$ , in any desired way. Each  
80 magnet is also connected by a wire  $d^4$  to the battery  $d^5$ .

$f$  represents a bar made of conducting material, provided with arms  $f'$ , by which it may be pivoted in any desired way. The bar  $f$  is  
85 designed to be turned into full-line position in order to press the strip  $b^5$  against the spring-fingers  $d^3$  when it is desired to use the attachment, and occupying the position shown in dotted lines at other times. A wire  $d^6$  connects the bar  $f$  with a resistance-coil  $f^2$ .  
90

$h$  represents a lever pivoted midway its ends to a casting  $h'$ , secured in any desired way to the bottom of the drawer.  $h^2$  represents a link connecting one arm of the lever  
95  $h$  to a lever  $r$  midway its ends, the said lever being pivoted at one of its ends to a portion of the casting  $h'$ . The other arm of the lever  $h$  is connected by a link  $h^3$  to a lever  $r'$  midway its ends, the said lever  $r'$  being pivoted  
100 at one of its ends to an extended portion of the casting  $h'$ . The levers  $r$   $r'$  are practically duplicates of each other, and it follows from their construction, arrangement, and connection that when one lever is thrown in one di-



rection the other lever must of necessity move in the opposite direction. These levers are arranged beneath the strip  $b^5$ , and are adapted to enter apertures in the strip separate from the apertures that engage the spring-fingers. Suppose the lever  $r$  to have been engaged by an aperture in the strip. The strip would carry said lever  $r$  and force it between a pair of spring conducting-fingers  $x$ , throwing the lever  $r'$  in the opposite direction, in the position of the parts occupied in Figs. 2, 3, and 5. If, however, the lever  $r'$  is engaged by an aperture in the strip, this lever will be carried forward and pressed between spring conducting-fingers  $x'$ , while the lever  $r$  will be given a movement away from the spring-fingers  $x$ .

$d^7$  represents a wire connecting the resistance-coil  $f^2$  with the spring-fingers  $x'$ .

$d^8$  represents a wire connecting the spring-fingers  $x$  with the wire  $d^6$  that connects the pivoted bar  $f$  with the resistance-coil  $f^2$ .

$d^9$  represents a wire connecting the battery  $d^5$  with the spring-fingers  $x x'$ .

It will be seen that when the lever  $r'$  is forced between the fingers  $x'$  the current to reach the magnets  $d$  must pass through the resistance-coil  $f^2$ , thereby decreasing its power and giving but a slight pull on the key  $a^3$ , producing a soft and low tone. When, however, the lever  $r$  is operated and forced between the fingers  $x$ , the current from the battery  $d^5$  reaches the magnet by way of the wire  $d^8$  without passing through the resistance-coil, and hence the magnet  $d$  receives the full force of the current, which can be as strong as it is desired, thus giving the key a sharper pull to operate the hammer mechanism for a loud tone.

The plan of the circuits is given in Fig. 3, the current passing from the battery by the wire  $d^9$  to the spring-fingers  $x x'$ . In this figure the fingers  $x'$  are inoperative, so that the current passes by means of the finger  $x$ , wire  $d^8$ , to the wire  $d^6$ , thence to a bar  $f$ , finger or fingers  $d^3$ , that rest in the apertured sheet in contact with the bar  $f$ , thence by said finger or fingers and wire  $d^2$  to the magnet  $d$ , and thence by the wire  $d^1$  to the battery. When, however, the lever  $r'$  is operated and forced between the fingers  $x'$ , the current will go from the battery, as before, to the wire  $d^9$ , to the finger  $x'$ , thence by the wire  $d^7$  to the resistance-coil  $f^2$ , thence by the wire  $d^6$  to the bar  $f$ , fingers  $d^3$ , and magnet  $d$ , as before.

In operation as the strip passes over the bar  $f$  the spring-fingers  $d^3$  drop into apertures into engagement with the bar  $f$ , thereby establishing electrical connection between the wire  $d^6$  and the wire  $d^2$  that is connected to the particular spring-finger. This operation, however, does not close the entire circuit, since it is necessary for one of the levers  $r$  to be also moved to close the circuit through the fingers  $x$  or  $x'$ .

It will thus be seen that the circuit is closed at two points before the key is operated, the mechanism at one of these points constituting a key-selecting mechanism, while the mechanism at the other point regulates the strength of the current to be applied to the magnets  $d$ .

Having thus explained the nature of my invention and described a way of constructing and using the same, though without attempting to set forth all the forms in which it may be made or all of the modes of its use, what I claim, and desire to secure by Letters Patent, is—

1. In a piano, in combination, a series of keys, a magnet adjacent to each key, a perforated strip, a conducting-bar over which said strip passes, said bar being in circuit with said magnets, a series of conducting-fingers, each in circuit with one of said magnets, and adapted to press upon said sheet, and contact with said bar through said perforations in said sheet, a resistance-coil, a switch mechanism for switching the circuit to said magnets through said coil, said switch mechanism having a part adapted to be moved by said strip whereby said mechanism is operated independently of said fingers.

2. The combination with a piano-action of electric means for separably actuating the different keys thereof, a music sheet or strip, sheet-controlled circuit-closers determining the operation of the keys, a resistance, and means operated by the sheet independently of the said circuit-closers for cutting said resistance into and out of the circuit, substantially as and for the purpose described.

3. The combination with a piano-action, of electric means for separably actuating the different keys thereof, a music sheet or strip, sheet-controlled circuit-closers determining the operation of the keys, a resistance, and a double-actuating sheet-controlled cut-out device operating independently of said circuit-closers to include said resistance in or exclude it from the circuit substantially as and for the purpose described.

4. The combination with a piano-action, of electric means for separably actuating the different keys thereof, a music sheet or strip, sheet-controlled circuit-closers determining the operation of the keys, a resistance, a pair of sheet-controlled switches, one to open and close a circuit embracing the resistance, and the other to open and close a circuit excluding the said resistance, and movement-reversing connections between said switches.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 14th day of November, A. D. 1895.

ERNEST J. SIMPKINS.

Witnesses:

JAMES AUSTIN, Jr.,  
EDNA DAYAN.