

UNITED STATES PATENT OFFICE.

GEORGE HOWLETT DAVIS, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE ELECTRIC SELF-PLAYING PIANO COMPANY, OF NEW JERSEY.

ELECTRICAL PIANO.

SPECIFICATION forming part of Letters Patent No. 546,582, dated September 17, 1895.

Application filed June 17, 1895. Serial No. 553,162. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HOWLETT DAVIS, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new, useful, and valuable Improvement in Electrical Pianos, of which the following is a full, clear, and exact description.

This invention has for its especial objects, first, to provide a construction which can be applied as an attachment to any piano whatever without injuring it in the least or affecting its ordinary use, while in applying other forms of attachments it has been necessary to make numerous alterations and use a large clumsy roller in front of the piano, requiring an expert to apply it; second, to provide a music-holder of extremely small dimensions, which may be placed entirely out of sight if desired, whereas the music-drawers of other attachments now on the market are so large as to interfere with the knees of the performer, and, furthermore, to provide a music-holder which can be placed at any distance away from the piano; third, to provide an attachment which will repeat a particular note faster than can be done even by an expert performer, thus making it possible to give a satisfactory reproduction of heavy classical music; fourth, to provide an attachment which can be manufactured at a comparatively lower cost than any now on the market; fifth, to provide an attachment which is adapted to use very thin music-paper instead of heavy thick paper.

Proceeding with a detail description of my invention, reference is had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a front elevation of a piano having my attachment applied thereto. Fig. 2 is a transverse sectional elevation of the same, and also of the music-holder and keyboard. Fig. 3 is a detail front view of the friction-roller, friction-shoe, magnet-bars, &c. Fig. 4 is a view of the under side of the music-holder, and Fig. 5 is a detail view of the pedal action.

Similar numerals of reference indicate corresponding parts recurring in two or more views.

I prefer to employ as a motive power an electric motor 1, located in the bottom of the

piano, (see Fig. 1,) having a cone-pulley 2, giving motion to the driving-belt 3, the pulley 4 and the friction-roller 5 bearing in the boxes 6 of the suspension-arms 6^a, rigidly secured to the wood-support 8', which is itself detachably secured to the under part of the piano, and upon which nearly my entire action is suspended.

Upon the angle-bar 9 are secured a series of electromagnets 9^a, the armatures 9^b of which are pivoted in the cleats 9^c adjustably secured by the screws 9^d, and to the free ends of said armatures are pivotally secured a series of friction-shoes 8, having the arms 8^a, to the ends of which latter are pivotally secured the striker-rods 12, which engage the rear ends of the keys 27, which keys operate the upper action of the piano in the usual way. Above the angle-iron 9 is located a smaller angle-iron 13, holding the adjustment or bumper-screws 28, regulating the upward movement of the armatures 9^b when drawn up by the spring 11, connecting it with the adjustment-screws 10. To the rear of said angle-iron is secured a wood strip 13^a, upon the top edge of which the wires 9^e, leading from the respective magnets 9^a, are joined to the wires 23^e leading from the music-holder 22 23, said music-holder consisting of two parts—first, the upper part having the wood piece 23 bound on either edge by the metal strips 23^a, to the front ends of which are pivoted the swinging arms 22^a, and the rear ends having the latches 23^b pivoted thereto, said latches having a rod 23^c connecting their upper ends, and to the center of which rod is attached the draw-bar 23^d, terminating in the hook 23^e, which, upon being pulled forward, disengages the latches and allows the lower part 22 to swing down and throws the roller 22^c out of engagement or contact with the metal contact-fingers 23^f, to which the wires 23^e are connected. The swinging arms 22^a also pivotally support the two music-rollers 22^d and 22^e, the latter having the music-paper 22^f permanently secured thereto, said paper being provided at its free end with a loop 22^g, which sets over the pin 22^h of the roller 22^d, the latter acting as what is known as a "live" roller, and gradually winds the music-paper 22 upon itself when revolved by the cable 29, extended

to a pulley on the friction-roller 5 and given motion thereby. The pedal-bars or dampers are actuated by simply extending the two bars 30 31 downward instead of upward from the ends 8^a of the friction-shoes and connecting said bars to the regular pedal-bars 30^a 31^a; but, as it requires some little power to draw up the pedal-bars and actuate the dampers, I prefer to attach the rods 30 31, each between two of the shoes 8, as shown at Fig. 5.

The operation of the complete device is substantially as follows: First, suppose the lower part of the music-holder to be down, then the roller 22^c, holding the music-paper, is set into the bearings 22ⁱ 22^j of any suitable construction, after which the free end of the paper is carried over the roller 22^c, and the loop 22^s set over the pin 22^h, when the swinging arms 22^a are thrown up until engaged and held by the latches 23^b, after which the electric current is turned on and the motor started, whereupon the roller 5, the cable 29, and the roller 22^d will be set in motion, and the music-paper 22^f slowly advanced and wound around the roller 22^d, and in passing over the roller 22^c it slowly revolves it, thus causing it to present clean and new contact-surfaces to the ends of the contact-fingers 23 whenever they project through their respective perforations. Each finger 22^f is connected by the wire 23^s and 9^c to its respective magnet 9^a, which when energized by its finger contacting with the roller, which acts as a ground or general contact, its armature 9^b, carrying at its end the friction-shoe 8, is drawn down and the friction-shoe thrown into contact with the friction-roller 5 and is carried forward thereby to the position shown by the dotted lines, and at the same time the striker-arm 12 is thrown up and acts against the rear of the key 27, which in turn actuates the strikers or hammers of the piano in the usual way, each note being prolonged according to the length of its respective perforation or slot in the music paper; but immediately the finger comes to the end of the perforation the paper insulates it from the roller, the magnet instantly becomes demagnetized, its armature 9^b is drawn up by the spring 11, and the friction-shoe raised and allowed to fall back into its normal position. The pedal-rods 30 31 are actuated in precisely the same manner, it being necessary under the arrangement shown to have the slots in the paper which actuate the pedal magnets or dampers much longer than those which actuate the note magnets.

It is obvious that the music-holder can be set at any distance from the piano by having a cable of wires run from it to the piano.

Various modifications can be made in the construction and arrangement of parts herein shown without avoiding the spirit of my invention.

What I claim is—

1. In an electrical piano, the combination with a revolving roller or drum, of a friction

shoe pivoted above said roller and adapted to be brought into contact therewith, an electro-magnet arranged adjacent to and having its armature connected with the shoe, and a connection between the latter and the keys of a piano, substantially as described.

2. In an electrical piano, the combination with a revolving roller or drum, of a friction shoe pivotally mounted above said drum and provided with a rearwardly extending arm, an electro-magnet located in front of and having its armature-lever connected to the shoe, and a connection between the rearwardly extending arm and the strikers or hammers of a piano, substantially as described.

3. In an electrical piano, the combination with a drum and means for revolving the same, of a series of friction shoes pivotally mounted above the drum and each provided with a rearwardly extending arm, a series of electro-magnets corresponding to and arranged in front of the shoes, pivoted armature-levers connected to said shoes and adapted when energized to bring the latter into contact with the drum, and a rod connecting each rearwardly extending arm with the keys or strikers of a piano, substantially as described.

4. In an electrical piano, the combination with a revolving roller or drum, of a series of friction shoes pivotally mounted above the drum and each provided with a rearwardly extending arm which has a connection with the keys of the piano, a plurality of electro-magnets arranged in front of and having their armature-levers connected to the shoes, a perforated music sheet and holder, and gearing intermediate the rotary drum and music sheet whereby the latter is advanced or fed during the rotation of the drum, substantially as described.

5. In an electrical piano, the combination with means for electrically operating the keys, or a rotary note-sheet holder hinged at one end to the piano and adapted to be swung down out of position, and catches secured to the piano and adapted to support the sheet holder in operative position, substantially as described.

6. In an electrical piano, the combination with a revolving drum, of a series of friction shoes pivotally mounted above the drum and each provided with a rearwardly extending arm having a connection with the striker arms of the piano, a series of electro-magnets arranged in front of and having their armature-levers connected with the shoes, a spring for normally holding the armature levers raised, and means for limiting the upward movement of the latter, substantially as described.

7. In an electrical piano, the combination with a rotary drum, of a series of friction shoes pivoted above the drum and provided with rearwardly extending arms having a connection with the strikers of the piano, a series of electro magnets arranged in front of said shoes and having their armature levers connected thereto, a music sheet holder

having one end pivoted to the under side of the piano key-board and its other end being detachably connected to the latter, a rotary contact roller carried by the music holder
5 and over which the note sheet passes, and a plurality of contact fingers bearing upon said roller, as and for the purpose described.

8. In an electrical piano, the combination with a rotary drum, of a series of friction
10 shoes pivotally mounted above the latter and provided with rearwardly extending arms having a connection with the keys of the piano, an angle-bar mounted in front of said shoes, a series of magnets arranged upon said angle-
15 bar and having their armature levers connected with the shoes, a contact roller having electric connection with the magnets, a note sheet, and electrically connected contact fingers bearing upon said roller, substantially
20 as described.

9. In an electrical piano, the combination with a rotary drum, of an electric motor for imparting motion thereto, a series of friction shoes pivotally mounted above the drum and

having rearwardly extending arms which are
25 connected to the strikers of the piano, an angle-plate mounted in front of the shoes, a series of electro magnets mounted upon the angle-plate and provided with adjustably arranged armature-levers which are connected
30 at their forward ends to the shoes, a note-sheet holder hinged at one end to the piano and having its other end detachably connected thereto, a pair of rotary note cylinders mounted upon the holder, an intermediate
35 rotary contact roller, contact fingers adapted to bear upon said roller, and a belt and pulleys arranged between one of said rotary note cylinders and the rotary drum whereby the rotary movement of the latter will be imparted
40 to the former, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE HOWLETT DAVIS.

Witnesses:

ISAAC H. HUNTER,
RICH T. NEWTON.