

No. 624,382.

Patented May 2, 1899.

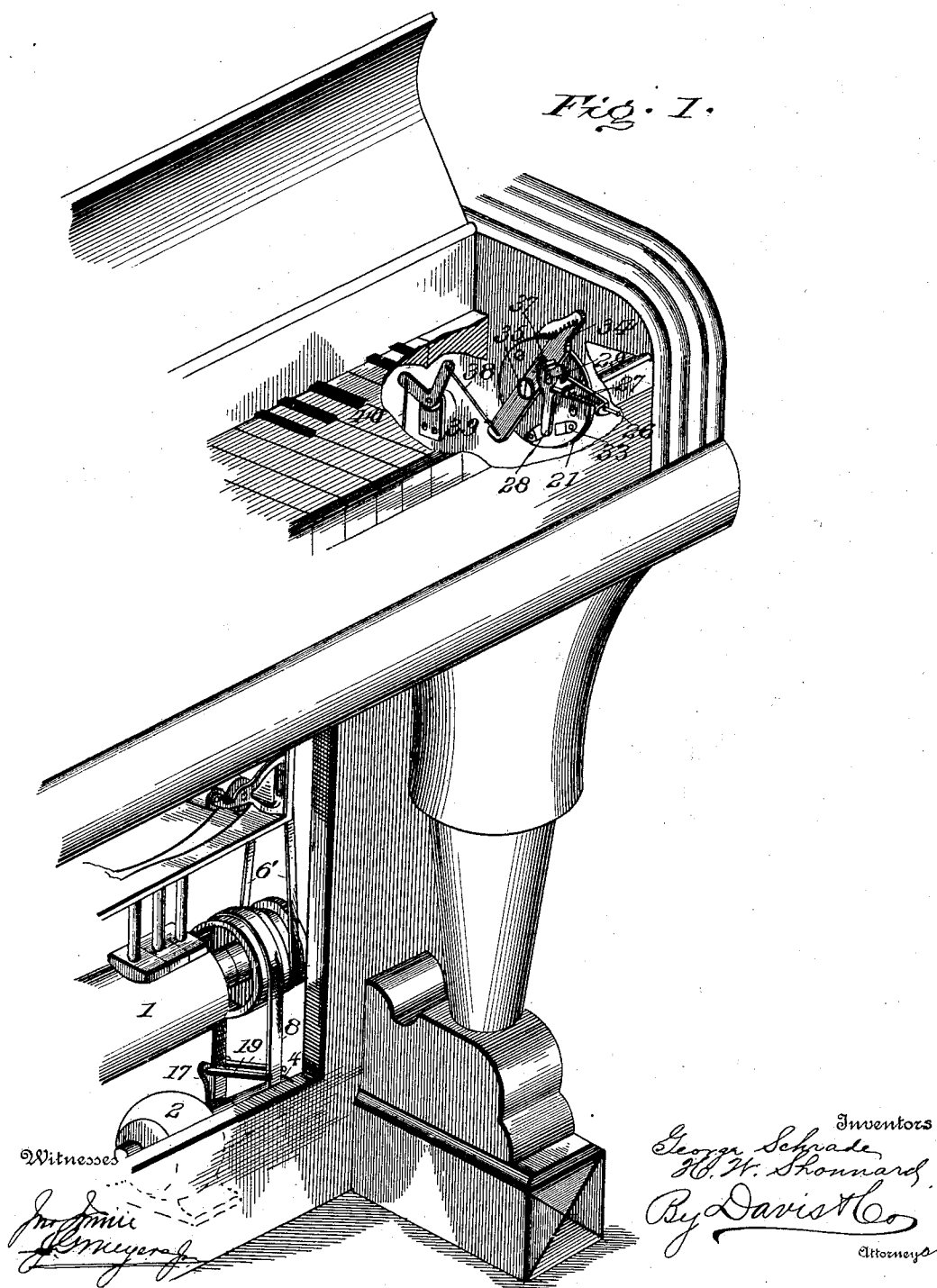
G. SCHRADE & H. W. SHONNARD.

ELECTRIC PIANO.

(Application filed Aug. 17, 1895.)

(No Model.)

3 Sheets—Sheet 1.



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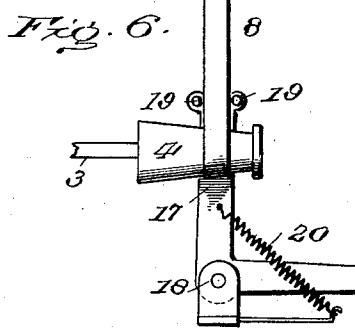
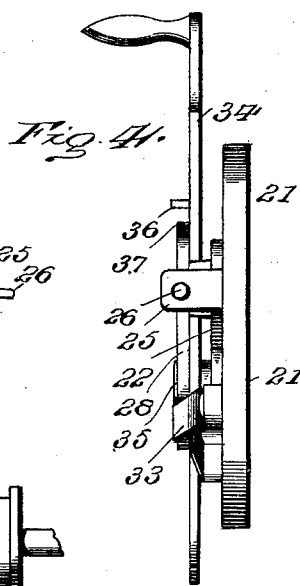
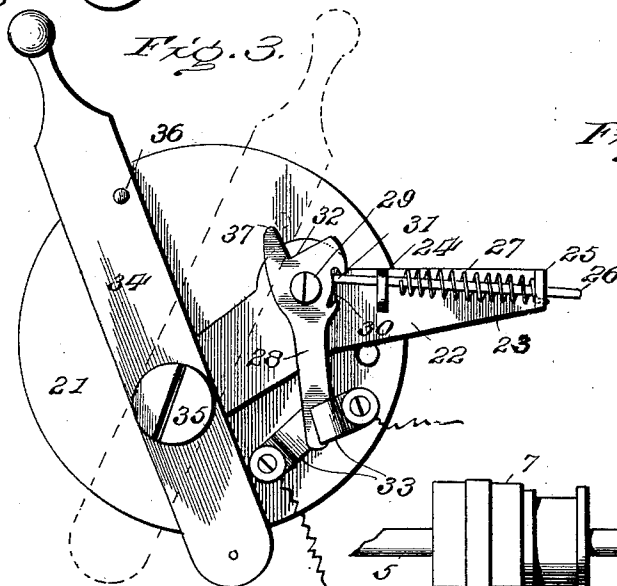
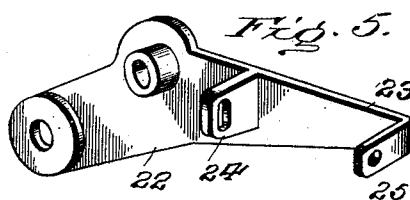
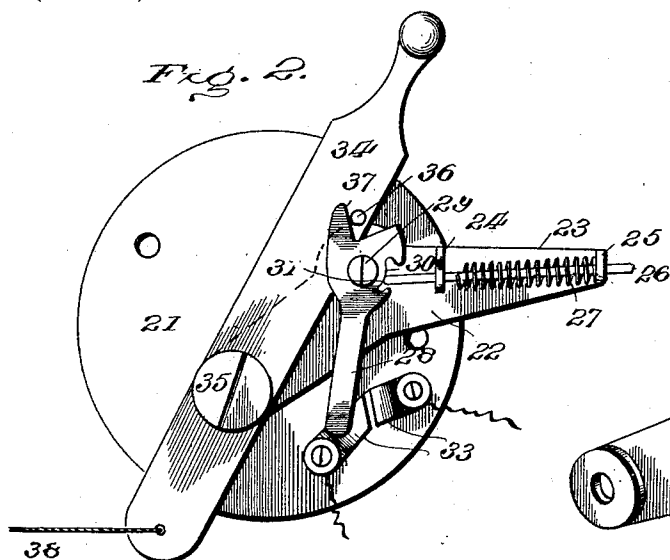
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(No Model.)

3 Sheets—Sheet 2.



Witnesses

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ELECTRIC PIANO.

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3 Sheets—Sheet 3.

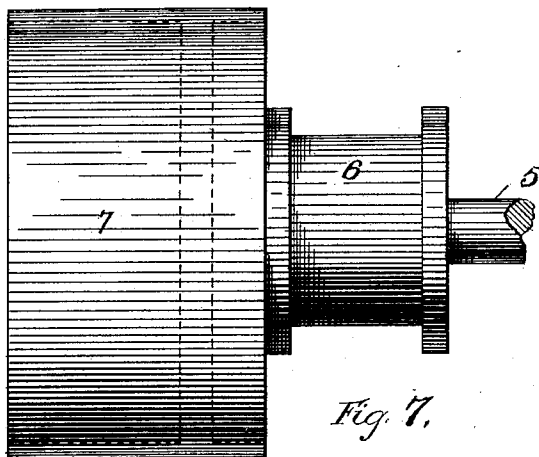


Fig. 7.

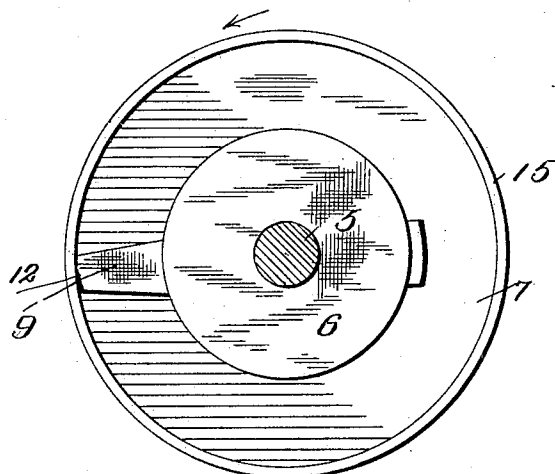


Fig. 8.

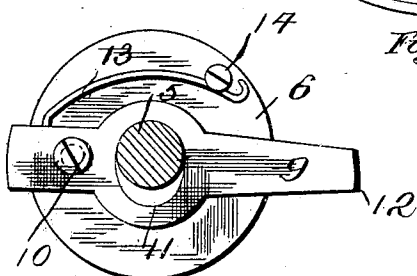


Fig. 9.

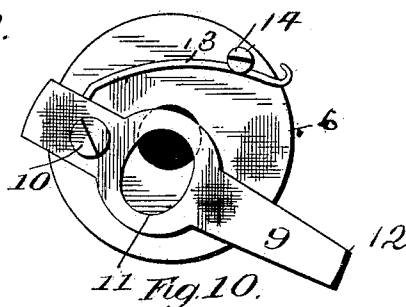


Fig. 10.

WITNESSES:

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UNITED STATES PATENT OFFICE.

GEORGE SCHRADE AND HAROLD W. SHONNARD, OF NEW YORK, N. Y.,
ASSIGNORS TO G. HOWLETT DAVIS, OF SAME PLACE.

ELECTRIC PIANO.

SPECIFICATION forming part of Letters Patent No. 624,382, dated May 2, 1899.

Application filed August 17, 1895. Serial No. 559,677. (No model.)

To all whom it may concern:

Be it known that we, GEORGE SCHRADE and HAROLD W. SHONNARD, citizens 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 Self-Playing Pianos, of which the following is a full, clear, and exact description.

Our present invention relates to improvements in self-playing pianos, and more particularly to the mechanism for controlling and regulating the speed of the instrument.

It is a further purpose of the invention to provide a novel construction of electric switch for controlling the action of the electric motor usually employed in operating musical instruments of this kind; and, finally, the invention consists in the combination and arrangement of parts hereinafter described and then more definitely pointed out in the claims which conclude this specification.

In the drawings, Figure 1 is a perspective view looking at one corner of a piano and showing our invention applied thereto, parts of the piano-frame being broken away or removed to show the various parts of the device and their relative positions and connections with respect to each other. Fig. 2 is a detail plan view of the electric switch, showing the position of the parts when the circuit is broken. Fig. 3 is a similar view showing the position of the parts when the circuit is complete. Fig. 4 is an end view of the switch. Fig. 5 is a detail view of a portion of the switch. Fig. 6 is a plan view of the driving-pulleys and belt-shifter. Fig. 7 is a side view of the clutch-pulley. Fig. 8 is a face view of the same. Fig. 9 is a detail view of the eccentric clutch. Fig. 10 is a similar view showing the shaft removed.

We will first describe the mechanism for controlling or regulating the speed of the rotary drum which actuates the sound-producing devices and will then describe our improved electric snap-switch, and, finally, show how the belt-shifter of the drum-speed controller is operated conjointly with the switch-operating lever, whereby a single lever controls both of these devices.

Referring now to the drawings the refer-

ence-numeral 1 designates a rotary drum or roller supported in any suitable manner below the piano-keyboard and rotated by any preferred form of motor. The key-striking mechanism used in connection with this type of self-playing instruments consists of a plurality of friction-shoes which are actuated by the rotary drum 1, and to said friction-shoes suitable levers are connected and arranged to cooperate with a perforated music-sheet and selecting devices in order to bring the said shoes into frictional contact with the roller or drum to operate the keys of the musical instrument either singly or collectively, all as clearly shown in the patent to George Howlett Davis, No. 546,582. As these features do not constitute a part of the present invention they will not be specifically treated herein.

The reference-numeral 2 indicates a suitable electric motor, upon the shaft 3 of which is fixed a cone-pulley 4, and above this shaft is mounted the driven drum-shaft 5, carrying the drum 1, near one end of which are mounted a fixed pulley 6 and a loose rim-pulley 7, over which latter pulley 7 and over the cone-pulley 4 is passed an endless flexible belt 8, and to the face of the pulley 6, adjacent to the face of the rim-pulley, is mounted a suitable clutch presently to be described. Over the fixed pulley 6 is passed a belt 6', which connects with the music-sheet roller for winding and rewinding the same.

Coming now to the clutch mechanism, the reference-numeral 9 indicates a clutch-lever pivoted near one end to one side of the fixed pulley 6 by means of a screw or bolt 10. This lever is provided with an elliptical perforation 11, through which the shaft 5 passes and upon which it is allowed a slight oscillating movement. The end 12 of the lever 9 is formed eccentric to its pivoted center. A spring 13 is secured at or near the shorter end of the lever 9 beyond the pivot-point 10, said spring being stayed or guided by a fillister-headed boss 14, as shown. The tendency of the spring, as will be obvious, is to throw the lever 9 away from the center of the pulley 6 on the shaft 5, so that its end 12 will be normally in contact with the rim 15 of the pulley 7, but it will engage with said pulley

sufficiently to rotate the same only when the latter is rotated by means of power applied thereto through the belt 8. If, however, power is applied directly to the shaft 5 to rotate the same, the lever 9 will not take hold of the rim-pulley 7, but will run free thereof, owing to the play allowed by the slot 11, and said pulley will remain at rest, although the pulley 6 will be rotated just the same. It will now be seen that the pulley 7 can revolve along with the shaft 5 only when power is applied directly to the pulley, and, as the inner surface of the rim 15 of said pulley is turned true, the end 12 of the lever 9 will have an opportunity to take hold at any point when revolved in the direction opposite to that of the arrow, Fig. 8, and thereby act as a clutch to lock the pulleys 6 and 7 together.

The object of employing the fast and loose pulleys 6 and 7 and the intermediate clutch mechanism will be apparent when it is understood that sometimes it is desirable or becomes necessary to rotate the drum-shaft 5 by means of a crank-handle (not shown) secured to one end thereof, and in operating the shaft in this manner it would be undesirable to rotate the motor-shaft 3 also. Hence it will be seen that by mounting the pulley 7 loose upon the shaft 5 and providing the clutch as described the shaft 5 can be rotated by a crank-handle without operating the pulley 7 and the motor-shaft 3.

The flexible belt 8 is guided laterally by a belt-shifter comprising a bell-crank lever consisting of the arms 16 and 17, said belt-shifter being pivoted at 18, as shown. The arm 17 of the shifter is provided with two outwardly-projecting rods 19, which lie upon the opposite side edges of the belt and which serve to shift the same laterally whenever the said shifter is rocked on its pivot. The belt-shifter is normally held in the position shown in Fig. 6 by means of a spring 20.

Referring now to our improved electric snap-switch we would first state that this switch is preferably carried by or mounted upon the piano in the position shown or at any other convenient place, and the object of this switch is to control the current leading to the electric motor 2, whereby the latter is put into operation or stopped at will. It is also a further purpose of the switch to connect the operating-lever thereof to the belt-shifter in such a manner that a single lever will serve to control the motor-current and operate the belt-shifter to regulate the speed of the rotary drum.

The electric snap-switch is constructed as follows: Upon a fiber or other disk 21 is mounted a metal base-plate 22, (shown in detail in Fig. 5,) said base-plate being provided with an extension 23 and apertured lugs 24 and 25, through which apertures a latch-pin 26 passes and around which latter a spring 27 is coiled, one end of said spring being attached to and normally acting to force the pin inward toward an oscillating metallic

contact-blade 28, and the other end of the spring acting against the lug 25. This oscillating contact-blade 28 is pivoted at 29 to the base-plate 22 and fiber disk 21 and is provided on one side with an approximately-dovetailed slot 30, against the arched wall of which the end 31 of the latch-pin 26 tends to exert a pressure. One end of the oscillating blade is enlarged, as shown, and provided with an angular cut 32, while its lower end is adapted to move laterally to and fro between a pair of metal contacts 33, which latter form terminals of an electric current in circuit with the motor 2. The contacts 33 are attached to the fiber disk 21 by screws, as shown. A switch-operating lever 34 is pivoted intermediate its ends, as at 35, to the fiber disk and base-plate and is provided near its upper end with a projecting pin 36, which latter is arranged to enter the angular cut 32 in the oscillating contact-blade, whereby the latter is oscillated when the switch-lever 34 is moved back and forth by the pin 36 coming into contact with the walls forming said angular cut.

The manner of operating the switch is as follows: In the position shown in Fig. 2 the circuit is broken, as the contact-blade is not between or in engagement with both the contacts 33. Now it will be seen that if the lever 34 is thrown to the left the pin 36 will engage with the end 37 of the contact-blade and rock the same on its pivot, thereby causing its lower end to move between the contacts 33, as shown in Fig. 3, in which position the circuit is closed. The reverse operation of the lever 34 will cause a reverse movement of the oscillating contact-blade, as will be obvious. The oscillating contact-blade is assisted in its movements and held in its two positions of adjustment by the spring-actuated pin 26, which bears against the same in the dovetail cut on either side of its pivotal point. When the oscillating contact-blade is in the position shown in Fig. 2 of the drawings, it will be seen that the latch-pin is bearing in the lower edge of the dovetail recess, and thereby tends to throw the end of the contact-blade from between the contacts and holds the same in such position; but as soon as the blade is given a slight movement of oscillation in the opposite direction by the lever 34 the position of the latch-pin will be shifted under the influence of the spring into the opposite corner of the dovetail recess and out of line with the pivotal point of the blade, as shown in Fig. 3, and when the pin assumes this position it will then act to force the blade between the contacts 33 and hold the same in this position to complete the circuit.

By referring to Fig. 3 it will be seen that the lever 34 can be moved to a considerable distance to the left after it has acted to force the contact-blade 28 between the terminals or contacts 33. This additional movement of the lever is allowed in order that the same lever may be used to operate the belt-shifter,

which is accomplished as follows: To the lower end of the lever 34 is attached a wire or cord 38, the opposite end of which is attached to a bell-crank lever 39, pivoted to the piano, as illustrated in Fig. 1. To the opposite end of the said bell-crank lever 39 is attached a second cord or wire 40, which extends downward and has its other end attached to the outer end of the arm 16 of the belt-shifter, as shown. It will now be obvious that an extreme movement of the lever 34 in either direction will operate the bell-crank lever 39 and through it the belt-shifter, which latter will cause the belt 8 to be shifted upon the cone-pulley 4, so as to regulate the speed of the drum 1, as is readily understood.

From the foregoing it will be seen that we produce a very simple construction and arrangement of parts for regulating and controlling the speed of the rotary drum which actuates the sound-producing devices, and we also provide an effective current-controlling switch, the lever of which is arranged to operate the belt-shifter.

What we claim is—

1. In a self-playing piano, the combination with an electric motor for operating the same, of a pulley on the motor-shaft, a drum-shaft carrying a pulley, a belt passing over said pulleys, a switch-lever for controlling the current to the electric motor, a belt-shifter for the said belt, and a connection between the belt-shifter and switch-lever, substantially as described.

2. In a self-playing piano, the combination with an electric motor for operating the same, of a cone-pulley on the motor-shaft, a drum-shaft carrying a pulley, a belt passing over said pulleys, a pivoted switch-lever, an oscillating contact-blade operated by the said lever, a belt-shifter acting to shift the belt on said cone-pulley, and a connection between the switch-lever and belt-shifter, substantially as described.

3. In a self-playing piano, the combination with an electric motor geared to impart mo-

tion to the sound-actuating devices, of an electric snap-switch for said motor consisting of a pivoted lever carrying a projecting pin, a pair of terminal plates, an oscillating contact-blade one end of which is adapted to engage with the terminal plates, and the other end provided with an angular recess arranged to receive the projecting pin of the lever for the purpose specified, and a spring-pressed pin acting upon one side edge of the contact-blade, substantially as described.

4. In a self-playing piano, the combination with an electric motor geared to impart motion to the sound-actuating devices, of an electric switch for said motor, consisting of a pivoted lever carrying a projecting pin, a pair of terminals, an oscillating contact-blade one end of which is adapted to engage with the said terminals, and the opposite end being provided with a recess to receive the projecting pin of the lever, said pin being arranged to contact with the side walls forming the said recess, for the purpose specified.

5. In a self-playing piano, the combination with an electric motor geared to impart motion to the sound-actuating devices, of an electric-current-controlling switch for said motor consisting of a pivoted lever carrying a projecting pin, a pair of terminals, an oscillating contact-blade provided with an angular recess at one end and a dovetail cut upon one side, the lower end of said blade being arranged to move to and from the said terminals when engaged by the pin on the lever, and a spring-actuated pin having one end normally resting in the said dovetail cut in the side of the contact-blade, as and for the purpose described.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE SCHRADE.
HAROLD W. SHONNARD.

Witnesses:

J. F. MACCOLGAN,
G. H. DAVIS.