

M. CLARK.

AUTOMATIC PIANO.

APPLICATION FILED MAR. 23, 1905. RENEWED JULY 8, 1907.

2 SHEETS—SHEET 1.

Fig. 8.

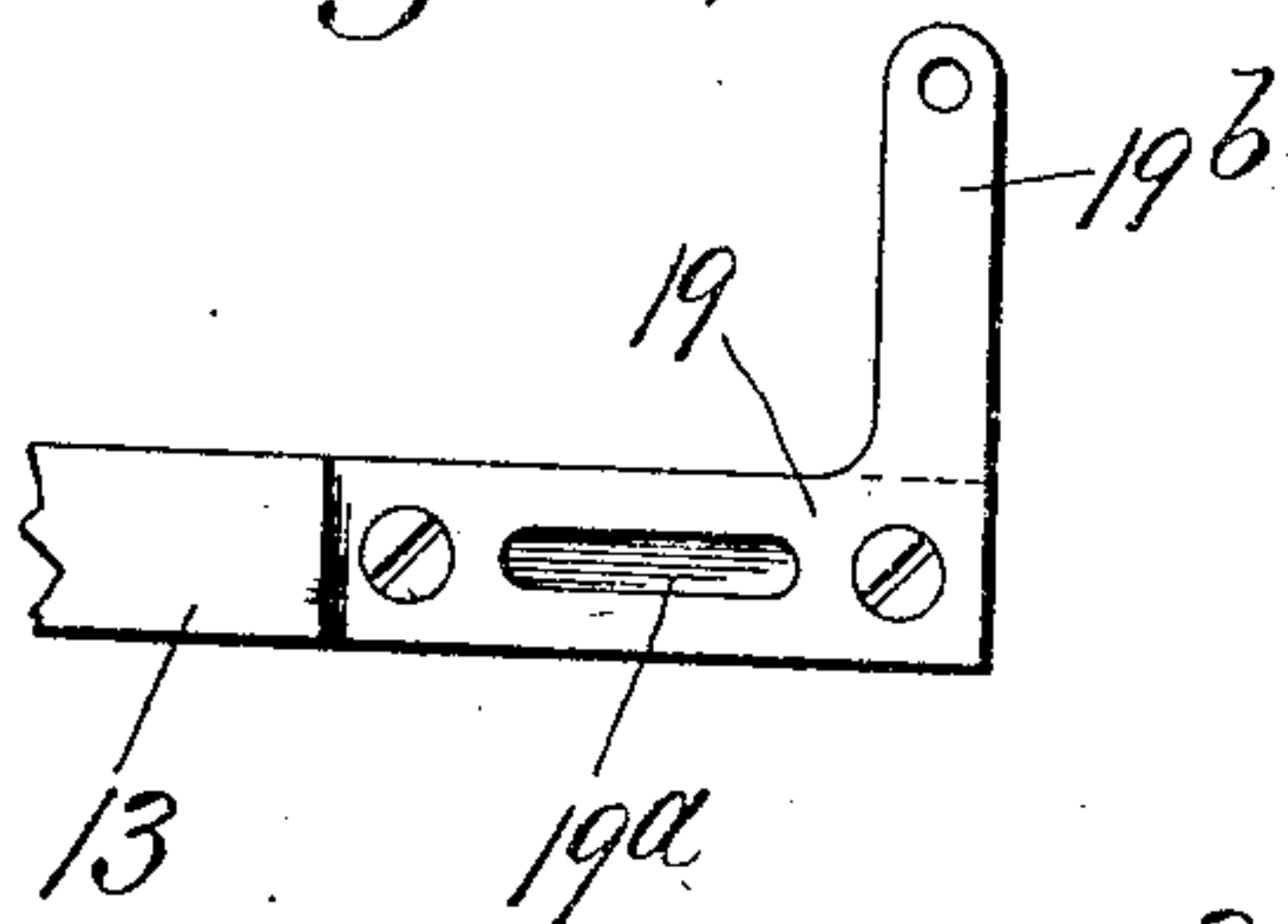
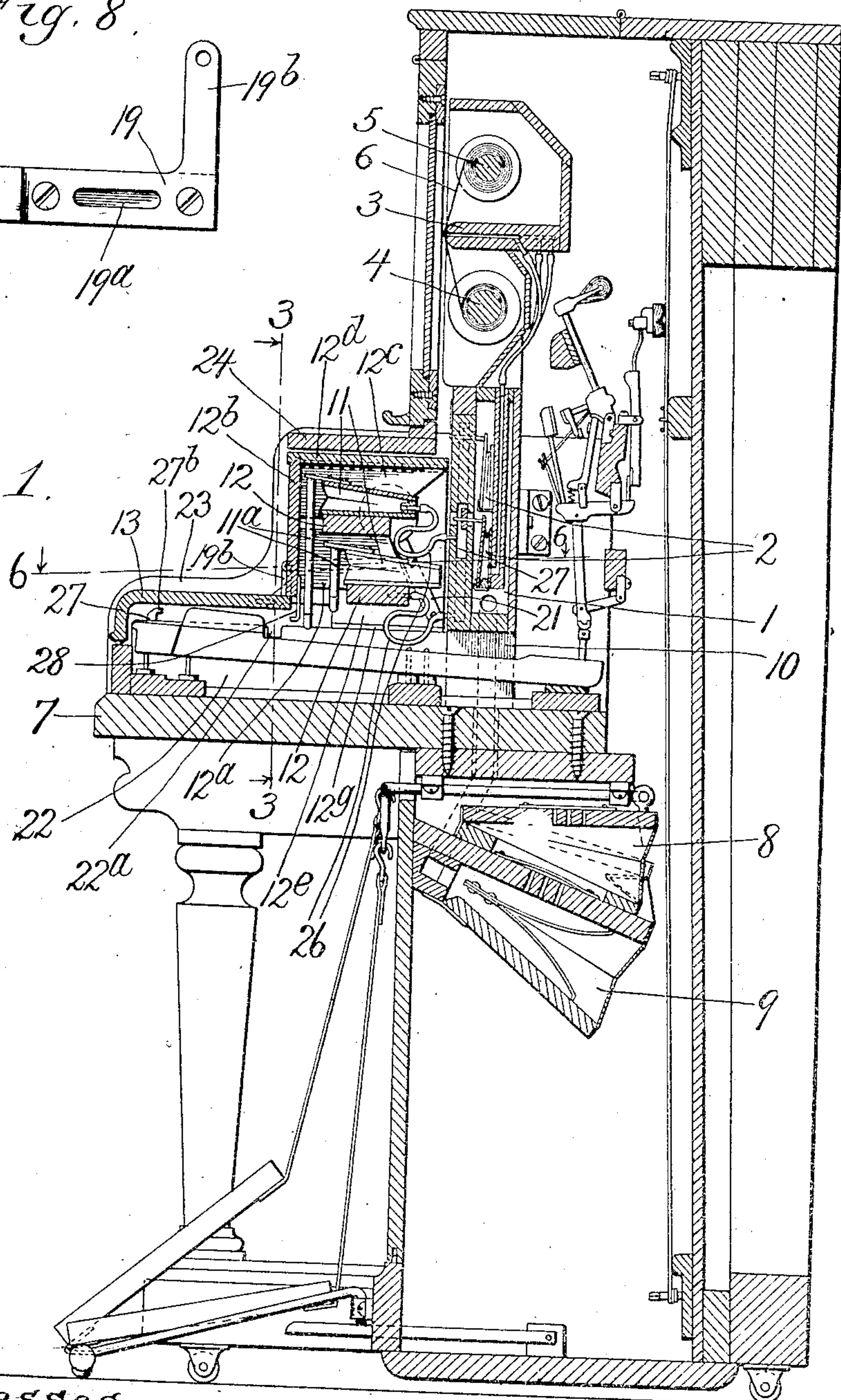


Fig. 1.



Witnesses.

Edward T. Wray  
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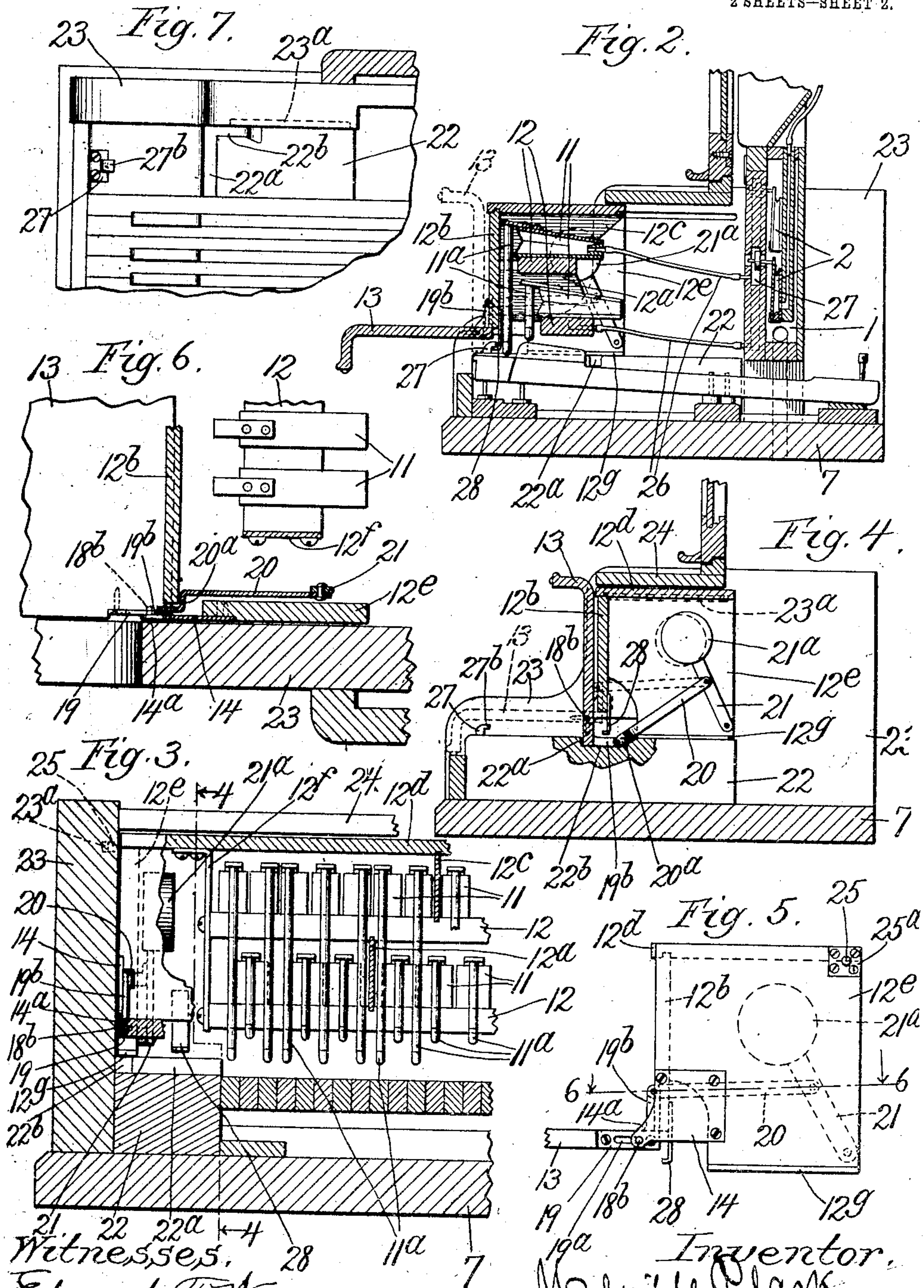
Inventor.  
Melville Clark  
by Burton Burton  
His Attys.



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APPLICATION FILED MAR. 23, 1905. RENEWED JULY 8, 1907.

2 SHEETS—SHEET 2.



Witnesses,  
Edward T. Way.  
J. S. Abbott

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his Attys.



# UNITED STATES PATENT OFFICE.

MELVILLE CLARK, OF CHICAGO, ILLINOIS.

## AUTOMATIC PIANO.

No. 879,789.

Specification of Letters Patent.

Patented Feb. 18, 1908.

Application filed March 23, 1905, Serial No. 251,581. Renewed July 8, 1907. Serial No. 382,719.

*To all whom it may concern:*

Be it known that I, MELVILLE CLARK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Automatic Pianos, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

10 The purpose of this invention is to provide in an upright piano an improved construction of devices for automatic playing which shall permit the location of such devices in better relation to the manual keys on which they operate, and more compactly in relation to the parts of the instrument not concerned in the automatic action and in relation to a case of substantially ordinary proportions and dimensions.

20 It consists of the features of construction set out in the claims.

In the drawings:—Figure 1 is a fore-and-aft vertical section of a piano and case embodying my invention, the parts being shown in the position occupied when the automatic devices are not in action. Fig. 2 is a view similar to Fig. 1, omitting certain parts of the piano not concerned in the invention and showing the automatic action parts in position for automatic playing. Fig. 3 is a section at the line, 3—3, on Fig. 1, certain parts being broken away. Fig. 4 is a section at the line, 4—4, on Fig. 3. Fig. 5 is an end view of the motor pneumatic cabinet and part of the fall board. Fig. 6 is a section at the line, 6—6, on Figs. 1 and 5. Fig. 7 is a detail plan of end portion of the manual and adjacent end of piano case. Fig. 8 is a detail elevation of one hinge fitting for the fall board.

40 In certain respects, the construction herein shown is similar to that shown in my application Serial No. 244,326, automatic piano, filed February 6, 1905. In the present structure, as in that shown in said application, the vacuum chamber, 1, containing the system of primary pneumatics, 2, 2, is mounted above the rear portion of the manual keys in front of the action, extending up behind the desk front, the tracker board, 3, take-up and rewind rolls, 4 and 5, for carrying the perforated sheet, 6, and all the mechanism for giving movement to the sheet, being supported above the vacuum chamber, 1, behind the desk. Said vacuum chamber is 55 mounted for support upon the key table, 7, as in said application, and the air-exhaust

devices, comprising the pumpers, 8, and the receiver or equalizing chamber, 9, being mounted below the key table, as in said application, the vacuum chamber obtains communication with the receiver, 9, by passages 60 formed through the foot pieces or supports, 10, 10, of the vacuum chamber and ducts extended through the key table registering at the upper end with the passages in the feet, 10, and opening at the lower end into 65 said equalizing chamber or receiver, 9. These parts of the structure need not be further described.

In my present invention, the motor pneumatics, 11, 11, are arranged in two banks 70 located forward of the vacuum chamber, 1, but instead of being supported by rigid connection with the vacuum chamber as in the construction shown in said application, they are mounted in a rigid frame comprising duct 75 boards, 12, 12, extending horizontally under the several banks of motor pneumatics (the pneumatics being shown ranged in two banks only), and rigidly connected by struts, 12<sup>a</sup>, 12<sup>a</sup>, located at intervals in the length inserted 80 between the motor pneumatics where space may be reserved for them. These struts are also joined at their forward ends to a front panel, 12<sup>b</sup>. From the upper duct board similar struts, 12<sup>c</sup>, extend to a top panel, 12<sup>d</sup>; and 85 the top panel and front panel are joined by end panels, 12<sup>e</sup>, said end panels, front panel and top panel constituting four sides of an inclosing cabinet or box for the motor pneumatics, which is open at the lower and inner 90 sides, and has in it shelves consisting of the duct boards, 12, 12, which may be further stayed by angle hangers, 12<sup>f</sup>, at the ends. The fall board, 13, is hinged to the forward 95 side of the motor pneumatic cabinet, the detail construction of the hinged devices being contrived with reference also to provide counterbalance for the fall board by which it may be held safely in upright position when 100 open, and with reference to certain other incidental purposes which will be pointed out in the course of the description. To each of the end panels, 12<sup>e</sup>, there is secured a pivot plate, 14, having a lug, 14<sup>a</sup>, projecting down 105 forwardly from the lower forward corner of the plate and having a rigid pivot stud, 18<sup>b</sup>, projecting inwardly. This stud engages a slot, 19<sup>a</sup>, in a hinge and lever plate, 19, which is let into and made fast to the end of the fall 110 board, 13. This hinge and lever plate is right-angle shaped, having an arm, 19<sup>b</sup>,



which projects back from the lower edge of the fall board when in upright position and directly up therefrom when the fall board is in horizontal or closed position, extending thus close alongside the plate, 14. To the upper end of the lever arm, 19<sup>b</sup>, of the hinge and lever plate there is pivotally connected a link, 20, which extends rearward, being offset by two right-angle bends, as seen at 20<sup>a</sup>, Fig. 6, so that in its rearward extent from said bends it stands just inside the end panel, 12<sup>e</sup> (see Fig. 6).

Within the motor pneumatic cabinet and pivoted to the end panel at the lower inner or rear corner of the latter, there is a weighted lever arm, 21, which extends from its pivot upward and forward, having the weight, 21<sup>a</sup>, at its upper forward extremity, and to this weighted lever arm the rear end of the link, 20, is pivotally connected intermediate the pivot of said lever arm and the weight. See Figs. 4 and 5. The relations of the several connected parts are such that the fall board swinging through ninety degrees from horizontal to upright position causes the weighted lever, 21, to oscillate a few degrees, only, back and forward from an intermediate position which it occupies when the fall board is erect, as seen in Fig. 4. The intermediate position is that at which the lever arm, 19<sup>b</sup>, and the link, 20, are in line, and as the fall board moves rearward of that position toward the upright position, the pivot of said link and lever to each other passes back or downward from said line and the weight operates then to bring the fall board to erect position and hold it securely at such position; and as the fall board is carried forward from said intermediate position, the weight still being forward of the fulcrum of the lever, 21, operates to force the fall board to closed position—that is, it coöperates with the weight of the fall board itself to close it.

For the purpose of further security of the fall board in open position, and for the purpose also of adapting the fall board at its lower edge when open to serve as a stop for the keys at the upper side, the key blocks, 22, upon which the motor pneumatic cabinet rests and is adapted to slide, have transverse notches, 22<sup>a</sup>, at a position directly below the lower edge of the fall board when the latter is erect and wide enough to permit the fall board to drop into such notches when it is thus erect; and the hinge and lever plate, 19, has for this reason the elongated aperture or slot, 19<sup>a</sup>, for the engagement of the hinged pintle or stud, 18<sup>b</sup>, this slot being of such length as to accommodate the drop of the fall board. This necessitates a short furrow, shown at 22<sup>b</sup>, Fig. 4, in the upper surface of the key block to accommodate the arm, 19<sup>b</sup>, of the lever plate, 19, and the thereto connected end of the link, 20. See Fig. 4.

The motor pneumatic cabinet is arranged to slide between the cheeks, 23, 23, of the piano case under the fixed shelf, 24, the cheeks having at their inner sides grooves, 23<sup>a</sup>, in which are engaged studs, 25, at the upper rear corners of said cabinet, a suitable plate, 25<sup>a</sup>, being provided with the stud for the purpose of securing attachment to the cabinet. See Fig. 5. The cabinet and its contents obviously obtain the proper support by the end panels riding on the key blocks, 22, the lower ends of said panels being covered with felt, as shown at 12<sup>g</sup>, so as to ride as described without disfiguring the upper surface of the key blocks at their forward exposed and finished portion. When the fall board is at closed position, the operator, lifting it sufficiently to engage its forward lip, can draw forward the entire motor pneumatic cabinet with its contents to the position shown in Fig. 2. In this position the strikers, 11<sup>a</sup>, 11<sup>a</sup>, of the motor pneumatics are in proper position for acting upon the keys respectively, and are in substantially the position with respect to the keys which is occupied by the strikers of an exterior player when the player is adjusted to the piano for playing. The duct boards, 12, have their ducts connected by flexible tubes, 26, 26, with the corresponding air passages, 27, 27, in the forward wall of the air chamber, 1, so that the movement of the entire system of motor pneumatics in the cabinet does not interfere with the pneumatic action nor with the control of the same by means of the primary pneumatics and the perforated sheet and its operating devices. In order to insure rigidity of position of the pneumatic cabinet so that the reaction of the strikers against the keys shall not tend to lift it at the forward side in playing, I mount upon the forward end of the key block a hook plate, 27, and provide a rigid angle hook, 28, fastened on the inner side of the front panel, 12<sup>b</sup>, which becomes engaged under the hook, 27<sup>b</sup>, of the hook plate at the forward or operating position of the cabinet. See Fig. 2.

I claim:—

1. In an automatic piano, in combination with the manual keys, motor pneumatics and strikers connected therewith respectively for operating on the keys; a rigid frame or cabinet in which the motor pneumatics and strikers are all mounted, such frame or cabinet being mounted on the piano case for forward-and-aft movement between a position above the rear part of the keys and the position above their forward part; controlling devices for the motor pneumatics supported within the piano case and flexible connections between the motor pneumatics and their respective controlling devices.

2. In an automatic piano, in combination with the piano case and the manual keys, a frame or cabinet mounted on the piano case



for fore-and-aft movement between a position above the rear part and a position above the forward part of the keys; motor pneumatics mounted in such cabinet; controlling devices mounted in the piano case; flexible connections from the controlling devices to the motor pneumatics respectively, the forward side of the motor pneumatic cabinet constituting an exposed upright panel of the piano case back of the manual, and a fall board hinged at its rear part to the lower side of said panel.

3. In an automatic piano, in combination with the case and the manual keys, a motor pneumatic frame or cabinet mounted on the piano case for movement fore-and-aft between a position above the rear part and a position above the forward part of the keys; motor pneumatics and strikers connected with them respectively mounted in such frame or cabinet; controlling devices for the motor pneumatics mounted within the piano case and flexible connections from them to the motor pneumatics respectively; a fall board hinged to the lower forward side of such frame or cabinet and a counterweight connected with such fall board contained within the piano case.

4. In a piano, in combination with the piano case and manual keys, a frame or cabinet mounted on the piano case for fore-and-aft movement between a position above the rear part and a position above the forward part of the keys; automatically operated devices for striking the keys mounted in such cabinet, the forward side of said cabinet constituting an exposed upright panel of the piano case back of the manual; a fall-board hinged to said panel, and counterbalancing devices for the fall-board connected thereto and located within the cabinet.

5. In a piano, in combination with the case and the manual keys, a frame or cabinet mounted on the case for fore-and-aft movement of its forward side over the portion of the keys exposed for playing; motor pneumatics and key strikers operated thereby mounted in such cabinet, the forward side of the cabinet constituting an exposed upright panel of the piano case back of the manual at the rear position of said cabinet; a fall-board hinged at its rear part to the lower side of said panel; counterbalancing devices for the fall-board located within the cabinet and connected to the fall-board at the ends of the latter.

6. In a piano, in combination with the

case and the manual keys, a frame or cabinet mounted on the case for fore-and-aft movement of its forward side above the position of the keys exposed for manual playing; an assemblage of automatically-operated key-striking devices mounted in such cabinet and carried thereby in such fore-and-aft movement, the forward side of the cabinet constituting an exposed upright panel of the piano case extending back of the manual at the rear position of the cabinet; a fall-board hinged at its rear part to the lower side of such panel; a lever arm extending from the hinged edge of the fall-board at one end thereof back within the cabinet, and counterbalancing devices for the fall-board located within the cabinet at the end of the assemblage of automatic key-striking devices, and connections therefrom to said fall-board lever arm.

7. In an upright piano, in combination with the piano case and the manual keys; a motor pneumatic frame or cabinet mounted on the piano case for movement fore-and-aft between a position above the rear part and a position above the forward part of the keys, such frame or cabinet having top, front and end panels which are exposed when the cabinet is at forward position; a single-piece fall board hinged at its rear lower edge at the forward lower side of the cabinet and a counterweight connected with such fall board and located within the cabinet.

8. In an automatic piano, in combination with the piano case and the manual keys, a motor pneumatic frame or cabinet mounted on the piano case for movement fore-and-aft between a position above the rear part and a position above the forward part of the keys, such frame or cabinet having top, front and end panels which are exposed when the cabinet is at forward position; banks of motor pneumatics mounted within the cabinet; a fall board hinged at its rear or lower edge to the forward lower edge of the cabinet, and a counterweight connected with the fall board located within the cabinet at the end of the bank of motor pneumatics.

In testimony whereof, I have hereto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 7th day of March, 1905.

MELVILLE CLARK.

In the presence of—

CHAS. S. BURTON,  
FRED. G. FISCHER.