

No. 743,781.

PATENTED NOV. 10, 1903.

C. WARREN.  
PIANO PLAYER.

APPLICATION FILED NOV. 11, 1902.

5 SHEETS—SHEET 1.

NO MODEL.

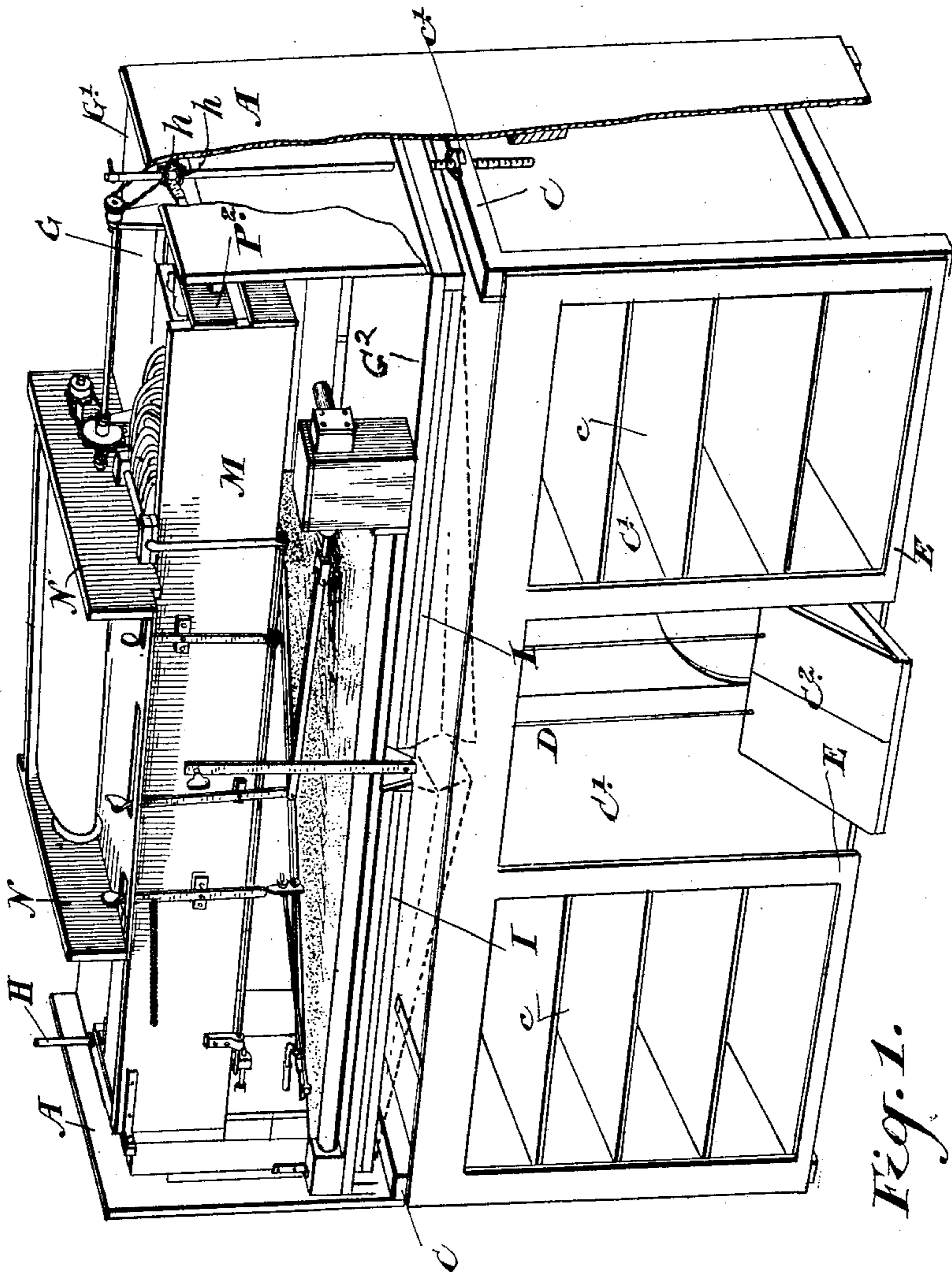


Fig. 1.

*Witnesses.*

A. T. S. Young.  
C. B. Sheffield

*Inventor:*

Charles Warren.

My Father's house is the  
Valley

No. 743,781.

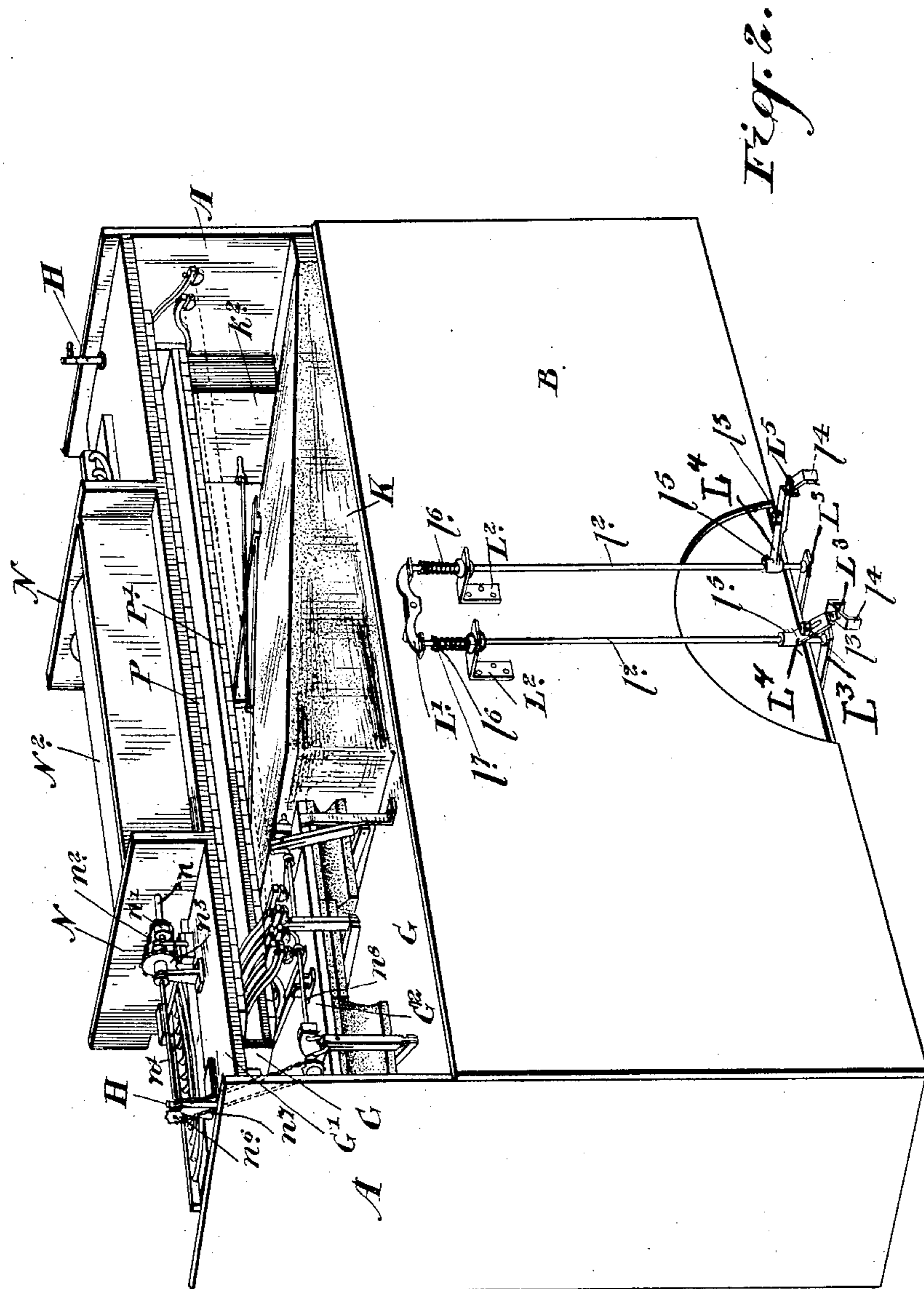
PATENTED NOV. 10, 1903.

G. WARREN.  
PIANO PLAYER.

APPLICATION FILED NOV. 11, 1902.

NO MODEL.

5 SHEETS—SHEET 2.



*Witnesses.*

*H. L. S. Young*

*E. B. Sheffield*

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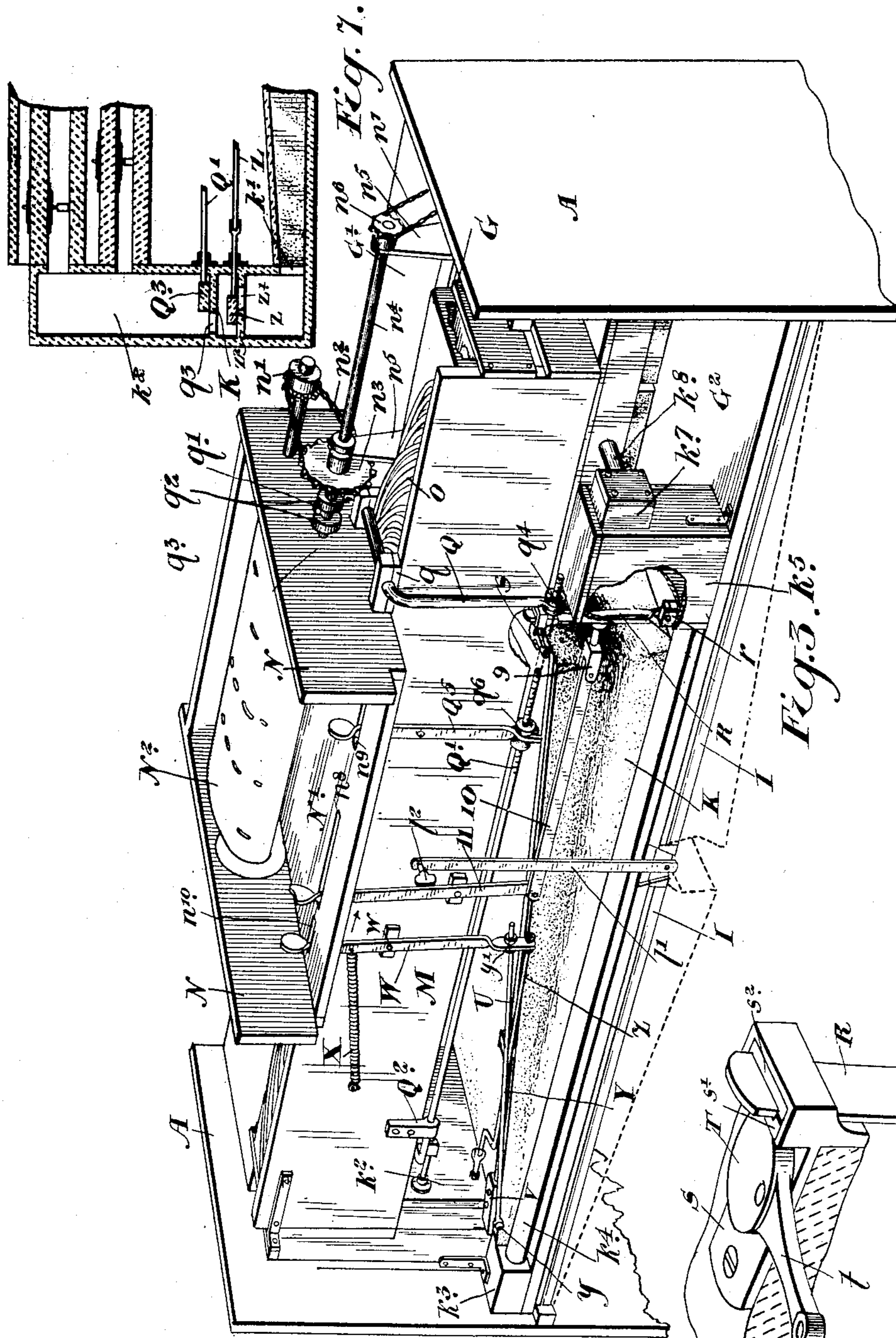
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C. WARREN.  
PIANO PLAYER.

APPLICATION FILED NOV. 11, 1902.

NO MODEL.

5 SHEETS—SHEET 3.



Witnesses.

A. S. Gung  
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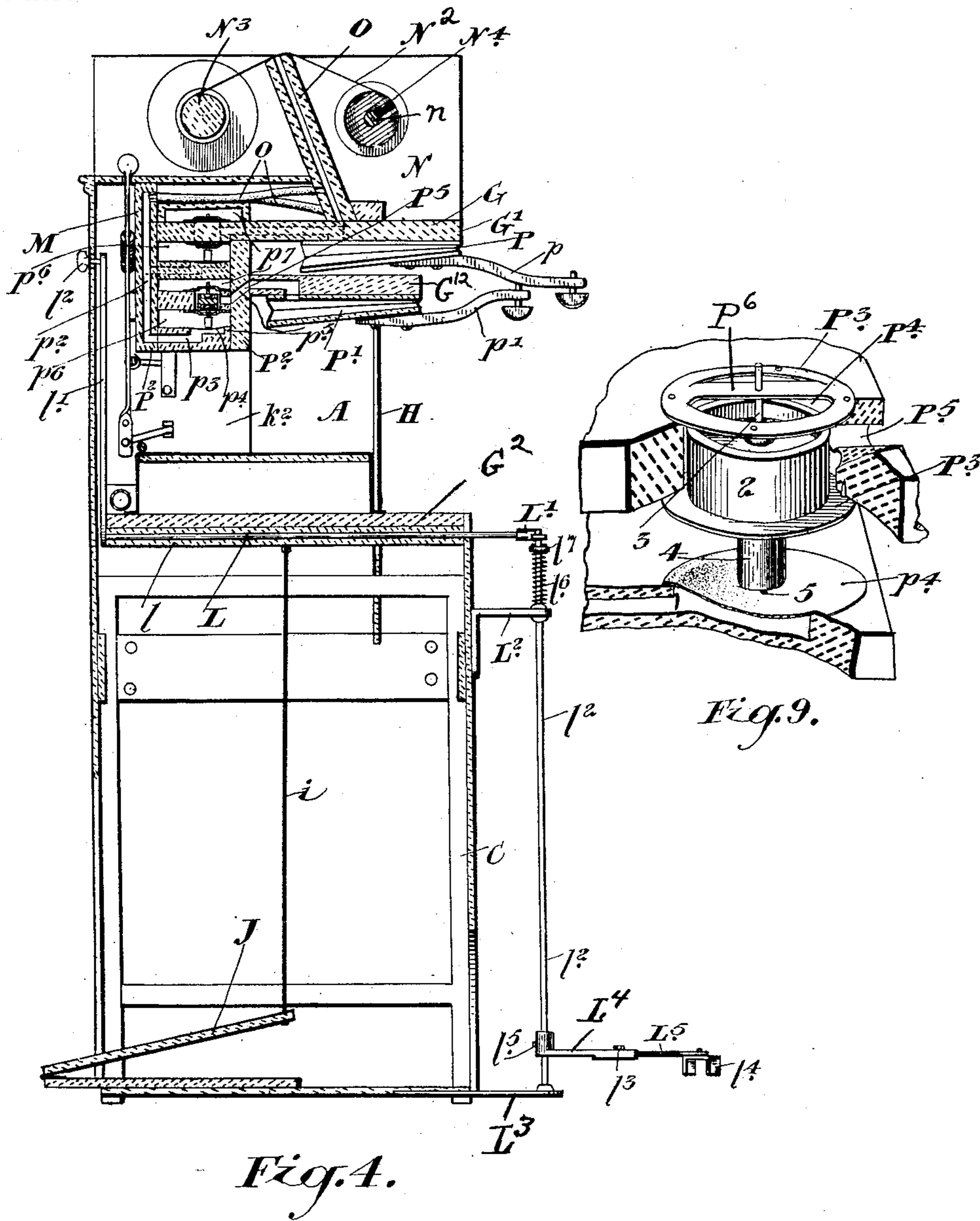
By J. L. Thompson  
att'y.

C. WARREN.  
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APPLICATION FILED NOV. 11, 1902.

NO MODEL

5 SHEETS—SHEET 4.



Witnesses.  
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C. WARREN.  
PIANO PLAYER.

APPLICATION FILED NOV. 11, 1902.

NO MODEL.

5 SHEETS—SHEET 5.

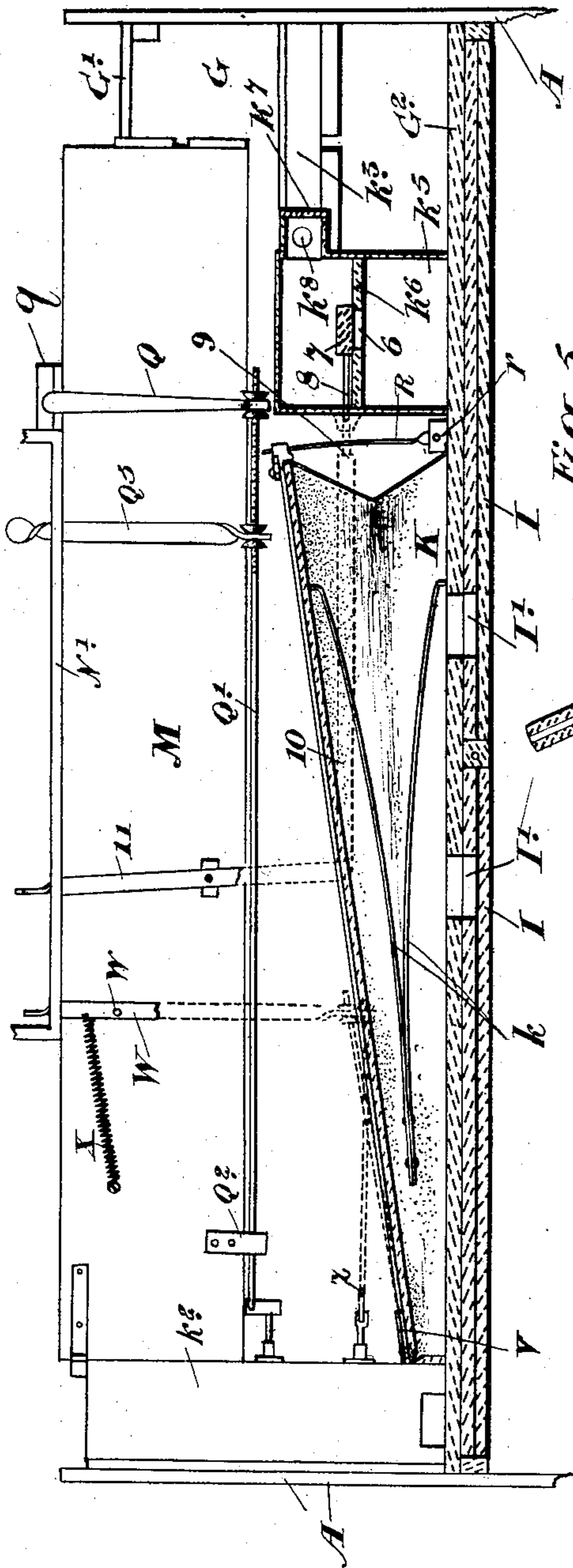


Fig. 5.

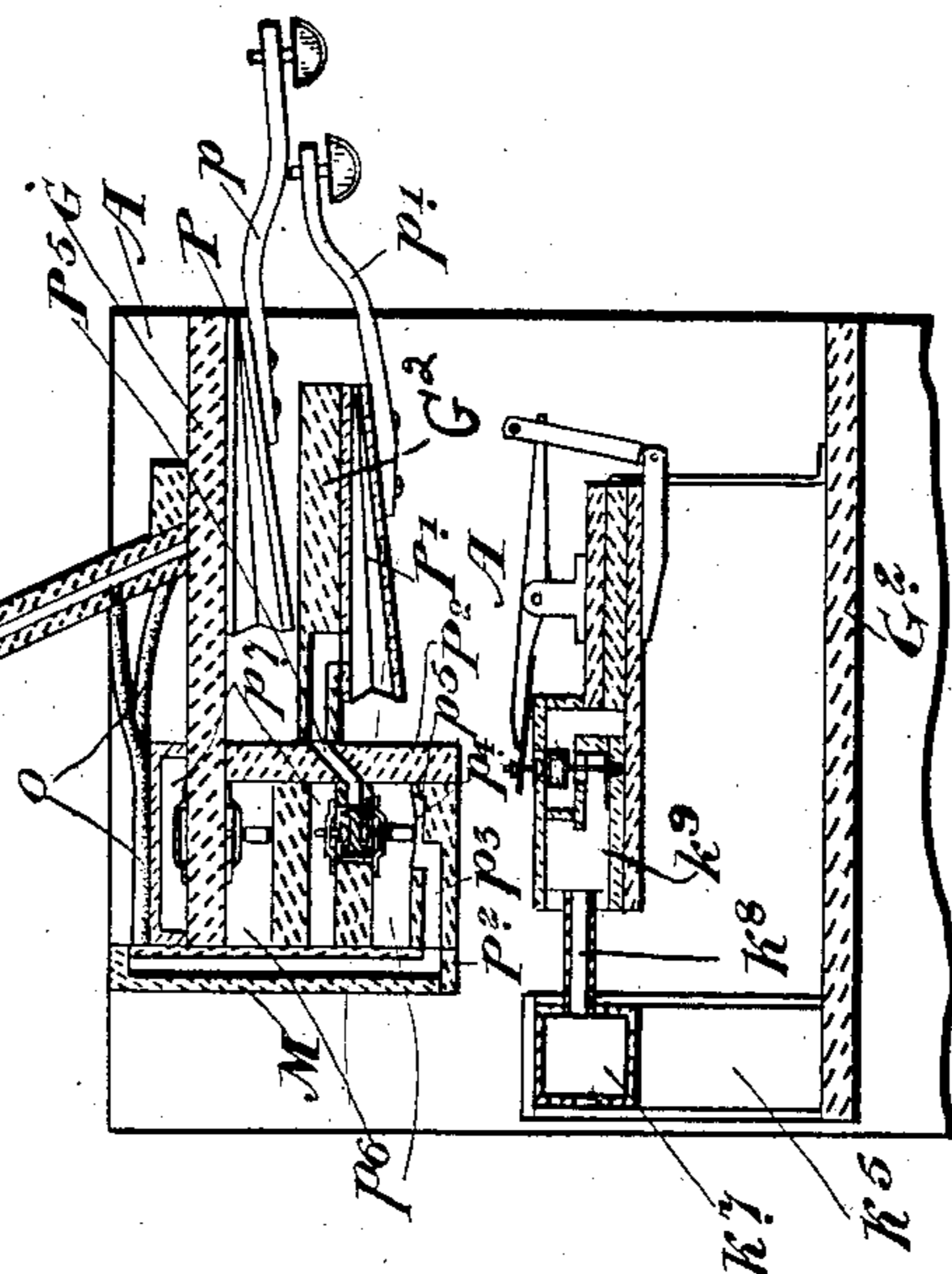
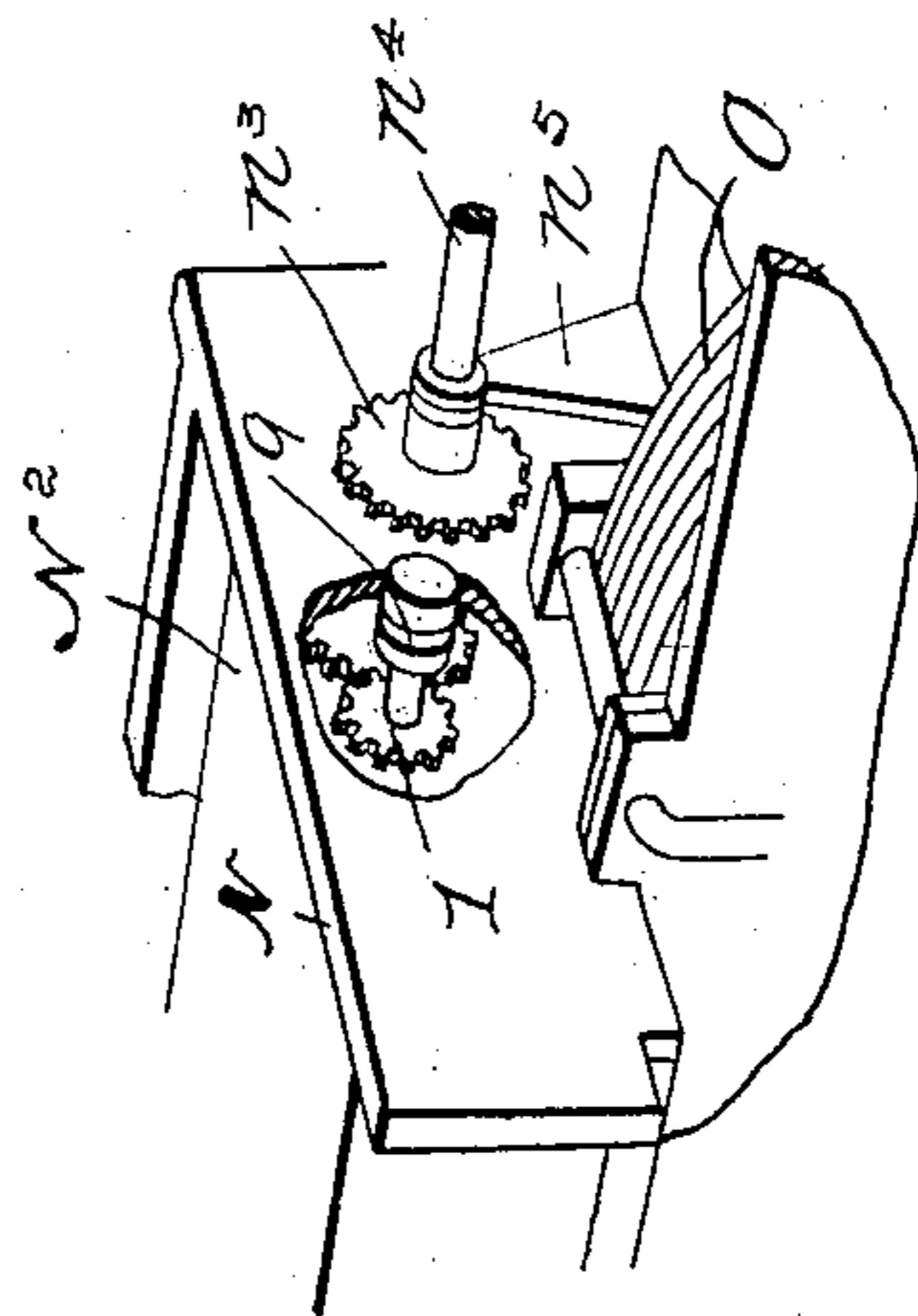


Fig. 6.

Fig. 10.



Attest:  
C. M. Mason  
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Inventor,  
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attys

# UNITED STATES PATENT OFFICE.

CHARLES WARREN, OF GUELPH, CANADA, ASSIGNOR TO THE BELL ORGAN AND PIANO COMPANY, LIMITED, OF GUELPH, ONTARIO, CANADA, A CORPORATION.

## PIANO-PLAYER.

SPECIFICATION forming part of Letters Patent No. 743,781, dated November 10, 1903.

Application filed November 11, 1902. Serial No. 130,909. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES WARREN, musical-instrument expert, of the city of Guelph, in the county of Wellington, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Piano-Players, of which the following is a specification.

My invention relates to improvements in piano-players; and the object of the invention is to devise a simple device of this class which will not be liable to get out of order or be affected by climatic changes, which may be very readily and rapidly attached to a piano, in which a maximum degree may be obtained in loud playing and a minimum degree in soft playing, in which the pedal-controlling devices may be easily and securely connected to the pedal, in which a simple and effective means is provided for manipulating the key-operating arms, and, further, to provide means for producing expression directly from the operating-pedals and also means whereby the vacuum is shut off simultaneously with the throwing in of the rewinding-gear. To carry out these objects, my piano-player is constructed and arranged in detail as hereinafter more particularly explained.

Figure 1 is a perspective front view of my piano-player with the casing mostly removed. Fig. 2 is a perspective rear view. Fig. 3 is an enlarged perspective view looking from the front. Fig. 4 is a vertical section. Fig. 5 is a longitudinal section through the equalizer near the front and through the motor-trunk. Fig. 6 is a cross-section showing the communication between the motor-trunk and motor. Fig. 7 is a longitudinal sectional detail through the main vacuum-trunk and vacuum-chamber, showing the valves. Fig. 8 is a detail showing the mechanism for locking the equalizer when it is desired to use the full power of the vacuum-chamber. Fig. 9 is an enlarged perspective detail of the valve located between the vacuum-chamber and the atmosphere for controlling the operation of the pneumatics. Fig. 9 is a detail view.

In the drawings like characters of reference indicate corresponding parts in each figure.

A represents the side boards, and B the bottom back board, of my improved piano-player.

C C are the end frames, the bottoms of which form legs.

D is a cross-board extending between the frames C C.

C' C' are central walls, which are secured at the top to the cross-board D and at the bottom to the bottom cross-board E.

Between the wall C' and the frame C at each side are arranged the shelves c, the front of the shelves being closed by suitable doors, which it is not necessary here to describe, so as to form the musical cabinet on each side of the central recess C<sup>2</sup>. In the central recess and at the front thereof are located the pedals J.

G is the frame, in which are contained the pneumatics and vacuum-chambers and playing-fingers and the mechanism generally constituting the operative part of my piano-player.

G' is the top board of the frame G, and G<sup>2</sup> is the bottom board, between which are contained the vacuum-chambers and the equalizer and motor and connecting trunks and under which are located the exhaust-feeders.

H represents rods located at each end of the frame G and extending through the top and bottom boards G' and G<sup>2</sup> near the end. The rods H are threaded at their lower ends and extend through threaded nuts c', located in the top of the frame C C at each end. The rods H near the top are provided with collars h h at the top and bottom of the board B', such collars being securely held in position. The extreme tops of the rods are provided with any suitable means for turning them. It will now be seen by turning the rods either to the right or left the frame G, containing the operative portion of my blower, may be raised and lowered in relation to the lower or stationary portion of the frame, so that the key-operating arms or fingers may be placed in the proper relative position to the finger-keys of the piano and the player set in convenient position for use.

I I are the exhaust-feeders, which are connected to and operated from the pedals J by

means of the connecting-cords  $i$ . The exhaust-feeders  $I$  are suitably hinged at the bottom of the board  $G^2$  and have openings  $I' I'$ , communicating with the equalizer  $K$ .

5 The equalizer  $K$  is provided with a distention-spring  $k$  and communicates, by means of an opening  $k'$ , with the trunk  $k^2$ , leading to the vacuum-chambers.

I shall first describe the mechanism whereby  
10 by the pedals of the piano are operated to increase or decrease the volume or loudness of sound or render the sound produced on the strings soft or loud, according to the expression desired.

15  $L$  is a spindle which extends through a bearing block or strip  $l$ , extending crosswise of the player underneath the board  $G^2$ , to which it is secured.

$L'$  is a double rocking arm secured on the  
20 back end of the spindle  $L$ , and  $l'$  is an arm secured on the front end of the spindle  $L$  and provided with a knob  $l^2$  for the purpose of manipulating such arm.

$L^2 L^2$  are brackets secured to the back board  
25  $B$  of the player, and  $L^3 L^3$  are brackets secured to the bottom  $E$  of the player vertically underneath the brackets  $L^2$ .

$l^2$  represents vertically-disposed rods, which extend through the brackets  $L^2 L^2$  and have  
30 an end bearing in the bottom brackets  $L^3 L^3$ .

$L^4$  represents arms suitably secured on the rods  $l^2$  at a convenient height and slotted, as shown, and provided with extension-arms  $L^5$ , connected to them by the bolts  $l^3 l^3$ . On the  
35 ends of the extension-arms  $L^5$  are pivotally secured the reverse-U-shape straddle-plates  $l^4 l^4$ , which are designed to straddle and rest upon the pedals. The arms  $L^4 L^4$  are vertically adjustable on the rods  $l^2 l^2$  and are held  
40 in any position to which they may be adjusted according to the height of the pedals by means of set-screws  $l^5 l^5$ .

It will be noticed that the rocking arm  $L'$  has broadened ends, and underneath such  
45 ends extend the vertically-disposed rods  $l^2$ .

$l^6 l^6$  are spiral springs encircling the rods  $l^2$  and  $l^2$  and extending between the collar  $l'$  and the brackets.

It will now be seen that by throwing the  
50 handle  $l'$  either to the right or to the left the rocking arm  $L'$  will be similarly thrown and depress one of the rods  $l^2$  and at the same time permit of the companion rod  $l^2$  to remain stationary. In this way the pressure  
55 may be exerted on either one pedal or the other, as desired, and when the pressure is applied to one pedal it is necessarily released from the other, and thereby I accomplish the end which I have in view by operating either  
60 the loud or soft pedals of the piano.

$M$  is a board which extends lengthwise to the front of the boards  $G$  and  $G'$  and the trunk, being suitably held or secured in position.

65  $N N$  are the side boards of the tracker-

board  $O$ , which extend forwardly of the board  $M$ .

$N'$  is the bottom board, on which the bottom of the tracker-board is supported.

$N^2$  is the roll or perforated music-sheet, 70 which is held in the usual manner on the rollers  $N^3$  and  $N^4$  and passes over the tracker-board, as indicated. The roller  $N^4$  is the driving-roller, the spindle  $n$  of which is provided with a sprocket-wheel  $n'$ , which is con- 75 nected by a sprocket-chain  $n^2$  to a sprocket-wheel  $n^3$  on the spindle  $n^4$  of the roller  $N^3$ , such spindle being journaled outside of the side boards  $N N$  in the brackets  $n^5 n^5$ .

$n^6$  is a sprocket-wheel on the end of the 80 spindle  $n^4$  and connected by a sprocket-chain  $n^7$  to the motor-spindle  $n^8$ , which derives its motion from the motor in the manner which it is not necessary here to describe, as it forms no portion of my invention. 85

I shall next describe the manner in which the arms and pneumatics which operate the finger-keys are controlled and operated.

$P$  is one of the row of pneumatics secured underneath the board  $G'$ , such pneumatics be- 90 ing provided with the usual arm  $p$  for operating the finger-keys.

$P'$  is one of the sets of pneumatics attached to the supplemental board  $G^{12}$  beneath the board  $G'$  and having connected to it the arm 95  $p'$  for operating the finger-keys.

$P^2$  is a casing extending practically from end to end of the frame and connected to the trunk  $k^2$ .

$o$  represents tubes leading from the slot of 100 the tracker-board to the longitudinal passage-ways  $p^2$ , which are provided with branch passage-ways  $p^3$ , leading underneath the diaphragms  $p^4$ , which are made of leather, rubber, or other suitable material. There is a 105 passage-way  $p^3$  which leads to a point underneath the diaphragms  $p^4$ , which cover the orifices  $p^5$  beneath each vacuum-chamber  $p^6$  in the casing  $p^2$ .

$p^7$  represents chambers communicating 110 with the atmosphere above each of the vacuum-chambers  $p^6$ .

$P^3$  represents circular perforated plates covering the orifices  $P^4$  between each one of the set of vacuum-chambers  $p^6$  and air-cham- 115 bers  $p^7$ .

$P^5$  represents passage ways leading from the orifices  $P^4$  to the pneumatics  $P$  and  $P'$ . The perforated plates  $P^3$  are secured to the edges of the orifices  $P^4$  and are provided with cross- 120 bars  $P^6$ .

2 is a cylindrical valve provided with a central stem 3 and depending thimble 4. The valve 2 is of smaller diameter than the orifices  $P^4$ , and the thimble 4 of the valve is situ- 125 ated on one side of a pin-hole 5 in the flexible disk  $p^4$ . When the air is admitted through any of the perforations in the music-sheet, it passes underneath the diaphragm  $p^4$  and forces such diaphragm against the thimble 4 130

and raises the valve, and thereby introduces the vacuum through the orifice  $P^4$  and passage-way  $P^5$  to the pneumatics, and thus operates the arms  $p$  and  $p'$ . When the music-sheet closes the particular passage-way to the chamber, the pressure of the air being relieved from behind the disk  $p^4$  it drops back on its rear rapidly, the air leaking through the pin-hole 5, so as to provide for a quick return, and thereby producing a staccato movement. In the drawings, both in the perspective and cross-sectional views, I have merely shown a view of the arms to indicate their position; but it will be understood that the arms are attached to all the pneumatics throughout the length of the upper and lower sets, which are attached to the boards  $G$  and  $G^3$ , respectively.

I shall now describe the means whereby the speed of the motor is controlled.

$k^3$  is an extension of the trunk, which is connected by a tube  $k^4$  to a supplemental trunk  $k^5$ , which is provided with a cross-partition  $k^6$ . (See Fig. 5.) The trunk  $k^5$  has an extension  $k^7$ , which is connected by a tube  $k^8$  (see Figs. 5 and 6) to the valve-chamber  $k^9$  of the motor.

$k^6$  is a partition in the trunk  $k^5$ . The partition has an orifice 6, as indicated in Fig. 5. 7 is a valve which controls the size of the orifice 6. The valve 7 is connected by a rod 8 to a jaw 9, which is connected by a bar 10 to a lever 11, which extends through the slot  $n^8$  in the front of the bottom of the tracker-board frame  $N'$ .

It will be seen by manipulating the lever 11 that the valve 7 may be thrown open, so as to vary the size of the passage-way leading from the bottom of the trunk, which is connected with the main trunk  $k^2$ , as before described, to the top of the trunk, which leads through the extension  $k^7$  and tube  $k^8$  to the valve-chamber of the motor, and thereby the speed of the motor may be regulated as required.

In my invention I have also provided a means whereby when the rewinding mechanism is set in motion all the pneumatics are rendered mute.

$Q$  is a crank-rod journaled in suitable bearings  $q$  and having a bent end  $q'$ , which extends up between the collars  $q^2$  on the counter-spindle  $n^4$ . The spindle  $n^4$  contains the pinion 1 of the winding mechanism, which is normally arranged when playing is being done to mesh with the gear-wheel on the end of the winding-roller. The crank-rod  $Q$  is connected by a rod  $Q'$ , which has a bearing at  $Q^2$  to the valve  $Q^3$ , which is located normally adjacent to the opening  $q^3$  in the partition  $K$  in the trunk  $k^2$ .

It will be noticed that the end of the rod  $Q'$  is threaded and that such threaded end extends through the crank-arm  $Q$ , being provided with a nut  $q^4$  at each side, so that I am

enabled to adjust to a nicety the position of the arm upon the end of the rod  $Q'$ .

$Q^5$  is a lever, the upper end of which extends through a slot  $n^9$  in the bottom  $N'$  of the tracker-board frame and the lower end of which extends between the nuts  $q^6$  on the threaded end of the rod  $Q'$ . It will be seen that the position of the bottom end of the lever  $Q^5$  upon the rod  $Q'$  is therefore also adjustable. By manipulating the lever  $Q^5$  the rewinding of the music roll or sheet is done as when it is pushed to the left, as shown in Fig. 3, the pinion 1 is thrown out of mesh with the wheel on the end of the winding-roll, and at the same time the valve  $Q^3$  is thrown so as to close the opening  $q^3$  and stop all action of the vacuum through the trunk, and thereby render the pneumatics mute.

I shall briefly describe the means whereby the equalizer is held from collapsing when it is desired to exert the full power of the exhaust-feeders to produce the vacuum direct through the trunk in loud playing. I may here mention that my equalizer is intended in the first place to draw from the trunk and produce a vacuum gradually and not be susceptible to inequality of pedaling, as would be the case where the exhaust-feeders are connected directly to the trunk. In loud playing, however, it is necessary, I find in practice, to exhaust directly from the trunk, and thereby produce any degree of vacuum.

$R$  is a bar which is pivoted on a bracket  $r$ , secured on the base-board  $G^2$  in proximity to the trunk  $k^5$ .

$S$  is a bracket secured on the weighted end of the equalizer at the top and provided with an opening extending therethrough.

$s'$  and  $s^2$  are friction-plates which fit on each side of the bar  $R$ .

$T$  is an eccentric provided with an arm  $t$ . The arm  $t$  is connected by a rod  $U$  to a bearing-plate  $V$  at the opposite end in proximity to the trunk  $k^2$ .

$W$  is the operating-lever, which is pivoted at  $w$  on the front board and extends through a slot  $n^{10}$  at the front of the tracker-board casing  $N'$ . The lever  $W$  is connected by a spiral spring  $X$  above its pivot to a suitable point on the front board.

$Y$  is a rod connected by a pin  $y$ , pivoted in the bearing-plate  $V$  at one end and at the other end extending through the lever  $W$  and provided with nuts  $y'$  at each side, so as to provide for a nicety of connection to the lever.

$Z$  is a rod connected also to the lower end of the lever and extending to and through the side of the trunk  $k^2$  to the valve  $z$ , which is designed to be brought to more or less cover the opening  $z'$  in the partition  $z^2$  in the trunk  $k^2$ . In the drawings the valve  $z$  is shown in the normal position for ordinary playing and to provide for the vacuum being produced evenly and softly through the equalizer. Immediately, however, it is desired to play

loudly the lever W is thrown in the direction indicated by arrow, thereby pushing the rods Y and Z so that the rod Y carries with it the rod U, and thereby turns the eccentric  
 5 T on its pivot, so as to clamp, through the medium of the strips  $s'$  and  $s^2$ , the bar R and securely lock the equalizer in position. At the same time the rod Z pushes back the valve  $z$  and completely uncovers the opening  
 10  $z'$ , allowing the full force of the exhaust-feeders to be exerted through the trunk and through the medium of the music-roll upon the pneumatics, as is commonly understood.

It will thus be seen that I have in my invention provided a simple means for raising and lowering the frame, so that my piano-player may be applied to instruments of various heights and whereby the various parts of the player are manipulated easily and controlled thoroughly to perform the various functions necessary to give a maximum expression to the music of a piano.

What I claim as my invention is—

1. In a piano-player, a piano-pedal-controlling device comprising vertical rods guided at the back of the player, pedal-operating arms carried thereby, a rocker-arm adapted to alternately operate said rods, and means for operating said arm, substantially as described.  
 30

2. In a piano-player, a piano-pedal-controlling device comprising vertical rods and supports therefor located at the back of the player and pedal-supporting arms connected thereto, spring means for holding such rods in the normal position and a centrally-pivoted rocker-arm extending above the tops of the rods and means for rocking such arm as and for the purpose specified.  
 40

3. In a piano-player, a piano-pedal-controlling device comprising vertical rods and supports therefor located at the back of the player and pedal-supporting arms connected thereto, spring means for holding such rods in the normal position, a rocker-arm having the ends extending over the tops of the rods, a central rod extending through the center of the rocker-arm and to the front of the frame, and an operating-arm secured at the  
 50 front of such rod as and for the purpose specified.

4. In a piano-player and pedal-controlling device therefor, the combination with the vertical rods and pedal-operating arms secured on the rods near the bottom, of a spiral spring encircling the tops of the rods above the brackets and extending between the collar on the rods and the brackets and a rocker-arm for operating either one or the other of  
 60 the rods at a time as and for the purpose specified.

5. In a piano-player and pedal-controlling device therefor, the combination with the vertical rods and pedal-operating arms secured on the rods near the bottom, of a spiral spring encircling the tops of the rods above

the brackets and extending between the collar on the rods and the brackets, a rocker-arm having the ends extending above the upper ends of the rods and means for rocking  
 70 the arm as and for the purpose specified.

6. In a piano-player, the combination with the trunk and equalizer, of a bar extending up in proximity to the deep end of the equalizer and means carried by the equalizer for  
 75 gripping the bar to prevent the equalizer collapsing as and for the purpose specified.

7. In a piano-player, the combination with the trunk and equalizer, of a bar extending up in proximity to the deep end of the equalizer and frictional means carried by the equalizer for gripping the bar, so as to allow of a variation of pressure of the equalizer in collapsing as and for the purpose specified.  
 80

8. In a piano-player, the combination with the trunk and equalizer, of a bar extending up in proximity to the deep end of the equalizer, an end bracket secured to the top of the equalizer, friction-plates located therein on each side of the bar and means for exerting  
 90 a pressure on such friction-plates as and for the purpose specified.

9. In a piano-player, the combination with the trunk and equalizer, of a bar extending up in proximity to the deep end of the equalizer, an end bracket secured to the top of the equalizer, friction-plates located therein on each side of the bar and a lever having an eccentric-shaped end and means for operating such lever as and for the purpose specified.  
 100

10. In a piano-player, the combination with the trunk and equalizer, of a bar extending up in proximity to the deep end of the equalizer, an end bracket secured to the top of the equalizer, friction-plates located therein on each side of the bar, a lever having an eccentric-shaped end, an operating-lever pivoted on the frame and spring-held in its normal position, a rod extending from the lower end  
 110 of the arm and pivotally connected to a plate and a rod connecting such plate with the end of the eccentric-shaped end lever as and for the purpose specified.

11. In a piano-player, the combination with the trunk and equalizer, of a bar extending up in proximity to the deep end of the equalizer, an end bracket secured to the top of the equalizer, friction-plates located therein on each side of the bar, a lever having an eccentric-shaped end, an operating-lever pivoted on the frame and spring-held in its normal position, a rod extending from the lower end of the arm and pivotally connected to a plate and a rod connecting such plate with the end  
 125 of the eccentric-shaped ended lever, a supplemental rod connected to the operating-lever, the trunk, the partition therein having an orifice, the valve to cover such orifice and connection between such valve and the  
 130 said rod as and for the purpose specified.

12. In a piano-player, the combination with

the equalizer and controlling means for hold-  
ing the same rigid or frictionally adjustable,  
of the trunk having a partition provided with  
an orifice and a valve for such orifice, and the  
5 operating-lever spring-held in its normal po-  
sition and connected by a rod to the valve in  
the trunk and by rods to the controlling de-

vice for the equalizer, whereby both valve  
and equalizer are simultaneously controlled  
as and for the purpose specified.

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Witnesses:

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