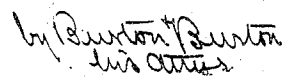


M. CLARK.
INTERIOR PLAYER PIANO.
APPLICATION FILED APR. 13, 1909.

5 SHEETS—SHEET 1.



M. CLARK.

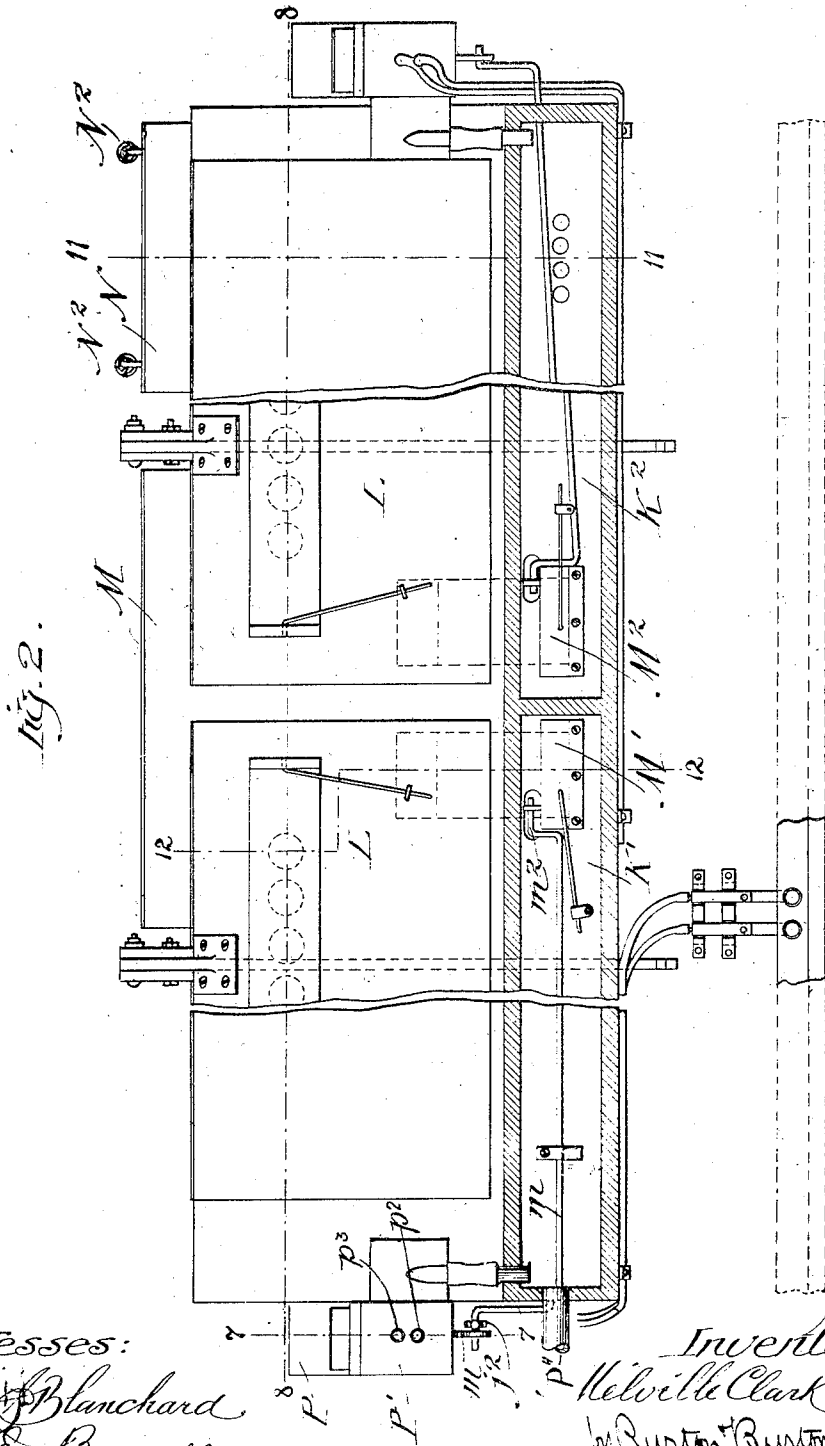
INTERIOR PLAYER PIANO.

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Patented Jan. 16, 1912.

5 SHEETS—SHEET 2.

1,014,864.

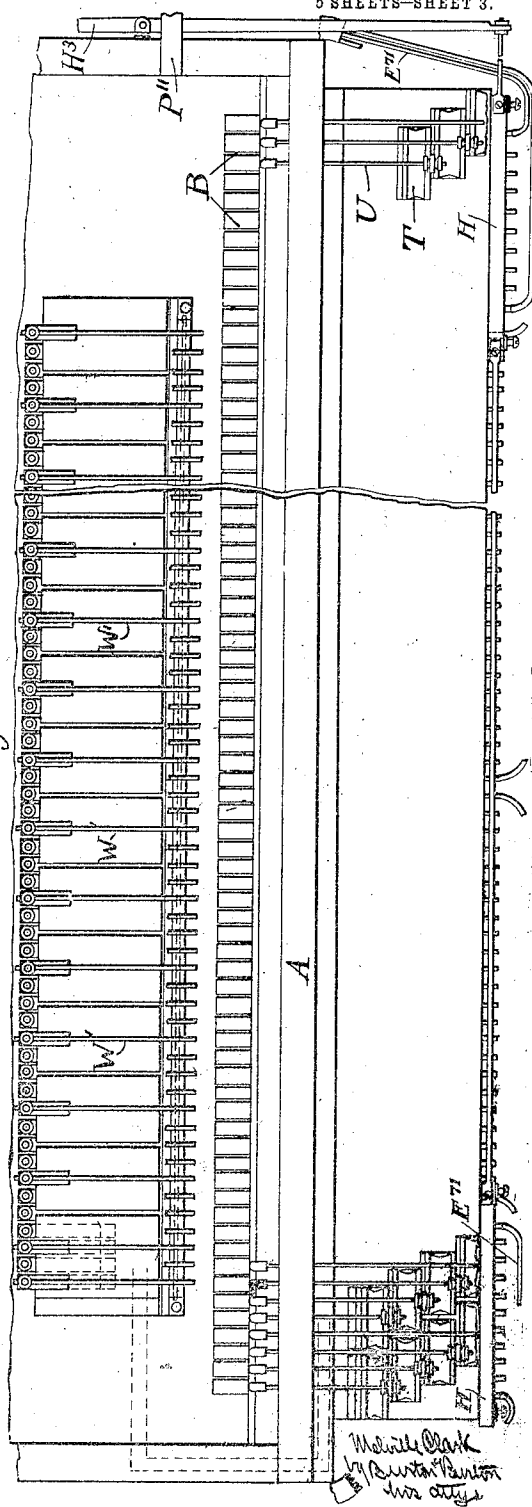


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M. E. Burrell

Inventor:
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by Burton R. Burton
his attys

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5 SHEETS—SHEET 3.



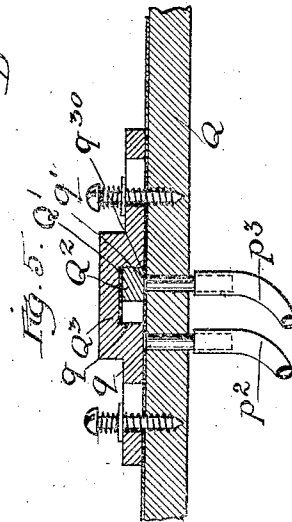
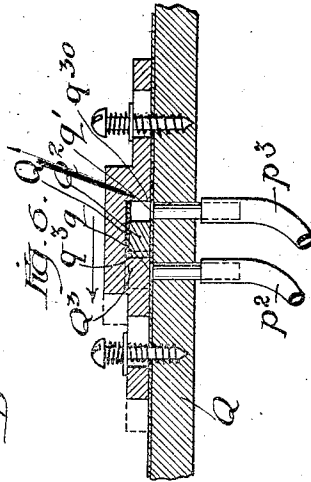
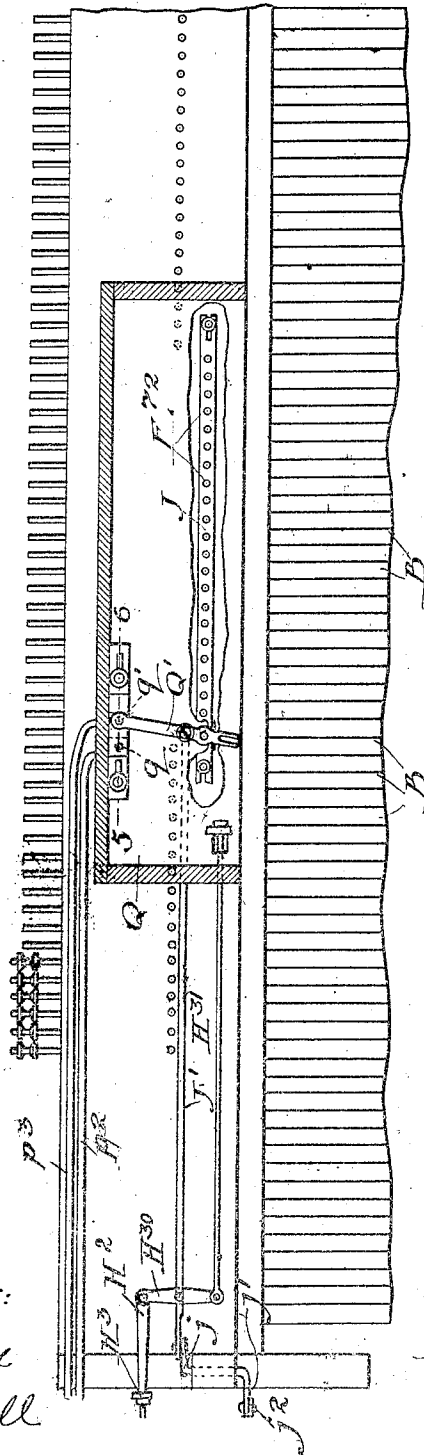
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1,014,864.

Patented Jan. 16, 1912.

5 SHEETS-SHEET 4.

Fig. 4.



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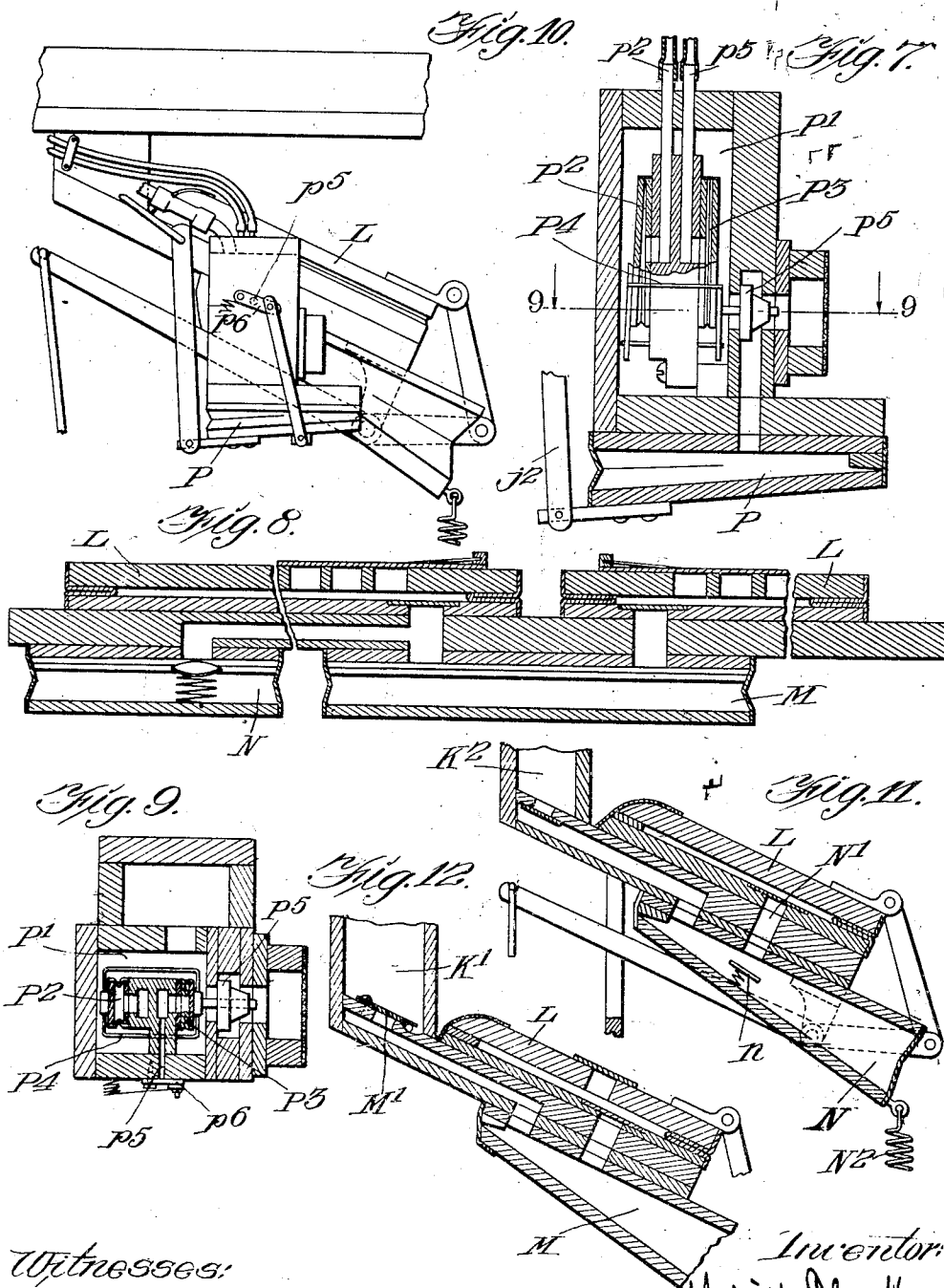
by Austin Buxton
 his attys.

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1,014,864.

Patented Jan. 16, 1912.

5 SHEETS-SHEET 5.



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UNITED STATES PATENT OFFICE.

MELVILLE CLARK, OF CHICAGO, ILLINOIS.

INTERIOR-PLAYER PIANO.

1,014,864.

Specification of Letters Patent.

Patented Jan. 16, 1912.

Application filed April 13, 1909. Serial No. 489,623.

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 Interior-Player Pianos, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved interior player mechanism for an upright piano, adapted for playing music comprising two parts, such as melody and accompaniment.

It consists in the features of construction shown and described as indicated in the claims.

In the drawings:—Figure 1 is a fore-and-aft vertical section of a portion of an upright piano embodying this invention. Fig. 2 is a partly sectional plan view of the bellows and exhaust air chambers, section being made at the line 2—2 on Fig. 1. Fig. 3 is a rear elevation of the upper part of the structure shown in Fig. 1. Fig. 3^a is a rear elevation of the lower part of said structure. Fig. 4 is a partly sectional plan view of the supplemental action chamber and its slide-operating devices, section being made horizontally through the tracker box. The bottom is partly broken away to disclose a slide bar. Figs. 5 and 6 are sections at the line 5—6 on Fig. 4, showing two positions of the valve which is cut. Fig. 7 is a section at the line 7—7 on Fig. 2. Fig. 8 is a section at the line 8—8 on Fig. 2. Fig. 9 is a section at the line 9—9 on Fig. 7. Fig. 10 is a side elevation of a pneumatic action for operating certain valves. Fig. 11 is a section at the line 11—11 on Fig. 2. Fig. 12 is a section at the line 12—12 on Fig. 2.

The customary parts of an upright piano which are shown in the drawings are represented in the usual form and construction, comprising the base or foundation board, A, manual keys, B, mounted thereabove with customary connection to the piano action indicated conventionally at the rear end of the keys. The tracker device has a set of ducts comprising three groups,—the first group for connection with a principal action, the second group for connection with a supplemental or melody action and the third group for connection with both actions

and to be used in conjunction with either, according to the character of the music and the controller sheets therefor.

The particular construction of the tracker device, C, is more fully shown and described in my application Serial No. 488,625, filed April 8, 1909, but will be here described sufficiently to indicate its relation to the remaining parts of the present invention.

Two sets of ducts, D and E, terminating in two parallel rows of mouths at the edge of the tracker on which the controller sheet, F, travels, are differently spaced to accommodate controller sheets differently cut, the row, D, being more widely spaced than the row, E. The ducts, D, of this set are formed in the main body of the tracker board in customary staggered arrangement to obtain adequate space for the same upon the downwardly facing rib or valve seat, C¹, at the rear side of the tracker. The set of ducts, E, more narrowly spaced at their mouths than the other set, extend through a downwardly projecting rib, C², at the forward side of the tracker, and are connected by flexible tubes, E², with the forward edge of the rib, C¹, the spacing of their continuations in said rib, C¹, being the same as that of the set, D, the tubes, E², being splayed or diverged in extending from one rib to the other. The set of ducts, D, comprises 88 ducts for playing the full range of the manual of an ordinary piano. The set of ducts, E, comprises, in addition to 88 apertures of the middle portion for the same purpose as the corresponding 88 ducts of the set, E, 40 additional ducts, 20 at each end, of which 38—19 at each end—are for playing melody, the two extreme ducts being for a supplemental purpose with which the present invention is not concerned, but which is more fully set out in my said application Serial No. 488,625. The flexible tubes from these additional 40 ducts, 20 at each end, connect with extensions of the rib, C¹, at opposite ends of the tracker, C. Upon the downwardly facing surface of the rib, C¹, there is mounted a slide or valve bar, G, having ducts for registration with either the 88 duct mouths of the set of ducts, D, or the corresponding 88 mouths of the ducts, E, which open down through said rib, the distribution of said duct-mouths relative to the ducts of the slide or valve bar, G, being such as fully explained in my said ap-

plication Serial No. 488,625, so that longitudinal movement of the valve bar shifts the registration of the ducts of the bar from one to the other of the two sets, D and E. The particular details of the arrangement by which this result is obtained are no part of the present invention and will not be further described.

For the purpose of the present invention, it is only necessary to consider the ducts of the set, E, and their connections, and it will be understood that the slide or valve bar, G, is represented as adjusted for connection of its ducts with that set; and that the set of ducts, D, may be ignored in further consideration of this invention. This set of ducts, E, and the flexible tubes which connect with the pneumatic actions comprise three groups which may be sufficiently indicated by reference to said flexible tubes, of which the first group, 5, comprising 67 tubes out of the middle portion of the 88 tubes leading from the slide, G, are connected directly with the principal action, being connected with the corresponding primary pneumatics of that action, as clearly shown in respect to one of said tubes in Fig. 1. A second group comprising the tubes, 6, which lead from the end portions of the rib, C, beyond the range covered by the slide, G, lead directly to the supplemental action, as clearly seen with respect to one of them in Fig. 1. A third group comprising two portions consisting of ten tubes, 7, at one end, and eleven tubes, 7, at the other end of the first group, 5, are branched or forked, as seen in Fig. 3, one branch, E⁷¹, extending and being connected to a slide, H, on the principal action, having its ducts with which the tubes are connected adapted to register with apertures leading to proper primary pneumatics of said action and to be moved longitudinally for cutting off such communication, the other branch, E⁷², extending to a similar slide, J, mounted on the supplemental action and having its ducts to which tubes connect adapted to register with ports for communication with proper primary pneumatics of that action and to be moved longitudinally for cutting off such communication.

Below the foundation board, A, and suitably supported thereby, and located under the portion of the manual keys, rearward of their fulcrums, there is mounted a principal pneumatic action comprising the customary motor pneumatics, T, and primary pneumatics, *t*, which need no further description. From the motor pneumatics pitman rods, U, extend up through the foundation board for action against the under side of the rear ends of the manual keys, respectively, for giving the proper upstroke at that end for operation upon the hammer action of the piano.

Above the manual keys, and extending over the portion thereof rearward of their fulcrums there is mounted a supplemental action, whose motor pneumatics, V, are most conveniently mounted in vertical position, as shown, their moving walls being pivoted at the lower end and vibrating at the upper end, and being connected by horizontal pitmen, V¹, with upstanding arms, W¹, of bell crank levers, W, fulcrumed at their angle at the lower end of the action frame, having their rearwardly extending arms engaging under the offset upper ends of hooks, b¹, with which the keys respectively are provided at the rear ends, so that the collapse of the motor pneumatics lifts the keys at the rear for causing them to operate upon the hammer action of the piano in the same manner as when the keys are struck by the operator in manual playing.

The main exhaust air space comprises two chambers, K¹ and K², both connected with the pumpers, L, L, through a high tension controlling bellows, M, whose communication with the said chambers is controlled by valves, M¹ and M², respectively. A low tension controlling bellows, N, is also connected with the chamber, K², and adapted when collapsed to close a port of communication, N¹, which is provided from the pumper to said chamber by means of a valve, *n*, so that when the valve, M², is closed the tension in said chamber, K¹, cannot exceed that which is measured by the resistance of the spring, N², of said low tension bellows. This chamber, K², therefore is termed the low-tension chamber, and the chamber, K¹, being controlled only by the high-tension bellows, M, is termed the high-tension chamber. The primary chamber of the principal action is exhausted by connection through a passage, P¹⁰, with the low-tension chamber, K². The primary chamber of the supplemental action is exhausted by connection from a trunk, P¹¹, with the high-tension chamber, K¹. The port controlled by the valve, M¹, being the sole avenue for producing suction through the primary pneumatic chamber of the supplemental action, said action will be out of service whenever this valve is closed. For closing this valve when the instrument is to be used with perforated controller sheet cut for playing without melody or solo supplement, there is provided a motor pneumatic, P, mounted upon a small exhaust chamber, P¹, and controlled by primary pneumatics, P² and P³, mounted within said chamber and having their moving walls connected together by a loop; P⁴, so that they move together for operating the motor-pneumatic-controlling valve, P⁵, which is positioned and operated in the usual manner for that purpose. The primary pneumatics, P² and P³, receive their air supply through flexible tubes, *p*² and *p*³, which extend to

ports, q , q^1 , controlled by valves Q^2 , Q^3 as hereinafter described. The primary pneumatic, P^3 , whose inflation puts the motor pneumatic, P , in communication with the exhaust chamber, P^1 , and collapses said motor pneumatic has an additional air communication through a duct, p^5 , leading out through the side wall of the chamber, P^1 , and exteriorly controlled by a valve, p^6 , connected with the motor pneumatic, P , for closing said port when the motor pneumatic is expanded and opening it when it is collapsed, so that when said motor pneumatic is collapsed by the first opening of the valve, Q^2 , Q^3 , it remains collapsed by reason of the air supply reaching the primary pneumatic, P^3 , through said duct, p^5 , until the opposite primary pneumatic, P^2 , is inflated by opening the valve, Q^2 , Q^3 , which, equalizing the action of the two primary pneumatics upon the motor pneumatic controlling valve causes it to move for admission of atmospheric air to the motor pneumatic, P , inflating it for action upon the valve, M^1 , in the opposite direction from that which was caused by its collapse.

The ports, q and q^1 , are formed in any convenient board or supporting member of the structure, as the bottom board, Q , of the tracker board and roll carriage frame, on which there may be mounted an operating lever, Q^1 , which actuates a compound slide valve, Q^2 , Q^3 (see Figs. 4, 5 and 6), being connected to the member, Q^2 , which plays between stop shoulders, q^3 , q^{30} , on the member, Q^3 , so that at one position shown in Fig. 5 the member, Q^2 , covers the port, q^1 , while the member, Q^3 , covers the port, q , and upon movement of the member, Q^2 , throughout its range of play with respect to the member Q^3 the port, q^1 , is uncovered, and continuing the movement in the same direction said port, q , is closed by the member, Q^3 , the port, q , being closed throughout the whole movement; and on movement of the member, Q^2 , in the opposite direction from the last position, the port, q , is successively opened and closed, while the port, q^1 , remains closed throughout the whole movement. The lever, Q^1 , is connected with the slide, J , so that the movement for setting that slide at open position successively opens and closes the port, q , as described, while its movement in the opposite direction successively opens and closes the port, q^1 , as described.

From the motor pneumatic, P , a link, p , extends to a lever arm, m^1 , of a rock shaft, m , whose arm, m^2 , is operatively connected with a valve, M^1 . Whenever the valve, M^1 , is closed for putting the supplemental action out of service, the ducts of the group, E^2 , should be also cut off from communication with the primary pneumatic chamber of the supplemental action, because other-

wise they would constitute passages connecting their respective pneumatics of the supplemental action with the pneumatics of the primary action to which the branches, E^1 , lead; therefore, the slide, J , is connected with the motor pneumatic, P , for closing movement by the action of said motor pneumatic which closes the valve, M^1 , and for opening movement when said valve is open. Such connection is made by a rod, J^1 , extending to one arm of a horizontal rock shaft, j , which has another arm, j^1 , to which is connected the link, j^2 , which extends, as above stated, to the lever arm, m^1 , of the rock shaft m .

When the instrument is to be operated with perforated controller sheets cut for playing only 65 notes instead of the full range of 88 notes and for playing this number without melody supplement, the supplemental action is put entirely out of service by the means above described, and the slide, H , carrying the branch group of eleven end tubes, e^1 , is moved for closing communication of said tubes with their respective primary pneumatics of the principal action. For such movement, the slide, H , is connected by a link, H^2 , with a lever, H^3 , mounted in convenient position for manipulation by the operator. For operating with perforated rolls cut for playing a full range of 88 notes without melody supplement, the supplemental action is put out of service by the means above described, and the lever, H^3 , is adjusted to open position of the slide, H .

It will be understood that the elements which are called "slides" in the foregoing description,—that is, the bars to which the flexible tubes are connected for shifting the connections of the tracker ducts with respect to the pneumatic actions,—are in effect valves controlling the communications leading through them, and they are referred to in the claims as "valve-bars". It will also be understood that the direction and character of their movement on their seats for controlling their communications are modified as convenience may determine, and that there is no necessary limitation to the longitudinal movement for that purpose.

I claim:—

1. In an interior player piano, in combination with the manual keys, a principal pneumatic action and a supplemental pneumatic action, the motor pneumatics of each of said pneumatic actions being mounted for actuating the hammer action of the piano independently of the motor pneumatics of the other action; a tracker device having tracker ducts comprising a group connected directly with the principal action; a second group connected directly with the supplemental action, and a third group branched for connection with both actions; valve bars

mounted on such actions respectively to which the branches of said group of ducts respectively are connected, such valve bars being movable for effecting and cutting off communication with said actions respectively, and means for operating said valve bars.

2. In an interior player piano, in combination with the manual keys, a principal pneumatic action and a supplemental pneumatic action, the motor pneumatics of each of said pneumatic actions being mounted for actuating the hammer action of the piano independently of the motor pneumatics of the other action; a tracker device having tracker ducts comprising a group connected directly with the principal action; a second group connected directly with the supplemental action, and a third group branched for connection with both actions; valve bars mounted on such actions respectively to which the branches of said group of ducts respectively are connected, such valve bars being movable for effecting and cutting off communication with said actions respectively; motor pneumatics connected with said valve bars for operating the same; primary pneumatics controlling said motor pneumatics; air connections for said primary pneumatics, and valves accessible for operation at will controlling such air communications.

3. In an interior player piano, in combination with the manual keys, a principal pneumatic action and a supplemental pneumatic action, one mounted above the portion of the keys rearward of their fulcrums and the other mounted below said portion of the keys; a tracker device having tracker ducts comprising a group connected directly with the principal action; a second group connected directly with the supplemental action, and a third group branched for connection with both said actions; valve bars mounted on said actions respectively to which the branches of said third group of ducts respectively are connected, such valve bars being movable for effecting and cutting off communication with said actions respectively, and means for operating said valve bars independently of each other.

4. In an interior player piano, in combination with the manual keys, a principal pneumatic action and a supplemental pneumatic action, one mounted above the portion of the keys rearward of their fulcrums and the other mounted below said portion of the keys; a tracker device having tracker ducts comprising a group connected directly with the principal action, a second group connected directly with the supplemental action, and a third group branched for connection with both said actions; valve bars mounted on said actions respectively to which the branches of said third group of ducts re-

spectively are connected, such valve bars being movable for effecting and cutting off communication with said actions respectively; motor pneumatics connected with said valve bars for operating the same; primary pneumatics controlling said motor pneumatics; air connections for such primary pneumatics, and valves accessible for operation at will controlling such air communications.

5. In an interior player piano, in combination with the manual keys, a principal pneumatic action and a supplemental pneumatic action, one mounted above the portion of the keys rearward of their fulcrums and the other mounted below said portion of the keys; a tracker device having tracker ducts comprising a group connected directly with the principal action, a second group connected directly with the supplemental action, and a third group branched for connection with both said actions; valve bars mounted on said actions respectively to which the branches of said third group of ducts respectively are connected, such valve bars being movable for effecting and cutting off communication with said actions respectively; an exhaust chamber communicating with the supplemental action; a valve which controls such communication; a motor pneumatic for operating such valve; primary pneumatics controlling such motor pneumatic, and a valved air supply for controlling the primary pneumatic, the valve bar pertaining to the supplemental action being operatively connected with said motor pneumatic.

6. In an interior player piano, in combination with the manual keys, a principal pneumatic action and a supplemental pneumatic action, one mounted above and the other mounted below the manual keys; connections from the motor pneumatics of said actions respectively for actuating the hammer action of the piano; a tracker device having tracker ducts comprising a group connected directly with the principal action, a second group connected directly with the supplemental action, and a third group branched for connection with both said actions; valve bars controlling communication with said actions respectively to which the branches of said third group of ducts respectively are connected, such valve bars being movable for effecting and cutting off communication with the respective actions; motor pneumatics connected with the valve bars for operating the same, and means for controlling such motor pneumatics at will.

7. In an interior player piano, in combination with the manual keys, a principal pneumatic action and a supplemental pneumatic action, and connections from the motor pneumatics of said actions respectively for actuating independently of each other the hammer action of the piano; a tracker device having tracker ducts comprising a group connected directly with

the principal action; a second group connected directly with the supplemental action, and a third group branched for connection with both said actions; valve bars controlling communication with said actions respectively to which the branches of said third group of ducts respectively are connected, such valve bars being movable for effecting and cutting off communication with the respective actions; motor pneu-

matics connected with the valve bars for operating the same, and means for controlling such motor pneumatics at will.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 25th day 15 of March, 1909.

MELVILLE CLARK.

Witnesses:

JULIA S. ABBOTT,
SOPHIE B. WERNER.