

No. 755,364.

PATENTED MAR. 22, 1904.

J. COURVILLE.

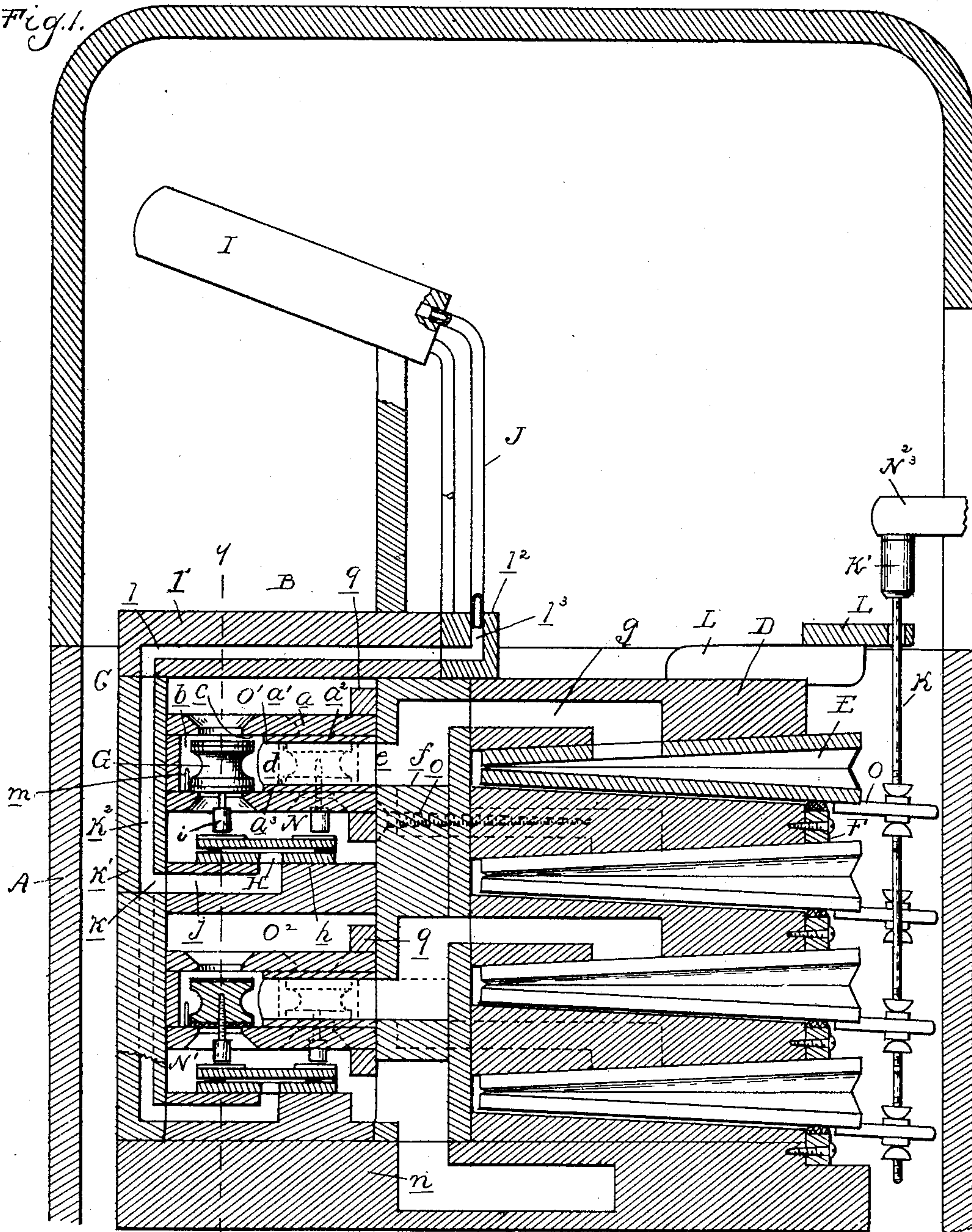
SELF PLAYING ATTACHMENT FOR MUSICAL INSTRUMENTS.

APPLICATION FILED MAY 27, 1901.

NO MODEL.

2 SHEETS--SHEET 1.

Fig. 1.



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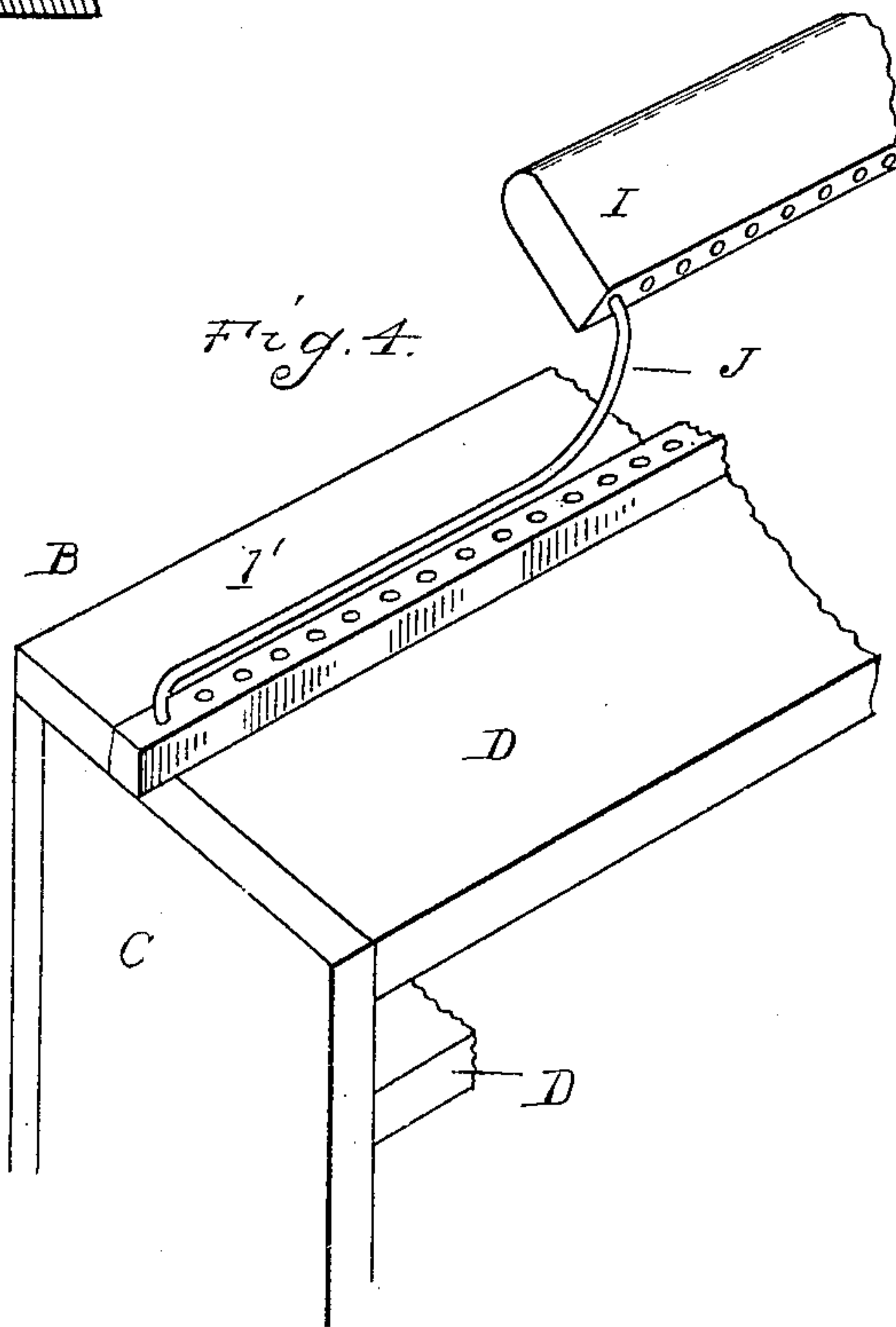
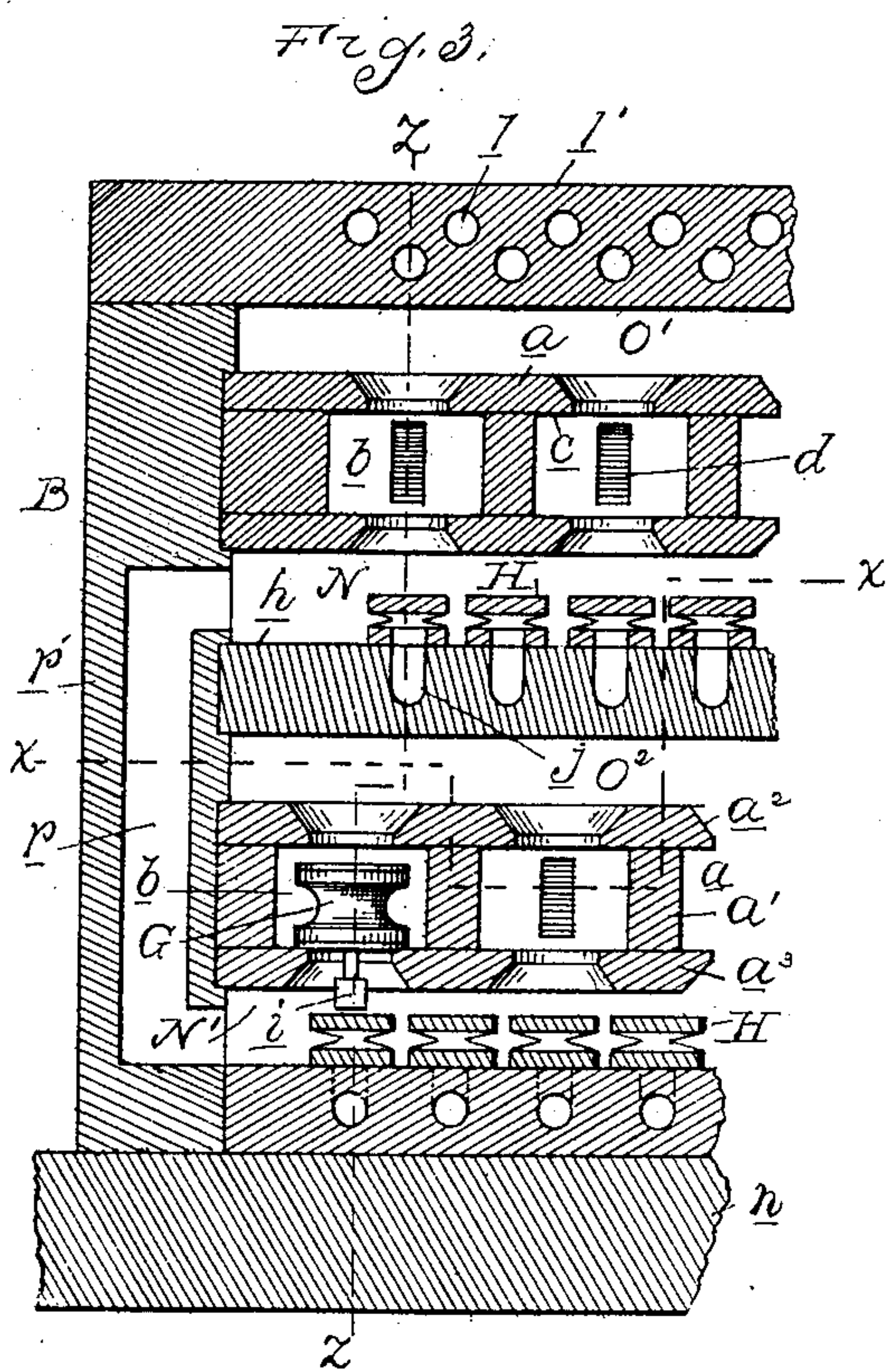
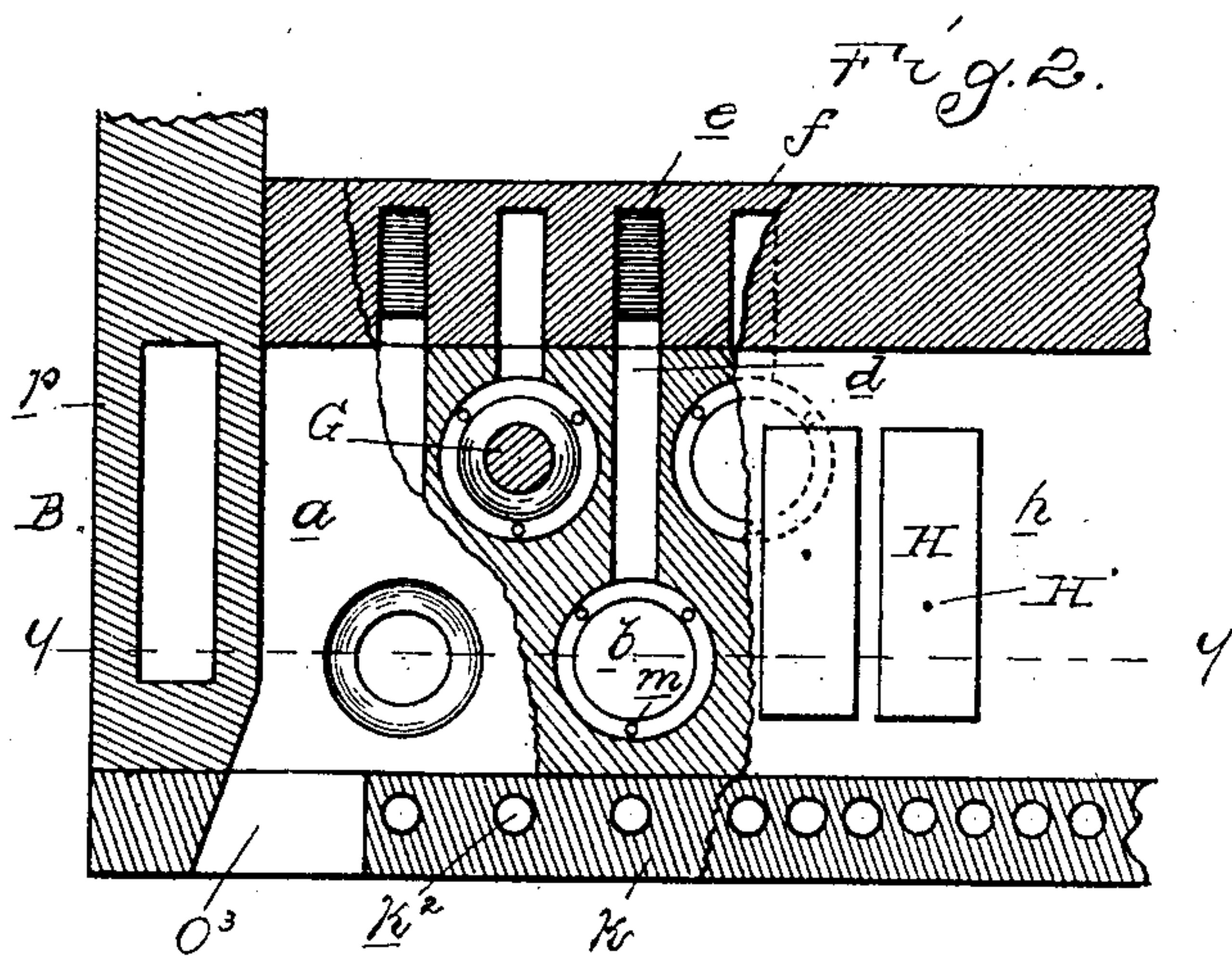
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOSEPH COURVILLE, OF DETROIT, MICHIGAN, ASSIGNOR TO FARRAND & VOTEY ORGAN COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

SELF-PLAYING ATTACHMENT FOR MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 755,364, dated March 22, 1904.

Application filed May 27, 1901. Serial No. 62,076. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH COURVILLE, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Self-Playing Attachments for Musical Instruments, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to self-playing attachments for musical instruments, and has particular reference to the construction of pneumatic actions for operating the finger-levers.

It is the special object of the invention to obtain a construction that may be compactly arranged within the casing of the instrument and at the same time will be certain in its operation.

It is a further object to obtain a construction which is inexpensive to manufacture and may be easily assembled and which also may be easily connected to the tracker-board with a minimum length of connecting-tubing.

The invention consists in the peculiar construction, arrangement, and combination of parts, as hereinafter described and claimed.

In the drawings, Figure 1 is a cross-section through the upper portion of the casing of the playing attachment, showing the pneumatic action arranged therein substantially on line *z z*, Fig. 3. Fig. 2 is a horizontal section on line *x x*, Fig. 3. Fig. 3 is a longitudinal section through one end of the action on line *y y*, Figs. 1 and 2. Fig. 4 is a diagrammatic perspective view showing the flexible connection to the tracker-board.

A is the casing of the self-playing attachment. Within the lower part of this casing is arranged suitable wind-pumping devices, which forming no part of the present invention are not illustrated in the drawings. In the upper part of the casing is arranged a pneumatic action B, which is of the following construction:

C is a wind-chest arranged with one side thereof adjacent to the front wall of the casing. This wind-chest preferably occupies

only a space on one side of the transverse center of the casing and has projecting from its rear wall a series of horizontally-arranged shelves or ledges D. The shelves or ledges D are spaced from each other sufficiently to permit of the arrangement of a series of pneumatic motors E therebetween. These motors are in the form of collapsible bellows hinged at their ends adjacent to the rear wall of the wind-chest and projecting rearwardly beyond the shelves D. In their normal or expanded condition these pneumatics nearly fill the space between the shelves, which latter are of wedge-shaped cross-section to enlarge the space at the rear end.

F represents bars secured to the rear ends of the shelves D, which bars are felted or otherwise cushioned upon their upper edges to form stops for limiting the opening movement of the pneumatics. These bars are secured to the shelves by screws or other securing devices after the wind-chest and shelves are assembled.

The wind-chest C contains valves controlling the air connections with the pneumatics E and also the primary pneumatics for actuating said valves, the arrangement being preferably as follows: *a* is a horizontal shelf or partition constituting what will be hereinafter termed the "valve-board." This shelf is provided with a double series of valve-cells *b*, the cells of the two series being staggered in relation to each other, as shown in Fig. 2, so as to economize space. The cells are open at their opposite ends and are provided with annular valve-seats *c* for the valves G, arranged within the cells. In order to more easily form these cells with the seats *c*, the valve-board *a* is preferably formed of three-ply material, the central section *a'* being bored to form the large portion of the cells and the top and bottom sections *a²* and *a³* being bored with smaller holes, so as to form an annular seat *c*. The central section *a'* is also channeled to form the horizontal passages *d*, respectively connecting with the cells *b* and leading rearward therefrom. These passages *d* are adapted to register with passages *e*, formed in the rear

wall f of the wind-chest. The passages e connect with passages alternately extending upward and downward, which passages in turn connect with laterally-extending passages g in the shelves D , while the latter connect with the pneumatics E . The object of this arrangement is to reduce the size of the wind-chest by placing a double series of valves in the valve-board, the valves of said series respectively controlling the pneumatics arranged in two tiers.

Below the valve-board a is arranged a second partition h , and between the partitions h and a is formed a vacuum-chamber. Within this vacuum-chamber is a double series of primary pneumatics H , which are alternately arranged and hinged at opposite ends. The free end of each primary pneumatic extends below its corresponding valve G , which latter is provided with a depending stem i , extending into proximity to the pneumatic. The pneumatics H are connected with passages j , formed by vertical and horizontal bores in the partition h , which bores register with bores k , formed in the front wall k' of the wind-chest. This front wall k' is also provided with a series of vertical bores k'' , connecting with the bores k and with intersecting horizontal bores l in the top board l' of the chest. Thus continuous channels are formed, extending from the rear edge of the top wall of the chest forward and downward and then inward through the partition h into connection with the pneumatics H within the vacuum-chamber.

The valve G is preferably formed of spool shape, having parallel top and bottom faces preferably flat and peripherally grooved. The height of the valve is less than the height of the large portion of the valve-cell b , so that said valve may alternately seat upon the upper or lower annular seat c , leaving either the upper or lower end of the cell open. The valve is also of lesser diameter than the large portion of the cell, so as to provide air clearance therearound, and to center the valve a plurality of pins or guides m are secured around one of the annular valve-seats.

The chest as thus far described is used for operating two tiers of the key-actuating pneumatics E , and the space occupied by the valve-board a , the partition h , and the intermediate vacuum-chamber containing the primary pneumatics is approximately the same in height as said two tiers of pneumatics. To increase the number of key-actuating pneumatics, additional tiers may be arranged below those already described, each pair of which is provided with corresponding valve-boards and primary pneumatics. In the drawings I have illustrated four tiers of pneumatics E , with two valve-boards in the wind-chest, and this number will be found sufficient for ordinary use. The completed chest is mounted upon a suitable base-board n ,

which is supported within the casing A , and is preferably directly attached to the store-bellows. (Not shown.)

I is a tracker-board which is provided with a series of channels corresponding in number to the total number of primary pneumatics. This board is arranged in an inclined position, as usual, and is supported above the central portion of the wind-chest. At the rear end this board is arranged in substantially the same vertical plane as the rear end of the top wall of said chest, which has an edge strip l'' , having vertical bores l''' therein. To complete the connection between the channels in the tracker-board and the passages l''' in said edge strip of the top wall of the chest, conduits J , formed of lead, rubber, or other flexible tubing, are arranged to connect said passages, their opposite ends being secured, respectively, to the tracker-board and the top wall l' .

The pneumatics E are provided with rearwardly-extending fingers O , which are connected to vertically-arranged push-rods K . These rods are arranged adjacent to the rear wall of the case, and the pneumatics of the different tiers are arranged to connect in succession to said rods. The upper ends of the rods K pass through a guide member L , which is supported upon arms L' , secured to the top shelf D . The rods K also are provided at their upper ends with heads K' , arranged directly below the finger-levers N'' , which latter form no part of the present invention.

With the construction as above described it will be observed that the parts are very compactly arranged and that the entire action is substantially rectangular in cross-section, so that it may be placed within a casing without waste of room. The vacuum-chambers N and N' between the valve-board a and the partitions h are connected to each other by channels P , formed in the end walls p' of the chest, while the air-spaces O' and O'' above the valve-boards a are connected through ports O''' in the front wall of the chest with the external atmosphere.

In assembling the parts the shelves D are first secured to the rear wall f of the chest, preferably by screws o , and the valve-board a and partitions h are then secured to the front side of said rear wall, preferably by cleats q , attached to said shelves and secured to the wall f . The front wall k' is then secured in position by securing to the valve-boards and partition h , after which the top board l' and end board p may be secured in position and the whole mounted upon the base-board n . In order to adjust the valves G to their actuating primary pneumatics, the stem i is preferably threaded and is screwed into the body of the valve, so that by turning it in or out the length of the stem may be adjusted as needed.

From the above description of the construction the operation of the action will be readily understood, but, briefly described, is as follows:

lows: The pneumatics H in the vacuum-cham-
 bers are normally collapsed. When, how-
 ever, their corresponding ports in the tracker-
 board are uncovered by the music-sheet, air
 5 will pass through the connecting-conduits and
 will expand the pneumatic, thereby pressing
 upward on the stem *i* of the valve G, raising
 the latter from its lower seat and pressing it
 against its upper seat. This will cut off com-
 10 munication between the atmospheric - pres-
 sure chamber O or O' and the cell of the valve
 operated and will establish communication be-
 tween said cell and vacuum-chamber. Thus
 the air in the key-actuating pneumatic E will
 15 exhaust through the channel *g* and bore *d* into
 the valve-cell and vacuum-chamber, thereby
 causing the pneumatic to be collapsed by ex-
 ternal atmospheric pressure and imparting an
 upward movement to the corresponding rod
 20 K. When the controlling-port in the tracker-
 board is again closed, the pressures inside and
 outside of the pneumatic H will equalize
 through any suitable bleed, such as H', there-
 by causing said pneumatic to collapse. This
 25 will permit the valve G to drop from its up-
 per seat onto the lower one, cutting off con-
 nection between the vacuum-chamber and the

valve-cell and reestablishing connection with the air-chamber O'.

What I claim as my invention is—

In a self-playing attachment for musical in-
 struments a pneumatic action comprising a
 chest containing a vacuum-chamber, a plural-
 ity of shelves projecting laterally from one
 wall of said chest, tiers of key-actuating pneu- 35
 matics, respectively connected to said shelves,
 a valve-board for each pair of shelves arranged
 within said chest and separating the vacuum
 and atmospheric - pressure chambers, said
 board containing a double series of valve-cells, 40
 and laterally-extending passages respectively
 connecting the cells of the two series with in-
 dividual passages leading to the motor, in the
 shelves for the two tiers, valves in said cells
 for alternately closing said oppositely-open- 45
 ing ports, and primary pneumatics in the
 vacuum-chamber for operating said valves.

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

JOSEPH COURVILLE.

Witnesses:

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 H. C. SMITH.