

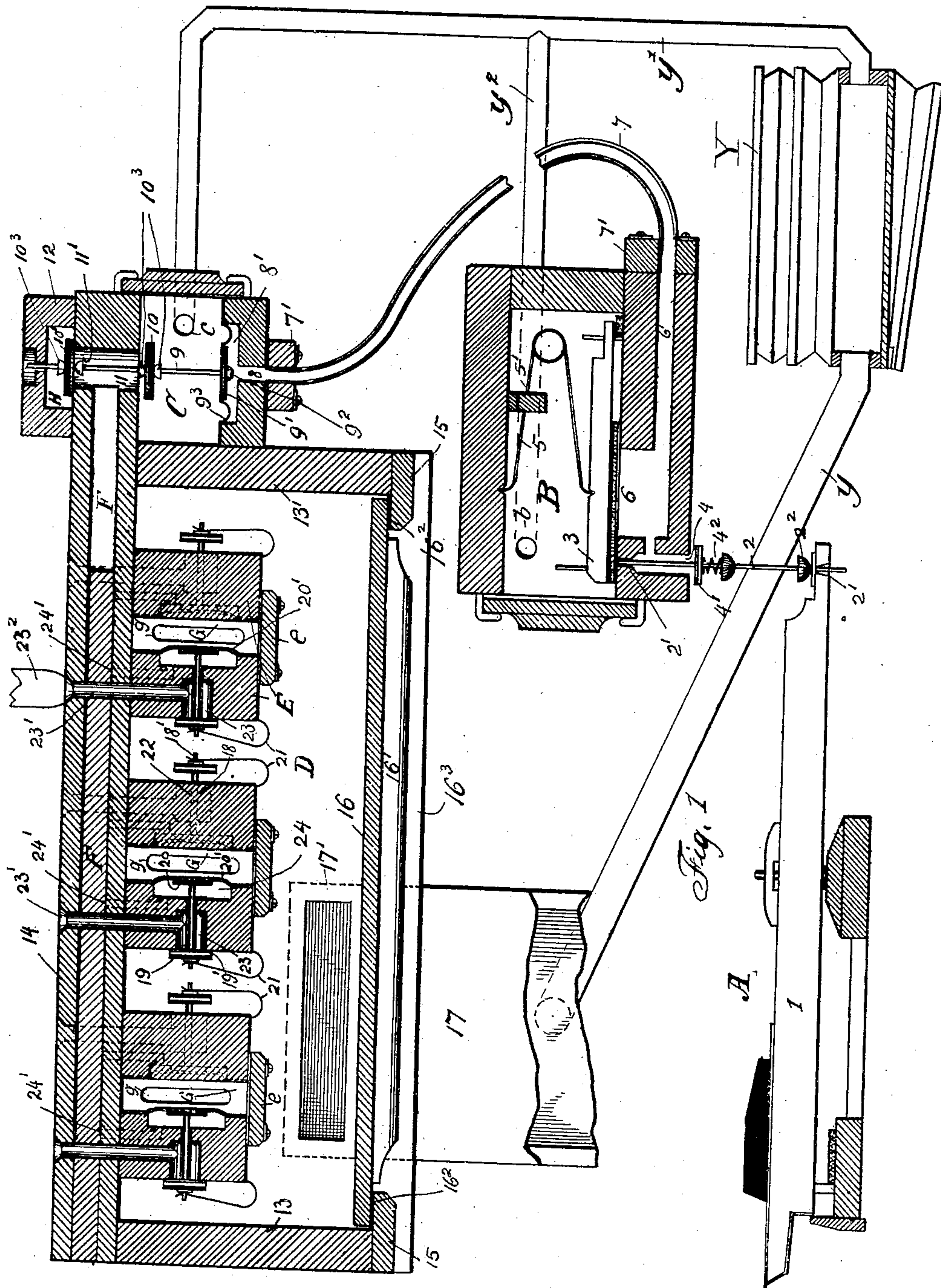
No. 879,503.

W. C. VERNEY.
PNEUMATIC CHEST FOR PIPE ORGANS.

APPLICATION FILED JULY 30, 1906.

PATENTED FEB. 18, 1908.

3 SHEETS—SHEET 1.



WITNESSES
J. b. Goosmann
H. Jacobsen

INVENTOR
William C. Verney
By Robt. Klotz
ATTY.

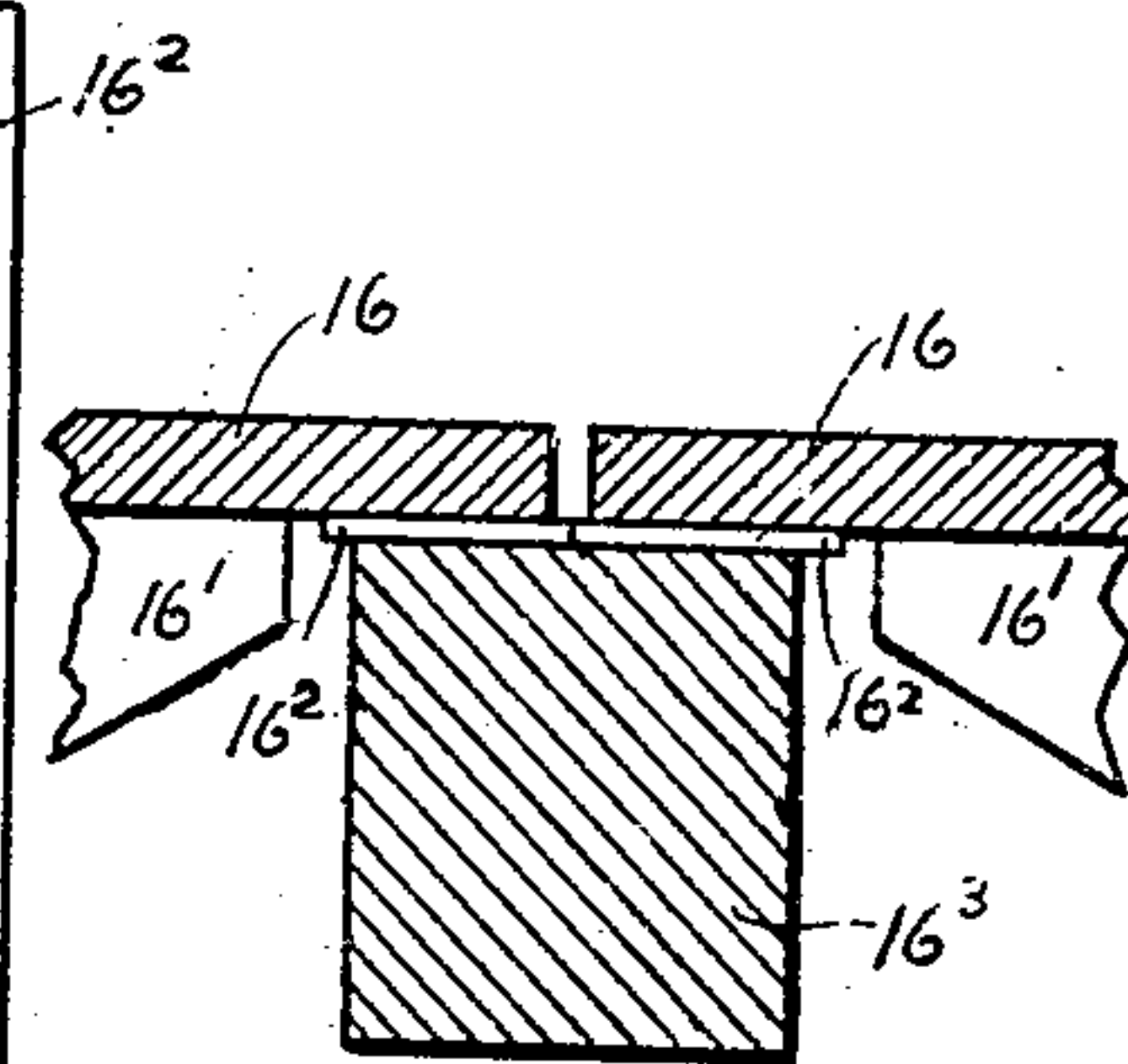
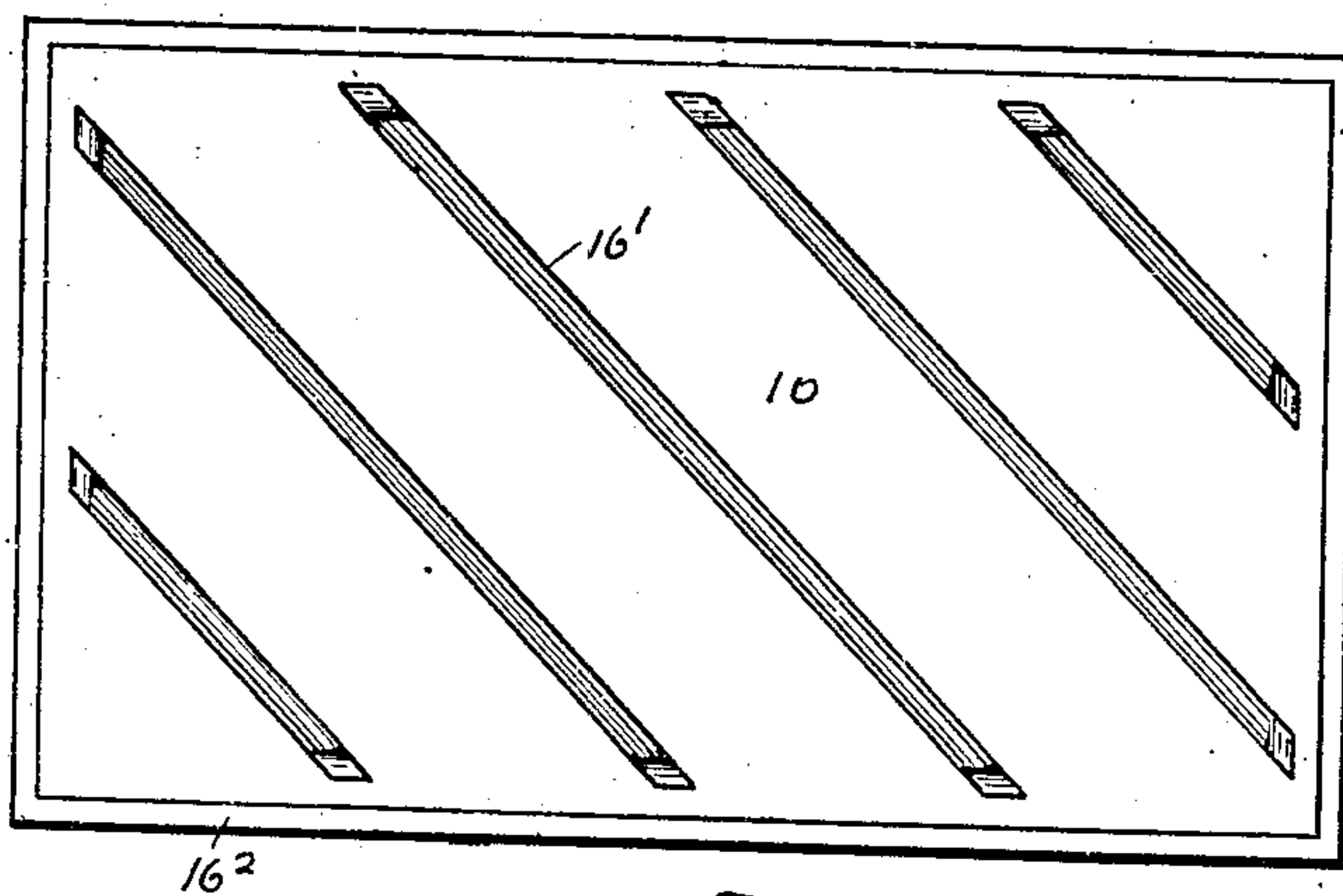
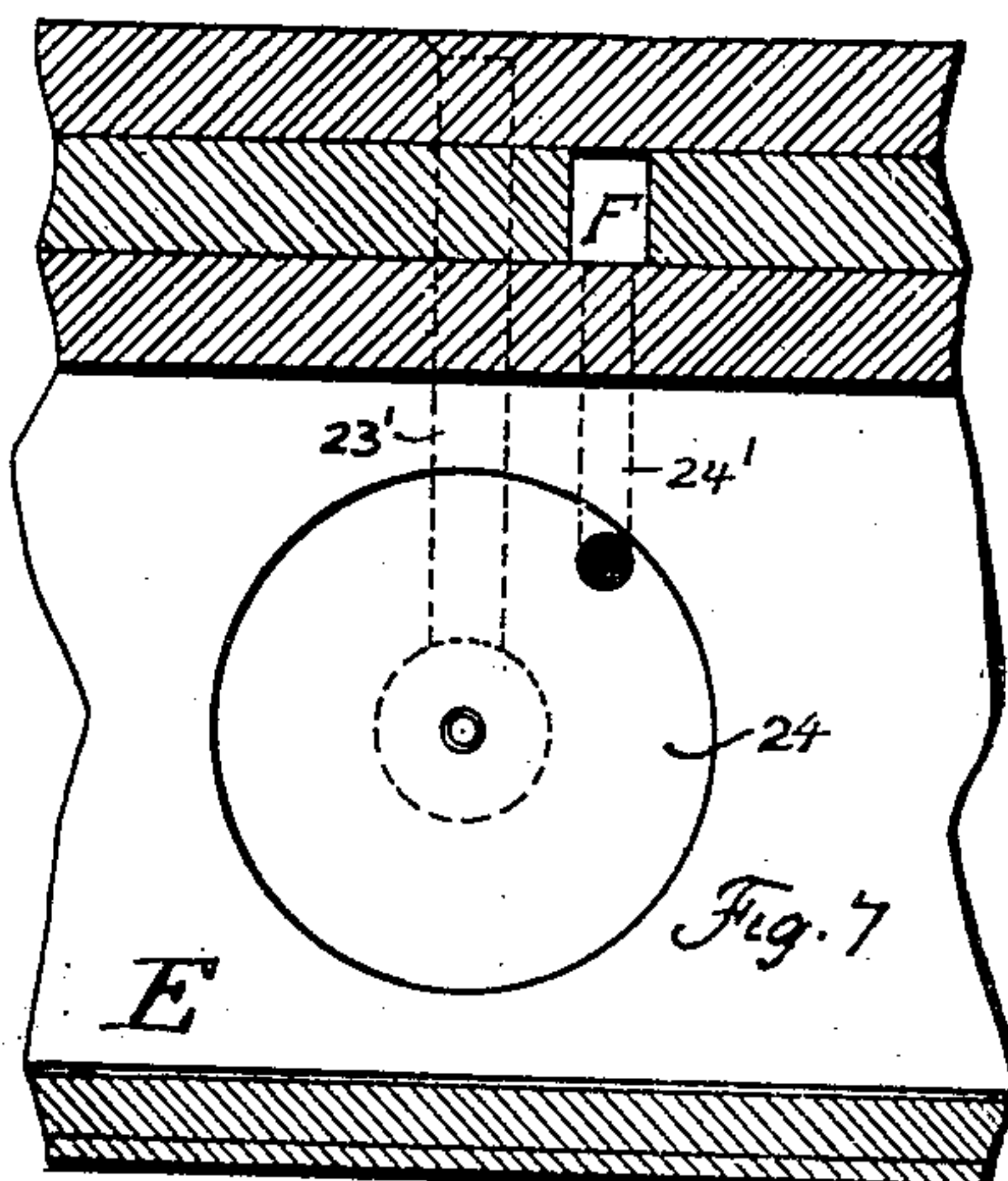
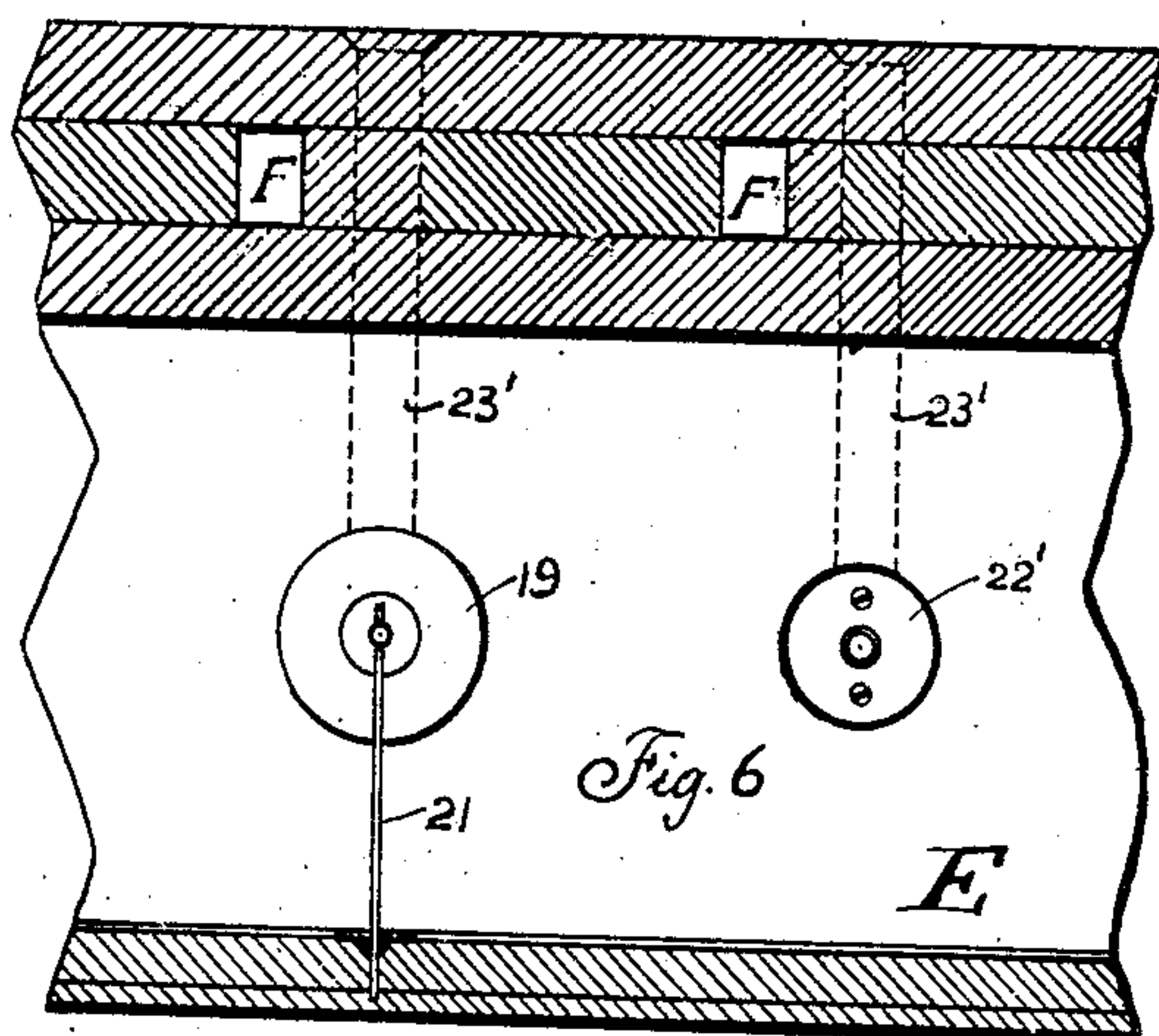
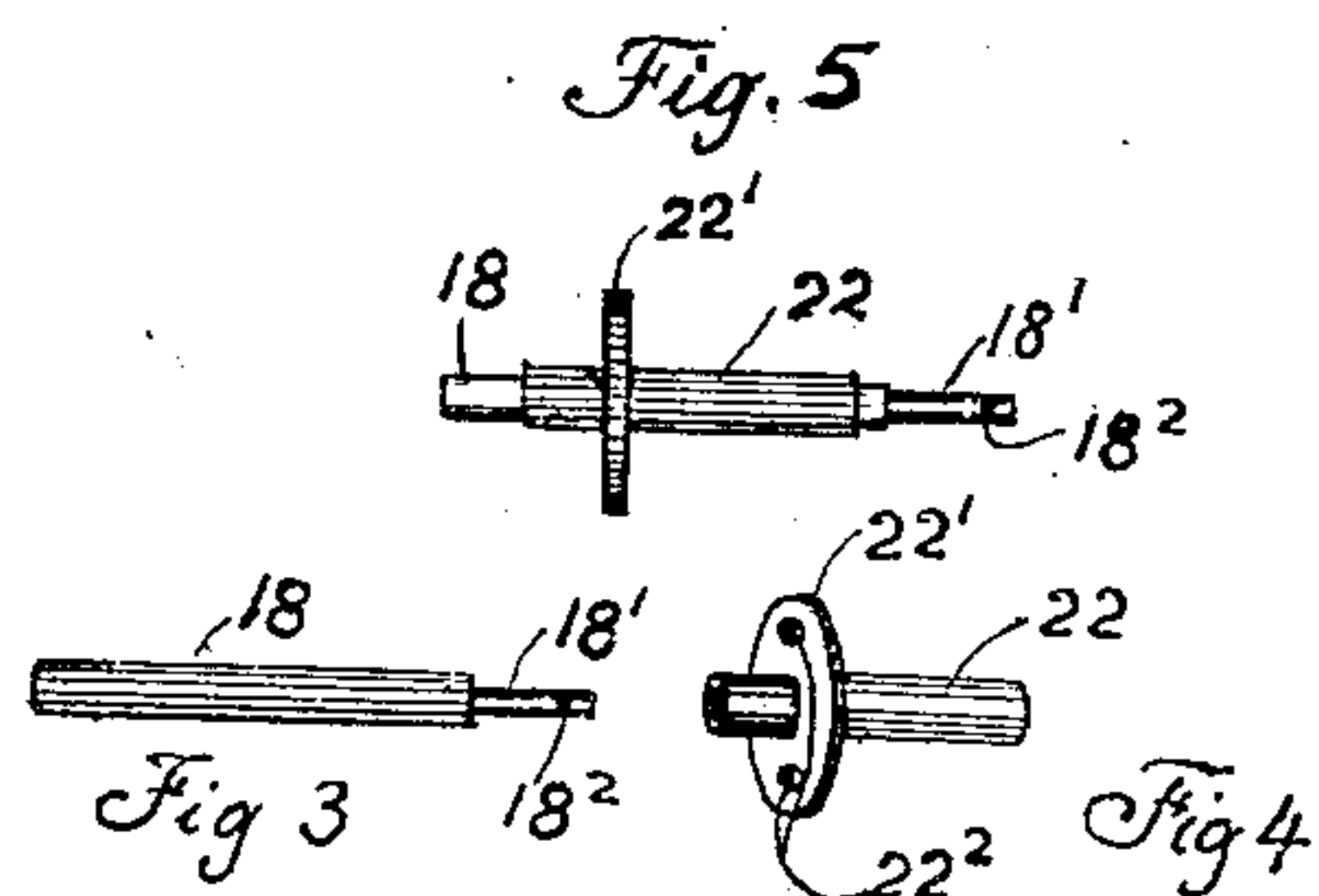
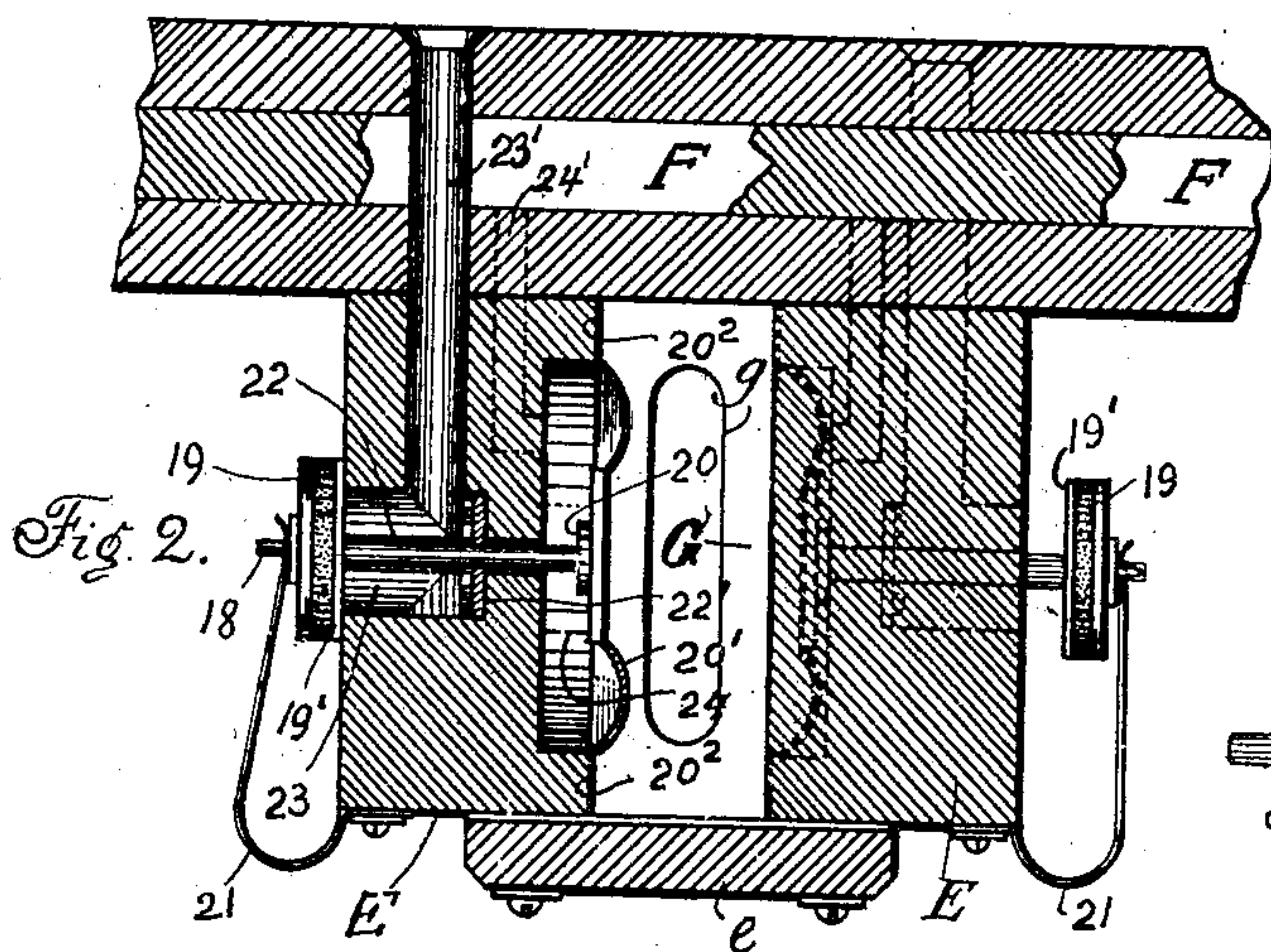
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3 SHEETS—SHEET 2.



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Fig. 8

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Att.

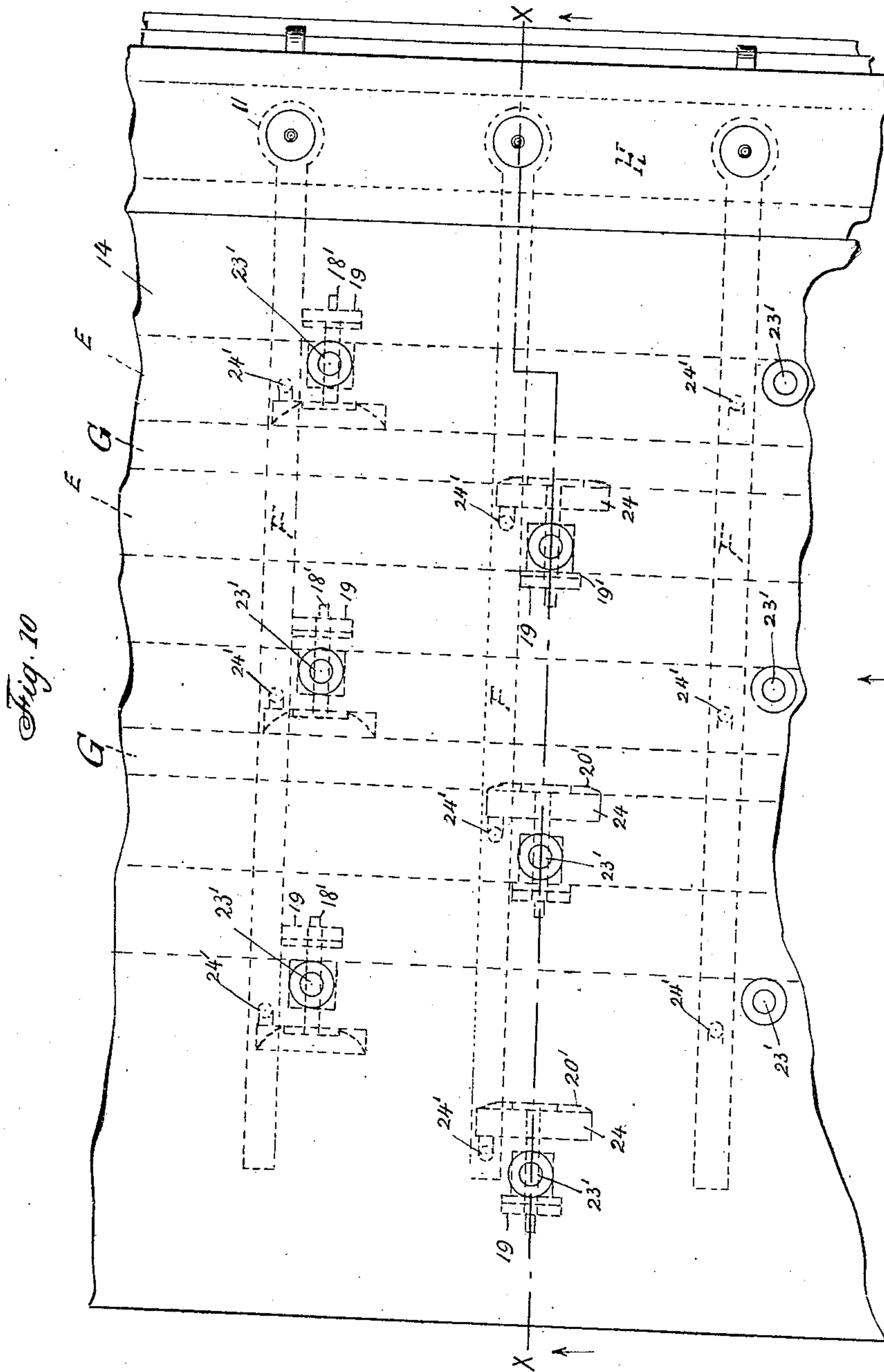
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3 SHEETS—SHEET 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM CONNINGSBY VERNEY, OF MASON CITY, IOWA.

PNEUMATIC CHEST FOR PIPE-ORGANS.

No. 879,503.

Specification of Letters Patent.

Patented Feb. 18, 1908.

Application filed July 30, 1906. Serial No. 328,318.

To all whom it may concern:

Be it known that I, WILLIAM CONNINGSBY VERNEY, a citizen of the United States, residing at Mason City, in the county of Cerro Gordo and State of Iowa, have invented a new and useful Pneumatic Chest for Pipe-Organs and other Pneumatically-Controlled Musical Instruments; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the arts to which it appertains to make and use the same.

My invention relates particularly to certain new and useful improvements in single pressure pneumatic chest construction, in which the valves are operated by air pressure from the main source of air supply, without resorting to a differential pressure, as is customary in other constructions. The air chest from which the air is supplied to the pipes or a register of pipes is of a large volume, which insures a full and round tone. All pipe valve spindles are journaled in a long sleeve and are provided with a valve seat or disk on one end and a diaphragm on the other. This construction allows of a free and easy action of the valve during which it retains its central position under all conditions. It is not influenced by moisture or otherwise, which often retards the action of valves, particularly those that are constructed on the reciprocating or see-sawing principle, whereby a quavering or lingering tone is produced.

The usual valve construction the communication between the air chest and pipes through the valves, the connection between the latter and the key board and finally the means of access to the valves has been entirely modified, so much so that the greatest simplicity in the details of arrangement has been attained. In addition thereto it is the object of my invention to provide a valve, which is easily operated, instantaneous in its action and positive in its movement.

I attain these objects by the construction, combination and arrangement of devices as will be hereinafter fully described and claimed and which are illustrated in the accompanying drawings in which,—

Figure 1, is a vertical section of the pneumatic chest taken on line X—X of Fig. 10 and showing the location of the pipe valves therein, and a diagram of connection between the key-board A, the primary wind box B and the auxiliary wind box C, together

with a diagram of the means for furnishing air of uniform pressure to the wind boxes. Fig. 2, is a detail of the valve bars in the pneumatic chest in section. Figs. 3, 4, and 5 are details of the valve spindle and sleeve, Fig. 6, is a longitudinal view of the valve housing in the pneumatic chest, partly in section, showing the complete valve with spring in place and also showing the valve disk removed, Fig. 7, is the reverse side of the same valve housing, indicating the opening, which is ordinarily covered by the valve diaphragm, as well as the exhaust opening, Fig. 8, is a plan view of the bottom or bung board located in the pneumatic chest, showing the method of stiffening by means of diagonally placed ribs, and Fig. 9, is a detail in section, showing the mode of placing the bung boards upon a center rest. Fig. 10 is a fragmentary top plan view of the chest.

Similar characters refer to similar parts throughout the several views.

The principal parts of the device are the key-board A, the primary wind box B, the auxiliary wind box C, the principal pneumatic chest D, the valve bars E, the exhaust canal F, and the air chamber G. B, C and D are continually supplied with air of a uniform pressure from the bellows Y through their respective communications *b*, *c* and *d*, by means of pipes *y*, *y'*, and *y''* which lead from said bellows to said communications. The valves are contained in bars E which run longitudinally through the pneumatic chest. A pair of such valve bars, of which one is right and the other left handed, are always placed together and are joined by a cross board *e* whereby a stop action chamber G is provided. The latter communicates with the bellows or air supply through oblong canal *g* and is controlled by the usual stop action or register in the customary way. When the register is drawn, or open, the corresponding chamber G is under the uniform air pressure, and when it is closed the air escapes from it and only atmospheric pressure obtains therein. There are as many stop-action chambers as there are stops to the organ and as many toned-controlling valves in each series as there are pipes in that particular register.

When key 1 is depressed its extreme opposite end elevates valve rod 2, which extends through perforation 2' and the primary valve 3 is raised in turn; simultaneously therewith exhaust port 4 is closed by means of exhaust

valve disk 4', which is adjustably mounted upon valve rod 2 and held in its normal position by spring 4². Lost motion between the upper end of valve rod 2 and primary valve 3 is adjusted by screw thimble 2². A spring 5 is located in the primary wind box B, it is secured in its position by a clamp 5' and presses the soft seat of valve 3 lightly upon the orifice 6 of the air canal 6'. As soon as primary valve 3 is raised, wind passes into canal 6' and tube 7, one end of which is secured with primary box B, while the other is fastened to auxiliary wind box C, for which purpose clamp blocks 7' are used, and continues through orifice 8 into the diaphragm chamber 8' where it acts upon a diaphragm valve. The latter consists of a spindle 9, a disk 9' secured therewith by round head screw 9², diaphragm 9³, which latter is glued to the inner wall of the wind box C, valve disk 10 and valve disk 10', both of which are secured with spindle 9' by thimble set screws 10³. The wind discharged from primary wind box B into diaphragm chamber 8' forces valve disk 10 against and removes valve disk 10' from its seat. This closes opening 11, leading from chamber C into canal F and opens orifice 11', which establishes communication between canal F and the atmosphere at H. 12 is simply a short wooden bridge, in which spindle 9 is journaled at its upper end. Space H opens directly into the atmosphere.

The pneumatic chest D is a closed wooden box, consisting of longitudinal side members 13 and 13', a top board 14, in which are constructed the canals F, bung board flanges 15, a center rest 16³ and the bung boards 16. The air is supplied from the bellows, or other air supply, through wind trunk 17, which opens into the chest at 17'. The tone-controlling valves are located in the bars E which are mounted on the lower side of top board 14 within the chest and which extend longitudinally throughout the latter. The valves are each provided with a valve stem 18 having a reduced part 18'. A disk 19 lined with soft material 19', preferably felt or other suitable substance, is placed upon the offset 18' against the shoulder produced thereby and is secured therewith by the end of spring 21, which is placed through the small eye 18². The other end of spindle 18 is provided with a disk 20 which is rigidly secured therewith. Upon this disk is glued diaphragm 20', the outer rim of the latter is glued to the face of the valve bar at 20². A metallic sleeve 22, made preferably of brass, to which is secured a metal collar 22', serves as a guide to valve spindle 18. It is secured in bar E in the countersunk valve orifice 23 and fastened therein by means of pins, which pass through the small holes 22² in collar 22'. Canal 23' connects orifice 23 with a tone producing pipe 23². When the valve is placed in position, it is securely guided in sleeve 22 and

closes orifice 23 perfectly centrally and therefore tightly. Spring 21 is bent in a loop form and as it is fastened to the bar E, it presses the valve disk 19 gently upon the orifice 23. Bar E is provided on the inner side of diaphragm 20', *i. e.* the side adjacent to orifice 23, with a circular space 24, which allows disk 20 and diaphragm 20' to vibrate freely therein. This space is in communication with channel F through a small canal 24'. It will thus be understood that as soon as the pressure in chamber G is superior to the pressure existing in the circular space 24, the diaphragm 20' collapses whereby valve orifice 23 is opened, and as soon as equal pressures have been reestablished on both sides of the diaphragm the latter is balanced and the valve will be closed by the tension of spring 21.

The bung boards 16 are made of suitable material, preferably wood, strengthened and made perfectly straight by cross ribs 16' as shown in Fig. 8. There are usually two of equal size placed in each chest, packed with strips of soft leather 16² around the outer edges with which the boards rest upon the flanges 15. The air tight joint between the two boards is made by similar packing strips 16² and a center rest 16³ as is shown in Fig. 9. When air is forced under pressure into the pneumatic chest D these bung boards are forced tightly upon flanges 15 and center rest 16³, whereby a tight joint clear around the outer edges of the bung boards is established. Access to the different parts of the chest can therefore readily be obtained, as it is only necessary to shut off the air pressure, whereupon each bung board can be raised and removed by sliding it over the center rest 16³ and the adjacent board 16.

In action the device operates as follows:— When a given key is depressed, primary valve 3 is opened, orifice 4 is closed simultaneously with the opening of primary valve 3, and air passes under pressure from the primary wind box B through channel 6' and tube 7 into the diaphragm chamber 8' in auxiliary wind box C, whereby disk valve 9 closes air port 11 and opens exhaust port 11'. This allows the air contained in channel F, as well as in the circular space 24 and canal 24' to escape into the atmosphere in air chamber G. Air pressure having been admitted into the chamber G by means of the draw stop, the diaphragm 20' collapses immediately by reason of the decrease in pressure in the circular space 24 and forces valve spindle 18 forward, whereby valve disk 19 is removed from its seat. This uncovers orifice 23 and as soon as the air passage becomes free, wind enters through orifice 23 into canal 23' and pipe 23². It will thus be seen that all the functions are controlled by single or uniform wind pressure and that a sensitive as well as positive valve action is obtained.

Having fully described the novel features

of my invention, what I claim as new and desire to secure by Letters Patent, is—

1. In a device of the class described the combination with a main chest D of a pair
5 of valve bars therein, a passage opening outwardly from said chest through one of said bars, a valve controlling said passage, a circular cut-out 24 in said bar, a diaphragm covering said cut-out and connected with
10 said valve, an auxiliary wind box C, a primary wind box B, a suitable wind connection between the wind box C and the primary wind box B, a valve 3 in the box B controlling said connection, a wind channel F
15 communicating with the auxiliary wind box C and said cut-out, a valve 9 interposed between the channel F and the auxiliary wind box C for the purpose of relieving air pressure from the channel F and the cut-out,
20 means for admitting air pressure to the outer side of said diaphragm and operating the valve controlling said passage, and a key adapted to operate said valve 3 and admit wind from the box B to the connection
25 leading to the box C and actuate the valve 9.

2. In a device of the class described the combination with a main chest D, of a plurality of valve bars arranged therein in pairs,
30 a chamber between the members of each pair, circular cut-outs in each bar adjacent said chambers, a diaphragm separating each cut-out from the adjacent chamber, passages opening from the chest D through the bars E valves on each bar connected with
35 said diaphragms and controlling said passages, an auxiliary wind box C, a primary wind box B, wind channels F leading from the box C and communicating with said cut-outs, a valve 9 interposed between each
40 channel F and the auxiliary wind box C, wind connections leading from the box B to the box C, valves 3 in the box B controlling said connections, a key adapted to actuate each valve 3, and means adapted to supply
45 air of a uniform pressure to the primary wind box B and to the main chest D.

3. In a device of the class described the combination with the main chest D, of a plurality of valve bars E arranged therein in
50 pairs, a chamber G between each pair of bars, passages opening from the chest D through said bars, valves on each bar controlling said passages, cut-outs on each bar adjacent said chambers, diaphragms separating said cut-outs from the chambers and
55 connected with the valves, wind channels F communicating with said cut-outs and adapted to conduct air to and from the same and thereby operate the valves, and means adapted to supply air of a uniform pressure
60 to the main chest D and to the chamber G.

4. In a device of the class described the combination with the main chest D, of a plurality of valve bars E arranged therein in
65 pairs, valves on each bar, a chamber G in-

closed between each pair of bars, a plurality of air channels F, a circular cut-out 24 in each bar adjacent to the chamber G, a diaphragm 20' secured to each valve and adapted to separate the said chamber G from the
70 cut-out 24, a passage 24' connecting each of said cut-outs with one of the channels F, means adapted to supply air of the same pressure to the main chest D and to the chamber G, and means adapted to relieve
75 air pressure in the channels F.

5. In a device of the class described the combination of the primary wind box B, with the main chest D, a plurality of valve bars E arranged in pairs in said chest, valves
80 on each bar, a chamber G inclosed between each pair of valve bars E, a plurality of air channels F, operative connections between said channels and the wind box B, circular cut-outs 24 in said bars, diaphragms separating the chambers G from the cut-outs and
85 connected with said valves, a passage 24' connecting each circular cut-out with the adjacent channel F, means adapted to supply wind of the same pressure to the main chest
90 D, the chambers G and to the primary box B and a key and connections adapted when depressed to relieve air in the cut-outs 24 through one of the channels F.

6. In a device of the class described the
95 combination of the main chest D, with the auxiliary wind box C, the primary wind box B, a plurality of valve bars E arranged in pairs in said chest D, valves in each bar, a chamber G inclosed between each pair of
100 valve bars E, a plurality of air channels F communicating with the box C, flexible wind connections between said primary wind box B and the auxiliary wind box C, a double seated valve interposed between the wind
105 box C and each air channel F, a key and connections adapted to actuate one of said valves by wind pressure when depressed, a circular cut-out 24 in said bars for each of their valves, a passage 24' connecting each of said
110 circular cut-outs 24 with the adjacent channel F, a wind canal 23' in connection with each valve, a tone producing pipe 23² attached to each wind canal 23', and means whereby air of a uniform pressure is supplied
115 to the main chest D, to the chambers G and to the primary box B.

7. In a device of the class described the combination of the main chest D, with the auxiliary wind box C, the primary wind box
120 B, a plurality of channels F communicating with the box C, double seated valves interposed between the channels F and the wind box C, a key and connections adapted to establish communication between the wind box
125 B and the box C, thereby actuating the double seated valves, a plurality of valve bars E arranged in pairs in said chest D, a chamber G between each pair of valve bars, a plurality of valves carried on each valve bar, a
130

sleeve 22 adapted to guide each valve, a plurality of tone producing pipes 23², a passage 23' between the chest D and each pipe 23² and controlled by the valves in said bars, a
5 circular cut-out in each bar for each valve, a diaphragm 20' secured to each of the valves on said bars and separating the chambers G from the said cut-outs, a passage 24' between
10 each circular cut-out and one of the channels F, and means whereby air of a uniform pressure is furnished to said main chest D, to the chambers G and to the primary box B.

8. In a device of the class described the combination with the main chest D, of a plu-
15 rality of removable bung boards adapted to tightly close said chest, a plurality of valve bars E located within said chest D and arranged in pairs, a plurality of valves on said bars E, a chamber G inclosed between each
20 pair of valve bars, a plurality of channels F, a circular cut-out 24 in each bar for each valve,

a passage 24' connecting each cut out with one of said channels, a diaphragm separating each cut-out from the adjacent chamber G and each connected with one of said valves, a
25 plurality of tone producing pipes, a separate passage between each of said pipes and the main chest D, each controlled by one of said valves, means whereby air of the same pressure is furnished to the main chest D and to
30 the chambers G, and means adapted to relieve the air pressure from the channels F and from the circular cut-outs and thereby actuate said valves.

In testimony whereof I have signed my
35 name to this specification in the presence of two subscribing witnesses.

WILLIAM CONNINGSBY VERNEY.

Witnesses:

FRANK W. CHAMBERS,
A. C. REUTER.