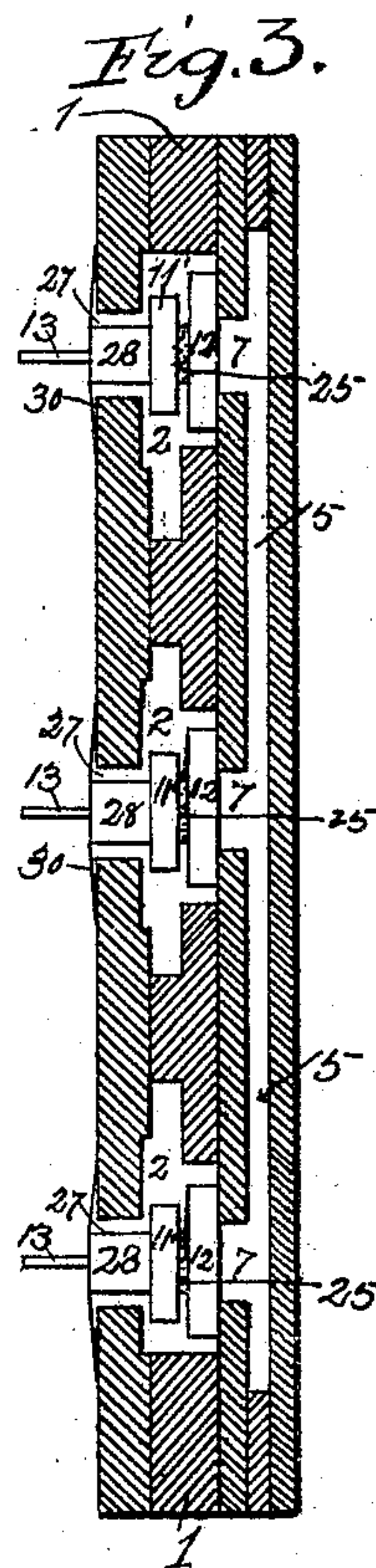
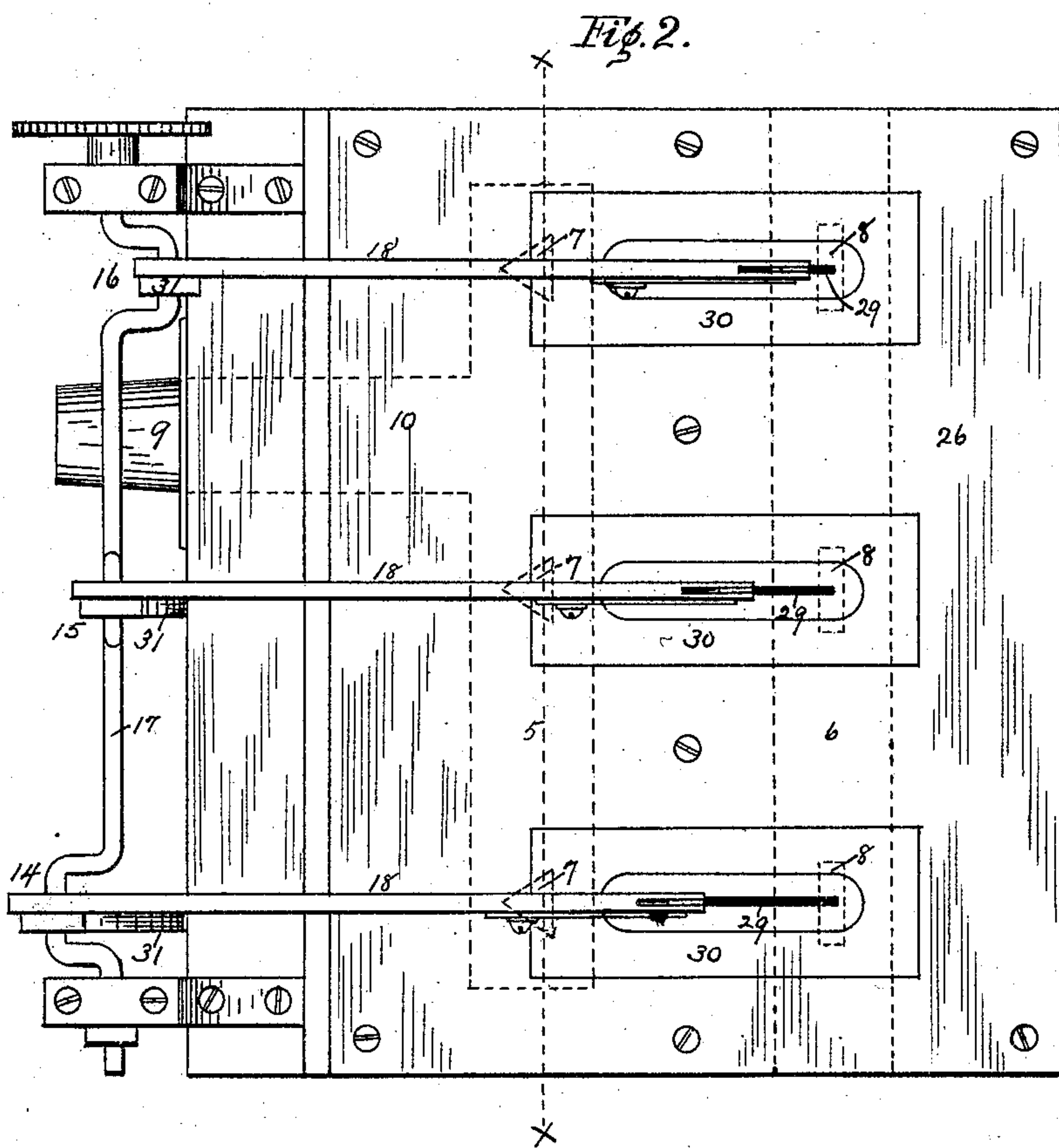
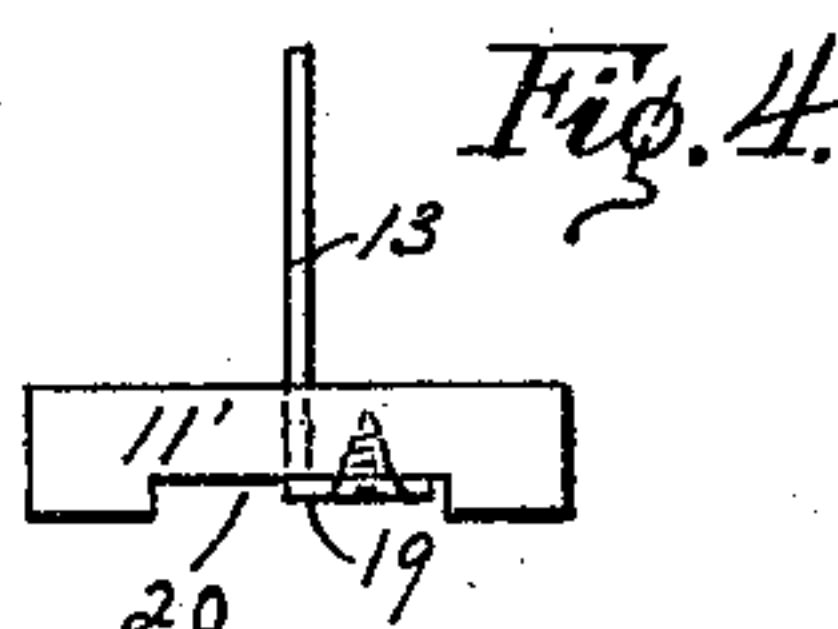
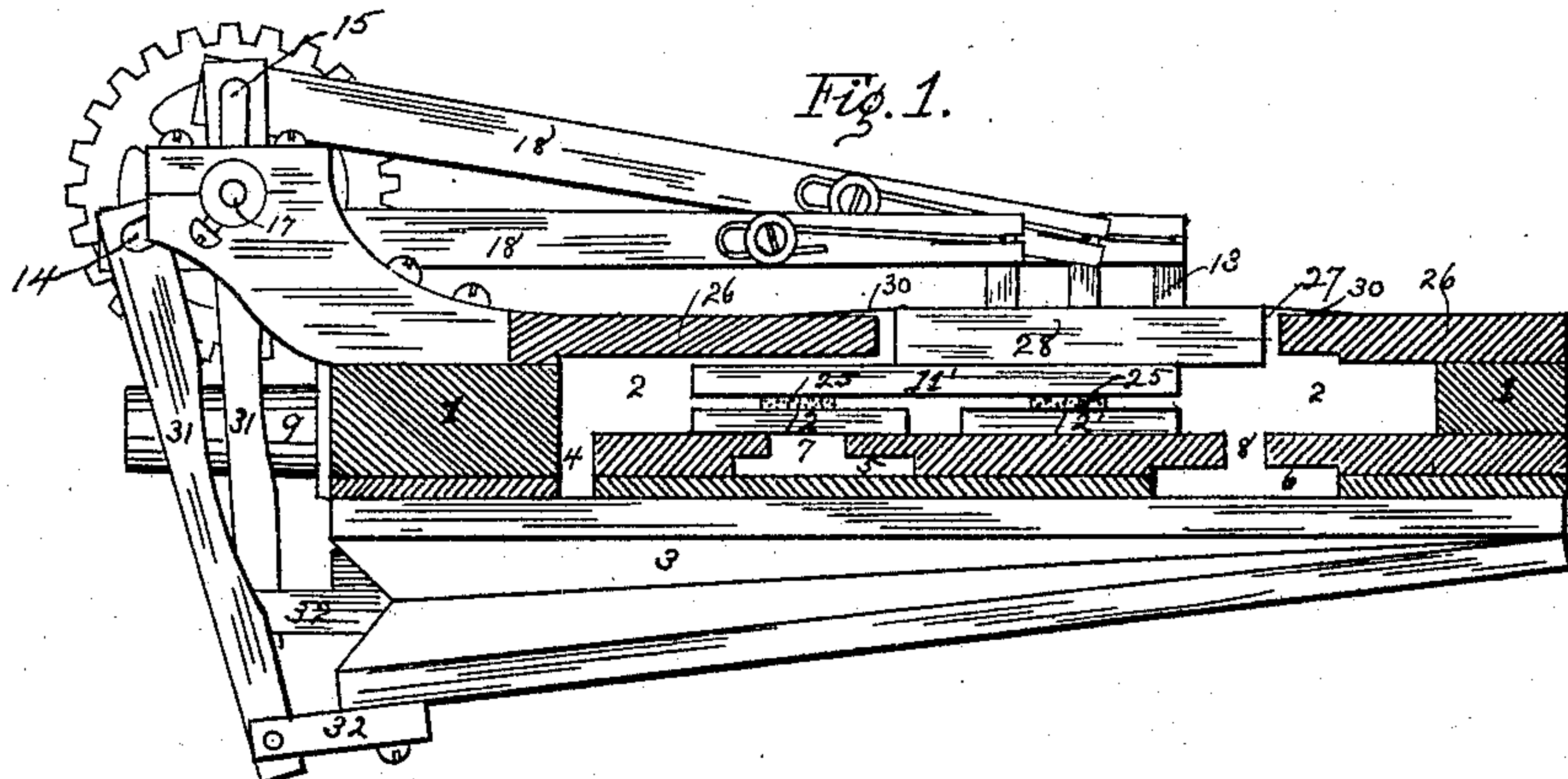


No. 788,472.

PATENTED APR. 25, 1905.

L. U. JOBES.  
PNEUMATIC MOTOR FOR MUSICAL INSTRUMENTS.  
APPLICATION FILED SEPT. 8, 1903.



WITNESSES:

J. M. Macy.  
H. K. Blinn

INVENTOR.

Lawrence U. Jobes



# UNITED STATES PATENT OFFICE.

LAWRENCE U. JOBES, OF CINCINNATI, OHIO, ASSIGNOR TO THE BALDWIN COMPANY, OF HAMILTON COUNTY, OHIO.

## PNEUMATIC MOTOR FOR MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 788,472, dated April 25, 1905.

Application filed September 8, 1903. Serial No. 172,410.

*To all whom it may concern:*

Be it known that I, LAWRENCE U. JOBES, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Pneumatic Motors for Musical Instruments, of which the following is a clear and full description.

My invention relates to that class of motors employed in self-playing instruments; and the object of my invention is to provide a motor certain and regular in its action and possessing the greatest power and efficiency, together with freedom from derangement due to adverse climatic conditions.

In the accompanying drawings, Figure 1 is a side elevation of my improved motor. Fig. 2 is a front elevation of the same. Fig. 3 is a horizontal section through the line  $xx$ , showing the valves, valve-channels, and flexible valve-seat. Fig. 4 shows that portion of the slide-valve to which the valve-arm is attached.

Corresponding numerals of reference indicate corresponding parts.

The channel-board 1 has three longitudinal valve-channels 2 open at the surface and extending almost its entire length. They are closed at one end and open at the opposite end in communication with the bellows 3 through the passage 4, which leads through the bottom of the channel-board into the bellows. Directly under the channels 2 are the cross-channels 5 and 6, connected with the longitudinal valve-channels by the ports 7 and 8. The channel 6 runs entirely across the channel-board and is open at both ends to the outer air. The channel 5 extends almost the entire width of the channel-board and is closed at both ends. It is in communication with the pipe 9 through the duct 10.

Working in the channels 2 are the compound duplex slide-valves consisting of the yoke 11', connecting the two parts 12 and 12', which have their seats below, one part for each of the ports 5 and 6. Each of the yokes 11' has an arm 13, connected to the differential cranks 14, 15, and 16 in the shaft 17 by the pitman-rods 18. The yoke-arm 13 is made of metal, the lower end 19 of which is

bent at right angles and is secured by a screw to the under side of the yoke 11', a recess 20 being therein provided for the same. The valve parts 12 and 12' are connected to the yoke 11' by soft leather punchings 25 or other means for making a flexible connection which give sufficient movement to the valves to allow them to seat themselves perfectly on the bottom of the channel 2.

The port 7 in the bottom of the channel 2 is triangular in shape. The point is uncovered first and as the valve moves the port is gradually opened to the action of the air. By this means the motion of my motor becomes more regular and even under a light or heavy suction and is adapted to the greatest variations in speed.

The cap 26 covers almost the entire surface of the channel-board 1 and protects the valve-channels 2 from the outer air. The cap has three longitudinal openings 27, one directly over each yoke 11'. In each of these openings is suspended the flexibly-held guide-plate 28, having a slot 29, through which the arm 13 works. The flexibly-held guide-plate is held in position and sealed to the outer air by a diaphragm 30, which is glued to the outer surface of the same and to the face of the cap 26. The function of the flexibly-held guide-plate is to allow the greatest freedom in the movement of the slide-valve and at the same time effectually sealing it against the entrance or exit of the air, while the narrow form of its construction reduces to a minimum the resistance of the valve.

The pitmen 31 are connected at one end to the cranks 14, 15, and 16 and at the opposite end to the flange 32 on the bellows 3.

The operation of my improved motor is as follows: The pipe 9 leads to a suction-bellows or other device, which steadily creates a partial vacuum therein and keeps the cross-channel 5 under suction and tends to communicate with and close the three bellows 3 by acting on the one bellows which happens to be open, since it is only when the bellows is open that its slide-valve 12 is in the proper position to allow the air to pass from the bellows through the passage 4, channel 2, and port 7. The



suction acting through the pipe 9 and duct 10 thus closes the bellows which acts upon the pitman 31 to revolve the shaft 17, and thus brings another bellows into open position ready to collapse, and so on until the third bellows is brought into open position, each bellows thus acting in turn upon the shaft 17 to revolve the same. When any particular bellows has been exhausted to its fullest extent, the valve 12' uncovers the port 8, which allows the outer air to enter through the channel 6. This relieves the suction in the channel 2 and allows the bellows to open freely.

To those skilled in the art the advantages of my improved motor will be apparent.

The triangular port 7 insures the most regular motion under all variations of speed. The valves are loosely placed in the valve-channels to prevent binding when the parts swell from dampness.

The divided port-valves insure the proper working of the motor under all climatic conditions, and the flexibly-held guide-plate allows the greatest freedom in the movement of the valves and seals the valve system from any loss of air.

Having described my invention, what I desire to secure by Letters Patent is—

1. In a pneumatic motor the combination of the cap 26 having a flexibly-held guide-plate 28 suspended in the opening 27 by means of the diaphragm 30, the channel-board 1 having valve-channels 2, two ports 7 and 8 leading from the valve-channels to the cross-channels 5 and 6, with the duplex valve consisting of the parts 12 and 12' connected by the yoke 11', said yoke being provided with an arm 13 passing through the same, and adapted to connect with the pitman 18, said arm being bent at right angles at the lower end, and secured

in the recess 20 to the under side of said yoke, the said valves and yoke being adapted to move under the flexibly-held guide-plate 28 and over the ports 7 and 8, substantially as described.

2. In a pneumatic motor the combination of the cap 26 and the flexibly-held guide-plate 28 having a slot 29 for the movement of the yoke-arm 13, said guide-plate being suspended and held in position in the opening 27, in said cap by the diaphragm 30; said flexibly-held guide-plate being adapted to rest upon and guide the valve-yoke 11' and seal its upper surface from the outside air, substantially as described.

3. In a pneumatic motor the combination with a channel-board 1, having valve-channels 2 open at the surface, a transverse port-channel 5 connected with the channels 2 by the triangular ports 7 and the pipe 9 through the duct 10, and the transverse port-channel 6 open at both ends to the outer air and connected to the channels 2 by the ports 8, the bellows 3, connected with the channels 2 by the passage 4, the cap 26 secured to the upper surface of the channel-board 1 and having openings 27 in which are suspended the flexibly-held guide-plate 28 by means of the diaphragm 30, the duplex valve consisting of the parts 12 and 12' connected by the yoke 11' moving over the ports 7 and 8 and under the guide-plate 28, a crank-shaft having a crank-arm for each bellows 3 and a pitman 31 connecting each crank-arm and bellows, and a pitman 18 connecting each crank-arm and valve-yoke, substantially as described.

LAWRENCE U. JOBES.

Witnesses:

J. W. MACY,  
A. P. HAGEMEYER.