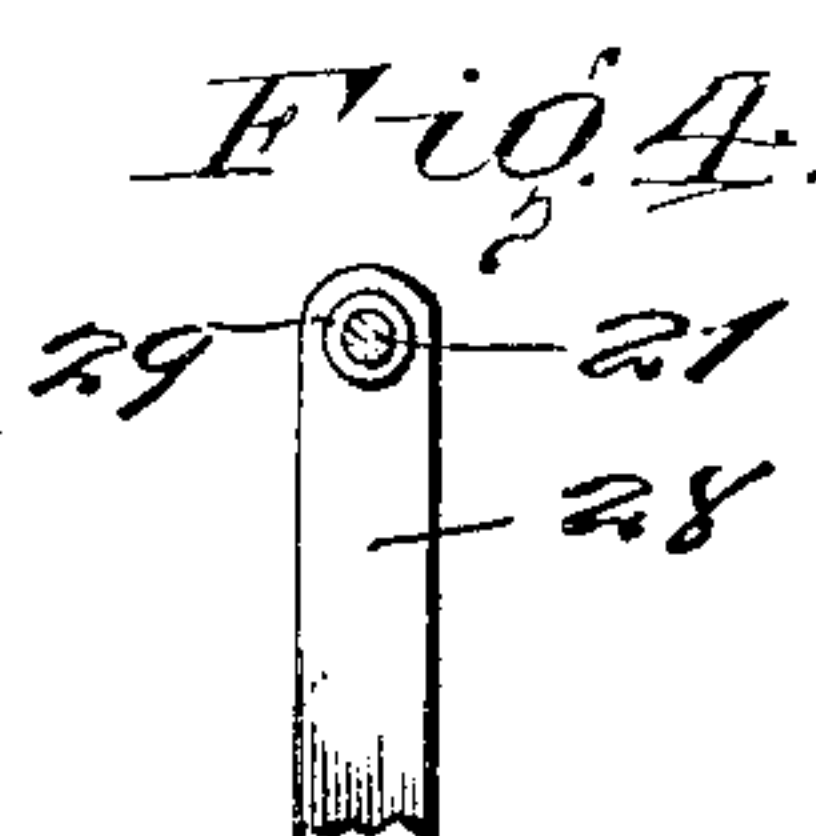
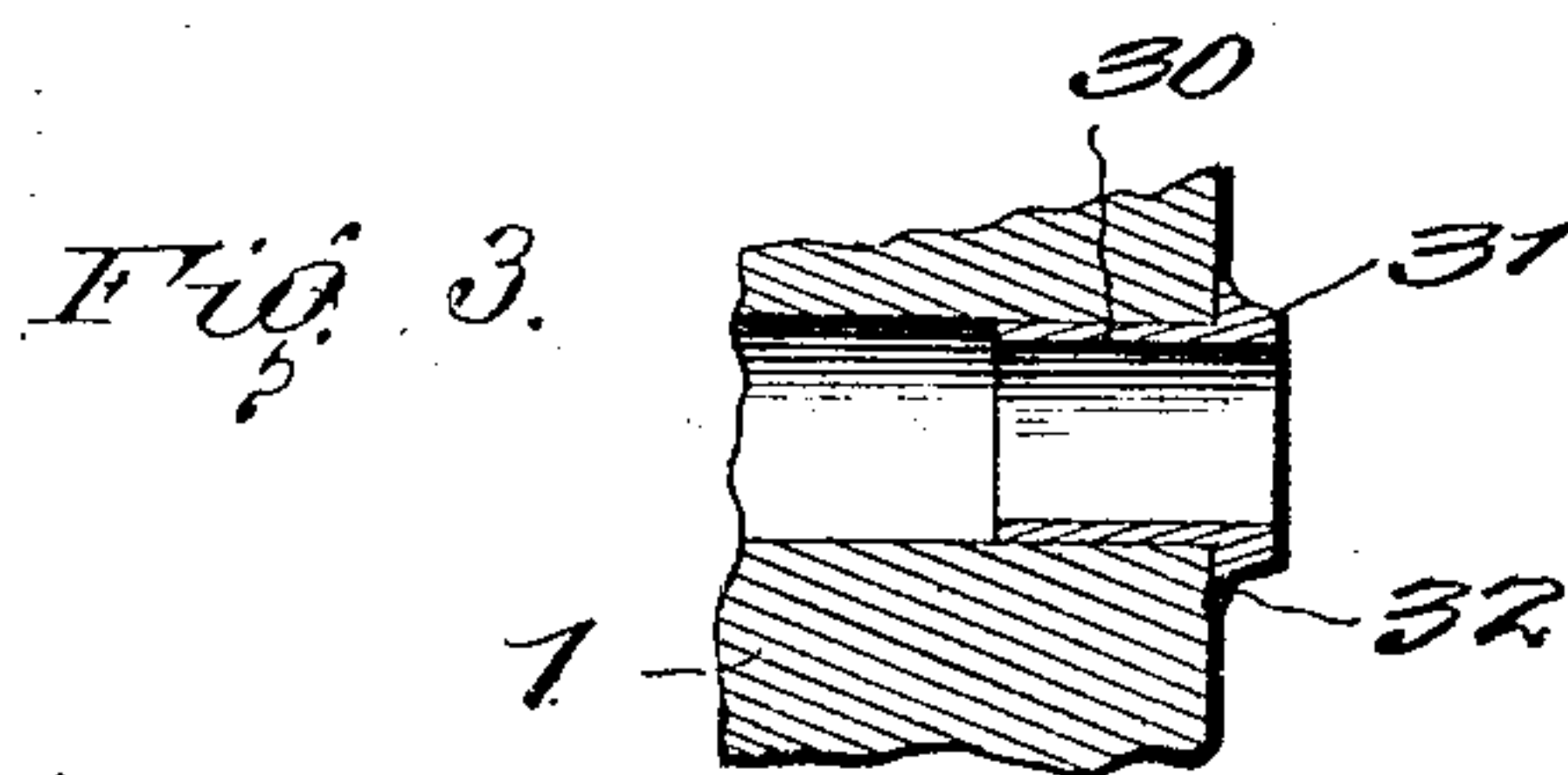
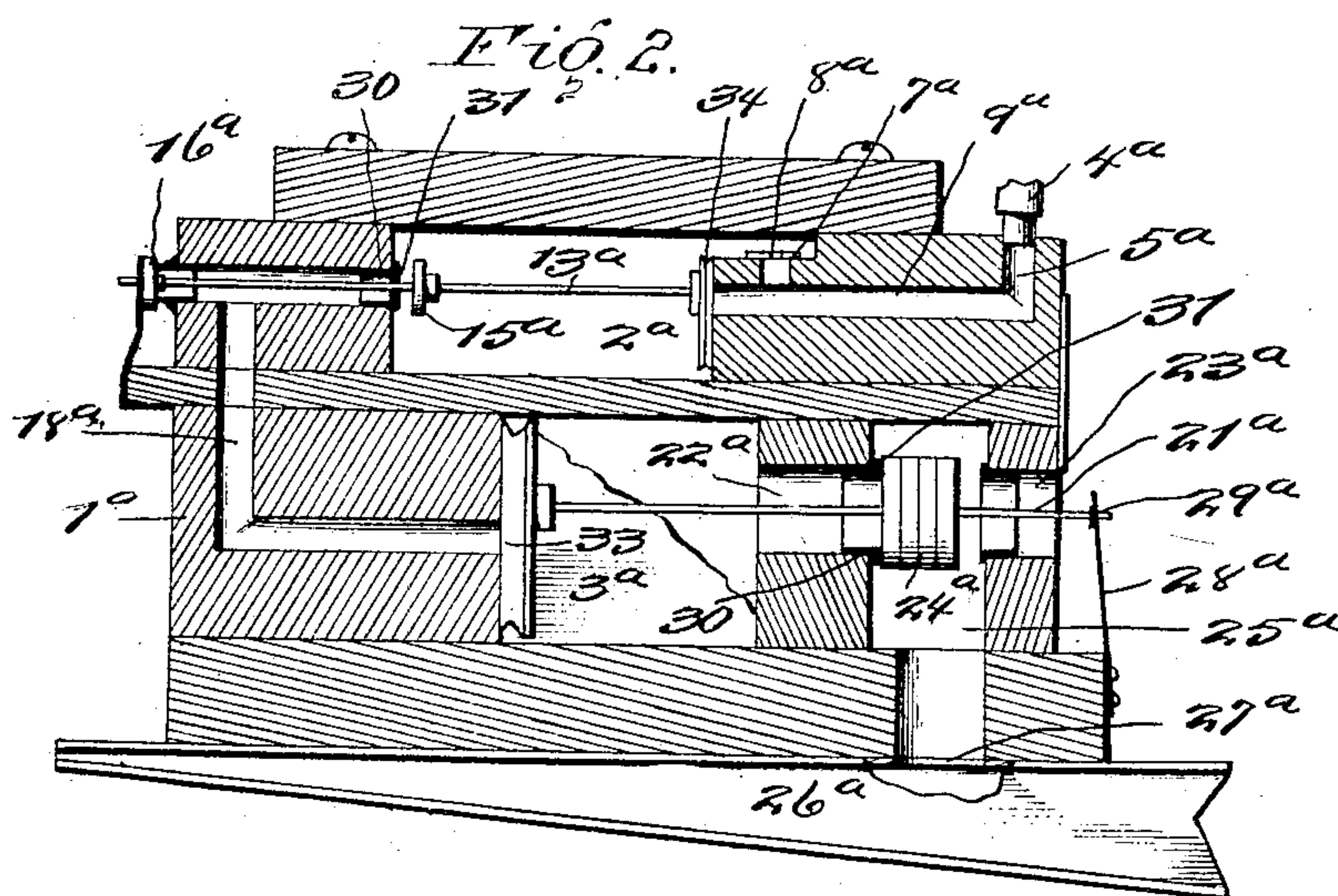
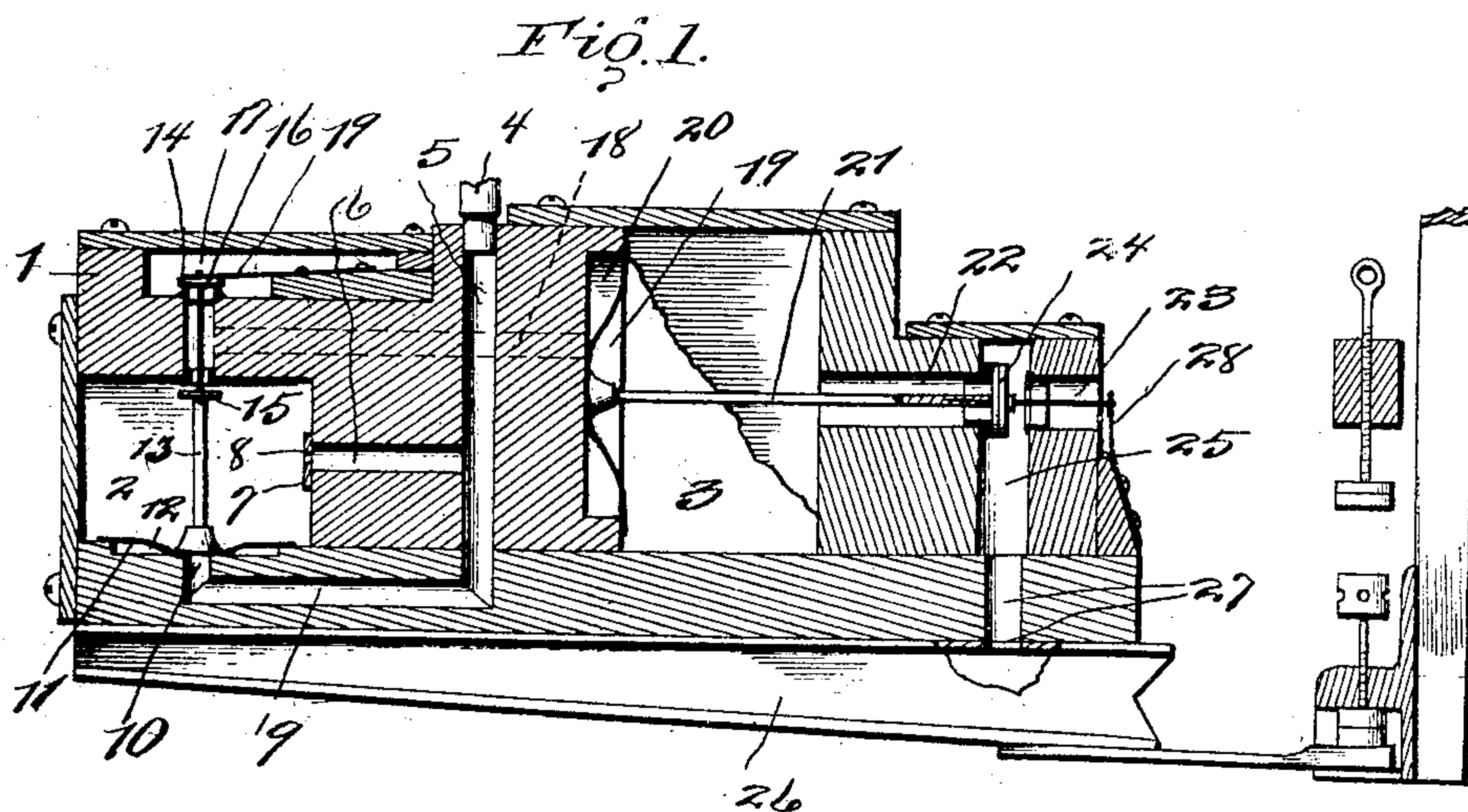


No. 841,206.

PATENTED JAN. 15, 1907.

F. W. WINTER.
PNEUMATIC MUSIC PLAYER.
APPLICATION FILED DEC. 28, 1905.



Witnesses
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UNITED STATES PATENT OFFICE.

FREDERICK W. WINTER, OF NEW YORK, N. Y.

PNEUMATIC MUSIC-PLAYER.

No. 841,206.

Specification of Letters Patent.

Patented Jan. 15, 1907.

Application filed December 28, 1905. Serial No. 293,657.

To all whom it may concern:

Be it known that I, FREDERICK W. WINTER, a citizen of the United States of America, and a resident of New York, in the county
5 and State of New York, have invented certain new and useful Improvements in Pneumatic Music-Players, of which the following is a specification.

This invention relates to certain new and
10 useful improvements in pneumatic music-players; and it has for its objects, among others, to provide simple and efficient means for normally holding a valve to its seat and serving also as a guide for the valve-stem
15 during its reciprocation; also, to provide an improved valve-seat consisting of a bushing with a conical head against which the valve, of pliable material, is adapted to impinge and with which it makes an air-tight joint. The
20 spring, which serves to force the valve to its seat and to guide the stem of the valve in its reciprocation, serves to keep the valve at all times in perfect parallelism with the face of the seat, so as to prevent the escape of air
25 and uneven wear on the valve or seat. This seat being removable can be readily replaced whenever circumstances may require.

Other objects and advantages of the invention will hereinafter appear, and the
30 novel features thereof will be particularly pointed out in the appended claim.

The invention is clearly illustrated in the accompanying drawings, which, with the numerals of reference marked thereon, form a
35 part of this specification, and in which—

Figure 1 is a vertical cross-section of an exhaust-chest, showing the application of my invention. Fig. 2 is a view similar to Fig. 1, showing a modified form of construction.
40 Fig. 3 is an enlarged longitudinal sectional detail showing the removable valve-seat. Fig. 4 is a detail in elevation of the spring-guide for the valve-stem.

Like numerals of reference indicate like
45 parts throughout the several views.

Such parts only of the player as are necessary to a proper understanding of the present invention are herein illustrated, it being understood that the construction herein claimed
50 is applicable to any and all forms of players, whether inside or outside players, where valves are employed, and in the following description only such parts will be particularly referred to as are directly associated with the
55 elements which constitute the novel construction hereinafter claimed.

Referring, then, to the drawings, 1, Fig. 1, designates an exhaust-chest, which may be, for instance, the secondary exhaust-chest of a player of known construction, except as
60 hereinafter explained. 2 is one of the chambers of this exhaust-chest, and 3 is another, both being suction-chambers. The chamber 2 extends the full length of the chest 1, and into this chamber is discharged the air
65 brought in by the tubes of the tracker-board, one of such pipes 4 being shown in Fig. 1. The lower end of this pipe 4 enters a vertical passage 5, provided therefor in the central
70 part of the chest 1 and tapped about mid-way of its length by a horizontal forwardly-extending passage 6, the end of which is covered by the plate 7, having a vent-opening 8. The lower end of the vertical passage 5 has
75 leading forwardly therefrom a horizontal passage 9. From the forward end of the passage 9 extends a short vertical passage 10, leading to a cavity 11, over which and over the said opening extends a diaphragm 12,
80 which is provided with a vertically-disposed spindle 13, the upper end of which passes freely through a passage 14 and carries two valves 15 and 16, respectively controlling the
85 opposite ends of said passage. The passage 14 connects the suction-chamber 2 with the air-chamber 17 directly above and within the exhaust-chest and affords communication
90 between either of them and a passage 18, (indicated in dotted lines in Fig. 1,) according as the valves 15 and 16 are worked. Upon the
95 upper end of the spindle 13 bears a spring 19, which tends to push it down and also acts as a guide for it during its reciprocation.

As the air is admitted to the passage 10 and as the spindle 13 ascends under the im-
100 pulse of the diaphragm 12 the lower valve 15 becomes seated, thereby closing the suction-chamber 2 to the passages 14 and 18, and the upper valve 16 is unseated, which opens the upper air-chamber 17 to the said passages 14
105 and 18. Then a small quantity of air from the chamber 17, which is open to the atmosphere, flows into the passages 14 and 18 and is allowed to reach a diaphragm 19 in either of the other chambers of the exhaust-chest 1,
110 as 3, according to the location of the tube 4, that leads in the air from the tracker-board and perforated sheet of music. This diaphragm covers a cavity 20 in the front wall of its suction-chamber and is caused to swell
inward by the incoming external air from the chamber 17. This diaphragm has secured

to it centrally a spindle 21, which extends horizontally across the suction-chamber 3 and thence out through alined passages 22 and 23 in the rear of the chest 1, all as clearly
 5 seen in Fig. 1. The spindle 21 carries a valve 24, lying in a vertical channel 25, which separates the passages 22 and 23 and extends from a point slightly above the same down to one of the pneumatics 26 through the open-
 10 ing 27. The channel 25, it will be noted, is also capable of communication with the suction-chamber 3 and with the atmosphere through the passages 22 and 23, which are controlled by the interposed valve 24. A
 15 spring 28, similar to the spring 19, is arranged to bear upon and guide the outer end of the spindle 21, keeping the valve 24 normally seated against the passage 22 to the suction-chamber and allowing the external air to en-
 20 ter the channel 25 through the passage 23, and consequently to flow into and inflate the pneumatic; but when the diaphragm 19 moves inward, as above said, the valve 24 is shifted from the passage 22 to the passage 23
 25 and becoming seated against the latter excludes the outside air from the channel 25 and establishes a communication between the suction-chamber and the channel, which causes a vacuum therein and the deflation of
 30 the thereto-appertaining pneumatic.

The reversal or contrary movement of the movable parts here referred to takes place as soon as the air in the tube 4 and its sublying passages is exhausted into the suction-chamber 2 through the vent 8, when the diaphragm
 35 12 drops, the valve 15 becomes unseated, and the valve 16 seated, the air first let into the passage 18 exhausts into the suction-chamber 2, the diaphragm 19 falls back in its cavity, the valve 24 returns from the passage 23
 40 to the passage 22, and the external air being again admitted into the channel 25 reinflates the secondary pneumatic.

Fig. 4 shows in detail the spring-guide used
 45 in connection with the valve-spindles, as above described. The spring in each case is a flat spring suitably secured at one end, and its free end is suitably perforated to allow the valve-spindle to pass therethrough and is
 50 adapted to be moved outward to regulate the tension of the spring by a nut or boss 29 on the valve-spindle.

The seat for each of the valves carried by the spindles consists of a bushing 30, remov-
 55 ably and preferably frictionally held within the opening closed by the valve and having a conical head 31 with a shoulder 32 to bear against the end wall of the passage and against which conical head the thereto-be-
 60 longing valve (to be made of pliable material) will impinge and with which it will make an air-tight joint.

Fig. 2 illustrates a modified construction of the secondary exhaust-chest which is
 65 somewhat different in design from that seen

in Fig. 1, but capable of achieving the same results in substantially the same manner. The secondary exhaust-chest in Fig. 2 is indicated by 1^a, and such component parts thereof as are substantially like those previ-
 70 ously described with reference to Fig. 1 are likewise indicated by the same numerals, characterized by the exponent "a." As these parts discharge functions already described and understood, it is unnecessary to reënu-
 75 merate them all here or to locate them, except to point out that the suction-chamber 2^a is above the other suction-chambers of the chest, which other chambers are separated
 80 by a partition, as are they in the form seen in Fig. 1. The location of these chambers of course determines the location of the several passages leading to and from the same. The diaphragms of Fig. 1 are replaced in Fig. 2 by
 85 pneumatics 33 and 34. The valve-spindles are guided by springs similar to those above described.

Modifications in detail may be resorted to without departing from the spirit of the in-
 90 vention or sacrificing any of its advantages and yet be within the scope of the appended claim.

It is deemed important that the regulating-nut, as 29, on the spindle be disposed be-
 95 tween the spring and the valve and be of less area than the spring, so as to be protected thereby, so that accidental change of position of said nut on the spindle cannot take place.

What I claim as new is—

In a piano-player, a pneumatic, an ex-
 100 haust-chest having two chambers, a vertical passage between said chambers, a forwardly-extending passage from said vertical passage to one of said chambers, a plate in said cham-
 105 ber covering the end of said forwardly-extending passage and having a vent, a passage leading forwardly from the lower end of said vertical passage and communicating by a
 110 short vertical passage with said chamber, a diaphragm over said short passage, an air-chamber in said exhaust-chest, a vertical passage connecting said exhaust-chamber and said air-chamber, a passage leading from
 115 said vertical passage to the other chamber of said exhaust-chest, a spindle from said diaphragm extended through said last-named vertical passage, valves on said spindle upon
 120 opposite sides of said passage, and a spring in said air-chamber serving to press upon and guide said spindle, and the secondary action mechanism interposed between the rearmost of said chambers and the pneumatic.

Signed by me at New York city this 27th day of December, 1905.

FREDERICK W. WINTER.

Witnesses:

QUINTIN LEE,
 A. NASS.