

No. 883,228.

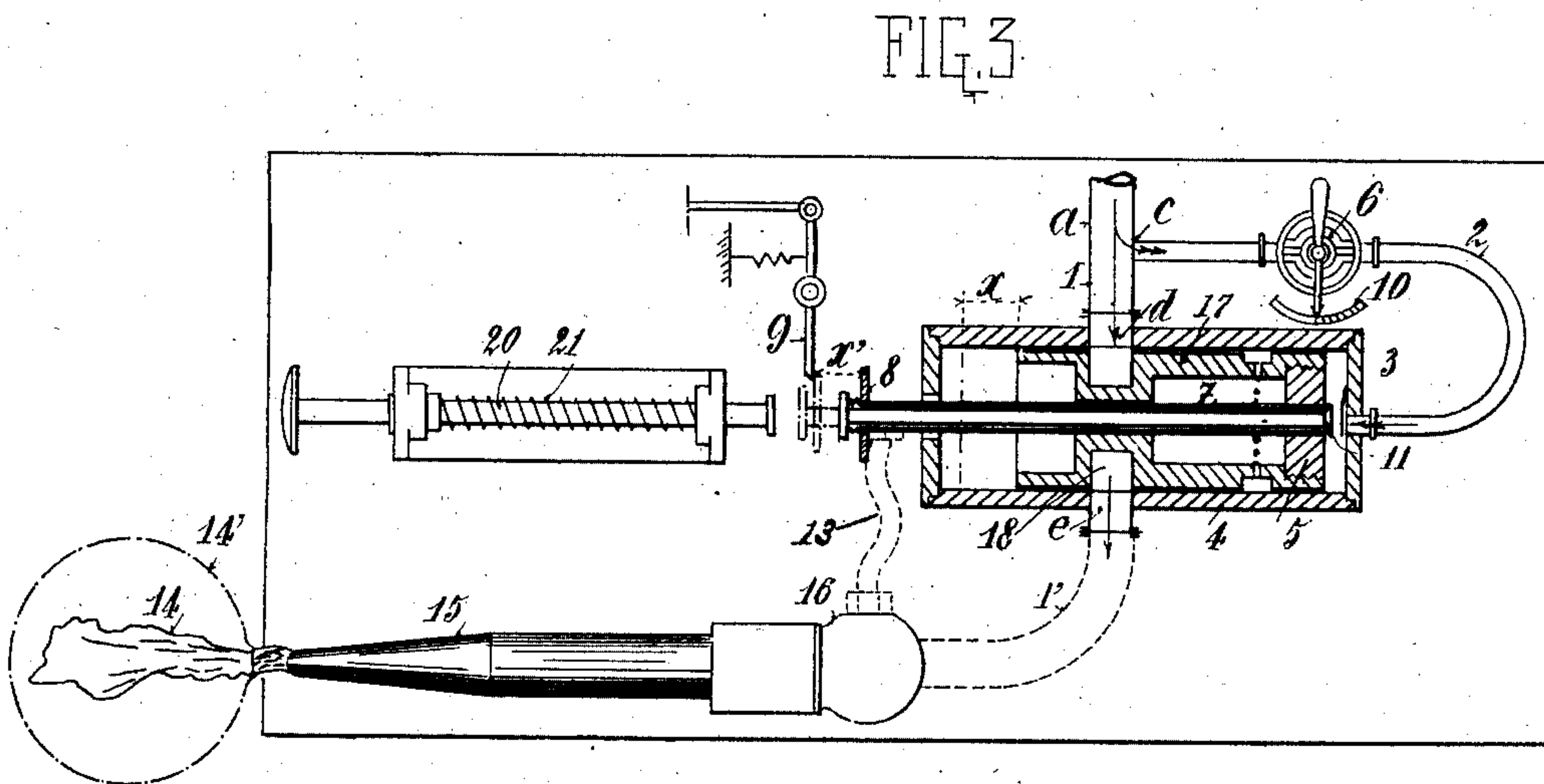
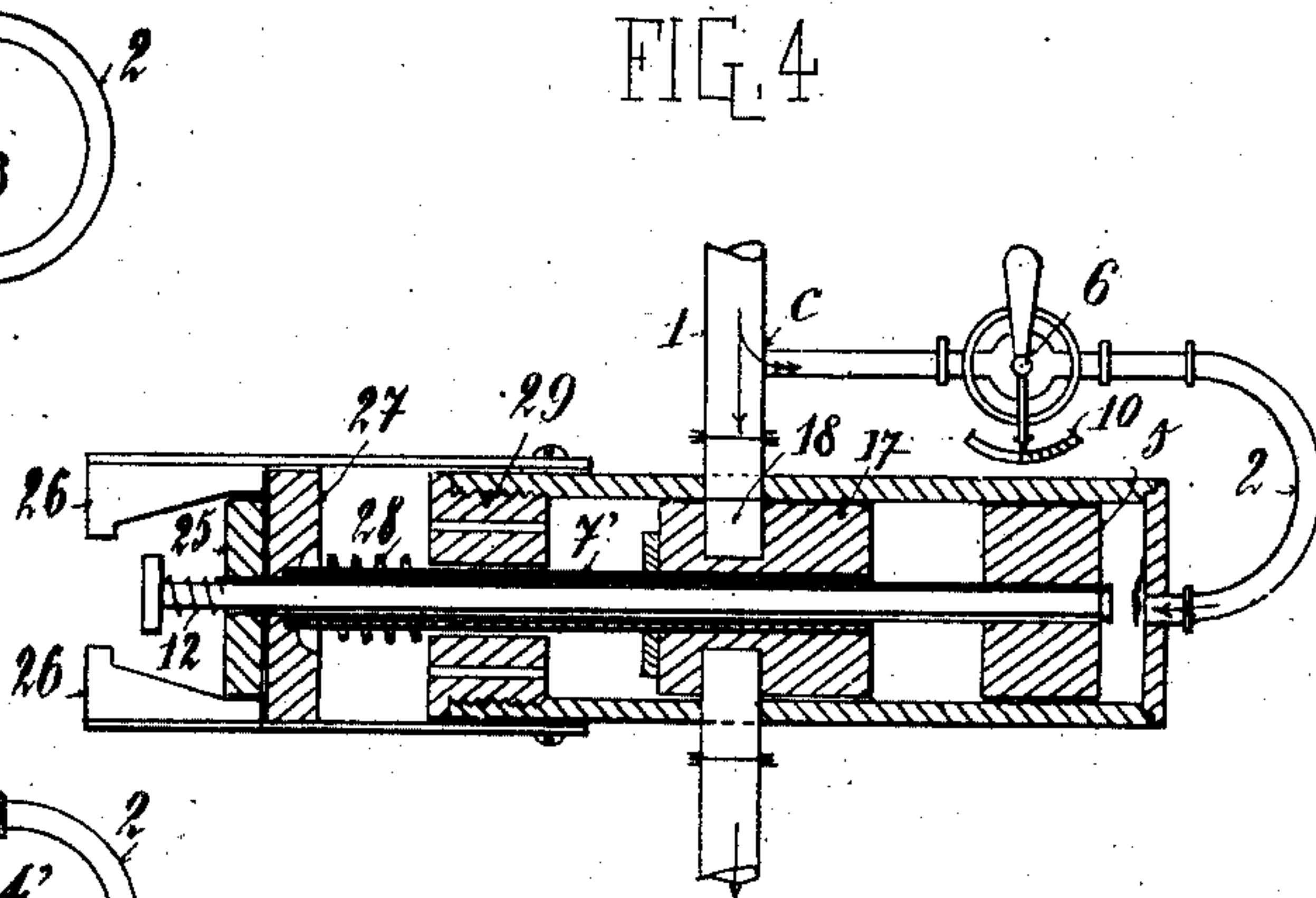
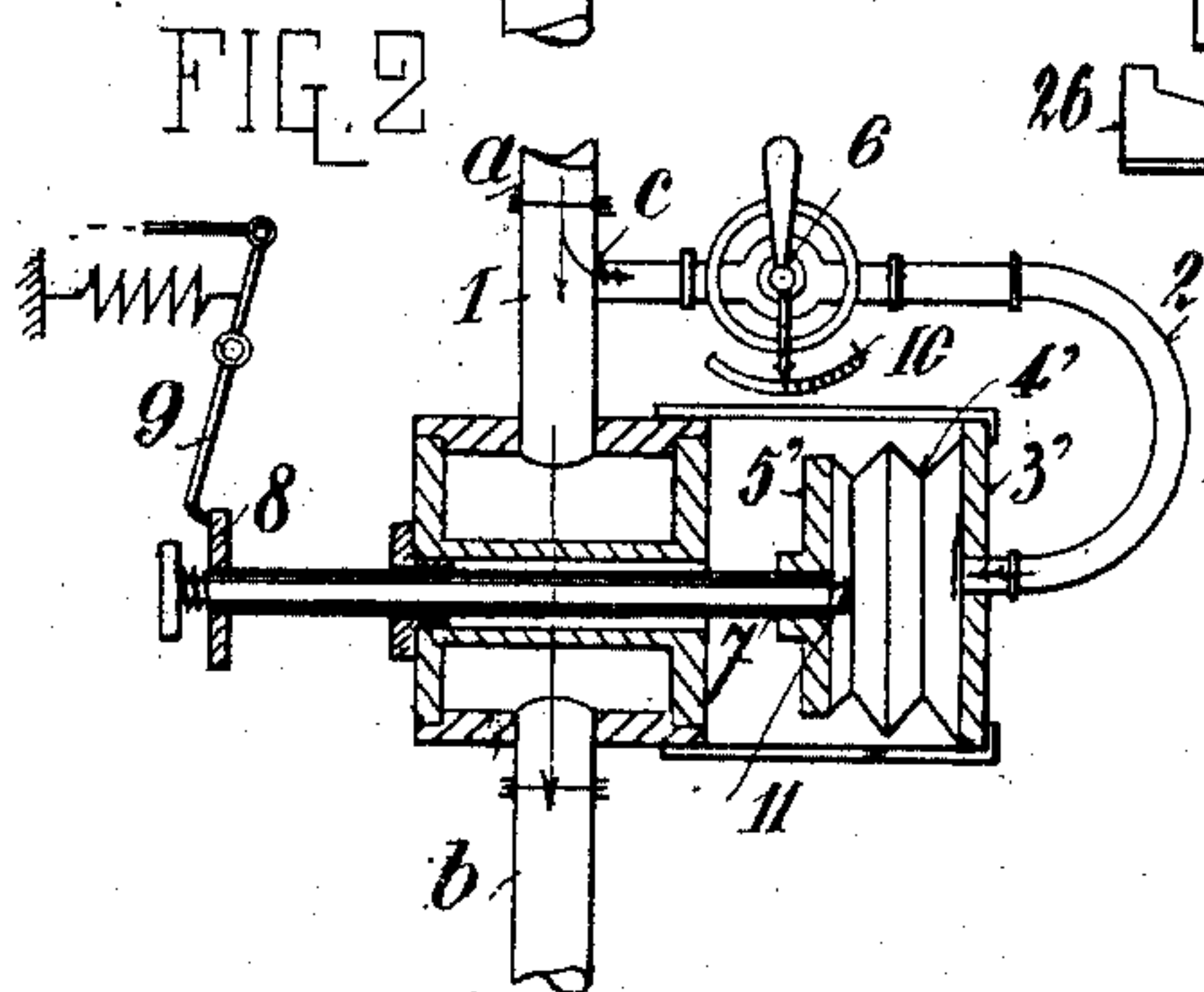
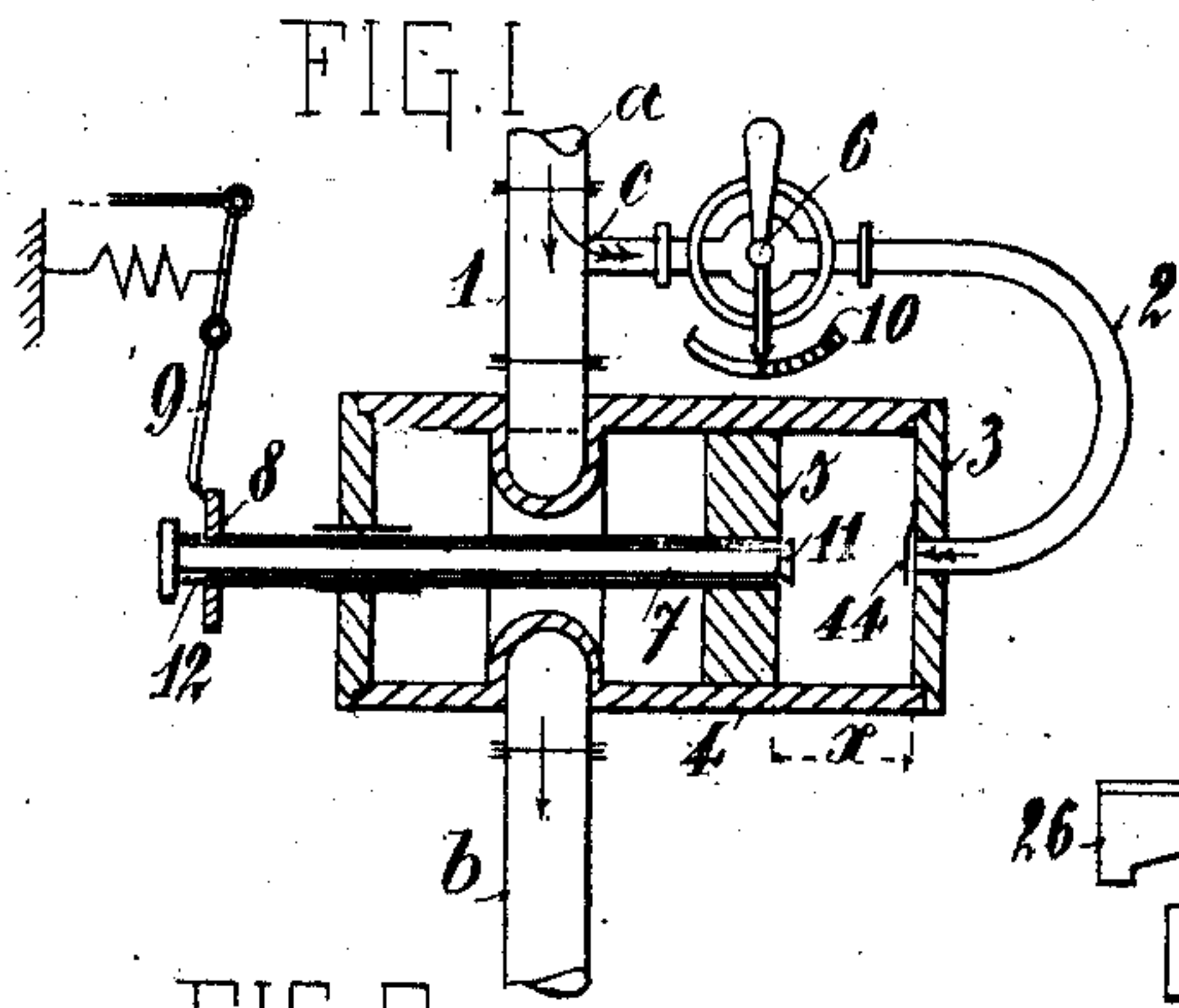
C. D. A. PASTEUR.

PATENTED MAR. 31, 1908.

INDICATING AND CONTROLLING APPARATUS FOR INFLATING MECHANISMS.

APPLICATION FILED MAY 31, 1907.

5 SHEETS—SHEET 1.



Witnesses

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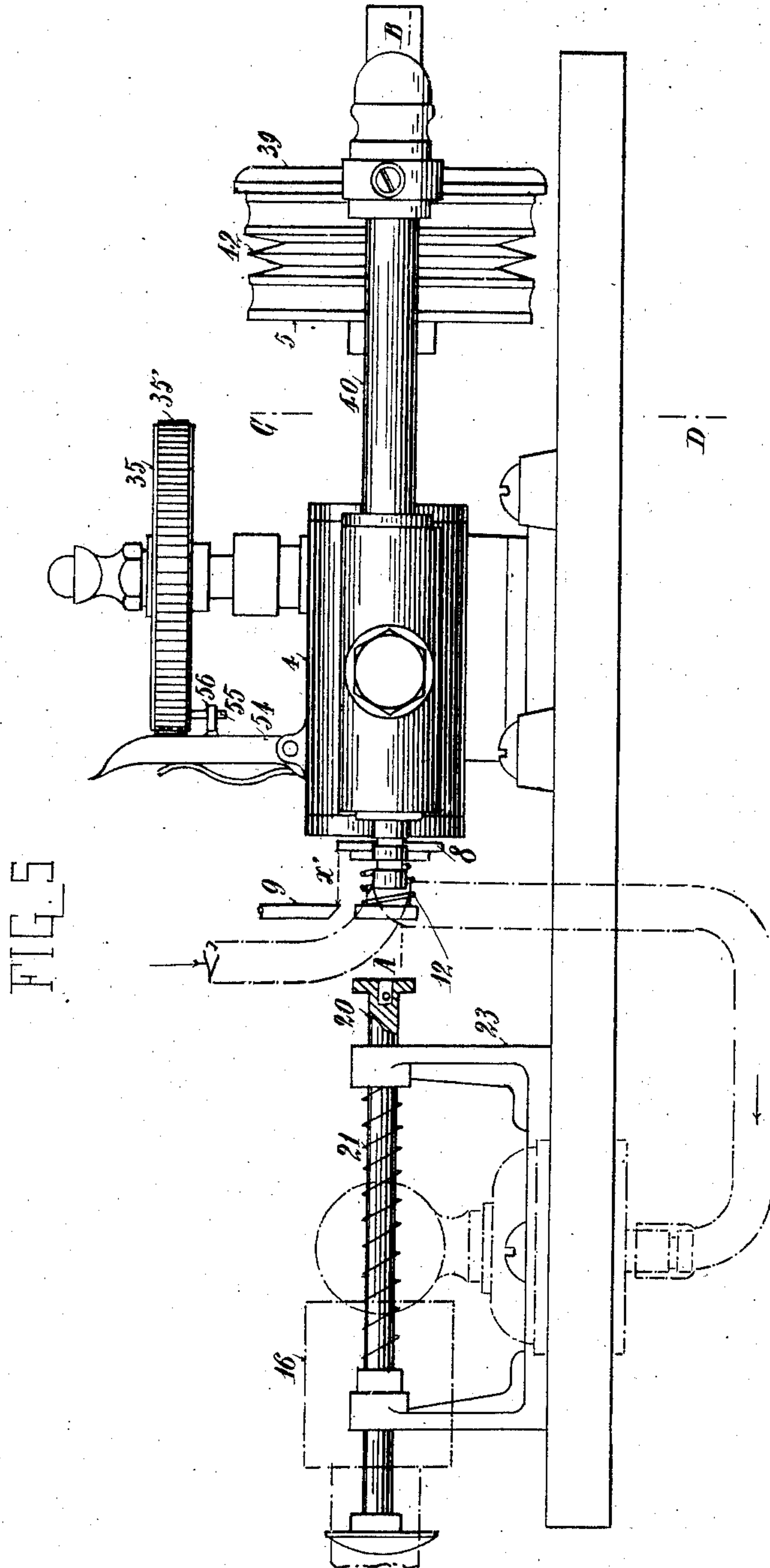
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5 SHEETS—SHEET 2.



Witnesses

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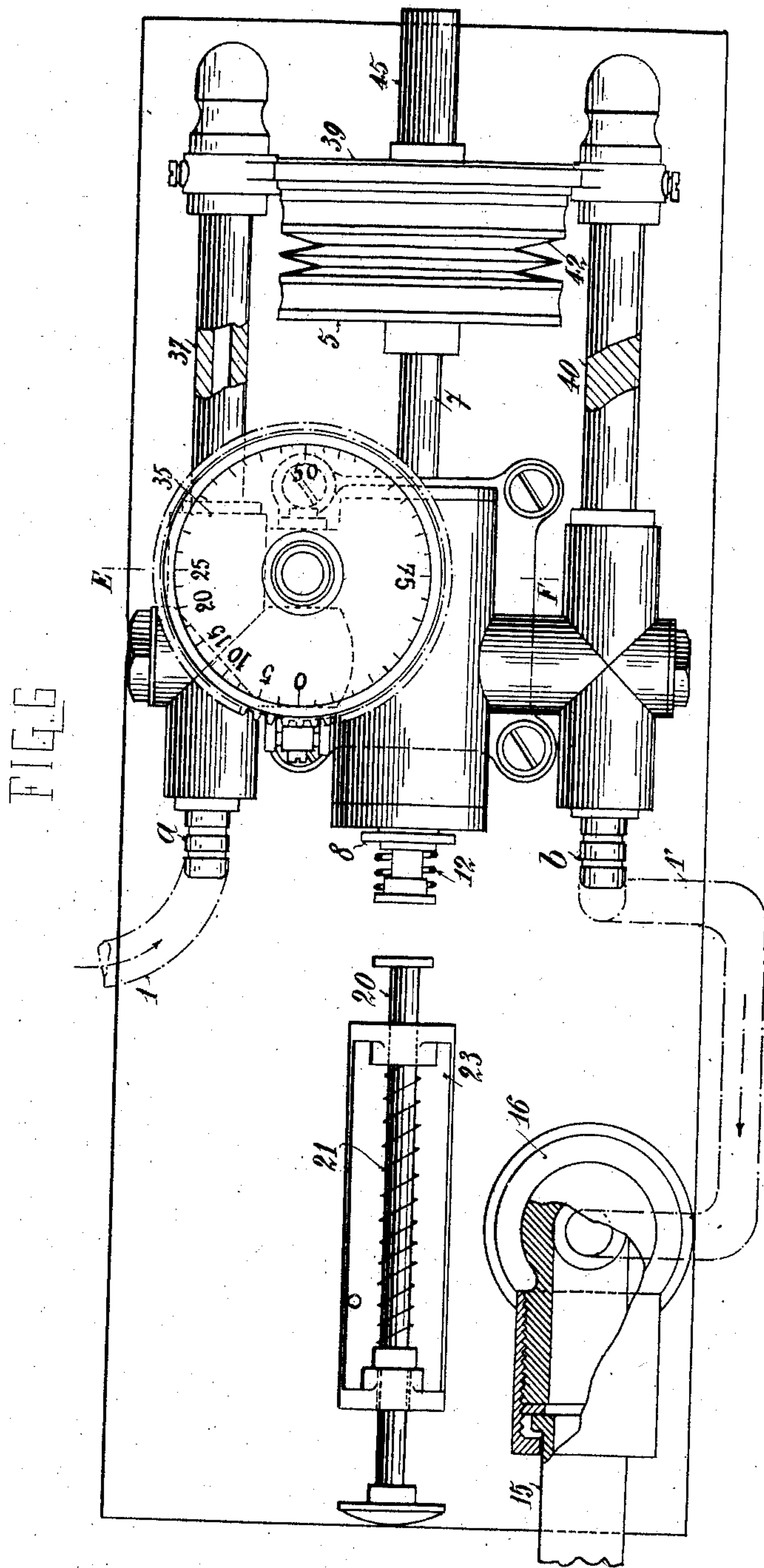
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5 SHEETS—SHEET 3.



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5 SHEETS—SHEET 4.

FIG. 7

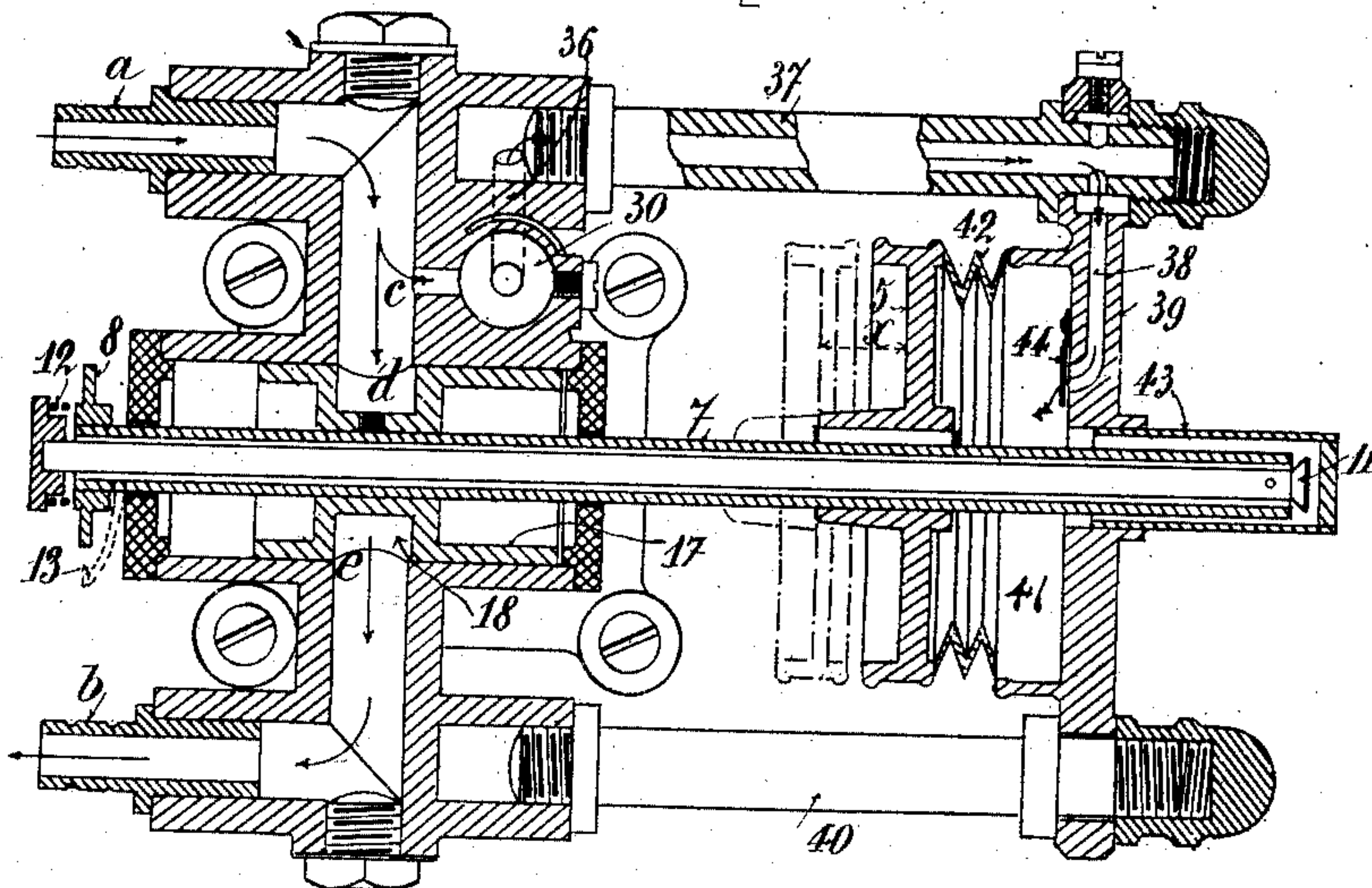


FIG. 9

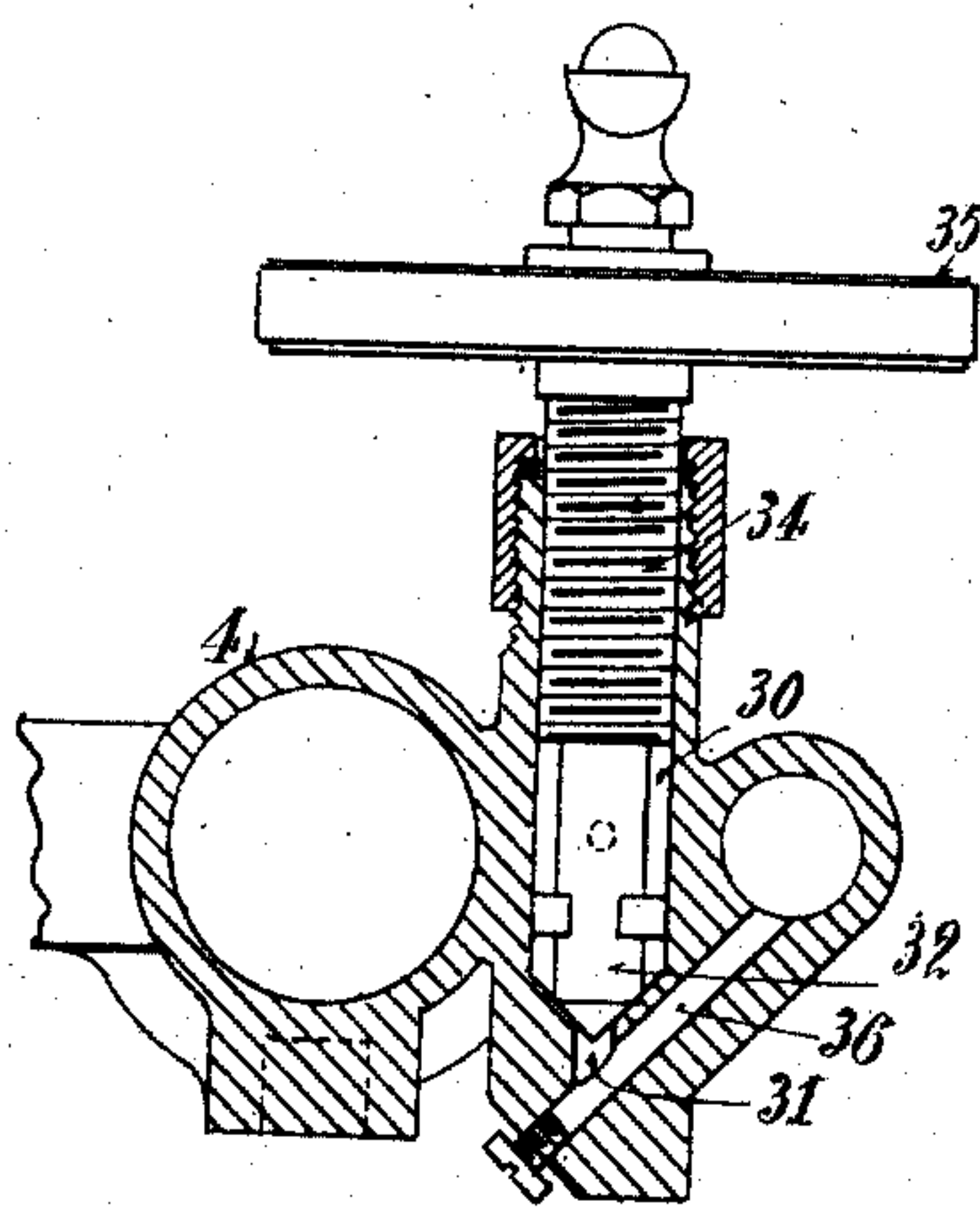
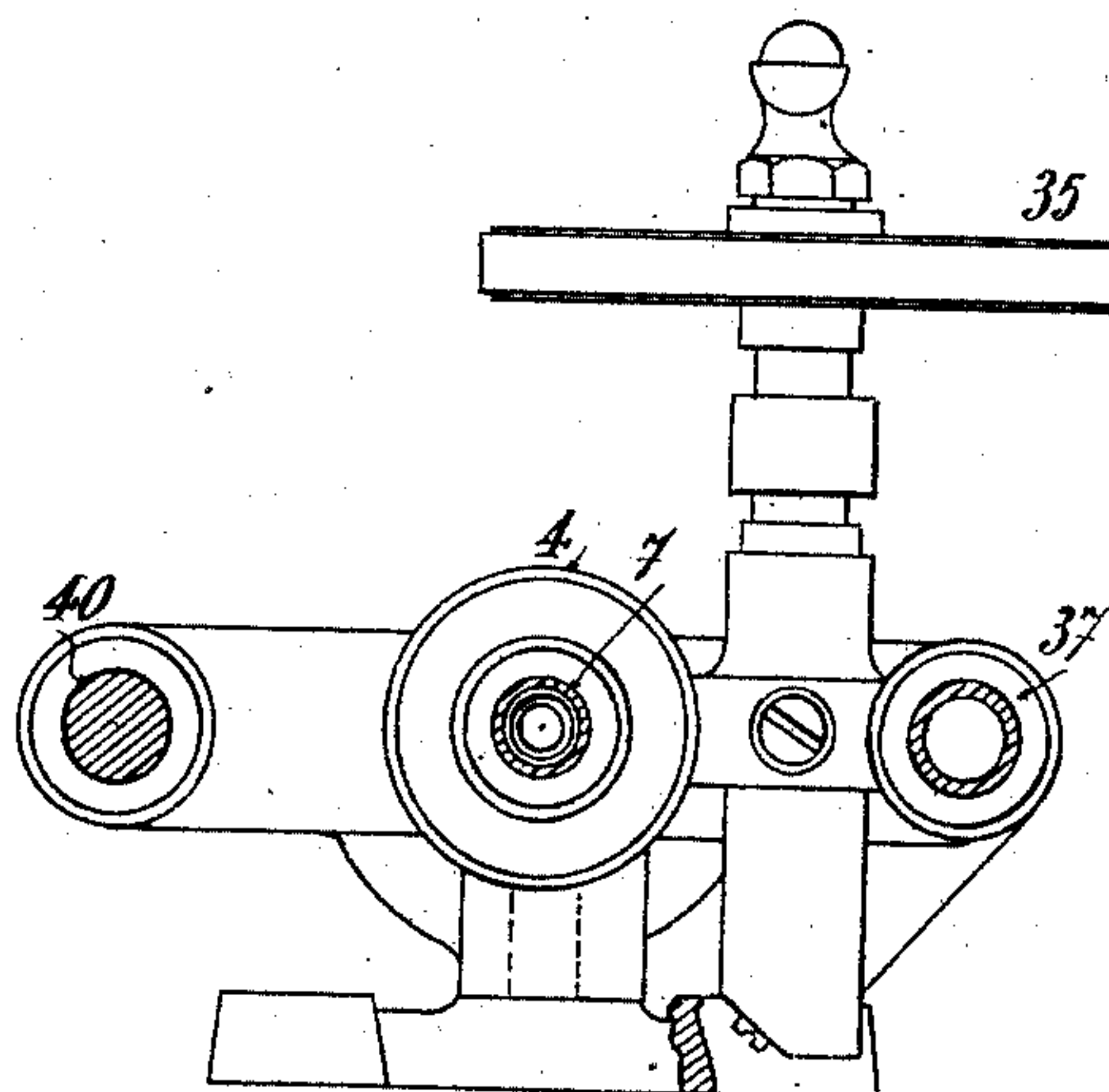


FIG. 10



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5 SHEETS--SHEET 5.

FIG. 10

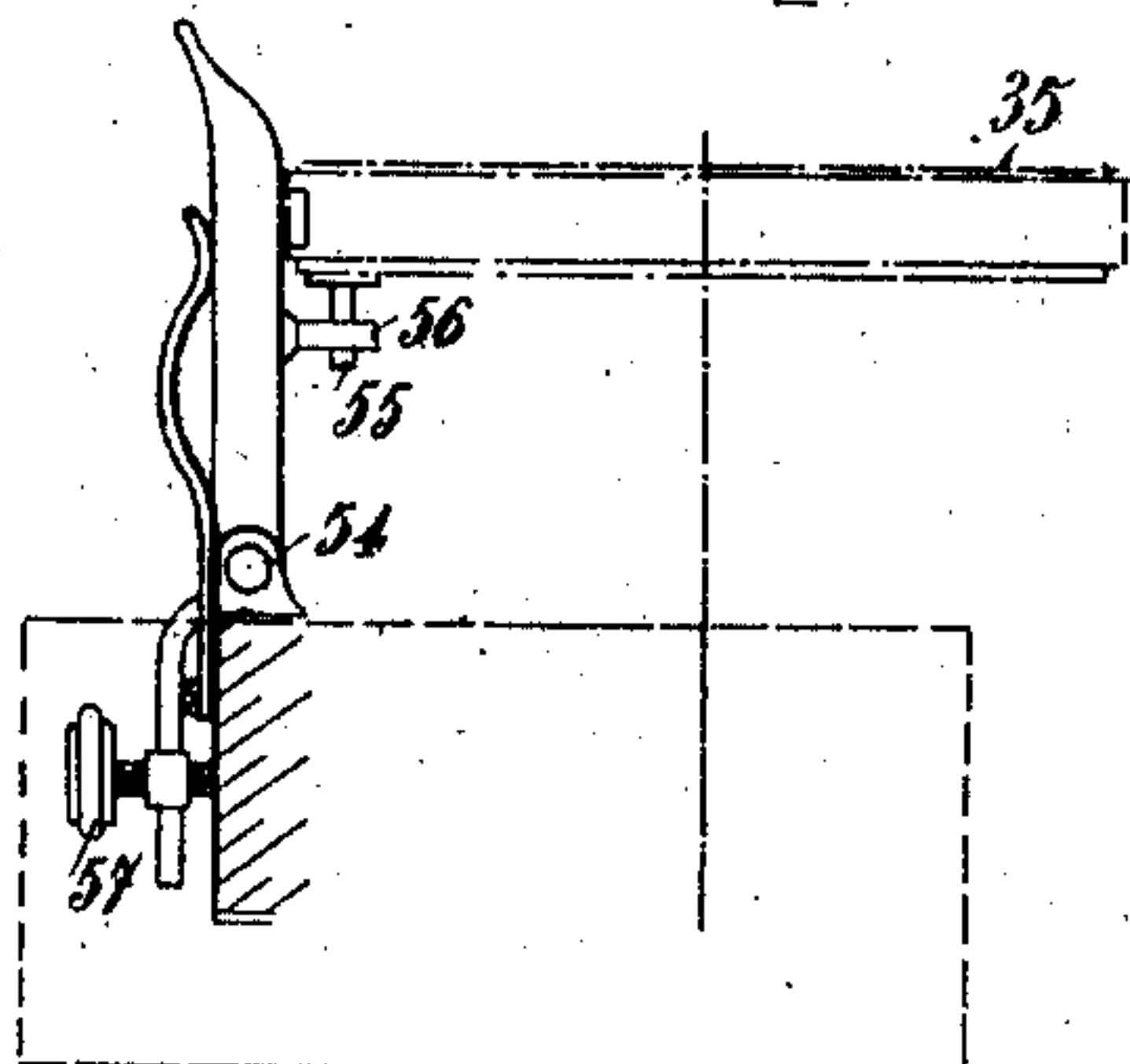


FIG. 12

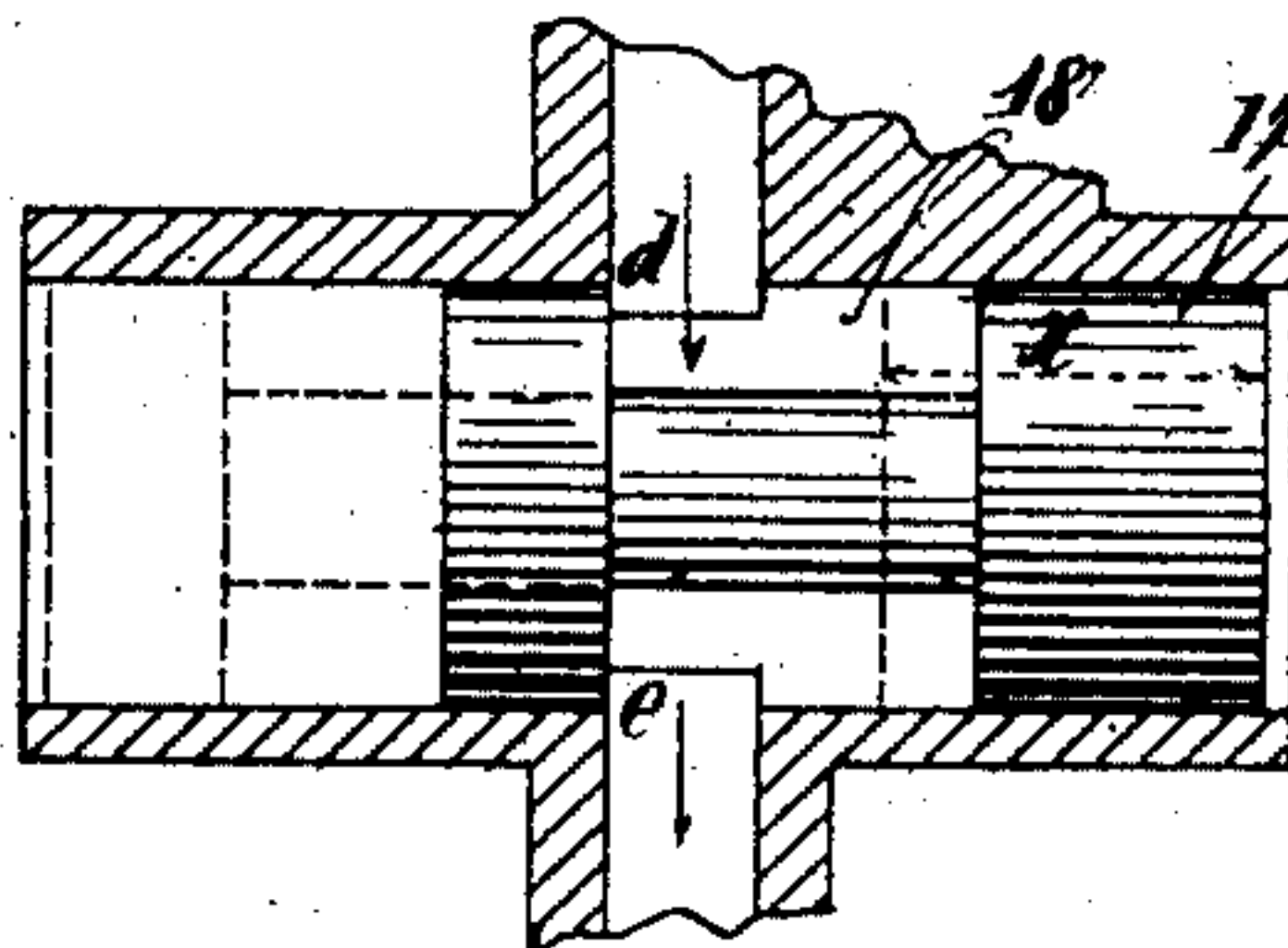
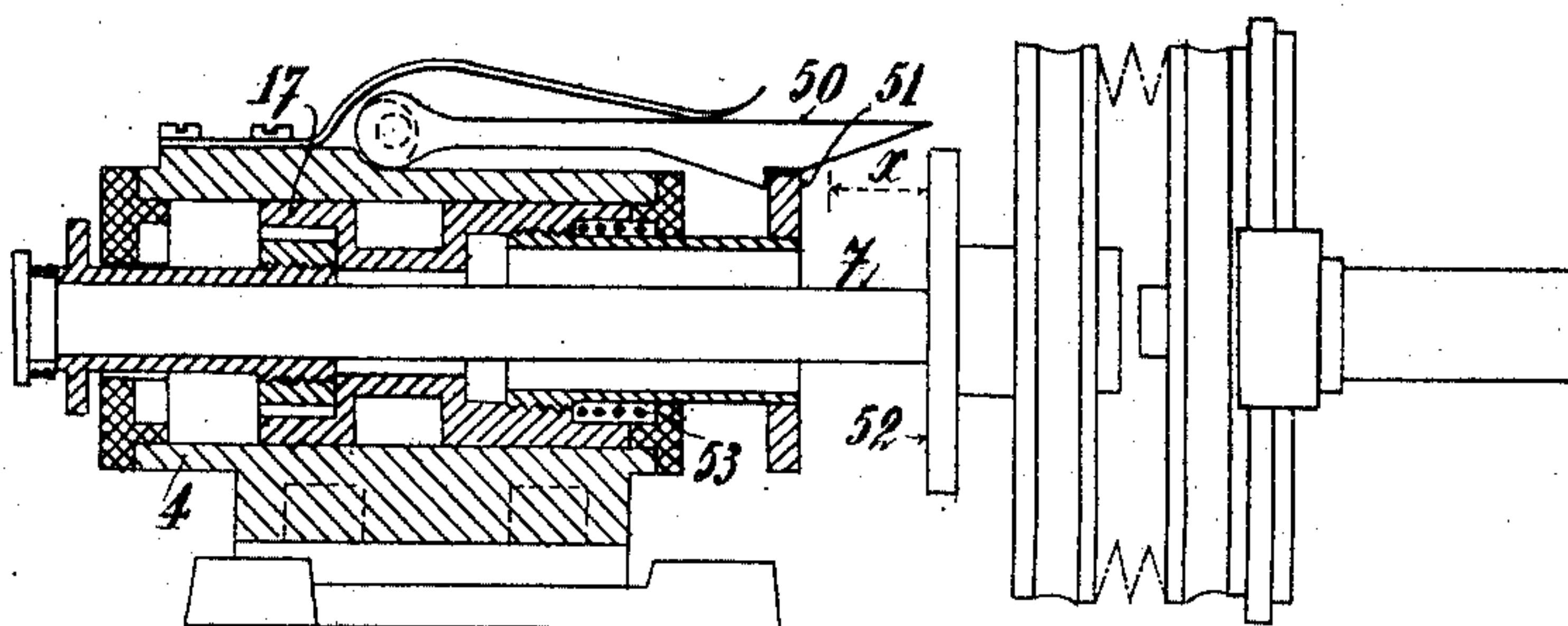


FIG. 11



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES DANIEL ALEXANDRE PASTEUR, OF PARIS, FRANCE, ASSIGNOR OF ONE-THIRD TO ALFRED ERNEST DUQUESNE AND ONE-THIRD TO LOUIS LAZARE DOCKES, BOTH OF PARIS, FRANCE.

INDICATING AND CONTROLLING APPARATUS FOR INFLATING MECHANISMS.

No. 883,228.

Specification of Letters Patent.

Patented March 31, 1908.

Application filed May 31, 1907. Serial No. 376,716.

To all whom it may concern:

Be it known that I, CHARLES DANIEL ALEXANDRE PASTEUR, a citizen of the Republic of France, residing at 6 Rue Godefroy Cavaignac, Paris, in the Department of Seine, France, have invented a new and useful Indicating and Controlling Apparatus for Inflating Mechanisms, of which the following is a specification.

10 The present invention relates to an apparatus intended to be used for the inflation of dilatable rubber articles such as toy balloons for instance, or for the filling of receptacles of all kinds by means of a fluid under pressure, the apparatus being inserted in the supply pipe between the supply of the fluid and the article to be filled, so as to warn the operator when the inflation or the filling is effected to the point desired. The apparatus is
15 moreover capable of being arranged to interrupt automatically the supply of the fluid at the same time as it indicates that the operation of inflation or filling is completed.

25 The indicating apparatus for the normal inflation or control of the supply of fluid admitted into the article to be filled facilitates greatly the delicate operation of inflation by preventing the risk of bursting, which is so frequent with thin envelopes.

30 Apparatus is already known for supplying given doses of fluid with a view to avoid bursting; but such apparatus necessitates a considerable construction in order to produce certain pressures and at certain volumes only, whereas a single apparatus constructed according to the present invention suffices for the normal inflation of articles of all sizes and at any pressure; it may also be applied for the inflation of a single balloon or of several at the same time and this at the same pressure or at different pressures.

Referring to the drawing, Figure 1 shows diagrammatically a warning apparatus for inflation with movable piston. Fig. 2 shows
45 diagrammatically a warning apparatus for inflation with extensible chamber. Fig. 3 shows diagrammatically the combined apparatus adapted to act simultaneously as indicator of the inflation and as controller of the supply of fluid by means of an automatic piston-valve with gradual action. Fig. 4 shows diagrammatically a combined apparatus provided with an automatic piston-valve of instantaneous action. Fig. 5 shows

an elevation of a combined apparatus with a releasing chamber separated from the cylinder and with extensible walls. Fig. 6 shows a plan of Fig. 5. Fig. 7 is a horizontal section on the line A—B of Fig. 5. Fig. 8 is a vertical section on the line C—D of Fig. 5. Fig. 9 is a transverse section on the line E—F of Fig. 6 showing the regulating index. Fig. 10 shows a detail of the stopping and blocking finger of the scale plate of the index. Fig. 11 shows a longitudinal section of the cylinder of the combined apparatus provided with a piston-valve operating instantaneously. Fig. 12 is a constructional modification of a piston-valve of gradual action.

Referring to the diagram of the apparatus shown in Fig. 1, the pipe 1 is traversed from *a* to *b* by the fluid under pressure, such as compressed air for instance. This comes from a bellows or other generator and passes directly to the balloon or other article to be inflated. At a point *c* of the pipe *a* there is a branch pipe consisting of the tube 2 which connects to the bottom 3 of a cylinder 4 in which is placed a piston 5. It will readily be seen that the compressed air coming from the generator will divide at the point *c* into two currents; the principal current (indicated by single arrows) passing towards *b* to inflate the balloon, and the other current (indicated by double arrows) passing through the tube 2 to the cylinder 4 and actuating the piston 5. If the sectional area of the second current be altered by means of a valve 6 or otherwise, the motion of the piston 5 will be influenced, and the piston will effect a given course in a time, the shorter in proportion as the section of the tube 2 is increased. The piston 5 is connected to a rod 7 bearing at its exit from the cylinder a piece 8 intended to operate the oscillating lever 9 of an indicator of any kind. The operation of the indicator will take place every time that the piston 5 has accomplished its predetermined course. It suffices therefore to give to the section of the air current passing through the tube 2 by means of the valve 6 dimensions such that the pre-determined course of the piston 5 shall be accomplished in the time which the principal pipe takes to inflate the balloon. By experiment I may graduate a scale 10 so as to indicate the position of the handle 6 which corresponds to the requirements according to the size of the

articles to be inflated or the amount of inflation required.

When the indicator is operated, the inflated balloon is taken off, the piston is pushed back by means of its rod 7, and another balloon to be inflated is placed on the end *b* of the pipe 1.

The piston rod 7 is hollow and closes at one end by a valve 11. In pushing back the piston it compresses at the same time a spring 12 in order to open the valve 11 and admit the compressed air which has actuated the piston, to escape to the outside or to be returned into the pipe 1 by means of a flexible connecting pipe 13 which joins the hollow rod 7 to the pipe 1 (Fig. 3).

Fig. 2 shows the same indicating apparatus in which the tube 2 terminates in an extensible chamber having a fixed bottom 3' and a movable bottom which effects the same purpose as the piston 5 of the apparatus shown in Fig. 1. The indicating apparatus may be combined so as to interrupt automatically the flow of the fluid at the same time as it indicates that the inflation of the balloon is finished.

Fig. 3 shows an indicating and inflating apparatus combined with a piston valve of gradual operation.

The principal current coming from a generator passes through the pipe 1 which discharges at *d* into the cylinder 4 of the indicator, passes freely through the cylinder and escapes at *e*, whence it is conducted directly by the pipe 1' to the balloon to be filled. This latter is fitted by means of its tube upon the end of a nipple at projection 15 of suitable size fixed in the support 16 in the well known manner.

The derived current passes through the tube 2 provided with the regulating cock 6 and discharges into the rear 3 of the cylinder 4 so as to operate the piston of the indicator 5. This latter is in one piece with the piston valve 17 located in the cylinder 4 and which possesses an annular neck 18 of the same width as the port holes *d e* for the entrance and exit of the principal current in the cylinder 4. The piston valve 17 consequently controls the principal current during its passage through the cylinder 4. It serves as a tap for allowing the current which is proceeding from the generator to the balloon to flow when the neck 18 coincides with the port holes *d e*, and causing the current to be cut off when the said neck blocks the said port holes by means of its unpierced part. If the piston valve 17 be brought into the open position at the commencement of the operation of inflation, it will be seen that under the influence of the derived current which displaces the piston of the indicator, the piston valve 17 will travel in the cylinder until it completely blocks the port holes for the passage of the principal current and at this

moment it will have traversed a course which corresponds to that of the piece 8 which actuates the indicator. Not only is the workman thus warned that the inflation is completed, but also it becomes impossible to introduce into the inflated balloon 14' the least quantity of air more than that permitted by the apparatus and regulated by the play of the piece 6. The inflated balloon is then withdrawn and the nozzle 15 is capped with a new elastic envelop 14. The pistons are restored to their original position by means of a pusher formed of the sliding bar 20 with resisting spring 21 mounted in a little frame 23 and forming a prolongation of the piston rod, the pusher 20 resting at the same time upon the head of the rod of the escape valve 11, in order to release and if desired to collect again the air compressed (or the residual gases which have served to operate the piston of the indicator).

The movement of the piston valve 17 may be instantaneous and take place at the precise moment when the inflation is effected. Fig. 4 shows diagrammatically an arrangement for this purpose. The piston of the indicator 5 and the piston valve 17 are not in one piece. The first one, actuated by the derived current, carries with it by means of its hollow rod 7 a piece forming the angle 25 which pushes the bolts or spring blades 26 which retain a plate 27 subjected to the action of the spring 26 supported at its other end upon a fixing ring 29.

The piston valve 17 is in one piece for the purpose of motion with the plate 27 by means of a sleeve 7' surrounding the rod 7 and it is forced to close on the release of the said plate. In consequence of this arrangement the principal current furnishes a constant supply during the operation of inflation.

In place of causing the tube 2 of the derived current to discharge into the cylinder of the piston valve 17 itself, it is preferable to adopt the arrangement illustrated in Figs. 5 to 11, according to which use is made of an extensible chamber having one wall or movable diaphragm adapted to receive the derived current. The principal current passing from a generator flows through a pipe 1 (Figs. 5, 6, 7) enters into the apparatus through the tube *a* and is admitted through the port hole *d* in the cylinder 4 closing the piston valve 17, and escapes by the port hole *e*. The principal current traverses the cylinder when the neck 18 of the said piston valve 17 coincides with the apertures *d e* and escapes from the apparatus by the pipe *b* which is connected to the conduit *i'* of the article to be inflated, the screw piece 16 and the adjustment 15 serve as intermediaries. The derived current commences at a point *c* on the principal circuit, in the front of the cylinder 4 and terminates in a chamber 30, the discharge orifice of which 31 is controlled by a

pointer 32 of which the bar filleted in its upper part 34 bears externally a plate engraved with a scale 35. The derived current at its escape from the orifice 31 passes up through a pipe 36 formed in a hollow horizontal piece 37 and discharges through a pipe 38 arranged in the thickness of a fixed plate 39, sustained by the said hollow piece 37 and by another solid support 40 (the two little columns being placed symmetrically on one and the other side of the imaginary prolongation of the axis of the cylinder 4). The plate 39 forms the fixed rear end of an extensible chamber 41 having a flexible side wall 42 (or bellows of rubber or of leather) and having a bottom front 5 movable. This part 5 moves under the pressure of the derived current penetrating in the extensible chamber through the orifices 43 of the pipe 38 which possesses a back pressure valve 44. The said part 5 actuates the piston valve 17 by means of the hollow piston 7 which traverses the cylinder 4, and has on its outside the projection 8 which actuates the indicator. The rod 7 ends in the chamber 41 in a central prolongation 43 supported by the fixed bottom 39, and is provided with a valve 11 for the exit of the compressed air or of the residual gases of the chamber 41, as has been already explained.

The operation of the apparatus will be obvious; the piston valve 17 having been placed in the open position and the extensible chamber having been folded up by the backward motion, the compressed air passing from the generator is admitted through the pipe 1 to traverse the cylinder 4 and passes directly into the balloon to be inflated; at the same time the derived current of which the amount is regulated by the pointer 32, enters into the chamber 41 and actuates the bottom 5 which determines either progressively or at once the movement of the piston valve 17 and that of the part 8 of the indicator. The apparatus is so regulated that a given course of the part 5 (equal to that of the part 8) shall be suitable for causing the piston valve 17 to close entirely. The apparatus thus constructed with an extensible chamber 41 for the recuperation of the derived current, can be arranged to effect the instantaneous stoppage of the piston valve 17 at the same time as it operates the indicator. This construction is represented in Fig. 11 according to which it will be seen that the moving bottom accomplishes its course without moving the piston valve 17; this latter mounted freely upon the rod 7 is maintained in the open position by a swinging catch 50 engaging a stopping collar 52 in one piece with the piston valve 17; when the moving bottom 5 has finished its course corresponding to the normal inflation of the balloon, it strikes by means of a projection 52 against the finger 50 and raises it, which re-

leases the piston valve and the latter is immediately closed by the spring 53.

According to the modification illustrated in Fig. 12 the piston valve 17 with progressive motion is provided with a neck 18' much larger than the width of the port holes *d e* in order not to modify the supply from these port holes except at the extreme end of each motion. In all these apparatuses the section of the derived pipe is modified at will by the control of the plate 35 arranged to raise or lower the pointer 32 by screwing or unscrewing. The pointer being blocked in closing, a complete rotation of the plate 35 determines the raising of this pointer by the height of one thread of its screw 34, and this position corresponds to the full opening of the orifice 31. A rack 35' formed upon the edge of the plate permits of the engagement of a catch 54 with the tothing of the plate over against the divisions marked upon the side plate which correspond to the rise of the pointer suitable for the supply of derived current, a supply which varies according to the size of the articles to be inflated or the pressure which is to be established in the inflated goods.

The plate represented in Fig. 6 possesses 100 divisions with respective 100 stopping teeth, and admits of obtaining 100 variations in the amount of the supply furnished to the extensible chamber by the derived pipe, and consequently with this apparatus, by operating simply on the plate 35, we realize 100 different working positions of the indicator and of the piston valve, corresponding to 100 different sizes of balloons or 100 different pressures of inflation for a single balloon. The considerable multiplication of the results obtained will be realized if there be combined this mode of variation of the supply of derived current with the modifications of pressure of the principal current which can be obtained by changing the calibers of the exit apparatus 15. It must be ascertained by experiment what is the position for the plate 35 which best corresponds to each size of balloon, in coöperation with the adjustment 15 of such caliber, and it suffices afterwards to turn the plate 35 according to the indications given by experience and registered upon a table in order to admit of the apparatus indicating the normal inflation and stopping automatically the supply of fluid when this inflation is attained. A stopping finger 55 supported by the plate strikes upon a projection 56 carried by the catch 54 so as to limit the rotation of the plate to a single turn and prevent the unnecessary rising of the pointer, also of the catch, which is held engaged in a suitable division of the plate and can be fixed by a screw 57 when many articles of the same size are to be inflated.

The combined indicating apparatus will be suitable for inflating at the same time a num-

ber of articles and it can be arranged in a row with a series of nozzles for receiving a number of articles at once. The operator cannot in this case hold by hand all the articles placed upon their nozzles during the inflation; it is necessary to make use of nozzles with clamping rings.

What I claim is:—

1. Indicating apparatus for inflating mechanism comprising in combination, a branch pipe from a source of compressed gaseous fluid, a graduated regulating valve on said pipe, a closed chamber in communication with said pipe, a piston in said chamber adapted to move under the pressure of the compressed gaseous fluid, a lever mechanism connected to said piston and an indicating apparatus operated by said lever mechanism.

2. Indicating apparatus for inflating mechanism for the simultaneous inflation of a number of articles comprising in combination, a main pipe from a source of compressed gas, a series of nozzles adapted to receive articles to be inflated, a branch pipe from the source of compressed gas, a controlling valve on said main pipe, a cylinder connected to said branch pipe, a piston in said cylinder adapted to move under the gas pressure and indicating and recording apparatus adapted to be operated by the motion of said piston.

3. Indicating apparatus for inflating mechanism comprising in combination, a branch pipe from a source of compressed gas, a closed chamber in communication with said pipe, a movable partition in said chamber adapted to move under the pressure of the

compressed gas, means for regulating the admission of compressed gas to the chamber, an indicating apparatus in operative connection with said movable partition, and means for shutting off the supply of compressed gas to the articles to be inflated adapted to be operated by the motion of the aforesaid movable partition.

4. In combination with indicating apparatus for inflating mechanism, means for shutting off the supply of compressed gas to the articles to be inflated, comprising a closed chamber, a communication to said chamber from a source of compressed gas, a movable partition in said chamber, a projection attached to the said movable partition, a piston valve on the main gas supply pipe and a spring adapted to be released by the said projection in a given position of the partition, and to close the said main valve.

5. In combination with a compressed gas inflating mechanism, an adjustable indicator, apparatus adapted to operate the said indicator under pressure from the compressed gas supply, and a connection between the main valve of the inflating mechanism and the apparatus controlling the indicator whereby on the indicator attaining a predetermined position the main gas valve is closed.

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

CHARLES DANIEL ALEXANDRE PASTEUR.

Witnesses:

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