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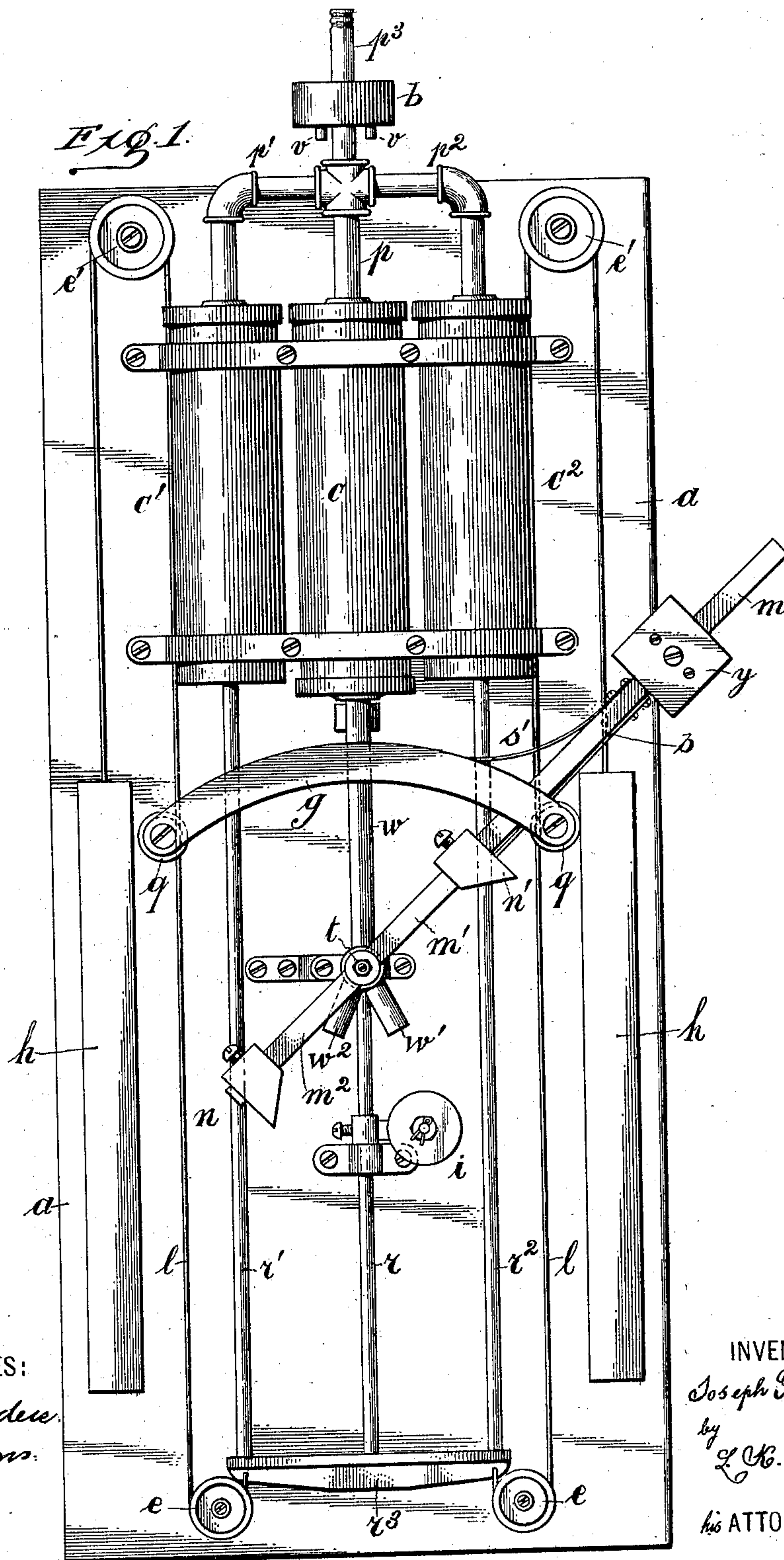
PATENTED FEB. 23, 1904.

J. GRÜNINGER.
BEER PUMP.

APPLICATION FILED FEB. 17, 1903..

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES:

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Lily Williams.

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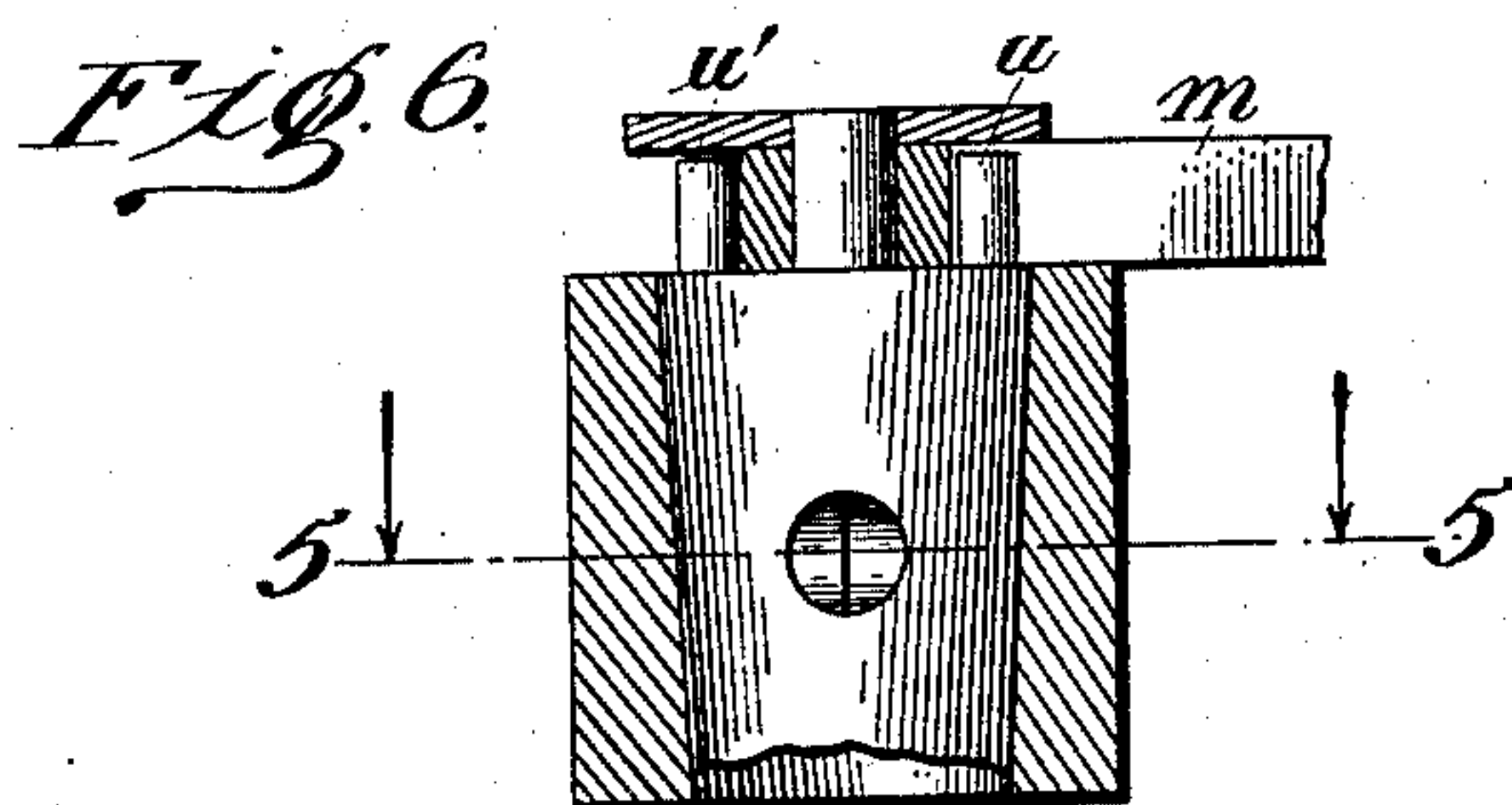
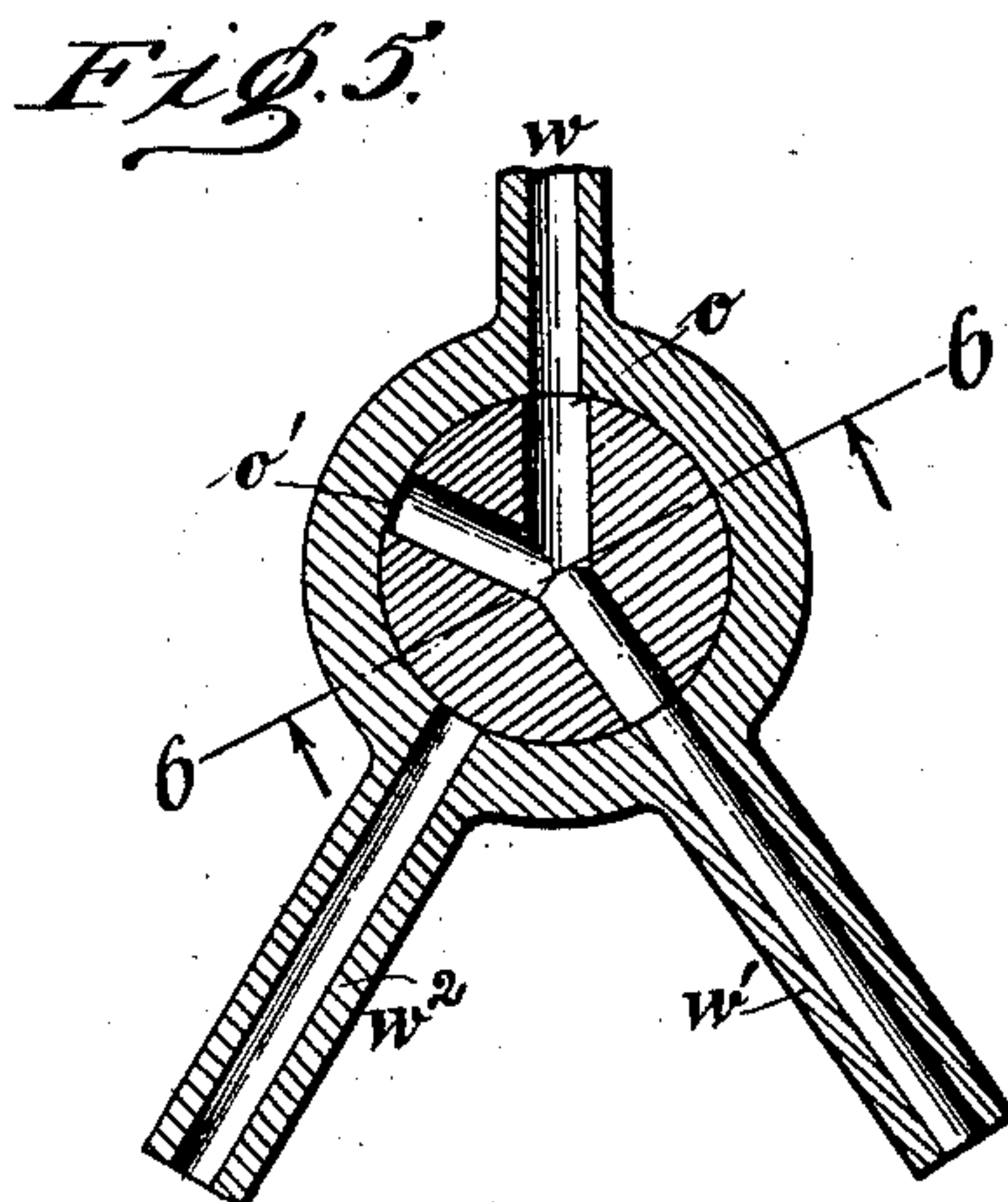
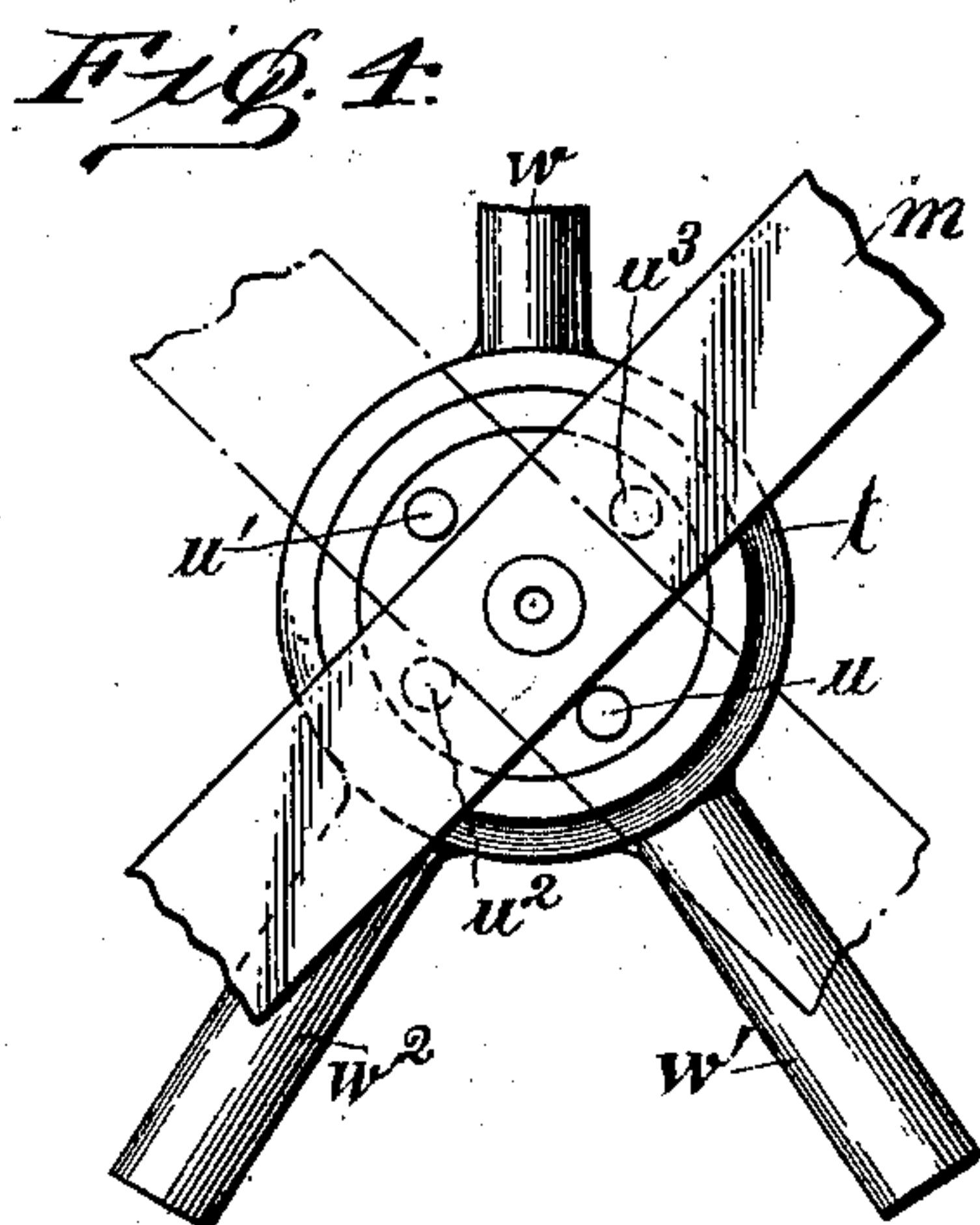
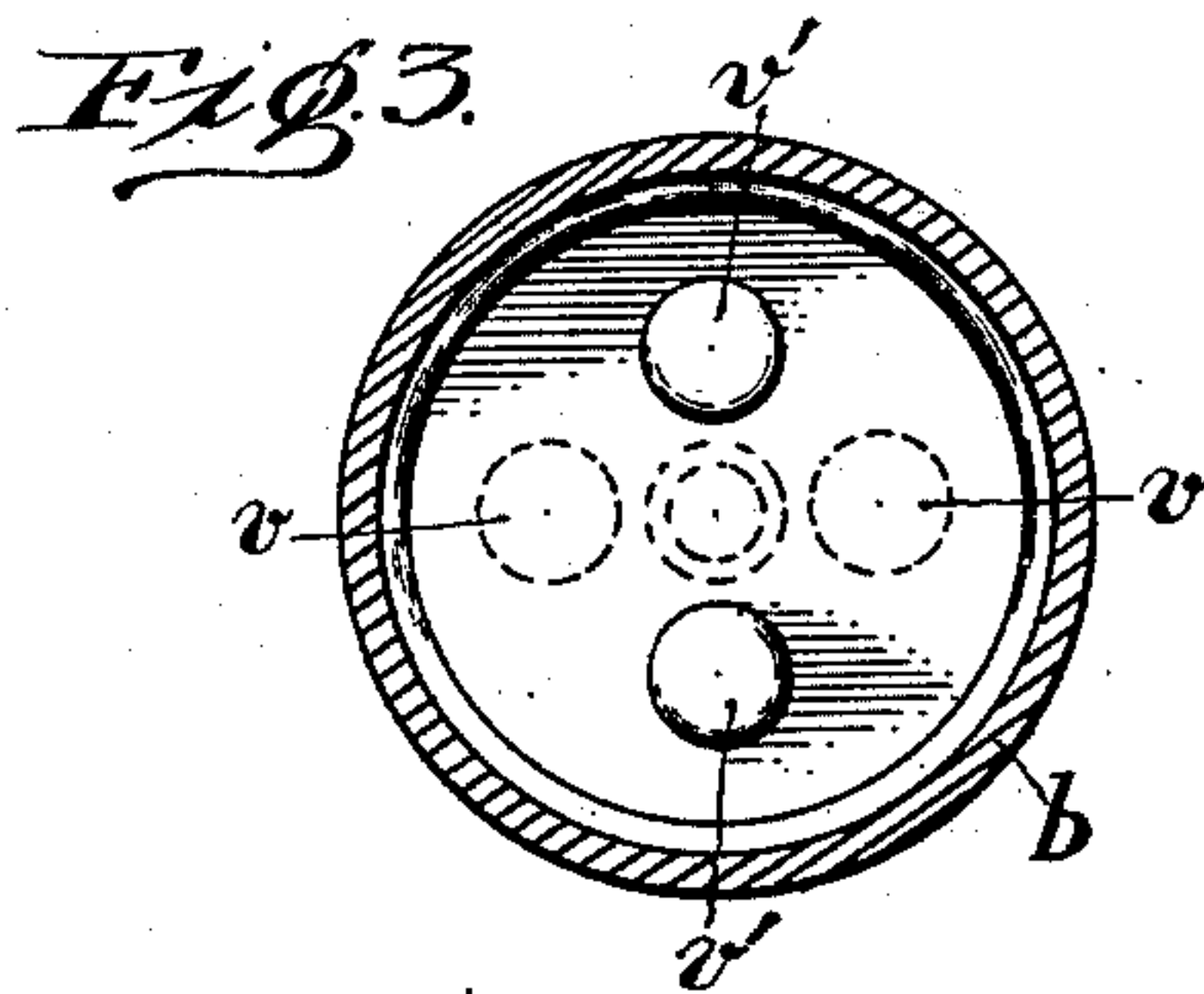
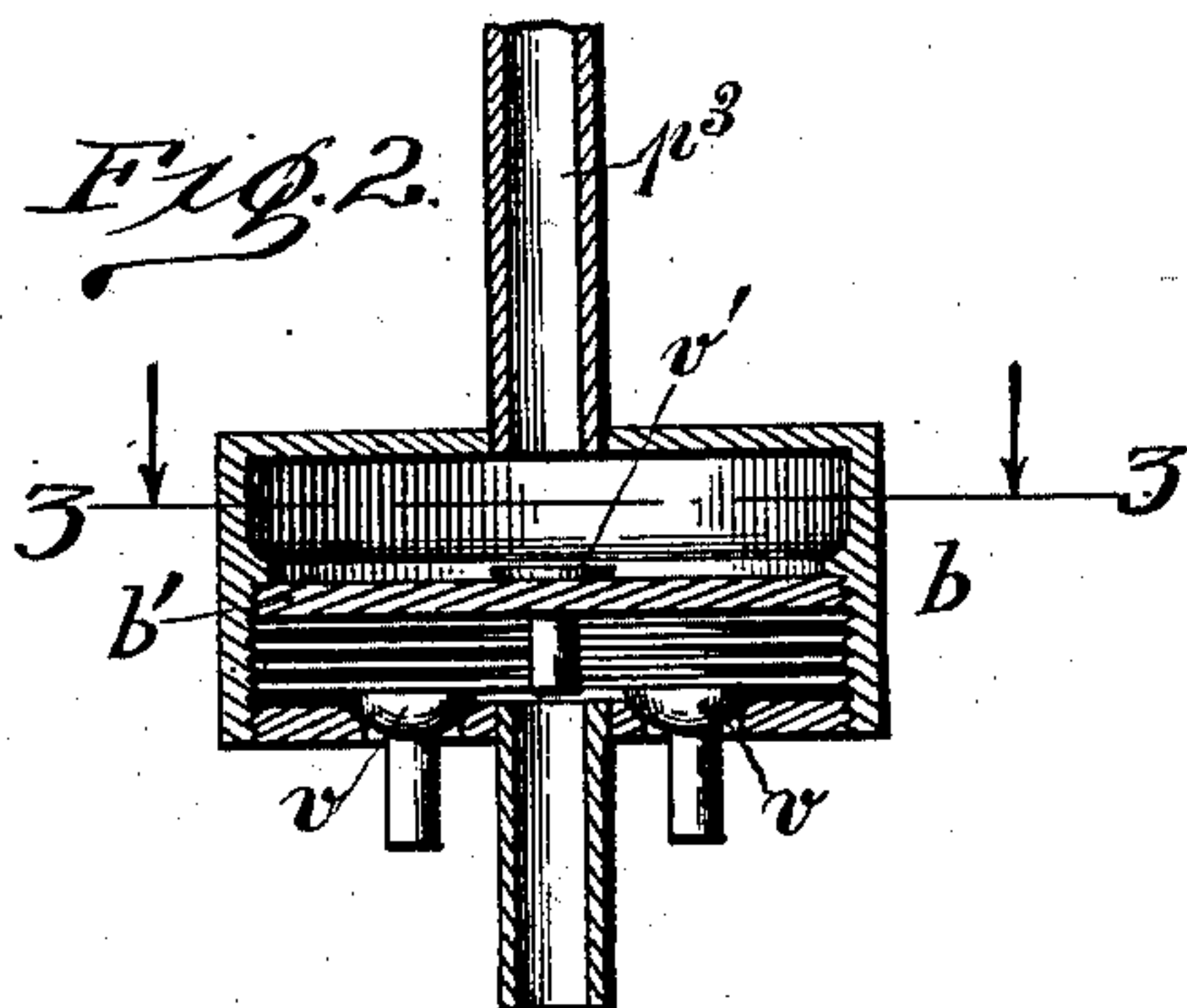
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APPLICATION FILED FEB. 17, 1903.

NO MODEL.

3 SHEETS—SHEET 2.



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No. 752,668.

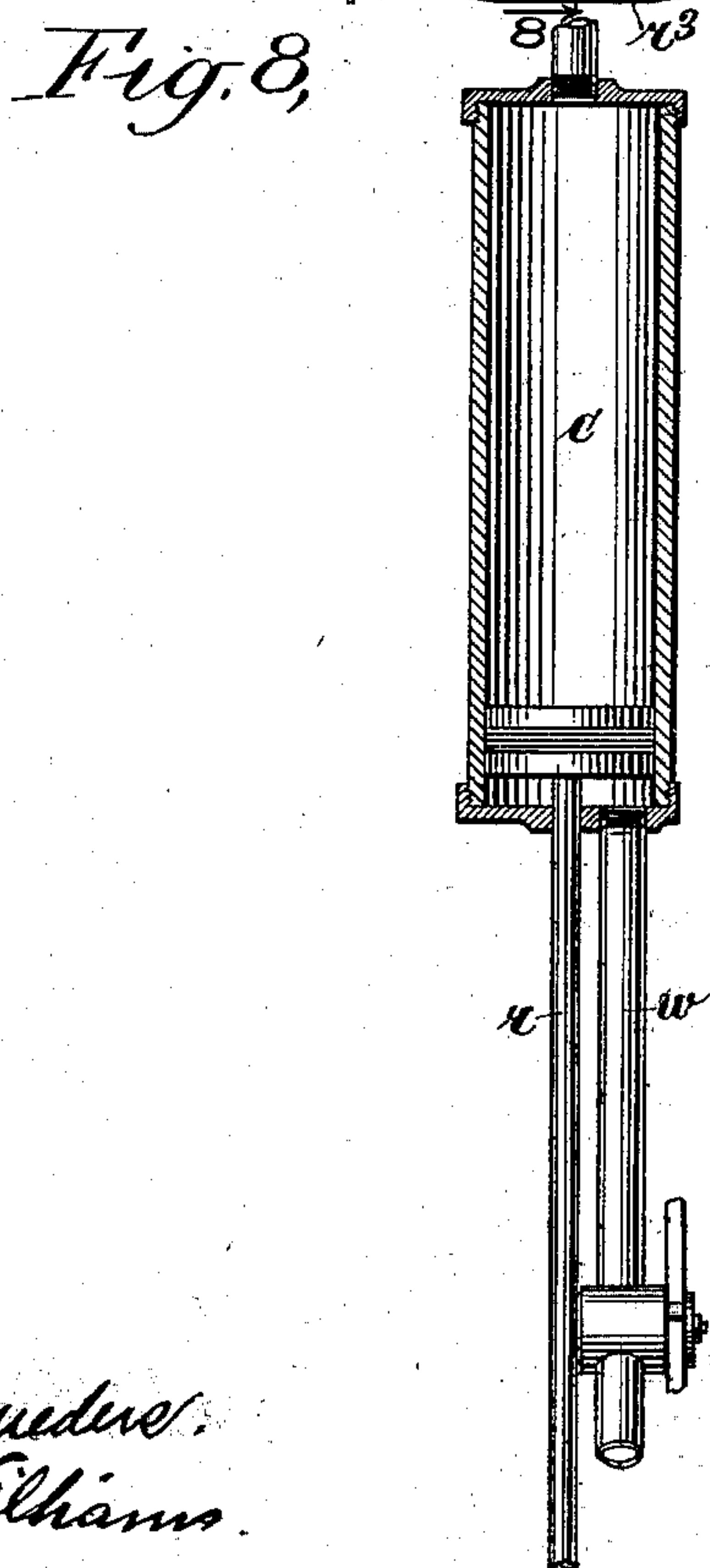
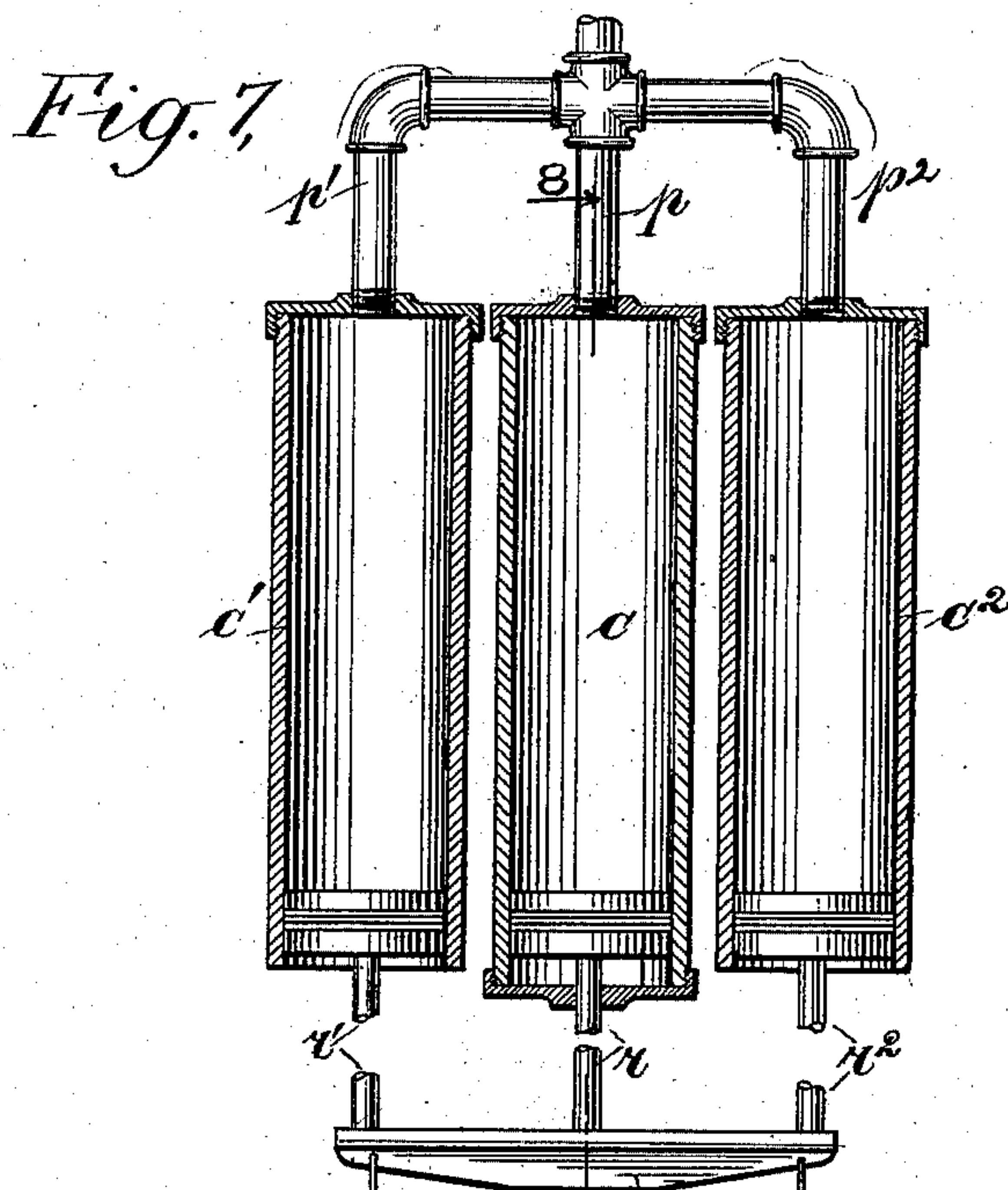
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J. GRÜNINGER.
BEER PUMP.

APPLICATION FILED FEB. 17, 1903.

NO MODEL.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JOSEPH GRÜNINGER, OF NEW YORK, N. Y.

BEER-PUMP.

SPECIFICATION forming part of Letters Patent No. 752,668, dated February 23, 1904.

Application filed February 17, 1903. Serial No. 143,755. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH GRÜNINGER, a citizen of the United States of America, and a resident of the borough of the Bronx, New York city, in the county and State of New York, have invented certain new and useful Improvements in Beer-Pumps, of which the following is a specification.

This invention has reference to beer-pumps; and it pertains particularly to that type of beer-pumps which are operated by means of water. The pumps are used for the purpose of compressing air into a reservoir. The compressed air is used on the surface of the beer for the purpose of forcing same up to the faucet through which it is dispensed. The principle underlying these pumps usually is that a volume of air is compressed by an equal volume of water, so that a certain volume of air is compressed by the same volume of water. Under these conditions great quantities of water are consumed for this purpose in large cities, owing to the fact that surprisingly large numbers of such pumps are in daily use.

It is the purpose of this invention to reduce the quantity of water employed for operating such pumps, the invention consisting in a pump which compresses one volume of air and requires but one-third volume of water for doing same.

The invention further consists in the details of the construction of the pump and the arrangement of the various parts composing same.

My novel beer-pump is illustrated in the accompanying drawings, in which—

Figure 1 represents a pump in front elevation which embodies my invention. Fig. 2 is a central section of air inlet and discharge valves. Fig. 3 is a cross-section of same on line 3 3 of Fig. 2. Fig. 4 illustrates in detail in front elevation a three-way pump controlling or operating valve. Fig. 5 is a cross-section of the three-way valve on line 5 5 of Fig. 6. Fig. 6 is longitudinal section of same on line 6 6 of Fig. 5. Fig. 7 is a vertical sec-

tion of the three cylinders, and Fig. 8 is a section on line 8 8 of Fig. 7.

Similar letters of reference denote like parts in all the figures.

My novel pump is provided with three cylinders, which communicate with each other by means of piping arranged at the top. There are three pistons and three piston-rods. The latter are connected, and therefore move up and down simultaneously. However, the central cylinder alone is provided with a water inlet and outlet pipe, while the two side cylinders do not possess this device. By virtue of the three connected piston-rods the three pistons are forced up together, compressing and delivering the air contained in the three cylinders, while merely the central cylinder is filled with water during the operation of the pump. In this way one volume of water compresses and delivers three volumes of air, thus saving two volumes of water.

In the drawings, *a* represents a thick oblong and rectangular board, on which the pump is mounted. The cylinders are designated by the letters *c*, *c'*, and *c''*. The cylinders *c'* and *c''* are open at the bottom, as is plainly seen in Fig. 7, while the central cylinder *c* is closed. (See Figs. 7 and 8.) At the top the three cylinders are closed and connected by piping *p*, *p'*, and *p''*. Each cylinder has a piston and piston-rod. The piston-rods *r*, *r'*, and *r''* are permanently connected to each other by a brace *r'''*. The central cylinder, which is closed at the bottom, is provided with a water inlet and outlet pipe *w*, which forms at its bottom two branches *w'* and *w''*. One of these branches serves as the water-inlet, while the other forms the outlet and connects with a waste-pipe. In order to regulate and control the inlet of the air into the cylinders and to discharge same into a reservoir, I have provided a box with two sets of valves above the central cylinder *c* and in the continuation of the pipe *p*. The location of this box is plainly seen in Fig. 1. The box is shown in central section in Fig. 2, while Fig. 3 is a cross-section of same on line of 3 3 of Fig. 2. It is

divided into two compartments, each containing one set of valves. In the lower compartment there are the air-inlet valves v , and the top compartment is provided with two discharge-valves v' , which rest in the intermediate portion b' , by means of which the two compartments are formed. The working of the two sets of valves will be described farther on. At the place where the two branches w' and w'' of the water-pipe w are joined there is a three-way valve t , which is shown in detail in Figs. 4, 5, and 6. The valve is operated by means of an automatic device connected to the key of the valve and actuated by the water which flows into and out of the central cylinder c . The valve-operating device consists, essentially, of a metal bar m , which is loosely secured near its lower end to the key of the three-way valve, so that it turns on the top portion of the key without affecting or moving same. In order to open and close the valve by means of the bar m , pins u u' are provided. These pins are permanently fixed to the key. (See Figs. 4 and 6.) When the loosely-secured bar m strikes one of these pins, then the key of the valve is turned, and when it strikes the other pin then the key returns to its former position, thereby establishing in one instance communication with the branch w' , the water-pipe, and the cylinder c' and in the other instance, with the cylinder c , the water-pipe, and the branch w'' . The position of the pins u u' after the bar m has moved them is shown in dotted lines in Fig. 4, (marked u^2 u^3 .) Near the top of the bar there is an adjustable weight y . Below this weight there are two springs s s' , attached to the sides of the metal bar m . There are, further, two cams on the rod m . The lower cam n is adjustably secured below the three-way valve, while the upper cam n' is adjustably secured above the same. The metal bar m , when moving during the operation of the pump, is guided by an arc-shaped guiding device g , which is secured to the board a , on which the pump is mounted. On the central piston-rod there is further provided a loose wheel i . This wheel is vertically adjustable and moves with the piston-rod. Its function will be understood when the operation of the pump is described. The piston and piston-rods are forced up during the operation of the pump by the water entering the central cylinder. After this has been done the pistons and piston-rods must return to the former position, in which it is shown in Fig. 1. This is effected by means of the loose wheel i and a weight secured to the brace r^3 . In order to prevent the weight from extending beyond the pump-supporting board, I have arranged two weights, as shown in Fig. 1. Two cords or strings l l are secured to the brace r^3 near its ends. Plain cords, metal strings, or, best, cords of catgut

may be used. These cords pass first around the rollers e and go upward. Then they pass around the rollers e' and go downward and are there attached to the weights h .

The operation of the pump is as follows: The branch w' of the three-way valve is connected, say by means of a rubber hose, to the water-supply. Assuming that the pump is in the position shown in Fig. 1, then the three-way valve illustrated in detail in Figs. 4, 5, and 6 will have the opening o in the location indicated in Fig. 5. The water then passes through the branch w' , the three-way valve, and the water-pipe w into the central cylinder c , thereby forcing up the piston contained therein. Owing to the fact that the three piston-rods are rigidly connected to each other, the cylinders c' and c'' are simultaneously forced up with the piston of the cylinder c . The air in the three cylinders being thus compressed forces the valves v' up, whereby the air will be discharged through the pipe p^3 into the air-reservoir. When the piston-rod r moves up, then the wheel i , attached thereto, moves up with it and strikes the portion m' of the loosely-secured bar m . It travels along same, moving the bar toward the left. Upon reaching the cam n' the wheel i travels along the lower obtuse-angular edge of same, the opening o so far retaining the position shown in Fig. 5. At this moment the bar m , with the weight y , stands beyond the vertical center line of the pump and strikes the pins u u' . Being beyond the center line, the bar is thrown to the other side by force of the weight. When this is done, the key of the valve has turned and the branches therein have changed position. The opening o' connects now with the water-pipe w , while the branch w' of same is closed, and thereby the supply of water. The two weights h then enter into action, pulling down the three pistons and causing thereby the water in the central cylinder c to flow off through the water-pipe w and branch w'' into the waste-pipe. While descending, the wheel i on the piston-rod r will reach the portion m'' of the bar and force the bar gradually to the right toward the center line. Upon reaching the cam n the wheel i travels along the obtuse-angular edge of same, which is inversely arranged to the same edge on cam n' . Then the wheel i forces the bar m beyond the vertical center line. Now the bar strikes the pins u^2 u^3 and is thrown over by the weight y into its original position, (shown in Fig. 1,) thereby turning the key of the valve and establishing again connection with the water-supply. This operation is automatically repeated as long as the water is turned on. The weight y is adjustably secured to the bar m and may be moved up and down while adjusting the pump. Between the bar-guiding device and the board there are two rubber pieces g , which are provided for the purpose

of lessening the sound when the bar strikes in that location. The two springs s s' also aid in lessening the sound by breaking the force of the bar and weight when same fall over.

5 In the described manner the three-way valve is opened and closed by the valve-operating device by means of the loosely-secured bar m with the weight y and the pins u , u' , u^2 , and u^3 , the openings in the valve retaining their

10 position until the bar strikes the pins, which are rigidly secured to the key, and therefore alone capable of turning same. As long as the pistons ascend the valves v' , Figs. 2 and 3, are kept open by the compressed air; but

15 when the water has been shut off by the valve-operating mechanism and the pistons descend by force of the weights then the compressed air in the reservoir keeps the valves v' closed. At the moment when the pistons begin to

20 descend a partial vacuum will be created in the top portions of the cylinders and the pressure of the atmosphere will actuate and open the valves v , Figs. 3 and 4, so that the three cylinders are again charged with air. This,

25 too, will be repeated each time the pistons descend. It is plainly understood that the stroke of the pistons may be varied by the adjustment of the cams n n' . The pressure required in the air-reservoir for the desired purposes

30 usually is from ten to fifteen pounds. When this pressure is exceeded to a certain degree, then the pump will work slowly, thereby saving water also.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A beer-pump comprising a central cylinder closed at the top and bottom, two side cylinders closed at the top and open at the

40 bottom, pipings connecting the three cylinders at the top, air-inlets for the upper ends of the cylinders, a piston and piston-rod for each cylinder, a brace connecting rigidly the three piston-rods at their bottom ends, a water-pipe

45 connected with the lower end of the central cylinder, an inlet and an outlet branch formed thereon at its bottom end, and means for automatically connecting the water-pipe and its two branches.

50 2. A beer-pump comprising a central cylinder, a water-pipe connected thereto at its bottom, an inlet and an outlet branch formed at the bottom of this pipe, two side cylinders, pipings connecting the three cylinders at the

55 top, air-inlets for the upper ends of the cylinders, a piston and piston-rod for each cylinder, a brace connecting rigidly the three piston-rods at their bottom ends, a three-way valve connecting the water-pipe and its two

60 branches, and means for forcing the pistons down.

3. In a water-actuated beer-pump, two side cylinders, a central cylinder, a water-pipe connected to its lower end, an inlet and an

outlet branch formed on this pipe, pipings 65 connecting the three cylinders at the top, air-inlets for the upper ends of the cylinders, a piston and piston-rod for each cylinder, a brace connecting rigidly the three piston-rods at their bottom ends, a three-way valve in the

70 water-pipe, means for automatically opening and closing the valve, two wheels arranged below the brace, two wheels arranged above the cylinders, two cords passing over the upper wheels and under the lower wheels and

75 each having one end secured to an end of the brace, and weights secured to the other ends of the cords.

4. In a water-actuated beer-pump, a central cylinder closed at the top and bottom, a water-pipe connected to its bottom, an inlet and outlet branch formed on this pipe, means for connecting the pipe alternately with the inlet and with the outlet branch, two side cylinders closed at the top and open at the bottom, a

80 piston and piston-rod for each cylinder, a brace connecting rigidly the three piston-rods at the bottom and pipings connecting the three cylinders at the top.

5. In a water-actuated beer-pump, a piston 90 with piston-rod, a three-way valve in combination with an automatic valve-operating device comprising a steel bar secured loosely to the key of the valve two adjustable cams on the bar, one on each side of the valve, an inner obtuse-angular edge on each cam arranged

95 inversely to each other, a loose wheel carried up and down by a piston-rod and actuating the cams, two pins secured rigidly to the key of the valve, these pins actuating the key when

100 the bar strikes them, a weight near the top of the bar, one spring on each side of the latter below the weight and an arc-shaped bar-guiding device.

6. In a water-actuated beer-pump, a piston 105 with piston-rod, a loose wheel connected to the piston-rod and moving with it, a three-way valve, and an automatic valve-operating device comprising a steel bar secured loosely to the key of the valve, two adjustable cams on the bar, one on each side of the valve, an inner obtuse-angular edge on each cam arranged

110 inversely to each other, two pins secured rigidly to the key of the valve, the pins actuating the key when the bar strikes them, a

115 weight near the top of the bar, one spring on each side of the latter below the weight, and an arc-shaped guiding device in combination with a loose wheel traveling along the bar and the obtuse-angular edges.

7. In a water-actuated beer-pump three cylinders provided with inlets and outlets for air, a piston and piston-rod for each, a brace connecting the piston-rods at the bottom, a water-pipe on the central cylinder forming an inlet

120 and an outlet branch at its bottom, a three-way valve connecting the water-pipe and its branches, and an automatic valve-operating

device consisting of a metal bar secured loosely
to the key of the valve, two adjustable cams
on the bar one on each side of the valve, an
inner obtuse-angular edge on each cam ar-
5 ranged inversely to each other, a weight on
the top portion of the bar, one spring on each
side of the latter below the weight, an arc-
shaped guiding device for the bar, a loose
wheel adjustably secured to the central piston-

rod and pins secured rigidly to the key of the 10
valve for opening and closing same.

Signed at New York, N. Y., this 4th day of
February, 1903.

JOSEPH GRÜNINGER.

Witnesses:

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