(No Model.)

5 Sheets—Sheet 1.

H. PORTEVIN.

BOTTLE WASHER.

No. 514,334. Patented Feb. 6, 1894.

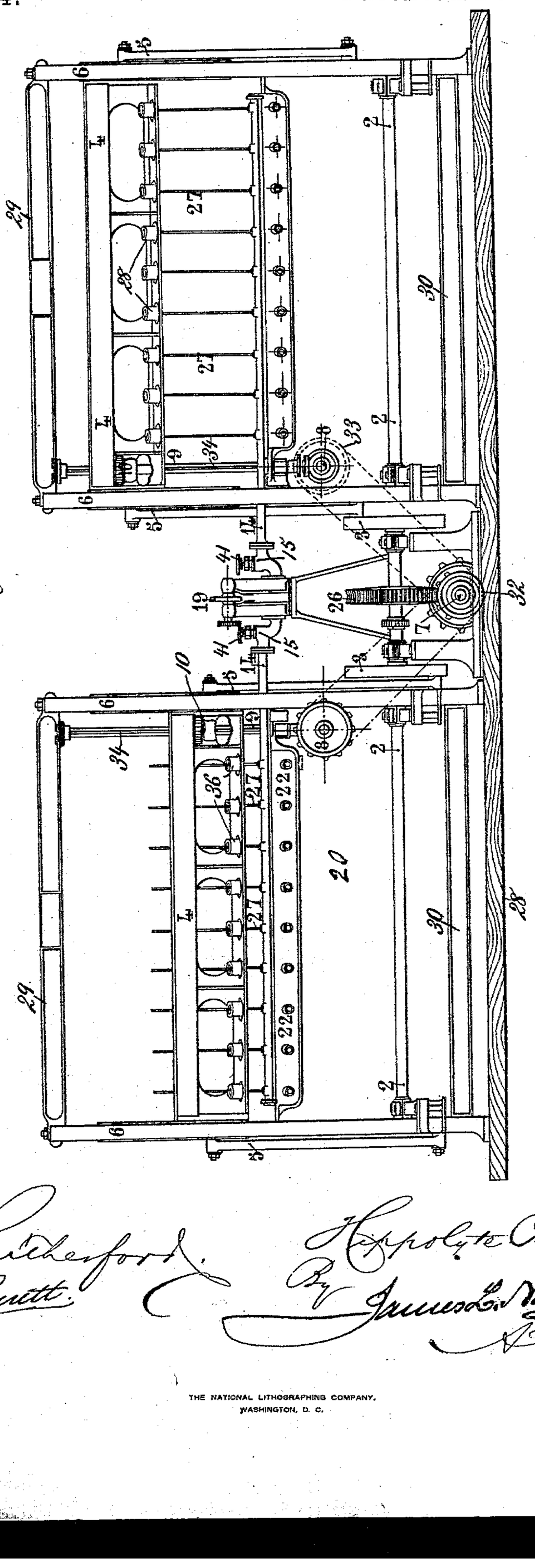

fig. 1.

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(No Model.)

5 Sheets—Sheet 2.

H. PORTEVIN.

BOTTLE WASHER.

No. 514,334.

Patented Feb. 6, 1894.

fig. 4.

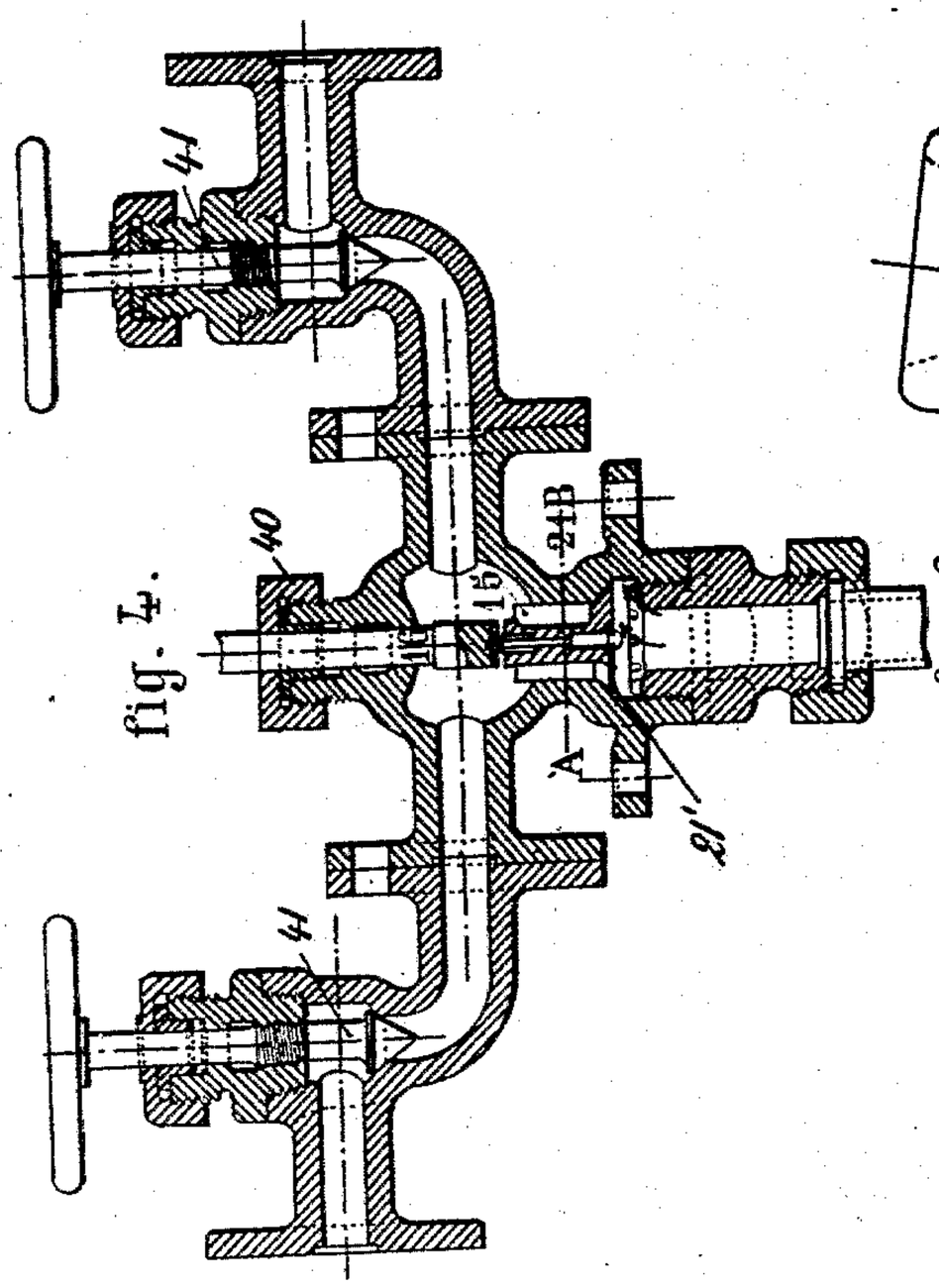


fig. 6.

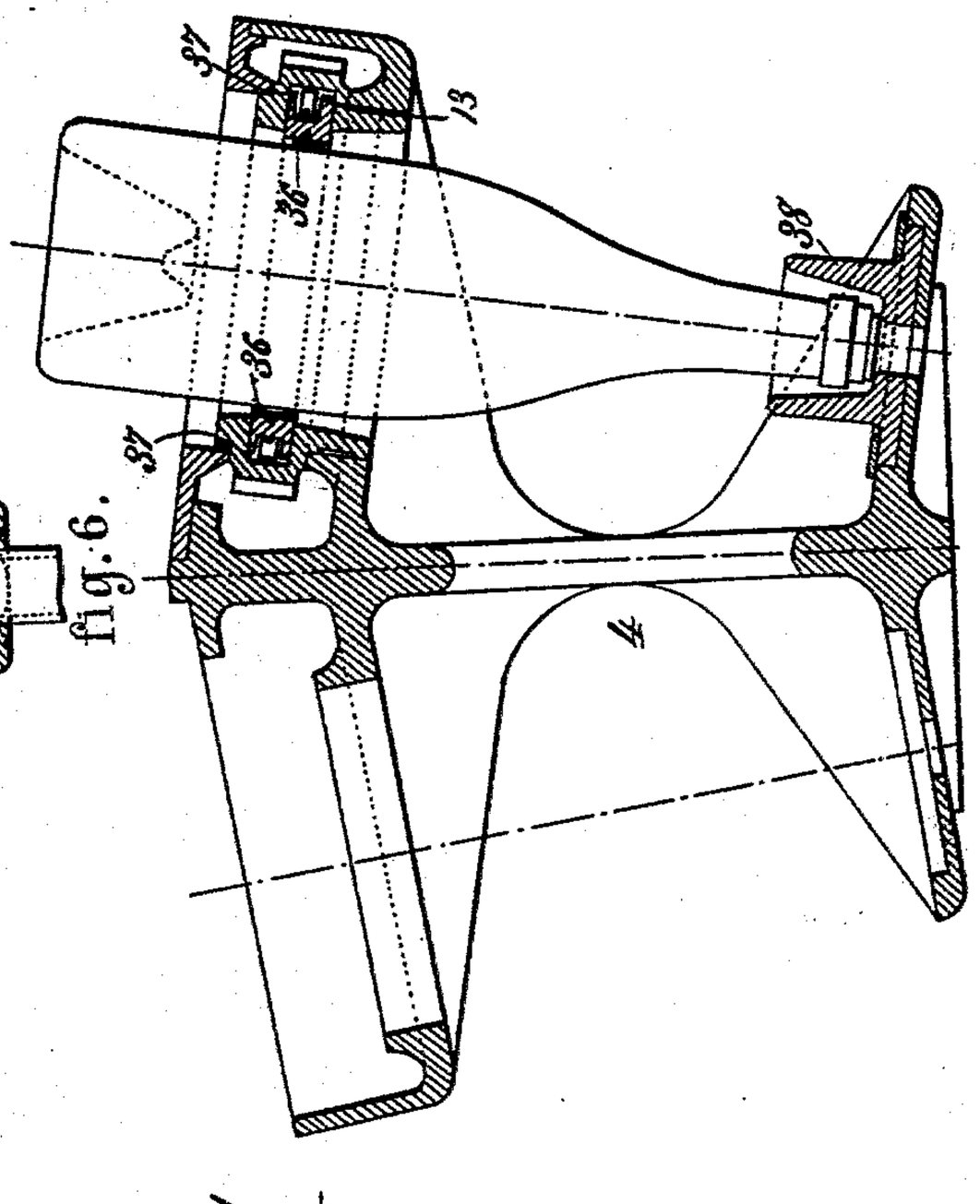


fig. 3.

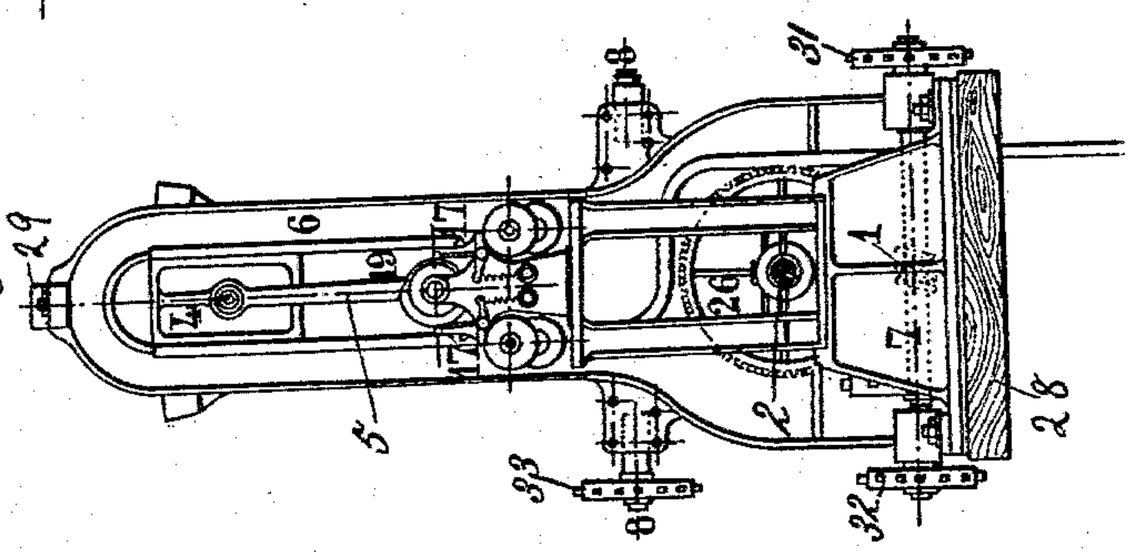


fig. 2.

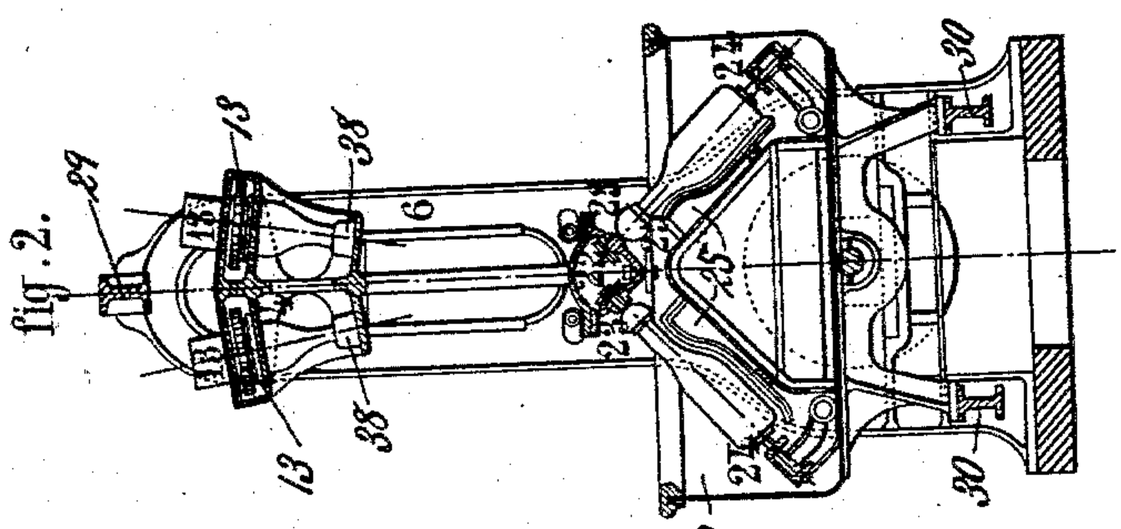
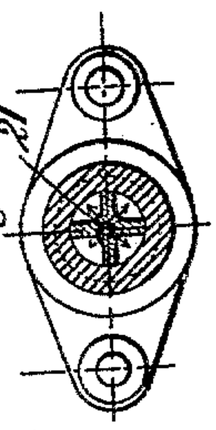


fig. 5.



Witnesses

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5 Sheets—Sheet 3.

H. PORTEVIN.

BOTTLE WASHER.

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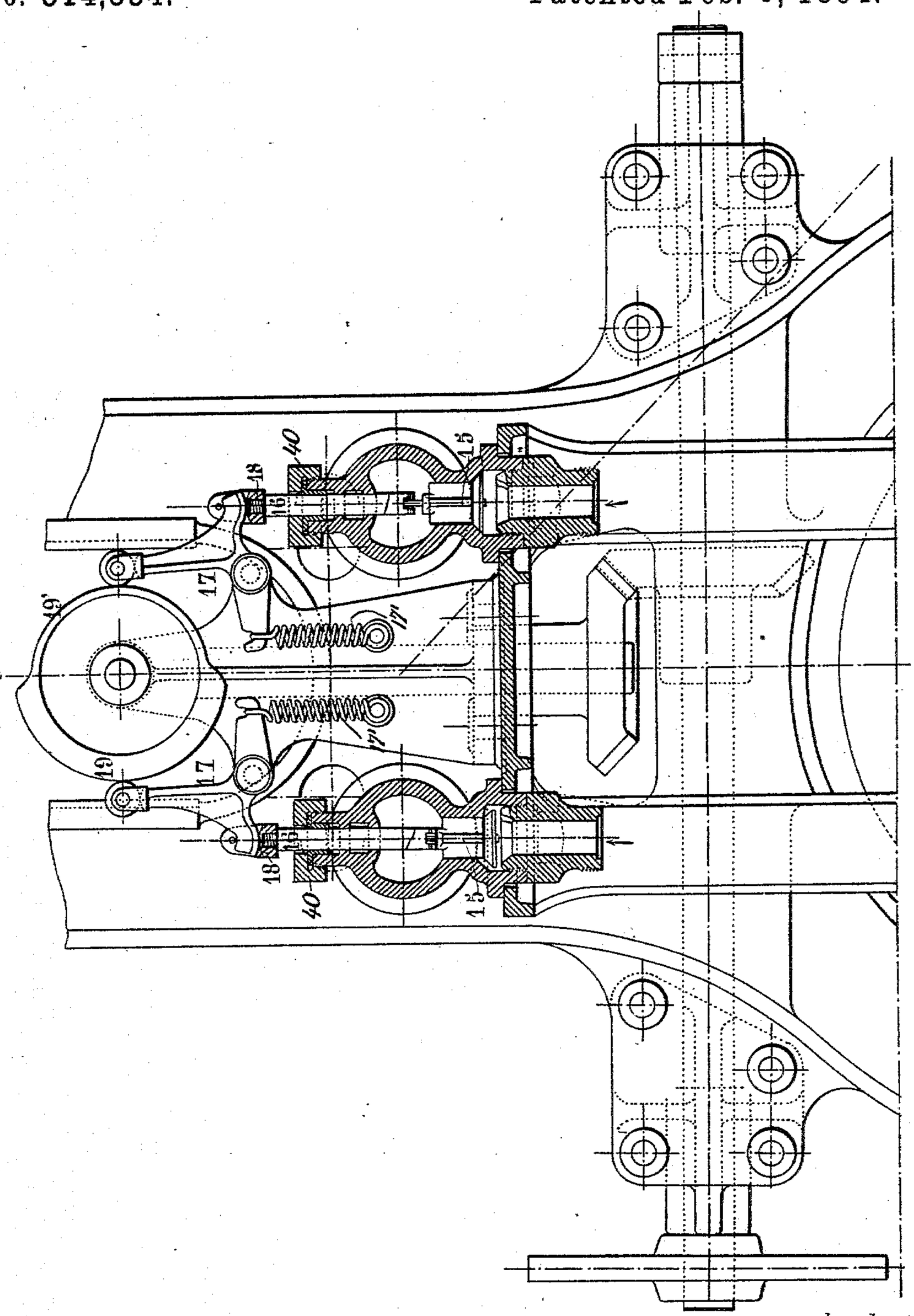

Fig. 7.

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(No Model.)

5 Sheets—Sheet 4.

H. PORTEVIN.

BOTTLE WASHER.

No. 514,334. Patented Feb. 6, 1894.

fig. 8.

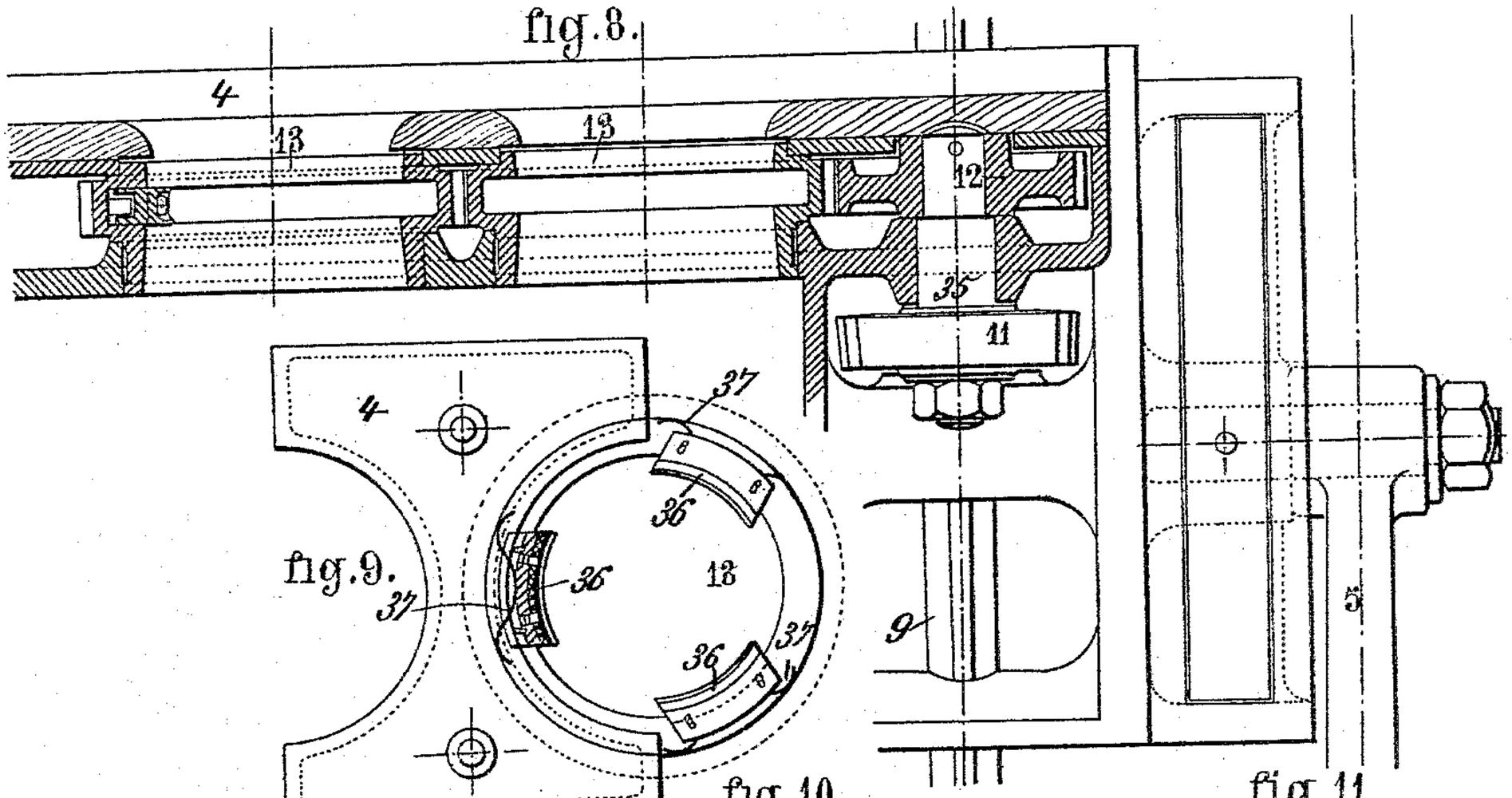


fig. 9.

fig. 10.

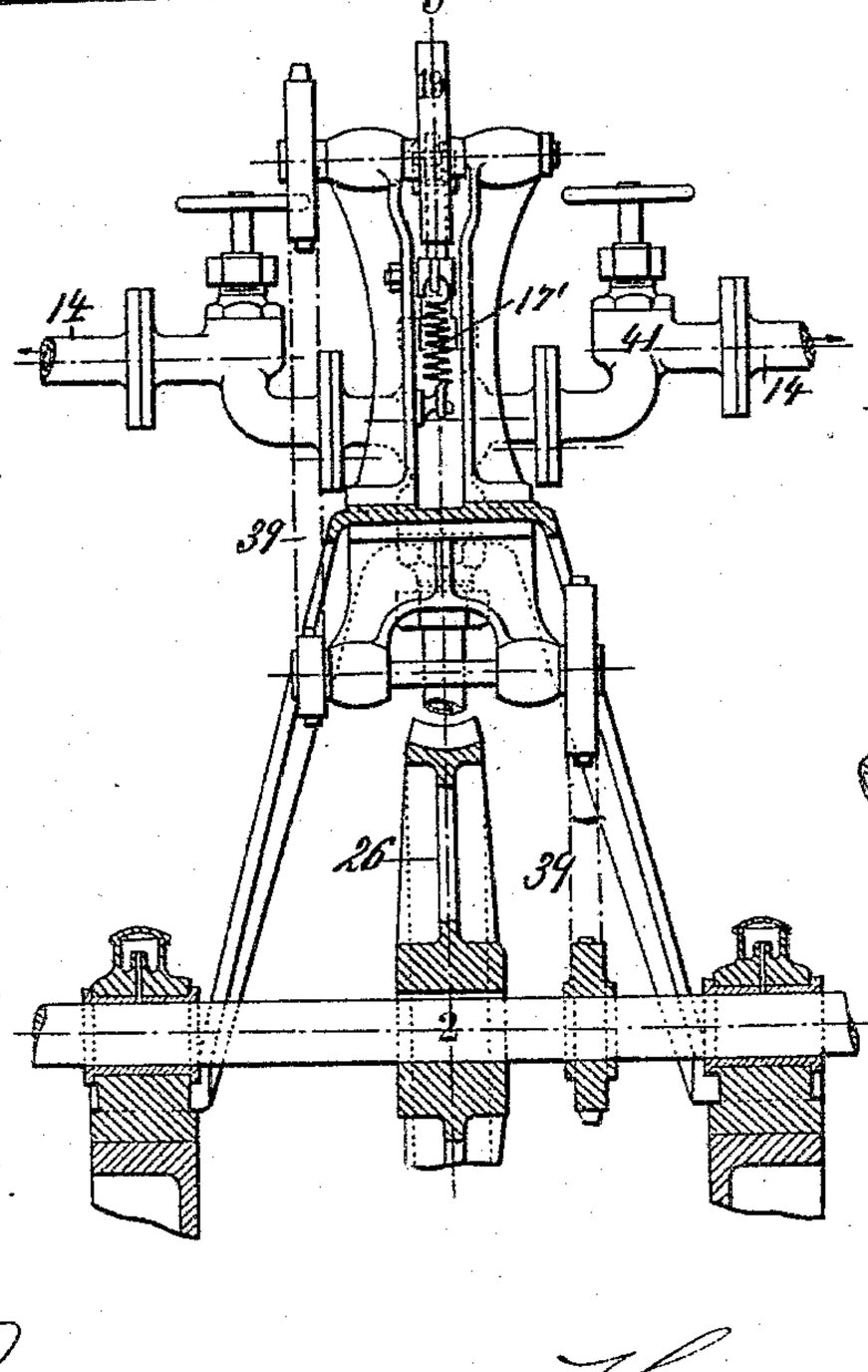
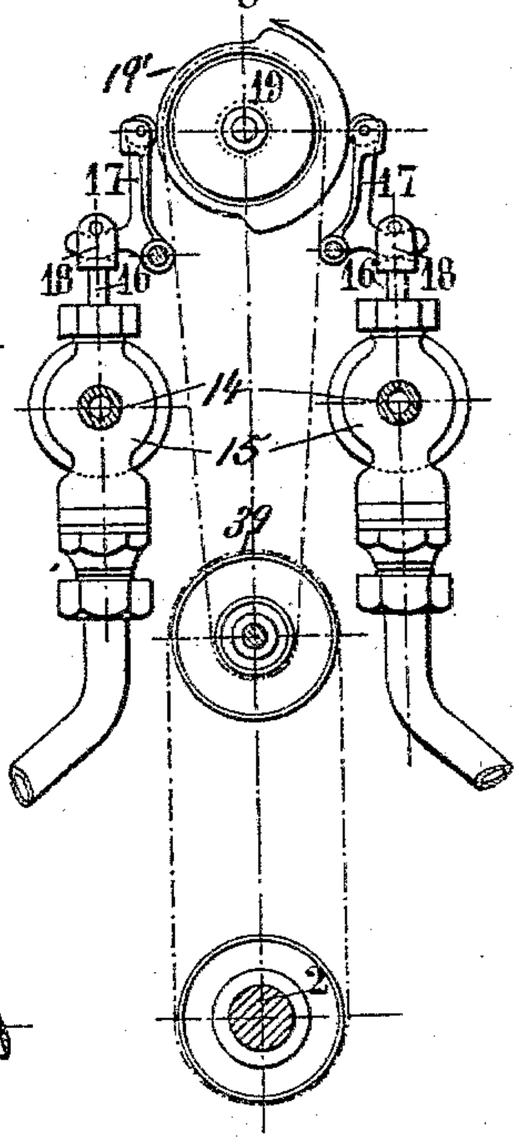


fig. 11



Witnesses

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(No Model.)

5 Sheets—Sheet 5.

H. PORTEVIN.

BOTTLE WASHER.

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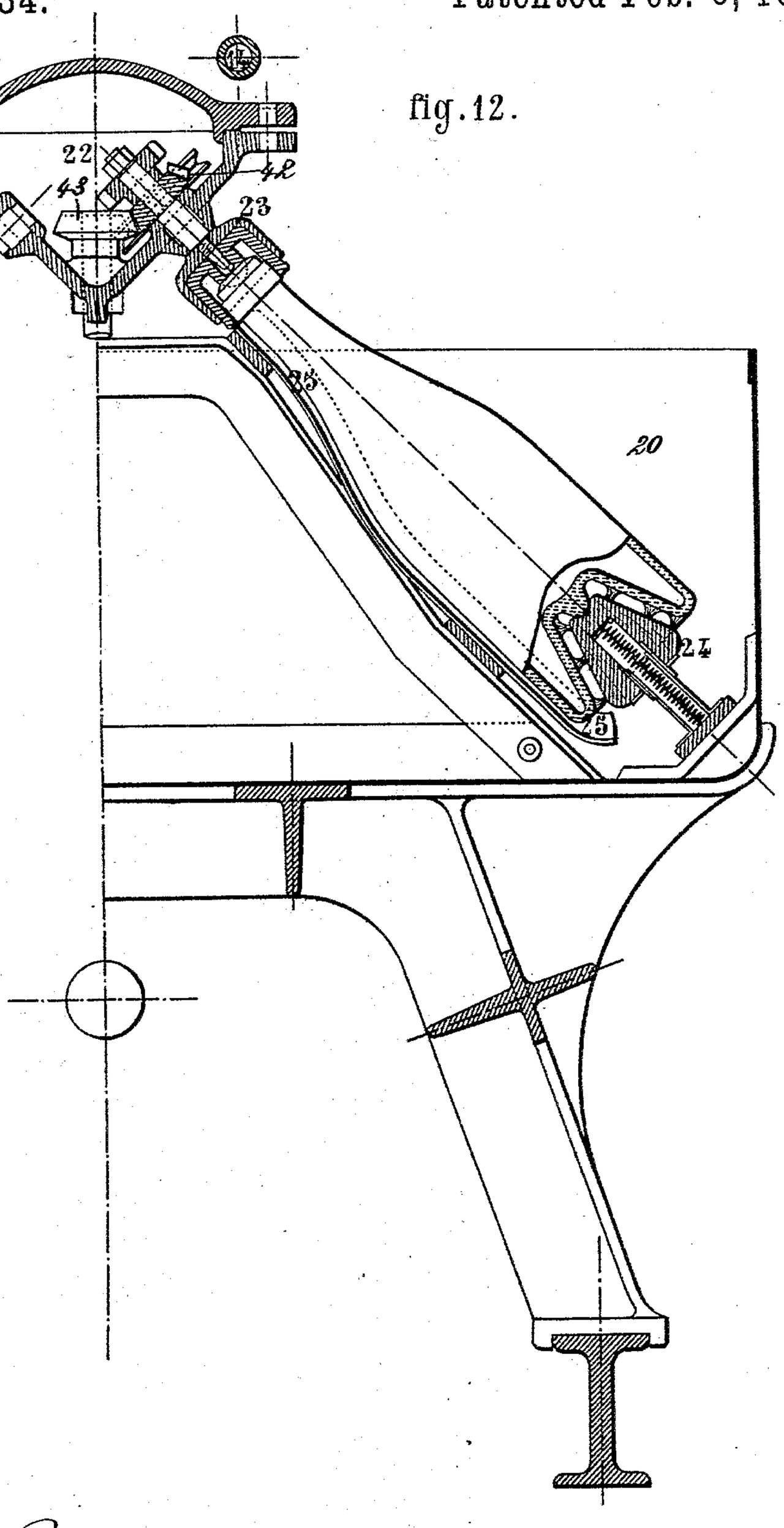

fig. 12.

Witnesses

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UNITED STATES PATENT OFFICE.

HIPPOLYTE PORTEVIN, OF RHEIMS, FRANCE.

BOTTLE-WASHER.

SPECIFICATION forming part of Letters Patent No. 514,334, dated February 6, 1894.

Application filed October 29, 1892. Serial No. 450,362. (No model.) Patented in France March 15, 1887, No. 182,210; in Belgium October 5, 1892, No. 101,607; in England October 8, 1892, No. 17,972; in Germany October 11, 1892, No. 70,945, and in Denmark December 22, 1892, No. 1,234.

To all whom it may concern:

Be it known that I, HIPPOLYTE PORTEVIN, a citizen of France, and a resident of Rheims, in the Department of the Marne, France, have invented a new and useful Improvement in Bottle-Washing Machines, of which the following is a specication, and for which I have obtained a patent in France, No. 182,210, dated March 15, 1887; in England, No. 17,972, dated October 8, 1892; in Belgium, No. 101,607, dated October 5, 1892; in Germany, No. 70,945, dated October 11, 1892, and in Denmark, No. 1,234, dated December 22, 1892.

This invention relates to automatic machinery for washing or cleaning bottles externally and internally as hereinafter explained. The internal washing is performed by means of water injected into the bottle under considerable pressure (about sixty atmospheres) while the bottle receives a reciprocating vertical or longitudinal movement combined with a rotary motion.

By means of this machine the interiors of the bottles are cleaned by the action of water alone without the employment of brushes the said water being supplied under pressure and injected into the bottles by an automatic arrangement while the bottles are simultaneously rotated and moved in the direction of their axes. The external washing is performed mechanically by the aid of brushes or rubbers either with the water resulting from the internal washing or in a special water trough the washing water being heated if required to a suitable temperature to facilitate the removal of the labels adhering to the bottles. The bottles are first placed in a trough at the lower part of the machine in order to undergo external washing being afterward transferred to the upper part in order to be washed internally. The time allowed for the washing is regulated according to the condition of the bottles.

In order that the said invention may be fully understood I shall now proceed more particularly to describe the same and for that purpose shall refer to the several figures on the annexed sheets of drawings the same numerals of reference indicating corresponding parts in all the figures.

Figure 1 of the accompanying drawings represents in longitudinal elevation a combination of machinery constructed in accordance with this invention and consisting of two machines worked by the same driving gear. The arrangement illustrated is one which is found to give good results in practice but the invention is evidently not limited to this particular combination. Fig. 2 represents the machine in transverse section. Fig. 3 represents the machine in end elevation partly in section. Fig. 4 drawn to a larger scale illustrates in longitudinal section the construction of the valves employed to control the supply of water under pressure as hereinafter described and Fig. 5 represents the automatic valve in section on the line A B Fig. 4. Fig. 6 illustrates in transverse section the arrangements for holding the bottles and rotating them during the internal washing. Fig. 7 is an elevation partly in section illustrating the mechanism for working the valves. Fig. 8 represents in longitudinal section the rings for holding and rotating the bottles. Fig. 9 represents one of these rings in plan and partly in horizontal section. Fig. 10 illustrates in end elevation and partly in vertical section the mechanism for driving the cam actuating the valves, and Fig. 11 represents this mechanism in side elevation. Fig. 12 illustrates the mechanism for washing the outside of the bottles.

In practicing my invention I prefer to employ apparatus comprising two like machines arranged end to end or in line with each other, as shown in Fig. 1, but at a sufficient distance apart to afford room for the driving mechanism and valve devices through which both machines are operated and controlled. The two machines being in all respects alike, a description of one will suffice for both.

Each machine comprises vertically slotted end frames or standards 6, Figs. 1, 2 and 3, supported on a suitable base 28 and connected at top and bottom by longitudinally arranged bars 29 and 30 for giving stability to the framework of the machine. The vertically slotted end frames or standards 6 afford guide ways for a vertically reciprocating frame or holde
4, Figs. 1, 2, 3 and 6, that is adapted for re-

ception of the bottles during the time required for their internal washing. This bottle holder or carrier 4 receives a vertically reciprocating motion through connecting rods 5 from crank disks 3 on a shaft 2 that is extended longitudinally of the machine, or two connected machines near the base. The shaft 2 is supported in suitable bearings as shown in Figs. 1 and 10. In Fig. 1 all the crank disks 3 carried by the shaft or shafts 2 are not shown, two of said disks being concealed by the outer end frames or standards of the machine, and one disk in each intermediate pair of such disks being concealed by the inner end frames of the double machine. On the shaft 2 is a worm wheel 26 through which said shaft is driven from a worm 1, Fig. 3, on a transverse shaft 7 having on one end a sprocket wheel 31 that may have a chain connection with any convenient motor.

A rotary movement of the bottles, during the internal washing, is derived from a sprocket wheel or chain pulley 32, Fig. 3, on the shaft 7 through suitable chain connection with a chain pulley 33 on one end of a transverse shaft 8 which is connected, through suitable bevel gearing, to the lower end of a vertical shaft 9, Fig. 1, that is provided with a longitudinal groove or keyway 34, in which slides a key or spline in the boss of a pinion 10 which is mounted in one end of the bottle holder or carrier. This pinion 10 gears with and between two toothed wheels 11, one of which is shown in Fig. 8. Each of these toothed wheels 11 is secured to a short shaft or spindle 35 carrying a gear 12 for actuating a series of toothed rings 13, Figs. 2, 6, 8 and 9, through which the bottles are rotated while being washed internally.

The bottles to be washed internally are arranged in inverted positions in the toothed rings 13, as shown in Figs. 2 and 6. Each toothed ring 13 is provided with a series of rubber lined segmental clamps or pads 36, Figs. 6 and 9, that are pressed against the bottles by means of blade springs 37, thereby clamping the bottles so that they will be rotated with the several rings. The inverted neck of each bottle is received in a tubular supporting boss 38 a series of which is arranged along the lower portion of the carrier or holder 4 on each side. By reference to Fig. 2 it will be seen that the holder or carrier 4 is provided with two series of rotating devices 13 and supporting devices 38, one series on each side. Pipes 14 provided with branches or nozzles 27, passing through the tubular bosses 38 and into the bottles, are employed for injecting the water which is automatically distributed by valves 15 opened and closed at intervals by the action of a cam 19 that is rotated from the shaft 2 by means of any appropriate gearing 39, as indicated in Figs. 10 and 11.

The injection tubes or nozzles 27 may be made of aluminium or other suitable material and are to be supplied with water at a pressure of about sixty atmospheres. The extremity of each nozzle may be perforated with two orifices, one so arranged as to deliver the water in the axis of the nozzle while the other delivers water at an angle of about ninety degrees with the axial jet. The rotary and vertically reciprocating movements simultaneously imparted to each bottle cause all the parts of the internal surface of its sides to be successively presented to the lateral or horizontal jet while the axial or vertical jet plays continually upon the bottom of the inverted bottle.

The supply of water to the pipes 14, under pressure, is automatically controlled by valves 15, Figs. 4 and 7, which the pressure of the water tends to close. These valves 15 each carry a small auxiliary valve 21, Figs. 4 and 5, controlling a passage formed in the valve 15 for the purpose of allowing the water under pressure to pass to the back of the latter. The small valve 21 is normally closed by a spring 21′ and is opened by a rod 16 passing through a stuffing box 40 and provided with a fork or stirrup piece 18, Fig. 7, engaging with a three armed lever 17 having attached to one arm a spring 17′ of sufficient strength to overcome the frictional resistance of the stuffing box and maintain the vertical arm of said lever in contact with the cam 19, as shown in Fig. 7. When the cam surface 19′, having the shorter radius, is in contact with one of the levers the valves 15 and 21 of that side are closed but when the off set or larger part of the cam, having the longer radius, comes in contact with the lever the latter is moved so as to force downward the rod 16 and cause it to open the small or auxiliary valve 21. The water then passes to the back of the valve 15 and establishes an equilibrium of pressure so that the weight of said valve causes it to fall from its seat and open the way for the passage of water to the bottles. As the cam 19, actuated from the shaft 2, continues to rotate its projecting part passes away from the lever 17 which in returning to its original position under the influence of the spring 17′ draws up the rod 16. The stem of the auxiliary valve 21 being thus relieved from the pressure of the rod 16 this valve is closed by the action of the spring 21′ and the valve 15 is also closed and pressed to its seat by the action of the water.

The time allowed for washing out the bottles may correspond with one upward and downward movement produced by one revolution of the shaft 2 with which the bottle holder 4 and cam 19 are geared.

The relative speeds of the cam 19 and shaft 2 may be regulated as required, by employment of intermediate pulleys in the connecting gearing as represented in Figs. 10 and 11 for example.

Stop valves 41, Figs. 4 and 10, are provided on each side of the valve 15 in order to enable the supply of water to be cut off without stopping the machine.

In order to wash the outsides of the bottles they are placed in a sheet metal trough 20, Figs. 2 and 12, filled with water. The bottles are arranged in opposite sides of the trough 20 at an angle to the vertical axis of the machine and are each supported between spring pads 24, Fig. 12, and rotary caps 23 through which they are revolved in contact with brushes or rubbers 25 of a shape corresponding to the profile of the bottles. The trough 20 should contain sufficient water to cover or nearly cover the bottles. The rotary caps 23 are preferably lined with rubber and are attached to short spindles driven by pulleys 42 and working in bearings in a hollow supporting bar 22, Figs. 1, 2 and 12, attached to the end standards 6 of the machine frame.

Rotary motion may be imparted to one of the pulleys 42 through suitable gearing 43, Fig. 12, from the shaft 9 and thence from pulley to pulley by a cord connection. The bottles are thus caused to rotate on their axes in contact with the brushes or rubbers 25 in the trough 20 whereby they are cleaned externally.

What I claim as my invention is—

1. In a machine for washing bottles, the combination of a reciprocating bottle holder or carrier provided with rotary toothed rings having clamps to receive and hold the bottles, a water pipe provided with branches or nozzles adapted to enter the bottles, and mechanism for simultaneously reciprocating the bottle carrier and rotating the bottle holding toothed rings, substantially as described.

2. In a machine for washing bottles, the combination of a reciprocating bottle holder or carrier provided with rotary toothed rings having spring clamps to receive and hold the bottles, mechanism for rotating said rings a water pipe provided with branches or nozzles adapted to enter the bottles, and an automatically actuated valve for controlling the delivery of water under pressure into the interior of the bottles, substantially as described.

3. In a machine for washing bottles, the combination of a vertically reciprocating bottle holder or carrier provided with a series of tubular bosses to receive the necks of the inverted bottles, a series of rotary toothed rings mounted in the bottle holder or carrier and each provided with spring clamps to receive the bottle, mechanism for rotating said rings a water pipe having a series of branches or nozzles adapted to enter the bottles and an automatically actuated valve for controlling the passage of water through said pipe and nozzle, substantially as described.

4. In a machine for washing bottles, the combination of a vertically reciprocating bottle holder or carrier provided with means for supporting a series of bottles in an inverted position and imparting a rotary motion to each bottle, a trough located below the reciprocating bottle holder or carrier, bottle supporting and rotating devices arranged in said trough, brushes or rubbers located in said trough adjacent to the bottle supporting and rotating devices, pipes having nozzles to supply water to the interior of the bottles in the reciprocating carrier, and mechanism for simultaneously actuating the several rotating devices in the carrier and trough, substantially as described.

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

H. PORTEVIN.

Witnesses:
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