

No. 740,931.

PATENTED OCT. 6, 1903.

A. SCHROEDTER.

APPARATUS FOR FILLING BOTTLES OR JUGS WITH AERATED LIQUIDS.

APPLICATION FILED AUG. 2, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

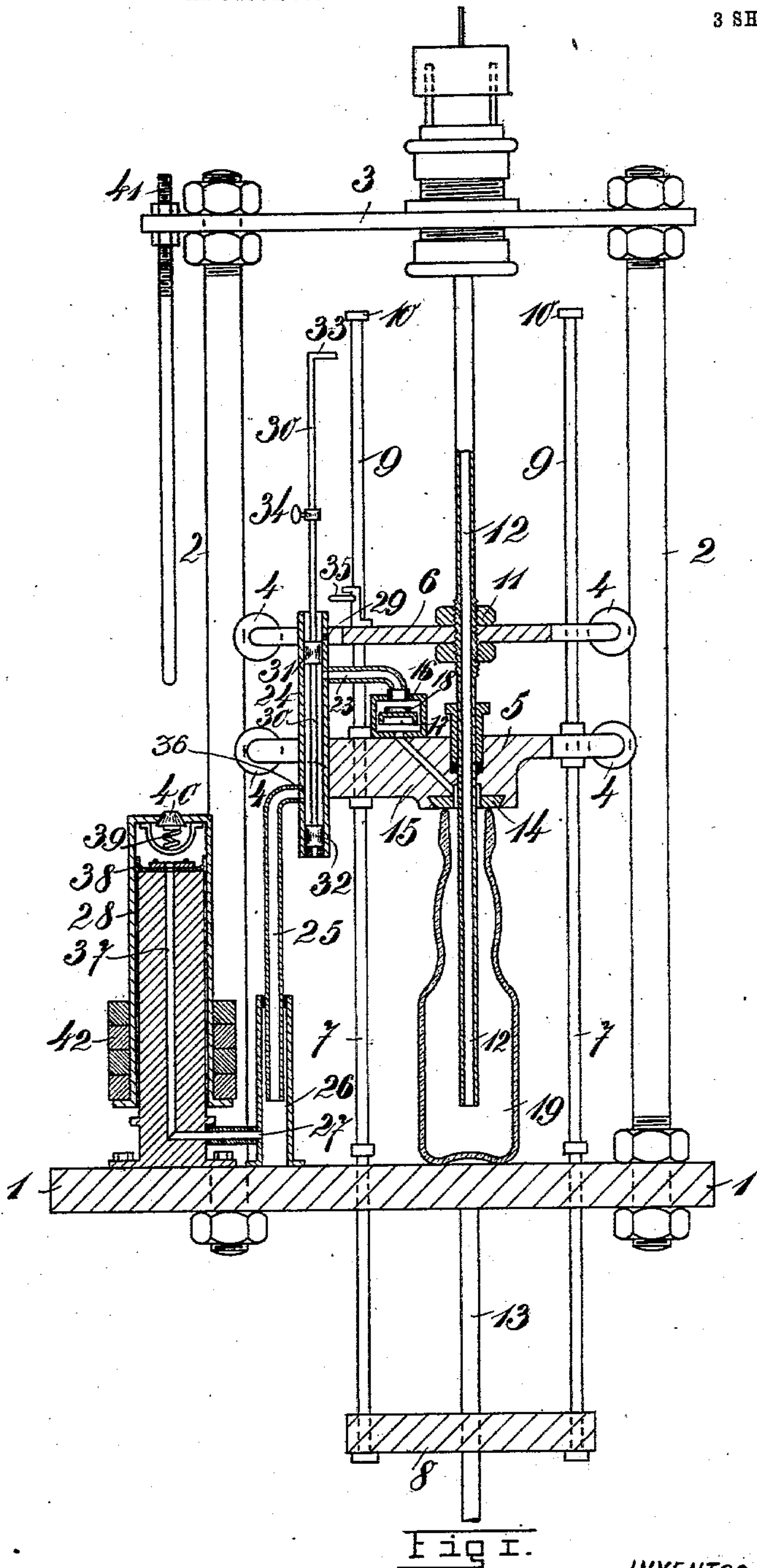


Fig. 1.

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3 SHEETS—SHEET 2.

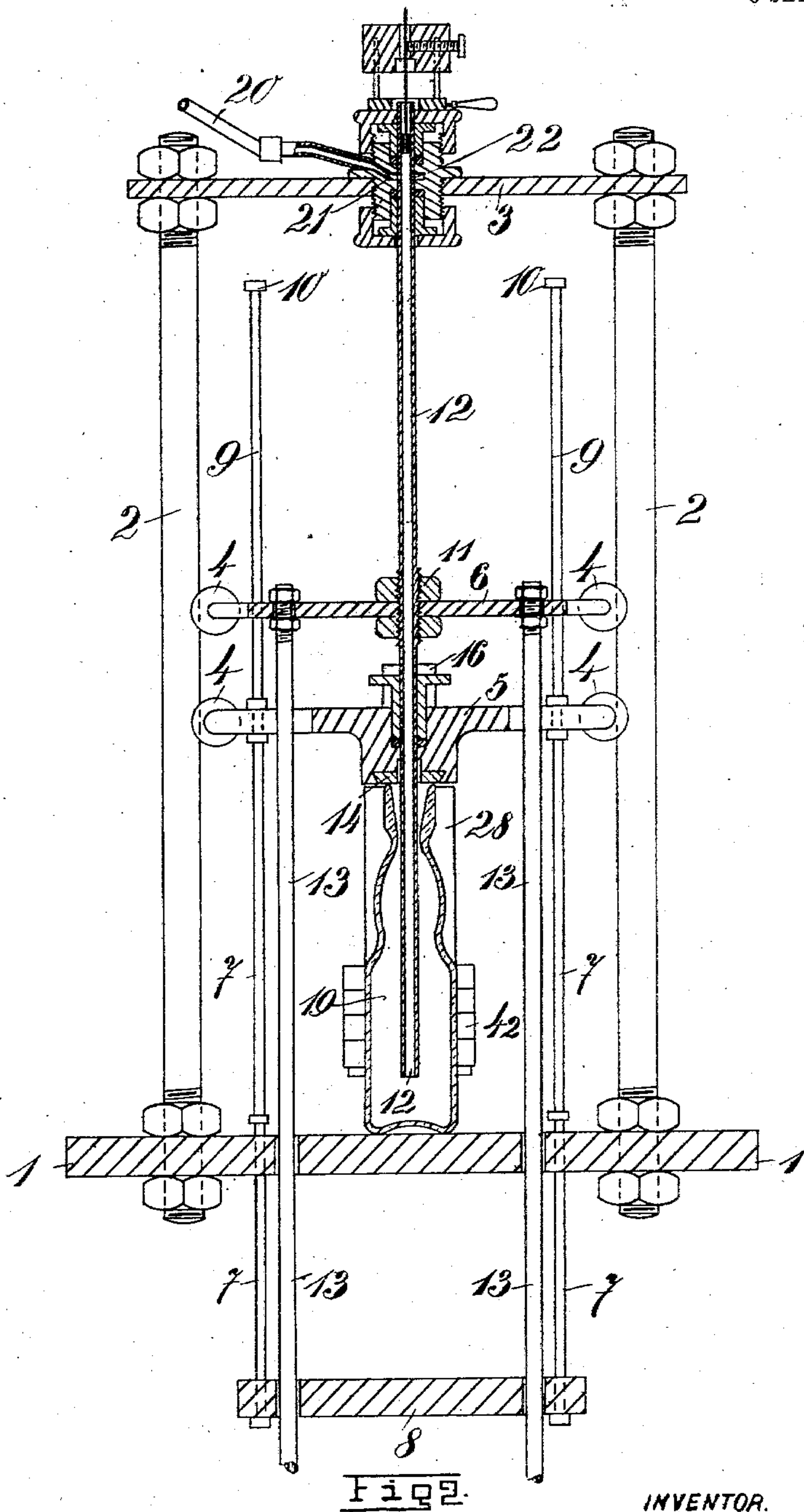


Fig 2.

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3 SHEETS—SHEET 3.

Fig. 3.

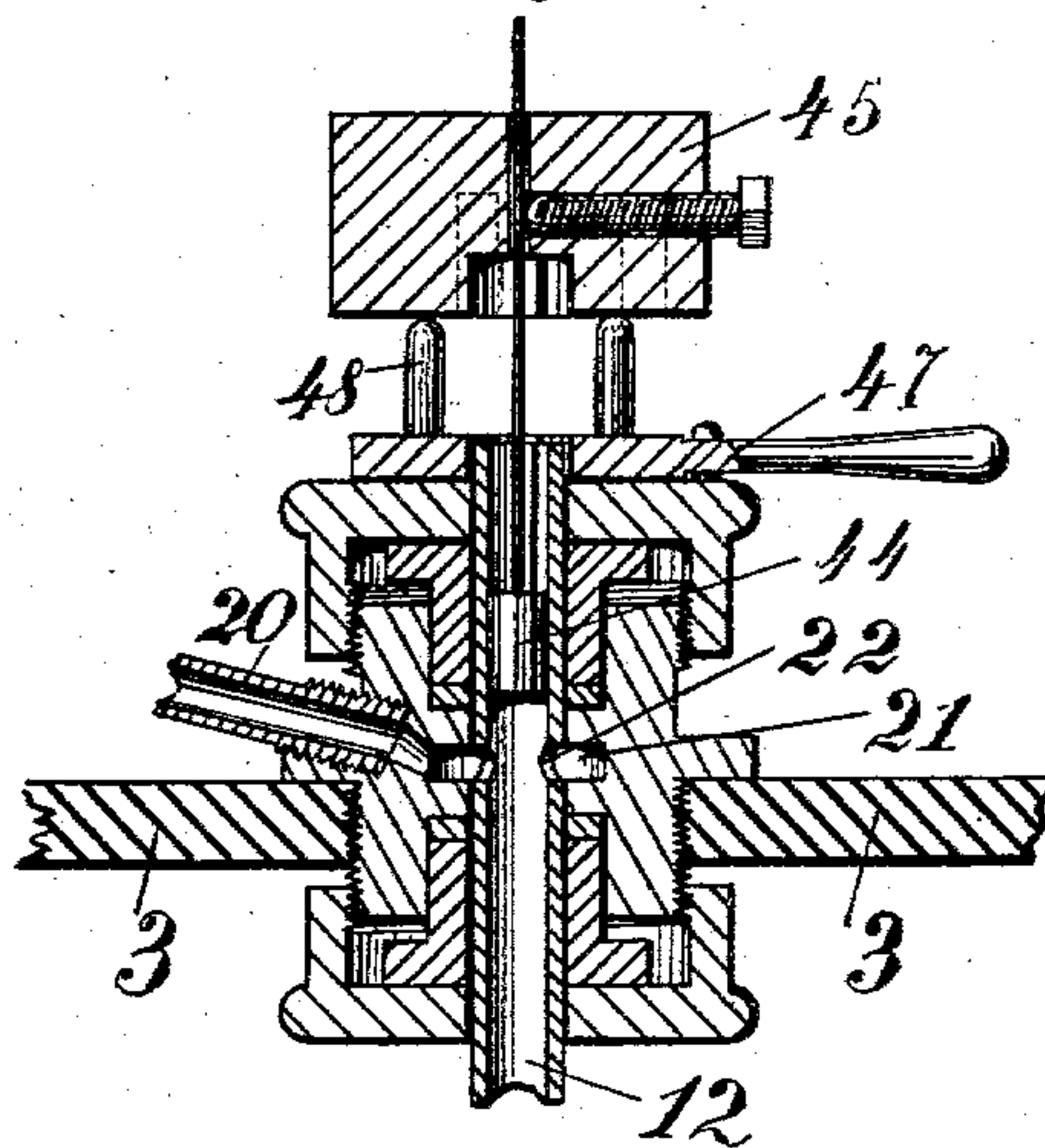


Fig. 4.

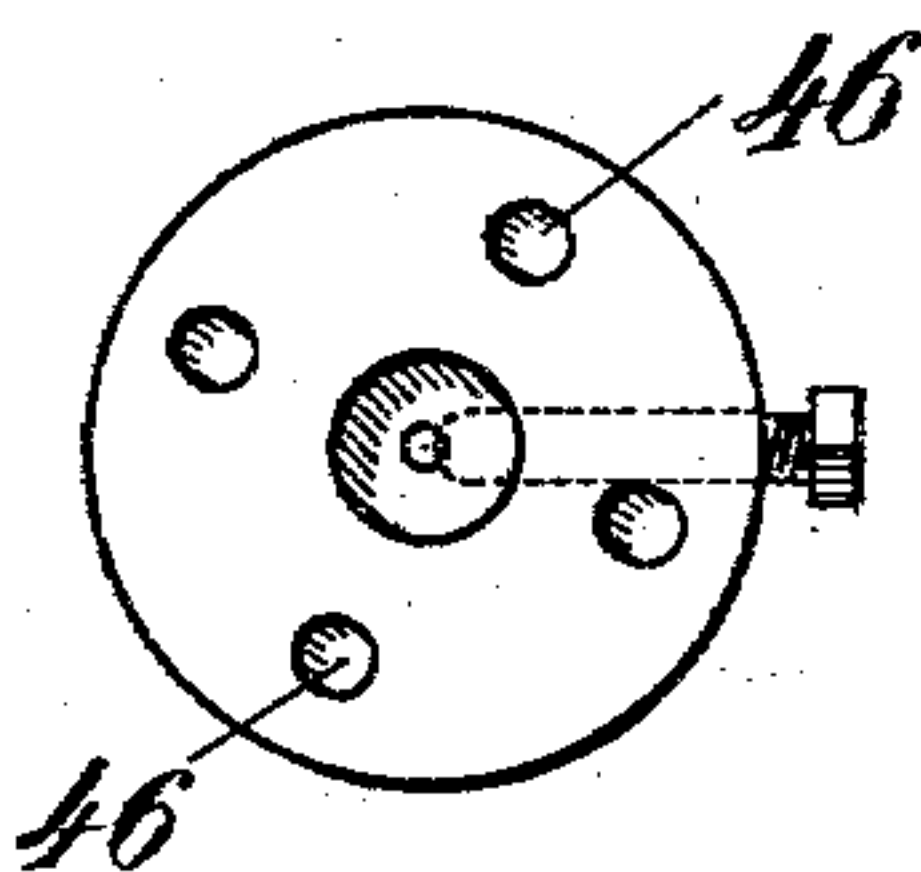
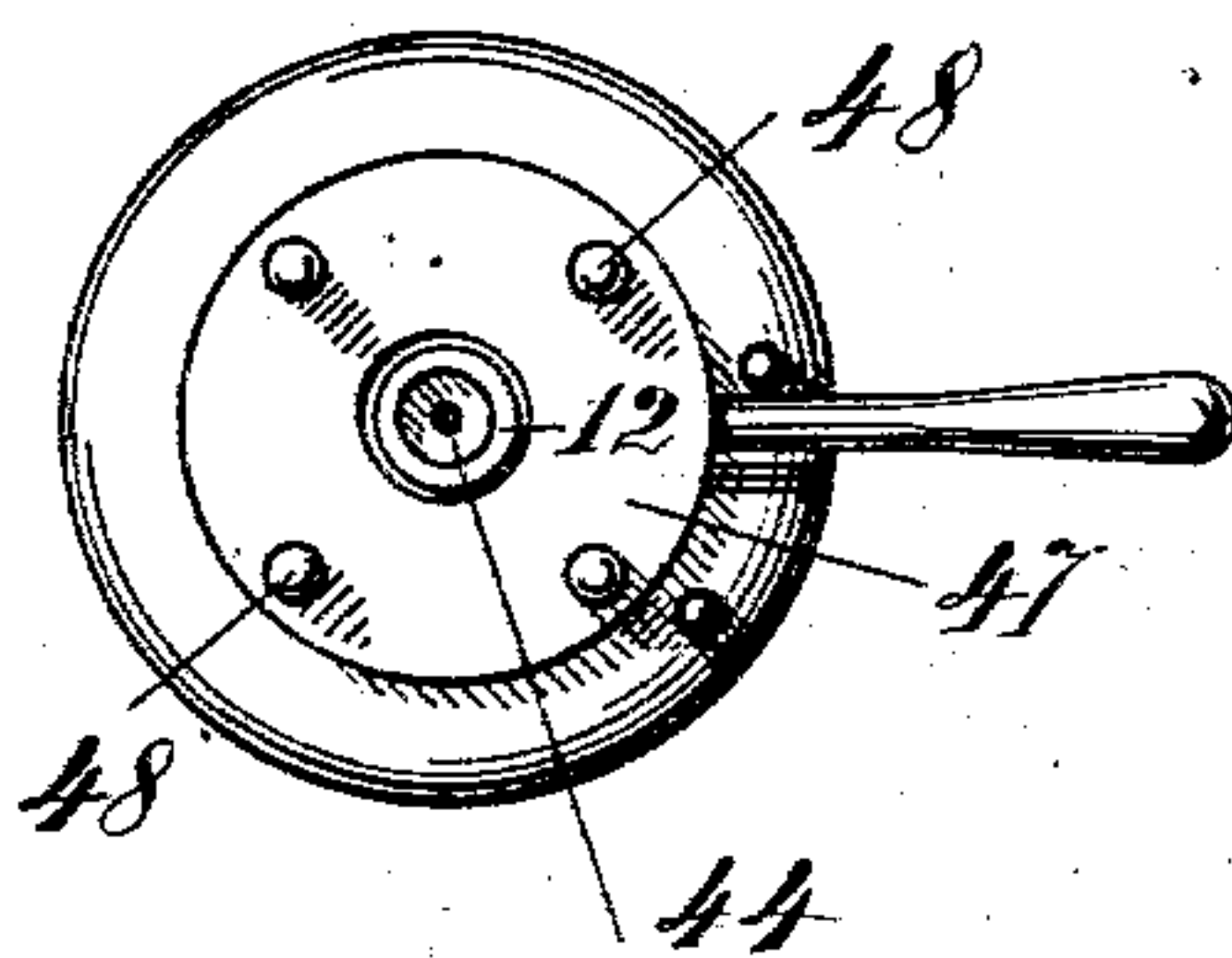


Fig. 5.



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UNITED STATES PATENT OFFICE.

AUGUST SCHROEDTER, OF CHARLOTTENBURG, NEAR BERLIN, GERMANY.

APPARATUS FOR FILLING BOTTLES OR JUGS WITH AERATED LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 740,931, dated October 6, 1903.

Application filed August 2, 1902. Serial No. 118,171. (No model.)

To all whom it may concern:

Be it known that I, AUGUST SCHROEDTER, a subject of the German Emperor, and a resident of Charlottenburg, near Berlin, in the Empire of Germany, have invented a certain new and useful Improved Apparatus for Filling Bottles or Jugs with Aerated Liquids, of which the following is an exact, full, and clear description.

10 This invention relates to such apparatus for filling bottles or jugs with liquids impregnated with carbonic acid, especially beer, in which compressed air is used as counter-pressure medium for preventing the formation of
15 froth. The improvement consists in the arrangement of a compressed-air cylinder whose pipe leading to the bottle is provided with an exhaust-opening and is so constructed that the bottle to be filled with beer may
20 be brought alternately in communication with the compressed-air cylinder or with the open air.

When filling the bottle with beer, the free space of the bottle communicates with the
25 compressed-air cylinder, so that the filling takes place under the counter-pressure of the compressed air. When the bottle is filled, the communication with the compressed-air cylinder is interrupted by a suitable mechanism and the part of the compressed-air
30 pipe located between the bottle and the exhaust-opening is brought into communication with the external air, so that the compressed air contained in the said part of the
35 pipe is exhausted into the open air. The apparatus affords the advantage that before the commencement of the bottling the quantity of compressed air of the necessary pressure required for one filling need only be produced
40 once and that after each filling only so much of this compressed air is exhausted as that supplied each time, according to the usual contents of air in the bottle to be filled.

The accompanying drawings show the improved apparatus in two vertical sections.

45 Figure 1 is a section through the middle of the apparatus and the compressed-air cylinder. Fig. 2 is also a vertical section through the middle of the apparatus. Figs. 3, 4, and
50 5 are detail views.

On the table 1 are secured the four vertical rods 2, which are held together above by the

frame 3, and on which rods the two slides 5 and 6 can move upward by means of guide-pulleys 4. The weight 8 is suspended from
55 the slide 5 by means of the bars 7, which extend loosely through the table 1. This weight may also be dispensed with if the slide itself is made heavy enough. The bars 9 extend above the slide 5 and pass loosely through
60 the other slide 6 and are provided above with the stops 10. The movable filling-pipe 12 is secured to the slide 6 by means of screws 11. The lower part of the filling-pipe 12 extends loosely through a middle bore with packing-
65 sleeve of the slide 5, and the upper part of the said pipe extends loosely through a middle bore with packing-sleeve of the frame 3. The filling-pipe 12 and slide 6, respectively, are raised and lowered by means of rods 13,
70 operated by a treadle (not shown) provided below the table or in any other suitable manner. The middle bore of the slide 5 is somewhat widened below, where it is surrounded by the packing-ring 14 and communicates
75 through a passage 15 with the receiver 16, provided above the slide. This receiver 16 contains the float 17, with upper washer 18. The liquid flows from the barrel into the bottle 19 when the filling-pipe 12 is lowered and from
80 above through the pipe 20, annular passage 21, and filling-pipe openings 22. The receiver 16 communicates through the pipes 23, 24, 25, 26, and 27 with the cylinder 28 for the compressed air. The pipes 25 and 26 slide one
85 within the other and are made air-tight. The pipe 24 is provided with the exhaust-opening 29, and the two small pistons 31 and 32 are arranged on one common rod 30. The piston-rod 30 is provided with the two stops 33 and 34
90 for the slide 6 and the pin 35, movably attached to the latter.

The pistons 31 and 32 are so arranged on the rod 30 that when the latter is in an elevated position the piston 32 enters the mouth
95 36 and the piston 31 extends beyond the exhaust-opening 29. The compressed-air cylinder 28 is arranged air-tight on a fixed hollow piston 37, with packing-flange 38, and provided in its closed upper part with a valve
100 40, actuated by a spring 39 and opening downward. A stop 41 is adjustably provided on the frame 3 above the valve 40. The cylinder 28 can be weighted by interchangeable

weights 42, and it is so weighted before the bottling process that the air caught therein is subject to a somewhat less pressure than that at which the liquid is forced out of the barrel through the filling-pipe into the bottle.

The operation is as follows: The tapster depresses the treadle, (not shown,) thereby lifting the slides 5 and 6 with the filling-pipe 12 and the packing 14, puts in a bottle 19, and again releases the treadle, whereupon the raised parts descend again through gravity and take up the position as shown in the drawings. While the cock of the barrel is closed, the tapster first introduces in the bottle in a suitable way compressed air of the required pressure. This can be done by lifting and depressing the cylinder 28 a few times, while air enters the packing-flange 38, but does not pass out of same. Consequently the air is condensed in the bottle 19, because in the position shown the communicating pipes 15, 16, 23, 24, 36, 25, 26, 27, and 37 are open. Above the cylinder 28 a manometer can be provided, which indicates the required pressure. The air can also be condensed by a special air-pump, for the connection of which the cylinder 28 or any suitable part of the said communicating pipe would have to be provided with sockets and back-pressure valve. This production of compressed air, which need only be effected once—*i. e.*, only for the first bottle—does not present any difficulty. The tapster now opens the cock, which remains constantly open. When the cock is open, the liquid flows through the pipe 20, annular passage or channel 21, filling-pipe openings 22, and filling-pipe 12 into the bottle 19, displaces the compressed air and forces the same through the passage 15, receiver 16, communicating pipes 23 to 27, and hollow piston 37 into the cylinder 28, which ascends. The running of liquid lasts as long as flask 19, canal 15, and receiver 16 are filled with beer. At this moment float 17 being in the receiver is highly pressed and with its upper washer 18 closes the upper opening of the receiver 16, so that now no more beer can flow. When the bottle 19 is filled with beer, the tapster again depresses the treadle. The filling-pipe 12 passes out of the bottle 19, whereby at the same time the beer still in canal 15 and receiver 16 flows into flask 19 and fills up the space which was taken before by the filling-pipe 12, so that the flask is filled with beer to the brim. The slide 6 now engages with the stop 33 of the piston-rod 30, raises the latter with pistons 31 and 32, closes the mouth 36, leading to the compressed-air cylinder 28, and uncovers the exhaust-opening 29. Consequently that part of the compressed air which is located between the piston 32 and the packing 14 in the communicating pipe escapes through the said exhaust-opening, while the major part of the compressed air remains between the piston 32 and the cylinder 28. In its further high course traverse 6 strikes against the hollows 10 of the support-rods of

the other traverse 5, by which the filling 14 is arranged for vessel 19, and thereby lifts traverse 5, with the filling 14, from the vessel. The tapster now removes the filled bottle, puts in an empty one, and releases the treadle. Hereby traverse 6 moves downward and sets free first the hollows 10 of the support-rods 9 of the second traverse 5, so that traverse 5 likewise falls down and is set with its filling 14 upon flask 19. At the same time the filling-pipe 12, which with traverse 6 moves downward, enters into flask 19. At the backward motion of traverse 6 bolt 35, embedded so as to revolve downward with the layer, strongly connected with traverse 6, and on this account exercises no action at the upward motion of traverse 6, strikes against hollow 34 of piston-rod 30, and presses down pistons 31 and 32, while the exhaust-opening 29 is shut off, the pipe-mouth 36 uncovered, and the previously-arrested compressed air is therefore forced by the heavy descending cylinder 28 through the said communicating pipe into the bottle 19. When pistons 31 and 32 are so far pressed down that piston 32 reaches its deepest position, then bolt 35, which, as previously stated, also shifts and is under the influence of a spiral spring, (not shown,) is pressed back, so as to glide from hollow 34 and further go down with traverse 6. Collar or stock 34 is movably or adjustably arranged on the piston-rod 30 in order to stop it higher or lower, according to the height of the vessels to be filled. Stop 33 is firmly arranged to the end of rod 30. When traverse 6 is so far lowered that the filling-pipe 12 reaches its deepest position, then its filling-openings 22 stop exactly on the circular canal 21 and the beer-guide 20, connected therewith. It should be remarked that the opening and closing of the liquid-guide is operated automatically without special cock. This is effected by arranging in the upper part of the filling-pipe 12 a small piston 44, Fig. 3, which is weighted by a weight 45, fixed to its piston-rod. Weight 45 on its lower side is provided with four holes 46, Fig. 4, in which can be inserted pivots 48, Fig. 5, provided accordingly on the rotatory slide 47. The rotatory slide 47 is usually so inserted that at low position of filling-pipe 12 the weight 45 rests on pin 48. Piston 44 is lifted up and sets free the inlet-openings 22, and thereby the flow of beer from guide 20 and the circular canal 21. In case for any reason the flow is suddenly interrupted the rotatory slide 47 is turned so far as it stops with its pivots 48 upon the holes 46 of weight 45, whereupon the latter sinks and closes the supply-openings 22 of filling-pipe 12 by means of the likewise sinking piston 44. When filling-pipe 12 moves up toward the filling of the flask, then openings 22 are also closed by piston 44, and thus is avoided a flow of beer from filling-pipe 12. When filling-pipe 12 is found in its lowest position, then weight 45 rests upon pivot 48 of rotatory

slide 47 and the beer flows into the filling-pipe, reaches into the flask, and forces the air contained therein back again into the cylinder 28, and during the second filling the cylinder 28 will ascend higher than during the first filling, because besides the compressed air in the bottle that air will also be displaced which was contained in the empty bottle at the outset. Hence the cylinder would rise higher with each additional filling, because there is a continuous supply of common air. In order to prevent this and make the cylinder as small as possible, the exhaust-valve 40 and stop 41 are provided. During the second and each subsequent filling the valve 40 bears against the stop 41. The valve is therefore opened for a moment, exhausts surplus air, and immediately closes again under the action of its spring 39, because the cylinder 28 at once descends below the stop 41 into its normal position. In this position the cylinder counterbalances the pressure due to the quantity of compressed air required for special-sized vessels. For smaller or larger vessels the stop 41 is placed higher or lower for the purpose of regulating the quantity of compressed air required for the time being. The differences above or below the normal capacity in connection with vessels of the same height are sometimes very considerable and can be adjusted automatically by more or less air being exhausted through the valve 40. Since after each filling so much air is exhausted through the valve 40 and the opening 29 as there is common or atmospheric air contained in the bottle when adjusting the same, the latter, however, being also compressed by the weighted cylinder 28, the original air-pressure remains constant, and consequently the vessel can be filled under constant counter-pressure without any froth being produced. If the original quantity of compressed air cannot be produced in any other manner, only the first bottle need be filled without counter-pressure. The air forced out of the bottle into the cylinder 28 is condensed by the latter, and thus forms counter-pressure for the second bottle. This counter-pressure increases with the third bottle, owing to the fresh supply of air. The required height of pressure may now already be exceeded and surplus air exhausted.

Generally speaking, the above-described apparatus does not require any special means

for being set in operation. Only the first two bottles or perhaps also the third one will contain more or less froth over the liquid; but as soon as the normal state of counter-pressure is attained after the third or fourth bottle each filling takes place without any froth being produced, and after each filling so much compressed air is exhausted as there is uncondensed air contained in the bottle.

Having now particularly described and ascertained the nature of the said invention, I declare that what I claim, and wish to secure by Letters Patent, is—

1. In an apparatus for filling bottles or jugs with aerated liquids, the combination with a filling-pipe connected with a source of liquid-supply and means for automatically opening and closing said filling-pipe, of a counter-pressure device, comprising a weighted movable pump-cylinder with a fixed hollow piston, means for connecting the interior of the pump-cylinder with the interior of the bottle to be filled, a vertically-reciprocatory filling-head, through which said filling-pipe reciprocates, means for connecting the interior of the bottle alternately with the pressure device or with the open air and means for reciprocating said filling-pipe and filling-head, substantially as set forth.

2. In an apparatus for filling bottles or jugs with aerated liquids, the combination with a filling-pipe connected with a source of liquid-supply and means for automatically opening and closing said filling-pipe, of a counter-pressure device, comprising a weighted movable pump-cylinder with a fixed hollow piston and an air-discharge valve, means for automatically opening said discharge-valve, means for connecting the interior of the pump-cylinder with the interior of the bottle to be filled, a vertically-reciprocatory filling-head through which said filling-pipe reciprocates, means for connecting the interior of the bottle alternately with the pressure device or with the open air and means for reciprocating said filling-pipe and filling-head, substantially as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

AUGUST SCHROEDTER.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.