No. 775,307. PATENTED NOV. 22, 1904.

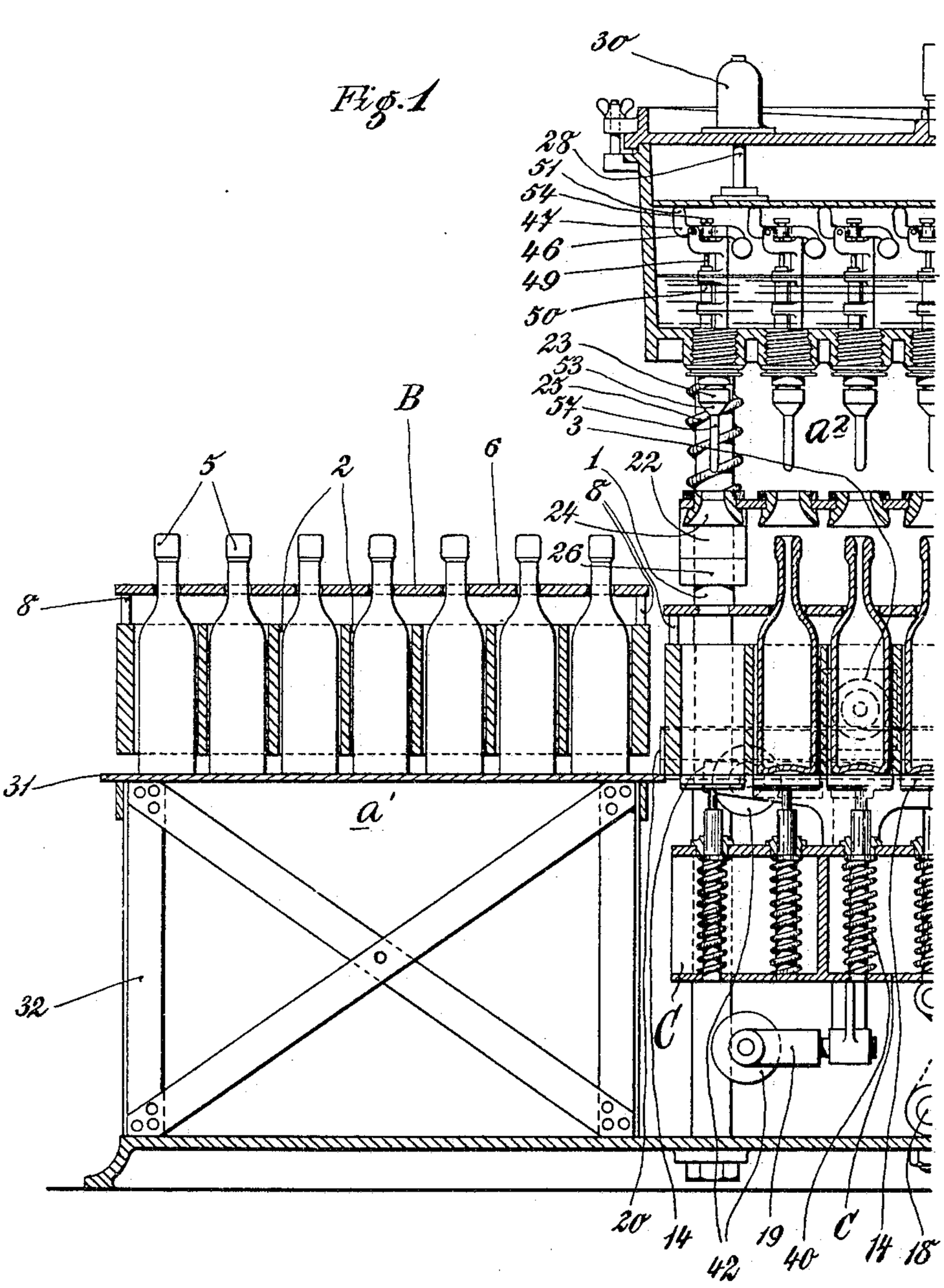
J. H. W. ORTMANN & C. W. HERBST.

BOTTLE FILLING MACHINE.

APPLICATION FILED JUNE 16, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1



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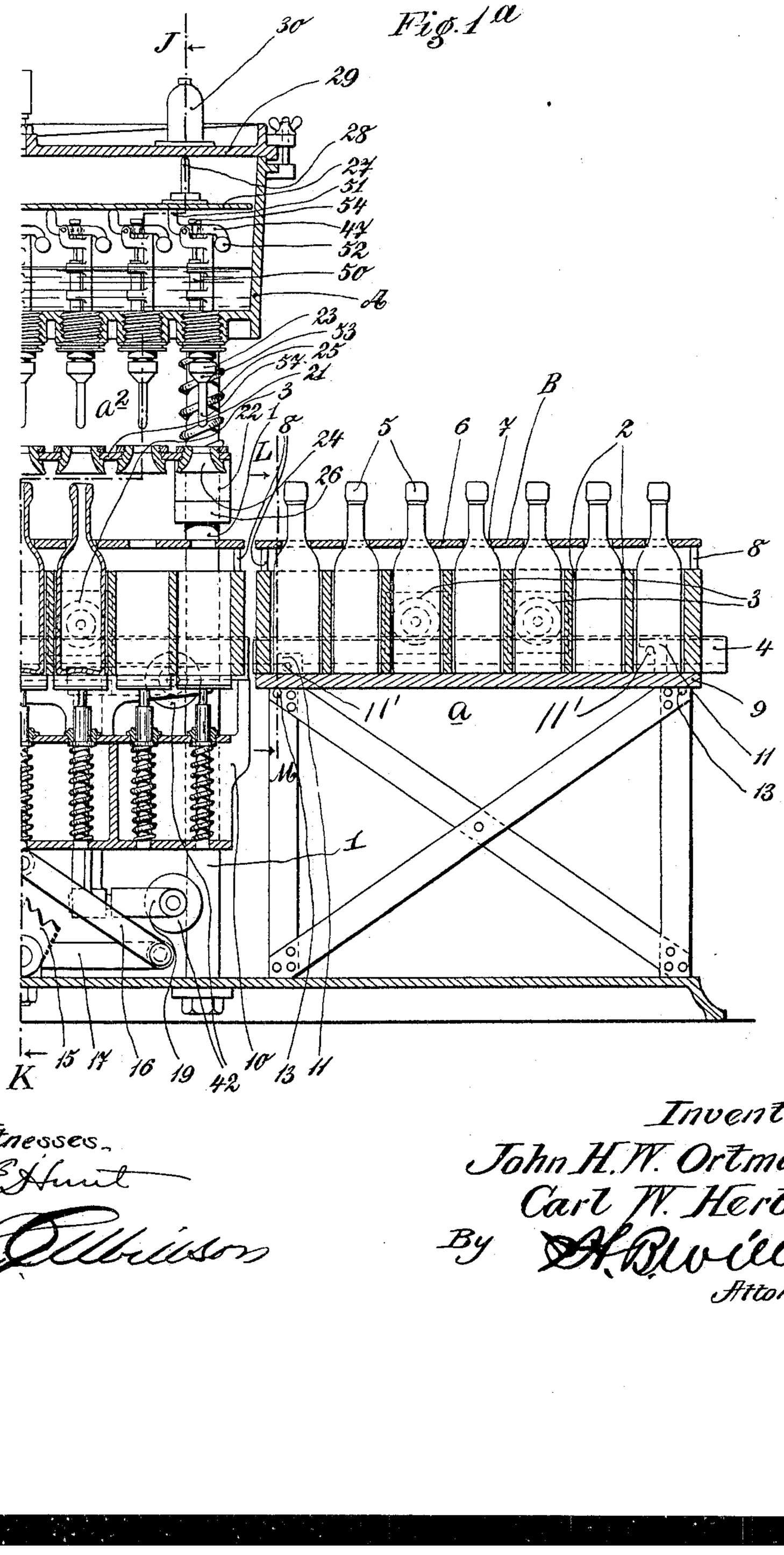
NO MODEL. 4 SHEETS—SHEET 2.

Fig. 1a



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NO MODEL. 4 SHEETS—SHEET 3.

Fig. 2

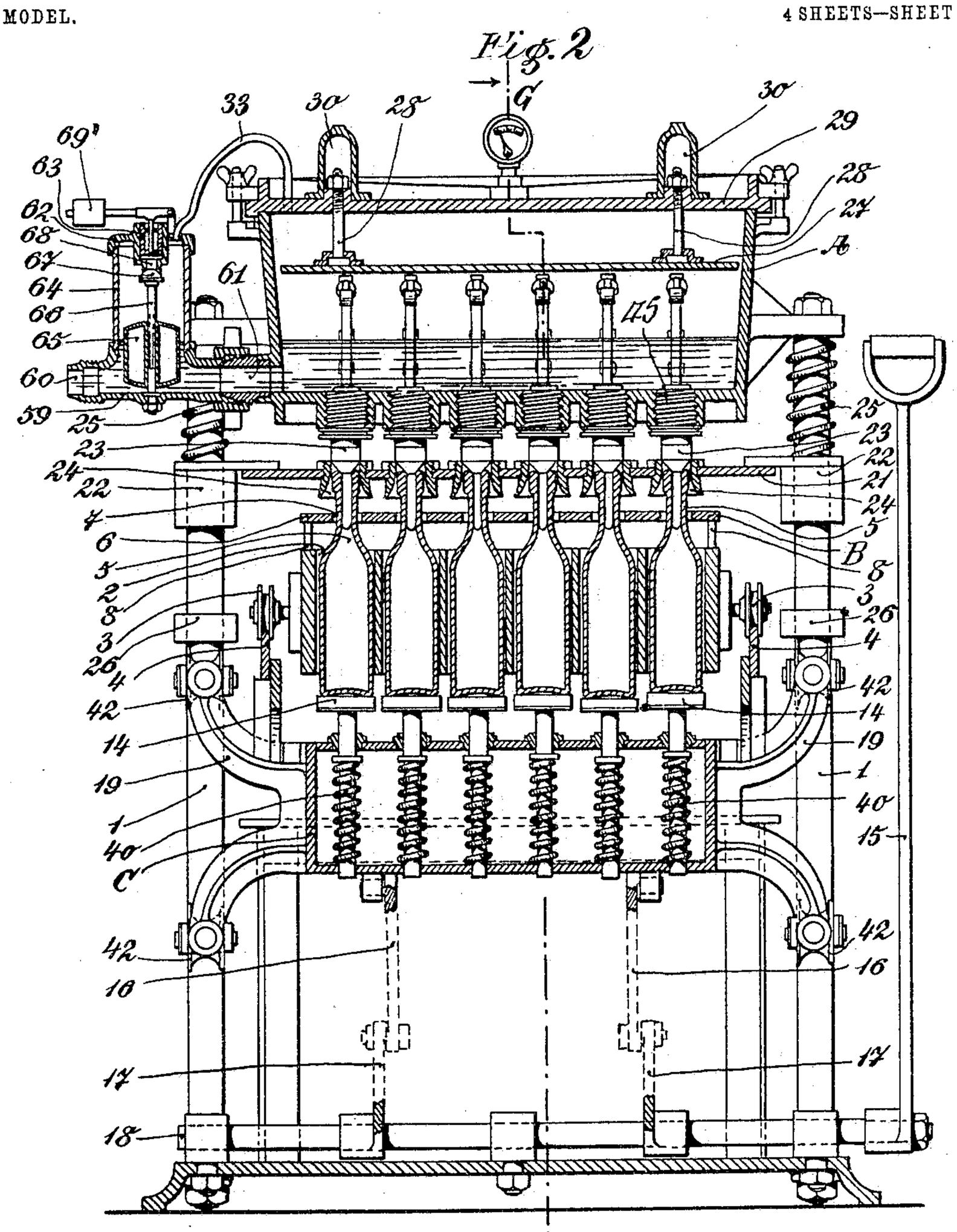
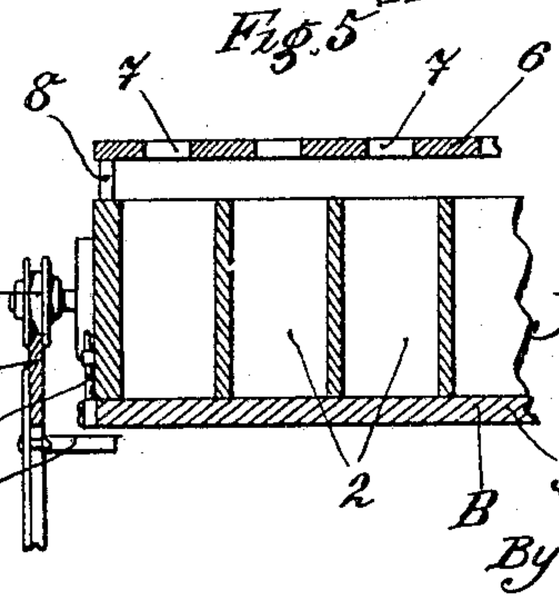


Fig. 5



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BOTTLE FILLING MACHINE.

APPLICATION FILED JUNE 16, 1903.

NO MODEL. 4 SHEETS—SHEET 4.

Fig. 4

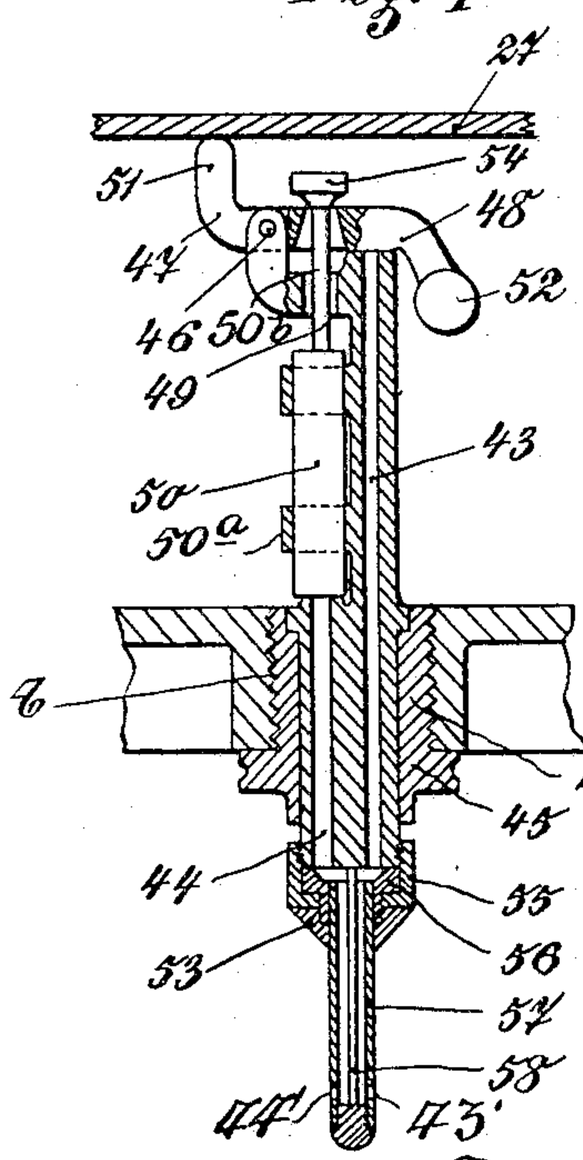


Fig. 3

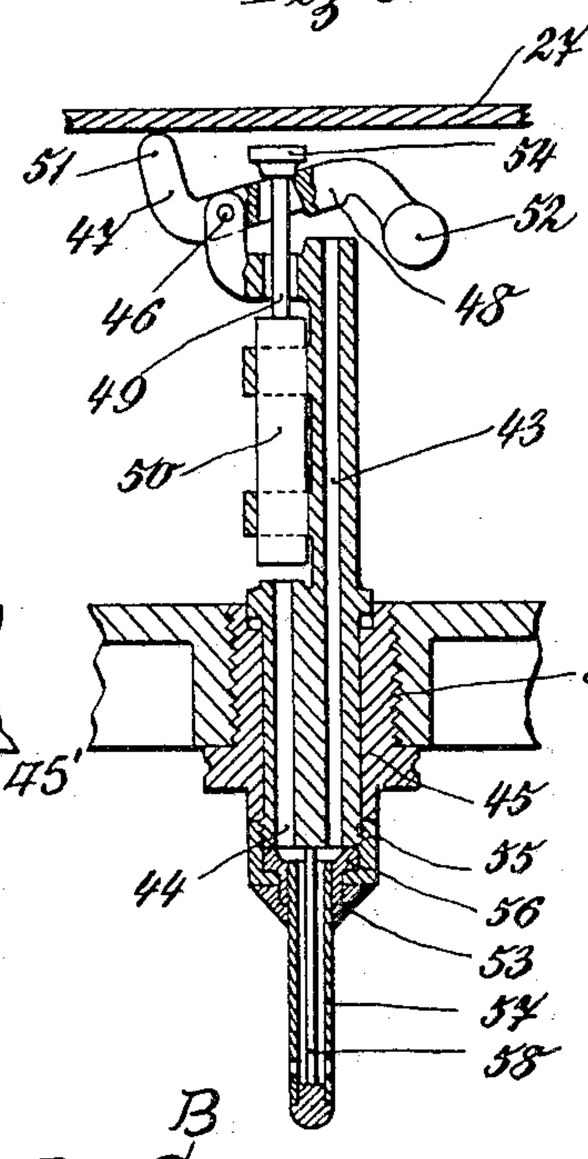
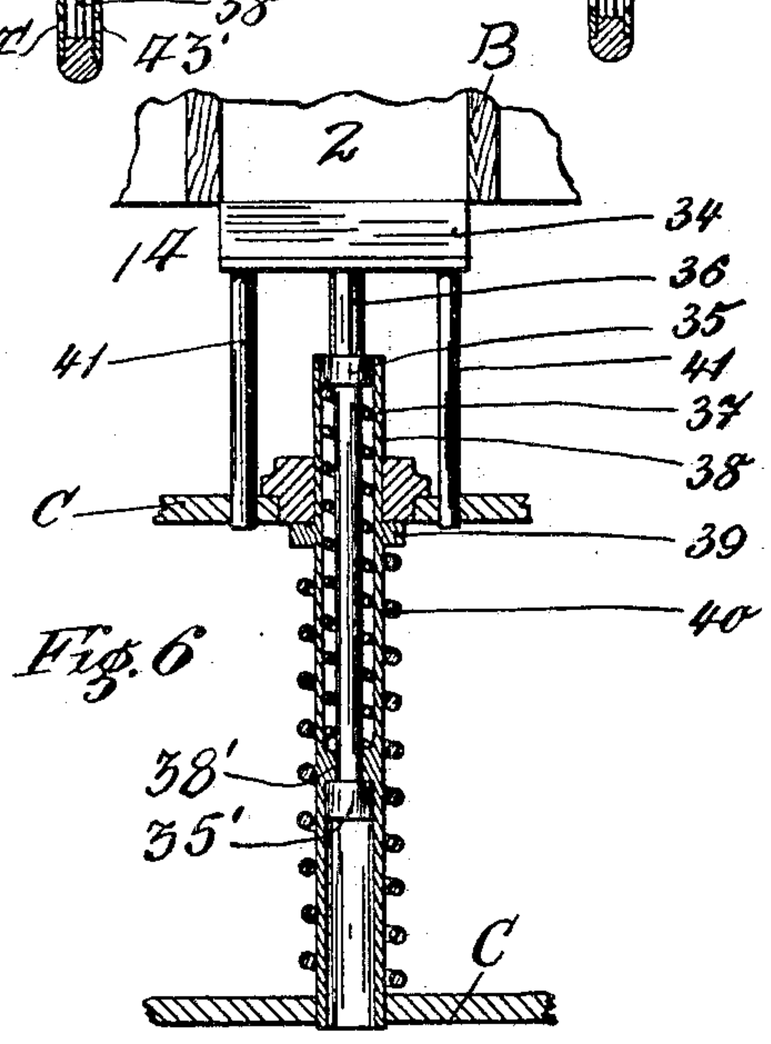


Fig. 6



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No. 775,307. Patented November 22, 1904.

UNITED STATES PATENT OFFICE.

JOHN HENRY WILLIAM ORTMANN AND CARL WILHELM HERBST, OF HAMBURG, GERMANY.

BOTTLE-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 775,307, dated November 22, 1904.

Application filed June 16, 1903. Serial No. 161,691. (No model.)

To all whom it may concern:

Be it known that we, JOHN HENRY WILLIAM ORTMANN and CARL WILHELM HERBST, both engineers, subjects of the Emperor of Germany, residing at Hamburg, Gothenstrasse 9, and Empire of Germany, have invented certain new and useful Improvements in Bottle-Filling Machines, of which the following is a full, clear, and exact description.

Our invention relates to improvements in bottle-filling machines; and its object is to provide a machine of this character whereby bottles of any desired size may be rapidly and efficiently filled.

In the accompanying drawings, Figure 1 is a vertical longitudinal section on line G H of Fig. 2 through one portion of the machine on one side of the central transverse line. Fig. 1ª is a similar view of the remaining portion of the machine on the opposite side of the central transverse line. Fig. 2 is an irregular vertical transverse section on the line J K of Fig. 1ª. Fig. 3 is a vertical section through one of the filling devices in an opened state. Fig. 4 is a similar view of the same closed. Fig. 5 is a vertical section on line L M of Fig. 1ª, and Fig. 6 is a vertical section showing the construction of one of the bottle-supports.

Referring to the drawings, 32 denotes the supporting-frame, having the receiving and delivery portions *a a'* and the intermediate portions a^2 where the operation of filling is carried on.

In the operation of this machine it is intended to convey the bottles to be filled directly from a bottle-washing machine to the filling-machine, so as to allow the water to drain therefrom on their passage. To this end the bottles are filled into boxes or trays in an inverted position to allow the water to drain out and upon arrival at the delivery end of the filling-machine are restored to a standing position by tilting and completely turning over the bottles.

In the construction illustrated the box, tray, or carriage B comprises a body portion divided by partitions to form compartments 2 of an internal diameter sufficient to receive the largest size bottle in general use. These compartments are closed at their lower ends by a bottom 9, which is provided with hooks 11 to engage pins 11′ on the sides of the body of the box. The upper ends of the compartments are closed by a cover 6, which is provided with openings 7, equal in number to the compartments, for the upward passage of the necks of the bottles. The cover 6 is adjustably and detachably connected to the body of the box by corner-rods 8, which are slidably fitted in the corners of the box-body. On the sides of the box-body are journaled rollers 3, which are designed to travel rails (not shown) extending from the washing-machine to the filling apparatus and also to travel sets of rails 4 and 20, mounted upon the delivery portion *a* and bottle-supporting frame C of the filling apparatus. The rollers 3 are arranged in close relation at or about the center of the box, so that the latter may be tilted through them on the track-rails to adjust the box to receive the bottles and restore them to an erect position. In the operation of filling the bottles into the boxes the box, in inverted position, is supported from the track-rails in proximity to the washing-machine and the bottles 5 inserted neck downward into the compartments 2 with the necks projecting through the openings 7 in the cover 6, after which the bottom 9 is applied and the box run along the track-rails to the delivery end *a* of the filling apparatus. On approaching the said delivery end *a* of the filling apparatus the box is inverted by tilting it on the rollers 3 and then run from the aforesaid track-rails onto the track-rails 4 of the receiving portion *a* of the filling apparatus, which is provided with pegs 13 or other similar portions to receive and support the bottom 9. In their passage from the washing-machine to the filling apparatus it will be apparent that as the bottles hang neck downward they will be quickly drained of any water which may be left therein and upon being restored to their normal position, as described, will be ready for delivery to the filling portion a^2 of the machine.

At the upper end of the filling portion a^2 is a hermetically-closed tank A, which is supplied with the beer or other liquid to be filled

into the bottles 5. This tank is closed at top by a cover 29 and is supported from the frame 32 upon columns or pillars 1. At the base of the filling portion is an adjustable bottle-supporting frame C, which carries a series of bottle-supporting devices 14, corresponding in number to the compartments of each box B. Each of these bottle-supporting devices comprises a rest or stand 34, having a depending stem 36, which fits and slides in a sleeve 38, slidable in a frame C. As shown, the stem 36 is provided with heads or collars 35 and 35′, which slide, respectively, in the upper and lower portions of said sleeve above and below an interposed shoulder 38′. Surrounding the stem between this shoulder and the upper head or collar 35 is a comparatively weak spring 37, which exerts pressure to normally hold the stand 34 at the limit of its upward movement. The sleeve 38 is limited in its upward movement by a collar 39, formed thereon and adapted to engage an upper portion of the frame C, and surrounding said sleeve between said collar and the lower portion of the frame C is a spring 40, which is stiffer than the spring 37. In practice the spring 37 is made of sufficient strength to support without compression the largest size bottle designed to be filled by the machine, while the spring 40 is made relatively stiffer in order to effect a better contact between the bottles and filling devices, as hereinafter described. The stand or rest 34 is guided and held from axial movement by guide-pins 41, depending therefrom and fitting and sliding in openings in the upper portion of the frame C. The frame C is provided with rollers 42, adapted to travel upon the columns or pillars 1, and is raised and lowered through the medium of adjusting mechanism comprising toggle-links 16 and 17, connected to and actuated by the rock-shaft 18, operatively connected to a hand-lever or other suitable actuating device 15. In delivering the bottles to the delivery portion a^2 of the filling apparatus it is necessary to remove the bottom 9 of the box B in order to allow the bottles 5 to rest directly upon the bottle-supporting devices 14. This is effected by providing the bottle-supporting frame C with stop portions 10, against which the bottom 9 of the box resting on the frame portion a abuts, so that by pushing the body portion of the box toward the center of the machine the pins 11^a will ride out of engagement with the hooks 11, allowing the box-body and bottles to move on the bottle-supporting devices independently of the bottom 9, which remains resting on the supporting-pins 13. In order to support the box-body, the frame C is provided with track-rails 20, which aline with the track-rails 4. The rollers 3 of the box-body run onto these track-rails 20, and thus support the box-body so as to allow the bottles 5 to have free independent movement within the compartments 2, the body-cover 6 by its adjustable connection with the box-body permitting the bottles to have such movement.

Between the bottle-supporting frame C and the filling-tank A is a frame or guide-plate 21, which is provided with sleeves 22 to slide upon the columns or pillars 1 and is limited in its downward movement by stops 26 and normally held in contact therewith by resistance-springs 25, surrounding the columns between said plate and the box. This plate 21 carries a series of hollow cone-shaped guide-pieces 24, adapted to receive, guide, and center the necks of the bottles and to also guide the filling devices thereto in the manner hereinafter described. The springs 25 are of such strength that the plate 21 is prevented from moving in the preliminary upward movement of the bottles under pressure therefrom, and thereby allows the bottle-necks to seat and center within the guide-pieces before completing their upward movement to receive the filling devices.

The filling mechanism of the present apparatus is of that type operating to simultaneously supply compressed air or gas and beer or other liquid to the bottles, and one object of the present invention is to provide a construction whereby the filling devices will be automatically opened when the bottles move into filling position and automatically closed when the bottles are filled. As shown in Figs. 3 and 4, each filling device comprises a tube having two vertical passages 43 and 44 for the respective supply of the compressed fluid and the liquid. This tube is slidably mounted in a bushing 45, screwed or otherwise fitted into the bottom of the tank A. In order to prevent any residue of beer or fluid from being left within the tank A, the beer-passage 44 opens through the tube into the tank, immediately above the bottom of the latter, while the compressed-fluid passage 43 extends farther upward into the tank to a point above the level of the beer. The passage 43 is controlled by a valve-lever 48, fulcrumed at 46 upon the upper end of the tube and having a weighted gravity-arm 52 to cause it to normally drop and close the upper end of said passage 43. It is also provided with a contact-arm 51 to engage an adjustable contact-plate 27, as hereinafter described. The passage 44 is controlled by a gravity slide-valve 50, moving in guides 50^a and having an upwardly-extending stem 50^b, sliding through the support of the lever 48 and passing through an opening in said lever and provided with a head 54 to rest thereon, so that when the lever 48 is tilted to open the passage 43 the valve 50 will be raised to open the passage 44, and in like manner when the lever 48 drops to close the passage 43 the valve 50 will drop therewith to close the passage 44. The arms 51 of the valve-lever 48 contact with the plate 27 when the filling-tubes slide upwardly in

the bushings 45, and are thereby opened, as will be readily understood. The plate 27 hangs suspended from screw-bolts or like adjusting devices 28, which pass through openings in the top 29 of the tank A and are fitted with adjusting-nuts. Caps 30 cover these nuts to prevent the passage of air through the bolt-holes into the filling-tank. Each filling-tube is provided at its lower end with a nozzle 57 to enter the mouth of the bottle, which nozzle is secured upon the tube by a cap-nut 55 and gasket 56 and is provided with a longitudinal partition 58, dividing the bore thereof for continuation of the passages 43 and 44 for the respective supply of air and beer, these passages having lateral outlets 43′ and 44′. A conical seal or stopper 53, of rubber or other similar material, is fitted on the nozzle to close the mouth of the bottle when the nozzle is applied thereto.

In the operation of the apparatus as thus far described after the bottles have been brought to rest upon their supports 14 the operating-lever 15 and connections are actuated to force the frame C upward on the pillars 1. Upon the movement of the frame C a prescribed distance the necks of the bottles 5 enter the guide-pieces 24 and are thereby centered or brought into alinement with the nozzles 57. In the preliminary upward movement of the bottles the guide plate or frame 21 does not move, as it is held downward by the resistance-springs 25; but the weak springs 37 yield and allow the bottles to seat properly within the guide-pieces 24, while the frame C continues to move upward a predetermined distance, thus permitting the bottles to come into operative position without objectionable pressure thereon, and then after the springs 37 have allowed the bottle-holders and bottles to move downward to the proper extent the stronger springs 40 are brought into action and exert a resistance to farther downward movement of the bottle-holders and bottles, so that the latter will be clamped firmly against movement between the holders and guide-pieces and may be moved upward to receive the filling devices, the resisting pressure of the springs 40 counteracting the pressure of the springs 25, so that under the forcing pressure of the operating mechanism the frame C will continue to move upward and carry the bottles so clamped and centered with it. At the same time the guide-frame 21 will also be forced upward until the bottles are elevated to a sufficient height to receive the nozzles of the filling devices and to be closed by the stops or seals 53. In this operation it will of course be understood that the box B remains at rest, while the bottles 5 move upward within the compartments 2 and the cover 6 is adjusted upwardly with the bottles. The bottles come into engagement with the nozzles as the frame C nears the limit of its upward movement, and in the final traverse of said frame the filling devices are slid upwardly in the bushings 45, thereby bringing the contact-arms 51 of the valve-levers 48 into engagement with the contact-plate 27 and opening said valve-levers and the valves 50. It will be observed that the connection between each valve-lever 48 and the coacting valve 50 allows some independent play between them, so that the valve 48 will open just before the valve 50, allowing a small amount of air to enter the bottles in advance of the beer and then allowing the beer and air to feed simultaneously. As soon as the bottles are filled the frame C is lowered and the parts restored to their normal positions, and then the box B, containing the filled bottles, is pushed from off the supports 14 onto the platform of the receiving portion a' of the frame, where the bottles may be stoppered. At this time the box may be lifted off the bottles, leaving the latter standing on the platform, or the top 6 may be removed, so as to allow the bottles to be individually taken out of the compartments.

Automatic means are provided to enable the level of the liquid in the tank A to be determined by sight from the exterior and to automatically control the supply of beer to the tank, thus preventing the beer from rising too high and flowing into the air-passages 43. These comprise a connection 59, having an inlet 60 for communication with a keg, vat, or other source of supply of the beer and an outlet 61 leading into the tank. A transparent chamber 64, of glass or other like material, rises from the center of said connection and is closed at top by a cap 62. In this chamber operates a float 65, moving on a guide-stem 66 and carrying a valve 67. This valve is adapted to close an air-vent 68, communicating with a cylinder 69, in which operates an escape-valve 63, controlled by a weighted lever 69′, adjustable to adapt the valve to blow off at a desired pressure. The air-spaces of the float-chamber and tank are connected by a pipe 33. Upon the inlet of beer under pressure to the filling-tank the air in the tank and float-chamber becomes compressed and sets up a counter-pressure to the pressure of the entering liquid, this counter-pressure being regulated by the valve 63, it being understood that the counter-pressure is proportionate to the amount of beer in the tank A. The valve 63 is adjusted under ordinary conditions to blow off at a somewhat lower counter-pressure than the pressure of the inflowing liquid. The beer is allowed to flow continually, for the reason that an overpressure is exerted on the interior of the supply cask or vessel and the flow can only be stopped when the counter-pressure rises sufficiently high to resist the said flow, this being brought about by the closing of the air-exit 68 by the valve 67 upon the rising of the float when the beer rises above the normal level. The level of the beer

may be readily observed at all times through the chamber 64.

From the foregoing description, taken in connection with the accompanying drawings, the construction, operation, and advantages of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a bottle-filling machine, the combination with a tank or reservoir, of a contact device therein, a sliding dispensing-tube provided with a liquid-passage communicating with the lower portion of said tank or reservoir and a fluid-passage communicating with the upper portion of said tank or reservoir above the level of the liquid therein, a guideway on the side of the dispensing-tube above said liquid-passage, a gravity-closing valve fulcrumed to the upper end of the dispensing-tube and controlling said fluid-passage, said valve having a trip to engage the contact device when the tube is moved in one direction, whereby said valve is opened, a sliding gravity-closing valve movable in said guideway and controlling said liquid-passage, and a connection between said valves adapting them to be successively opened, substantially as described.

2. In a bottle-filling machine, the combination with a filling tank or reservoir, of a contact device therein, a dispensing device movably mounted, a governing-valve on the dispensing device adapted to engage and be opened by said contact device when the dispensing device is moved, and a bottle-holder adjustable to operate said dispensing device, substantially as described.

3. In a bottle-filling machine, the combination with a filling tank or reservoir, of a dispensing device provided with a fluid and a liquid passage, a contact device, a valve governing said fluid-passage and adapted to be engaged and opened by the contact device, a second valve opened by the first-named valve and governing the liquid-passage, and means for bringing the contact and fluid-governing valve into engagement, substantially as described.

4. In a bottle-filling machine, a liquid-reservoir, a contact device therein, a dispensing device having a governing-valve adapted to be opened by said contact device, and means for bringing the valve and contact device into engagement, substantially as described.

5. In a bottle-filling machine, a liquid-reservoir, a contact device therein, a movable dispensing device having a governing-valve adapted to be opened by said contact device, and means for moving the dispensing device to bring the valve and contact device into engagement as the bottle to be filled comes into coacting relation with said dispensing device, substantially as described.

6. In a bottle-filling machine, a liquid-reservoir, a contact device therein, a vertically-movable dispensing device having fluid and liquid passages, valves governing said passages, and means for moving the dispensing device to cause the contact device to successively open the valves as the bottle to be filled comes into coacting relation with said dispensing device, substantially as described.

7. In a bottle-filling machine, a liquid-reservoir, a contact device therein above the level of the liquid, a vertically-movable dispensing device having fluid and liquid passages, a gravity-valve governing the fluid-passage and having an arm to engage said contact device, a second gravity-valve governing the liquid-passage and operatively connected to the first-named valve, and means for moving the dispensing device to cause the contact device to open the valves as the bottle to be filled comes into coacting relation with said dispensing device, substantially as described.

8. In a bottle-filling machine, a liquid-reservoir, movable dispensing devices, valve mechanism for opening and closing said dispensing devices as they are moved in one direction or the other, a bottle-carrier movable toward and from the reservoir to bring the bottles into engagement with said dispensing devices, said carrier being provided with independently-movable bottle-supports, guides for the bottles movable in unison to guide the necks of the bottles and nozzles of the dispensing devices into engagement, and springs of different resisting forces for governing the action of said movable bottle-supports, substantially as described.

In witness whereof we subscribe our signatures in presence of two witnesses.

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CARL WILHELM HERBST.

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