(No Model.) 3 Sheets—Sheet 1.

W. R. DANNALS.

BOTTLE FILLING MACHINE.

No. 440,916. Patented Nov. 18, 1890.

FIG. 1.

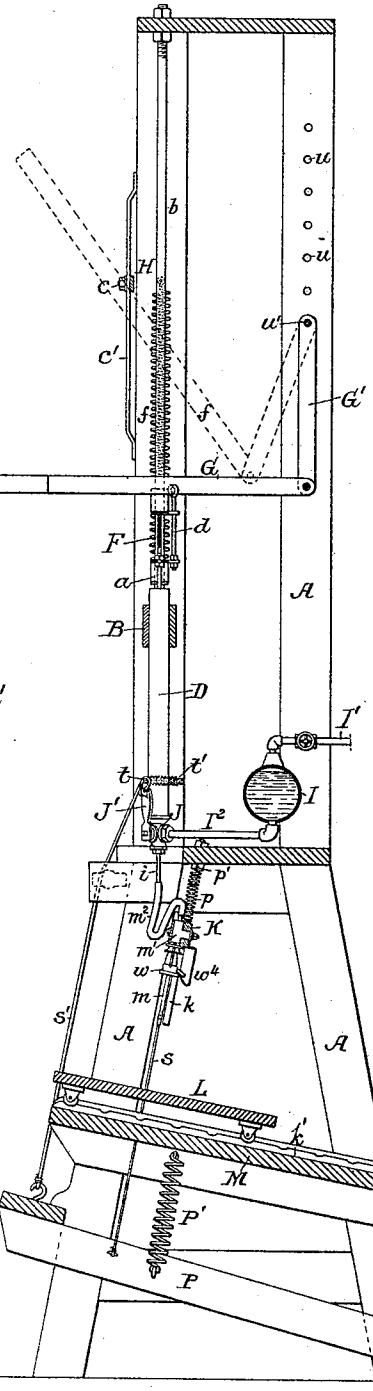


FIG. 3.

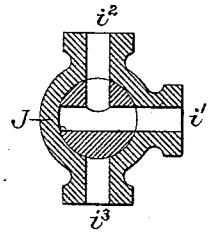


FIG. 4.

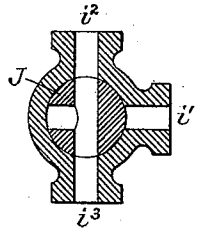


FIG. 9.

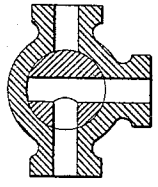
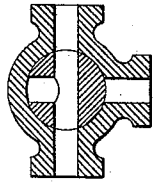


FIG. 10.



Witnesses:
Hamilton D. Turner.
Alex. Barkoff.

Inventor:
William R. Dannals
by his Attorneys
Howson & Howson

(No Model.) 3 Sheets—Sheet 2.

W. R. DANNALS.

BOTTLE FILLING MACHINE.

No. 440,916. Patented Nov. 18, 1890.

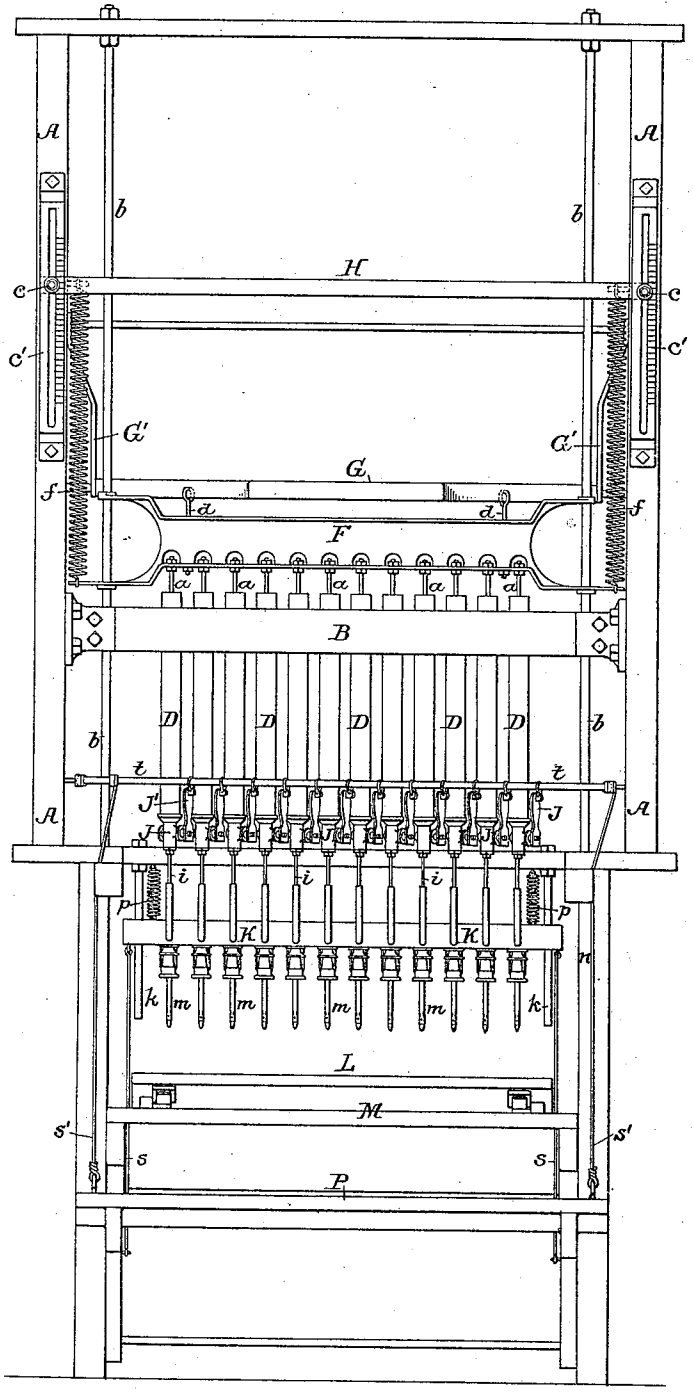


FIG. 2.

Witnesses:
Hamilton D. Turner.
Alex. Barkoff

Inventor:
William R. Dannals
by his Attorneys
Howson & Howson

(No Model.) 3 Sheets—Sheet 3.

W. R. DANNALS.

BOTTLE FILLING MACHINE.

No. 440,916. Patented Nov. 18, 1890.

FIG. 5.

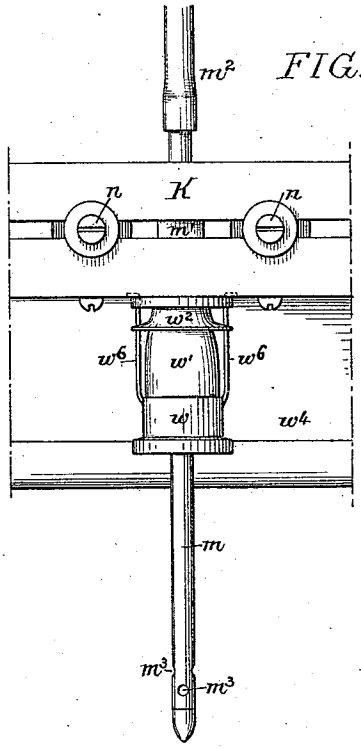


FIG. 6.

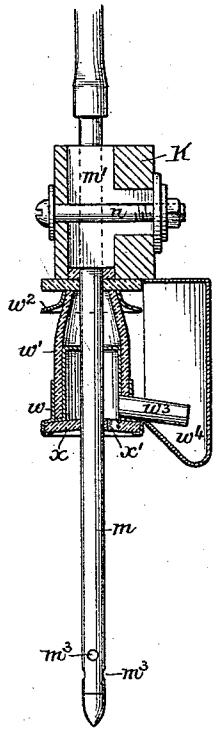


FIG. 8.

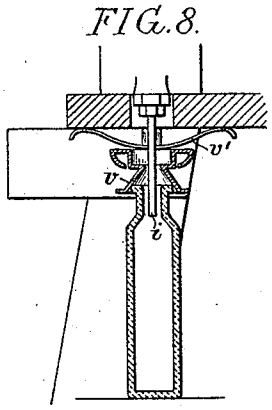
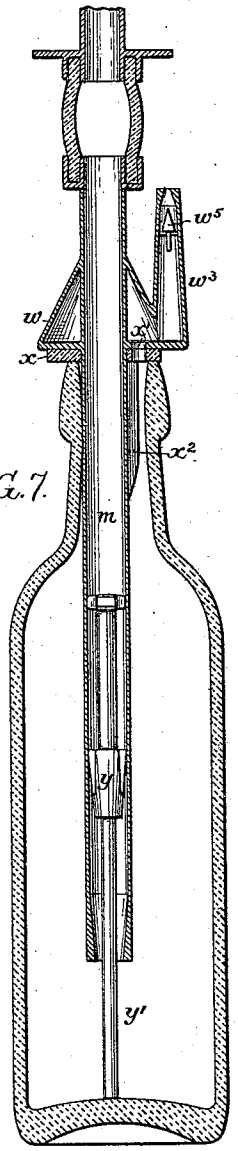


FIG. 7.



Witnesses:
Hamilton D. Turner.
Alex. Barkoff

Inventor:
William R. Dannals
by his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

WILLIAM R. DANNALS, OF PHILADELPHIA, PENNSYLVANIA.

BOTTLE-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 440,916, dated November 18, 1890.

Application filed March 24, 1890. Serial No. 345,057. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. DANNALS, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Bottle-Filling Machines, of which the following is a specification.

My invention relates to that class of bottle-filling machines in which a series of bottles are filled at one time, my invention comprising certain details in construction of the machine, as fully described and claimed hereinafter, with a view of simplifying said construction and insuring a rapid and accurate filling of the bottles.

In the accompanying drawings, Figure 1 is a transverse section of a bottle-filling machine constructed in accordance with my invention. Fig. 2 is a front view of the machine. Figs. 3, 4, 5, and 6 are detached views, on an enlarged scale, illustrating parts of the machine. Fig. 7 is a sectional view of a special form of the filling-nozzle. Fig. 8 is a view illustrating a modification of part of the invention, and Figs. 9 and 10 are views illustrating one of the features of the invention.

A A represent the fixed side frames of the machine, and B a transverse bar, to which is secured a series of filling-cylinders D, arranged side by side, each of these cylinders having a plunger or piston, the rods *a* of which are connected to a transverse bar or frame F, suitably guided in its vertical movement upon opposite rods *b*, near each side of the machine. The bar or frame F is suspended by short rods or links *d* from a lever G, which is hung by means of links G′ to the opposite side frames of the machine and extends out in front of the machine, so as to be readily manipulated by the attendant. The opposite end portions of the bar or frame F are acted upon by springs *f*, which tend to elevate said bar or frame and the plunger-rods carried thereby to an extent which is limited by contact of the lever G with the transverse bar H, the latter being adjustable vertically and being secured in position after adjustment by tightening the nuts upon the bolts *c*, carried by the bar and guided in the opposite slotted plates *c*′ on the side frames of the machine, as shown in Fig. 2.

At the back of the machine is a cylindrical drum or reservoir I, which during the operation of the machine is kept constantly filled with the liquid for supplying the bottles, this liquid flowing by gravity or being drawn through a pipe I′ into the reservoir I on the operation of the plungers in the cylinders, the pipe I′ communicating with the main reservoir or source of supply.

The reservoir I has a series of discharge-pipes I^2, one for each of the filling-cylinders D, each pipe communicating with one branch *i*′ of the casing of a three-way valve J, having another branch i^2, communicating with the lower end of the filling-cylinder, and a third branch i^3, communicating with a filling pipe or nozzle *i*, so that the valve may be turned, as shown in Fig. 3, to provide communication between the reservoir I and the filling-cylinders, or may be rotated to the extent of a quarter of a turn, as shown in Fig. 4, so as to cut off communication with the reservoir I and open communication between the filling-cylinders and the nozzles *i*. In the rear of the nozzles *i* are a corresponding number of nozzles *m*, which are carried by blocks *m*′, guided in a transversely-slotted frame K and adjustable laterally therein to accord with the varying diameters of the bottles to be filled, suitable clamping-bolts *n*, provided with nuts and washers, being employed for confining the blocks *m*′ between the front and back bars of the frame K, so as to insure the securing of said blocks and their nozzles in the proper position after adjustment.

The frame K is suitably guided at each end upon rods *k*, and is supported by springs *p*, hung to a bar or other support *p*′, so that the frame K and nozzles *m* are free to rise and fall, the upper ends of the nozzles *m* being connected to the nozzles *i* by means of flexible pipes or tubes m^2, as shown in Fig. 1. The tray carrying the rows of bottles is mounted on a carriage L, having wheels adapted to the notched tracks *k*′ upon a platform or table M, which is mounted at an angle upon the side frames or supports A of the machine, the nozzles *m* being mounted and guided in a plane at right angles to that of the table or platform M, so that when a row of bottles has been brought under and in line with the row of nozzles the latter may be depressed, so as to enter the bottles, such depression being

effected by connecting the frame K, by means of cords or chains *s*, to a treadle P, and this treadle being also connected by cords or chains *s'* to the operating arms or handles J' of the three-way valves J, whereby on depressing the treadle so as to cause the nozzles to enter the bottles the three-way valves will be simultaneously operated, so as to open communication between the filling-cylinders and the nozzles *i*, thus permitting the liquid in said cylinders to be forced through the nozzles *i*, tubes m^2, and nozzles *m* into the bottles.

The arms or handles J' of the three-way valves J are connected to a rod *t*, which is acted upon by springs *t'*, so as to restore the valves J to their former position on the rise of the treadle P, the latter movement being effected by means of a spring P', as shown in Fig. 1, and the elevation of the bar K and its nozzle *m* being effected by the springs *p* when the treadle is permitted to rise. The nozzles *m* have pointed lower ends to facilitate their entrance into the mouths of the bottles, and said nozzles project some distance down into the bottles and have discharge-openings m^3 near their lower ends.

Sliding on each of the nozzles *m* is a cap *w*, which is acted upon by a spring *w'*, tending to depress it, this spring in the present instance being shown in the form of an elastic tube interposed between the cap and a plate or washer w^2 on the bottom of the frame K, suitable guide-rods w^6 serving to prevent twisting of the cap on the nozzle. The lower end of the cap has a washer *x* for bearing upon and closing the mouth of the bottle, this washer having a central opening for the passage of the nozzle, and at one side of the same a smaller opening *x'* for the escape of air from the bottle as the latter is being filled, and for the escape also of any surplus liquid from the bottle in case the capacity of the bottle is not equal to the charge, this surplus liquid being conveyed from the cap *w* through a branch w^3 into a trough w^4, carried by and extending through the length of the frame K and discharging at one end into any suitable receptacle.

On one side of the nozzle *m* at a point adjacent to the cap *w* is a rib or projection x^3, which serves to so locate the nozzles in the mouths of the bottles that the opening *x'* in the washer *x* will always be in communication with the interior of the bottle when the nozzle is inserted therein.

The operation of the device is as follows: The normal position of the parts is that shown by full lines in Fig. 1. In starting to fill the bottles the lever G is first elevated to the position shown by dotted lines in Fig. 1, so as to charge the cylinders D, the extent of this elevation being limited, as before mentioned, by the adjustable bar G, so that the upward stroke of the plunger of each filling-cylinder is restricted and the amount of liquid drawn into the cylinder thus regulated. The carriage L being adjusted to such a position that the front row of bottles is directly beneath the filling-nozzles *m*, the treadle P is depressed so as to cause said nozzles *m* to enter the bottles and at the same time to cause the washers *x* of the caps *w* to close the mouths of the bottles. The same movement of the treadle which effected the entrance of the nozzles into the bottles caused such an operation of the valves J as to open communication between the filling cylinders and nozzles *i* and close communication with the reservoir I, as shown in Fig. 4. The lever G being now depressed forces the liquid from the filling-cylinders into the bottles, the amount of the liquid drawn into each filling-cylinder on the rise of the plunger therein being just sufficient to constitute the desired charge for each bottle. As the liquid rises in each bottle, the air passes from the same through the opening *x'* in the washer *x*, and through the cap *w* and its branch w^3, and if the charge of liquid is greater than the capacity of the bottle the surplus liquid also escapes in the same manner, and is directed by the trough w^4 to a suitable receptacle, to be returned to the main reservoir. On releasing the pressure from the treadle the nozzles *m* and caps *w* are withdrawn from the bottles, and the valves J are readjusted to the position shown in Fig. 3, so as to permit the filling of the cylinders D prior to a repetition of the above-described operation when a row of unfilled bottles has been brought under and in line with the nozzles *m*. In some cases the bottles may be filled directly from the nozzles *i*, sliding caps *v* in this case serving to properly center the mouths of the bottles for the entrance of the nozzles, as shown in Fig. 8, for instance, the bottles in this case being caused to rise as the nozzles occupy a fixed vertical position, and the caps *v* being normally depressed by means of suitable springs *v'*.

When the machine is used for filling bottles with beer or effervescent liquids, I prefer to use the form of filling-nozzle shown in Fig. 7, this nozzle being mounted in the same way as the others. In this case the nozzle is normally closed at the lower end by means of a valve *y*, carried by a rod *y'*, which projects below the lower end of the nozzle, so that when the latter is inserted into the bottle the contact of this rod with the bottom of the bottle will cause the valve *y* to open and permit the liquid to flow into the bottle, the valve closing automatically as the nozzle is raised from the bottle when the filling of the latter has been completed. In this case, also, I prefer to provide the discharge-branch w^3 of the cap *w* with a check-valve w^5, closing upward, this valve remaining open as long as air is being discharged through the cap, but being forced against its seat by any flow of liquid through the cap, so that while the discharge-branch provides for the escape of air it will prevent the escape of the liquid, for in the case of beer or effervescent liquids any such escaping liquid

would be lost, as it could not be returned to the main reservoir again.

The side bars of the frame of the machine have a series of openings *u* for the reception of the pins *u'*, whereby the links G' are hung to said side frames, so that the fulcrum-point of the lever G may be raised or lowered, in order to provide for the most effective operation of said lever under different circumstances.

Where a force or pressure supply of liquid to the bottles is not required, the use of the cylinders D may be dispensed with and the liquid permitted to flow directly from the reservoir I to the nozzles *i* without gaining any access to the said cylinders, the two positions of the three-way valve under such method of operation being those shown in Figs. 9 and 10, a simple reversal or half-turn of the plug of the valve being all that is required to adapt it to this new method of operation.

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

1. The combination, in a bottle-filling machine, of a movable bottle-support, a row of filling-nozzles, a series of caps surrounding said nozzles and adapted to close the mouths of the bottles, springs serving as backings for said caps, and means for moving the nozzles from and toward the bottles, substantially as specified.

2. The combination, in a bottle-filling machine, of a bottle-holder or support, a liquid-reservoir, a series of filling-cylinders having plungers therein, a series of filling-nozzles, and three-way valves whereby the cylinders may be caused to communicate either with the reservoir or with the nozzles, substantially as specified.

3. The combination, in a bottle-filling machine, of a bottle holder or support, a liquid-reservoir, a series of valved nozzles communicating with said reservoir, a series of laterally-adjustable filling-nozzles for entering the bottles, and flexible connections between said valved nozzles and said adjustable filling-nozzles, substantially as specified.

4. The combination, in a bottle-filling machine, of the filling-nozzle having a rib or projection at one side with a cap surrounding said nozzle and having a flat gasket or washer adapted to close upon the top of the bottle-mouth, said cap and washer having an air-discharge vent therein adjacent to the rib or projection on the nozzle, substantially as specified.

5. The combination, in a bottle-filling machine, of the filling-nozzle, a vented cap for closing the mouth of the bottle, and a valve closing the said nozzle and having a rod projecting downward beyond the same, so as to be operated to open the valve by contact with the bottom of the bottle, substantially as specified.

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

WM. R. DANNALS.

Witnesses:
EUGENE ELTERICH,
HARRY SMITH.