

(No Model.)

2 Sheets—Sheet 1.

S. B. SMALLWOOD.
BOTTLE FILLING MACHINE.

No. 523,016.

Patented July 17, 1894.

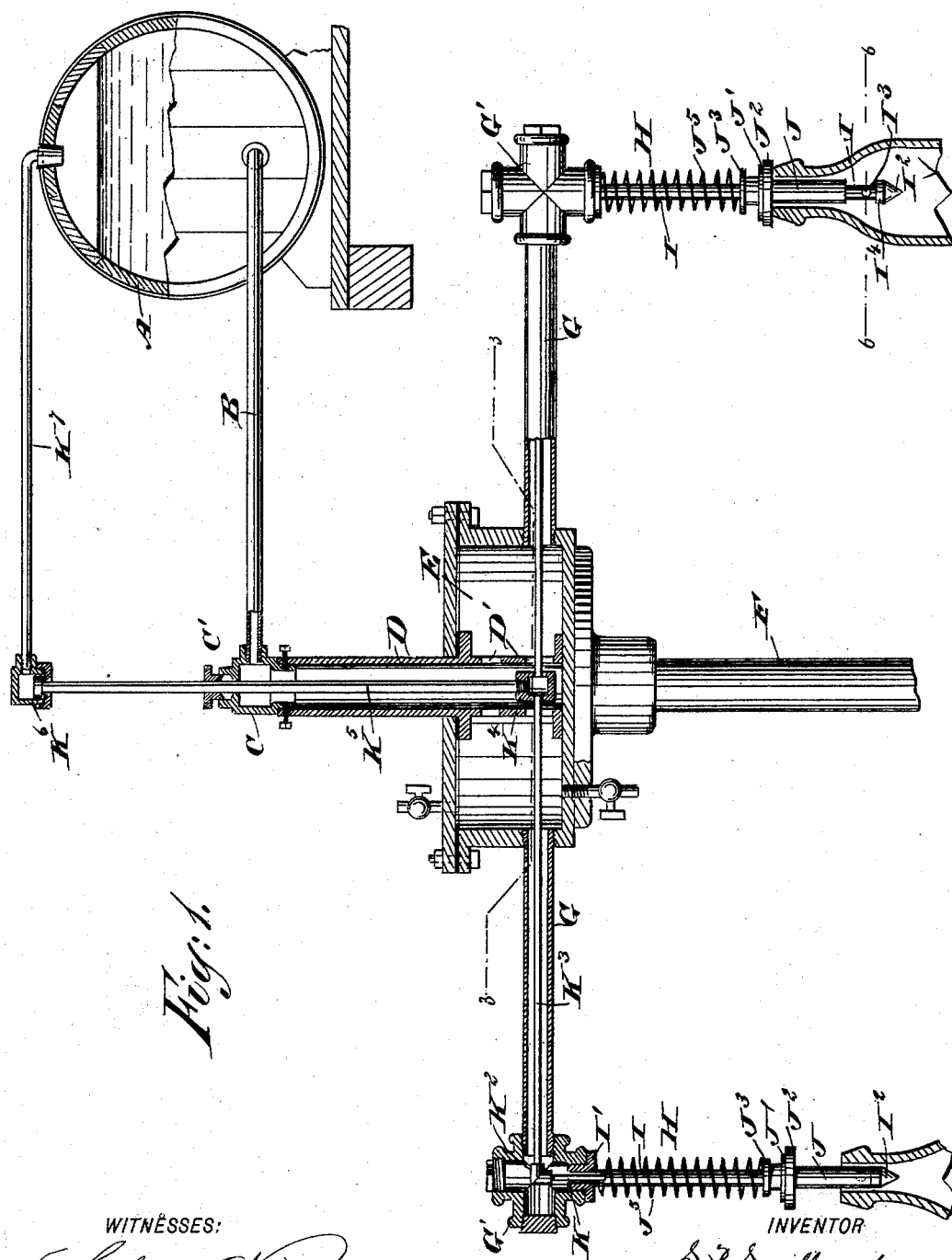


Fig. 1.

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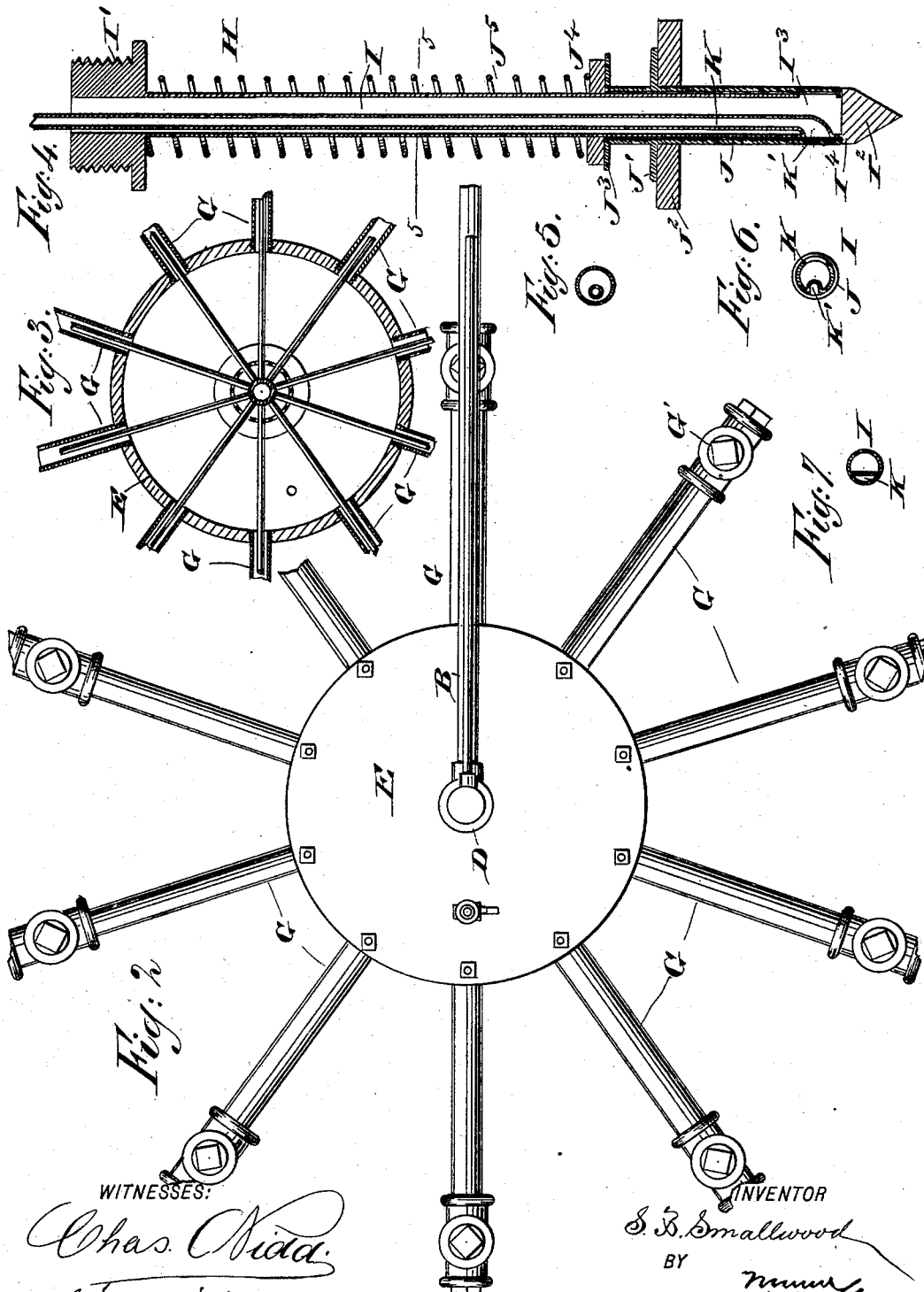
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UNITED STATES PATENT OFFICE.

SAMUEL B. SMALLWOOD, OF LONG ISLAND CITY, NEW YORK.

BOTTLE-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 523,016, dated July 17, 1894.

Application filed June 15, 1892. Renewed May 13, 1893. Again renewed November 20, 1893, and again renewed May 23, 1894.
Serial No. 512,735. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL B. SMALLWOOD, of Astoria, Long Island City, in the county of Queens and State of New York, have invented
5 a new and Improved Bottle-Filling Machine, of which the following is a full, clear, and exact description.

The invention relates to bottle filling machines such as shown and described in the application for Letters Patent of the United States, Serial No. 421,694, filed by me February 16, 1892.

The object of the present invention is to provide a new and improved bottle filling machine which is simple and durable in construction, very effective in operation and arranged to insure a ready flow of the filling liquid from the cask to the bottle, and also to aid the escape of the displaced air from the receptacle being filled.

The invention consists of certain parts and details, and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a plan view of the same. Fig. 3 is a sectional plan view of part of the same on the line 3—3 in Fig. 1. Fig. 4 is an enlarged side elevation of the filling and air discharge tube. Fig. 5 is a sectional plan view of the same on the line 5—5 in Fig. 4. Fig. 6 is a similar view of the same on the line 6—6 in Fig. 1; and Fig. 7 is a sectional plan view of a modified form of filling and air discharge tube.

The cask, barrel or tank A, containing the filling liquid is connected by a pipe B with a head C engaged, at its bottom, by the upper end of a tube D secured within the tank E carried on a shaft F mounted to revolve the said tank corresponding to the tank B, shown in the patent above referred to.

In the tube D within the closed tank E are formed openings D' through which the liquid can escape from the said tube to fill the tank E. When the machine is in motion, the tank E revolves and with it the tube D which lat-

ter thus turns in the lower end of the head C as will be readily understood by reference to Fig. 1. From the side of the tank E lead a series of outlet pipes G, preferably arranged radially, equal distances apart, as shown in Fig. 2. Each of the pipes G is provided on its outer end, with a head G' made in the shape of a hollow cross and supporting, on the downwardly extending arm, a filling and air discharge tube H adapted to be engaged by a bottle carried on a bottle carrier revolving with the tank E in the manner described and shown in the application above referred to, the said bottle carrier being arranged to raise the bottles to open the said filling and air discharge tube in the manner hereinafter more fully described.

Each of the filling and air discharge tubes is provided with a tube I formed at its upper end with a nut I' screwing in the downwardly extending arm of the cross head G'. On the lower end of the tube I is formed a point I² adapted to pass into the bottle to be filled, and above the said point in the wall of the tube I is formed a liquid outlet opening I³. On the top of the point and directly below the outlet opening I³ is formed an annular valve seat I⁴ extending somewhat beyond the tube I and adapted to be engaged by the lower edge of a valve J, in the shape of a sleeve, fitted to slide vertically on the outside of the tube I.

On this sleeve valve J is secured a flange J' supporting a rubber disk J² adapted to be engaged by the mouth of the bottle when the latter is filled, as illustrated in Fig. 1. Above the flange J' is formed a second flange J³ also carrying a disk J⁴ on which rests the lower end of a coil spring J⁵ surrounding the upper part of the tube I and pressing with its upper end on the under side of the nut I'. The spring J⁵ forces the sleeve valve J downward so as to hold the lower end of the same normally on its seat I⁴; when the sleeve valve J is in this position, then it closes the outlet opening I³ for the liquid, and also closes the inlet opening K' for the air pipe K extending upward in the tube I or directly formed thereon by a partition, as shown in Fig. 7. The inlet opening K' is arranged in close proximity to the outlet opening I³, so that both openings K' and I³ are simultaneously closed

or opened by the sleeve valve J. When the latter is in its normal position, as shown in Fig. 4, both openings are closed and when a bottle engages the point I² and is moved upward until the mouth finally engages the point I², and on a further upward movement lifts the sleeve J against the tension of the spring J⁵, then the two openings K' and I³ are opened so that the liquid from the tube I can pass through the opening I³ into the bottle and at the same time the air from the bottle can escape through the opening K' into the pipe K.

As the mouth of the bottle is hermetically sealed by the disk J² all the air escaping from the bottle and displaced by the inflowing liquid must flow through the inlet opening K' into the pipe K. The latter extends into the head G' and is connected there by an elbow K² with a pipe K³ extending horizontally through the pipe G into the tank E and through one of the openings D' in the tube D to connect with a head K⁴ located in the lower end of the said tube D. The several air pipes K³ are connected with this head K⁴, and the latter is connected with a single pipe K⁵ extending vertically through the tube D to finally pass out of the head C through a stuffing box C' therein, see Fig. 1.

The upper end of the pipe K⁵ revolves loosely in and discharges into the head K⁶ connected with a pipe K⁷ leading to the top of the cask, barrel or tank A, so that the liquid flowing out of the said cask forms a vacuum therein and consequently sucks in the air through the pipe K⁷, whereby a like suction of air takes place in those bottles moved upward, which opens the sleeve valve J, as above described, so that the air from the several bottles is sucked into the pipe K and from the latter readily passes through the pipe K³, the head K⁴, the pipe K⁵ head K⁶ to the pipe K⁷ to finally pass into the top of the cask A, and which entrance of air acts as a vent to the cask.

It is understood that the pipes K³, the head K⁴ and pipe K⁵ revolve with the tank E, while the head K⁶ is constantly on the end of the fixed pipe K⁷. The several heads G' are formed with plugs on the end and top arms, as shown at the left in Fig. 1, so that ready access is had to the pipes G, K³ and K for cleaning the same or for other purposes.

The operation is as follows:—The sleeve valve J for the several filling and air discharge tubes H is held normally closed by the action of the spring J⁵. Now, when a bottle to be filled engages the pointed end I² of the tube I and rises, at the same time traveling with the filling tube revolving with the tank E, then the said sleeve valve J is finally opened, as above described, so that the liquid flows into the bottle through the outlet opening I³, the liquid passing sideways onto the wall of the bottle, thus filling the same without making much foam. At the same

time the air in the bottle is sucked through the inlet opening K' to the air tube K to pass into the top of the cask or barrel A, as above described. It is understood that the bottle revolves with the tank E until the bottle is filled, after which the bottle descends so that the force of the spring J⁵ finally closes the sleeve valve J. The filled bottle is then taken off the closed filling and air discharge tube in the manner described and shown in the application above referred to.

It will be seen that this device is composed of but few parts, and hence is not liable to get out of order and forms a ready escape for the air displaced in filling the bottles, and at the same time insures a ready flow of the liquid from the cask to the receptacle to be filled. The tank E is provided with suitable devices for cleaning the same and for letting out gas and air.

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

1. In a bottle-filling machine, the combination with the liquid eduction tube, B, for connection with a cask, the liquid-conducting tubes, and a tank of the air inlet tube, K', for connection with the top portion of the cask, and air-conducting tubes connected with the air-inlet tube and arranged within the aforesaid liquid-conducting tubes, and a sleeve valve adapted to slide on the outlet tube to cover or uncover its outlet, as shown and described.

2. A bottle filling machine, comprising a revoluble tank, a tube secured on the said tank and discharging into the same, a head engaging the said tube and arranged to permit the tube to revolve thereon, the said head being adapted to connect with the liquid supply, a series of pipes leading from the said tank, and a filling and air discharge tube, substantially as described, held on the end of each of the said tubes, as set forth.

3. A bottle filling machine, comprising a revoluble tank, a tube secured on the said tank and discharging into the same, a head engaging the said tube and arranged to permit the tube to revolve thereon, the said head being adapted to connect with the liquid supply, a series of pipes leading from the said tank, a filling and air discharge tube, substantially as described, held on the end of each of the said tubes, air pipes leading through the said tank tubes to connect with the air pipes of the filling and air discharge tubes, a head arranged within the said tank and to which lead the several air pipes, and a second pipe extending from the said head and connecting with the top of the liquid supply vessel, as set forth.

SAMUEL B. SMALLWOOD.

Witnesses:

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FRANK J. CROSS.