

No. 622,429.

Patented Apr. 4, 1899.

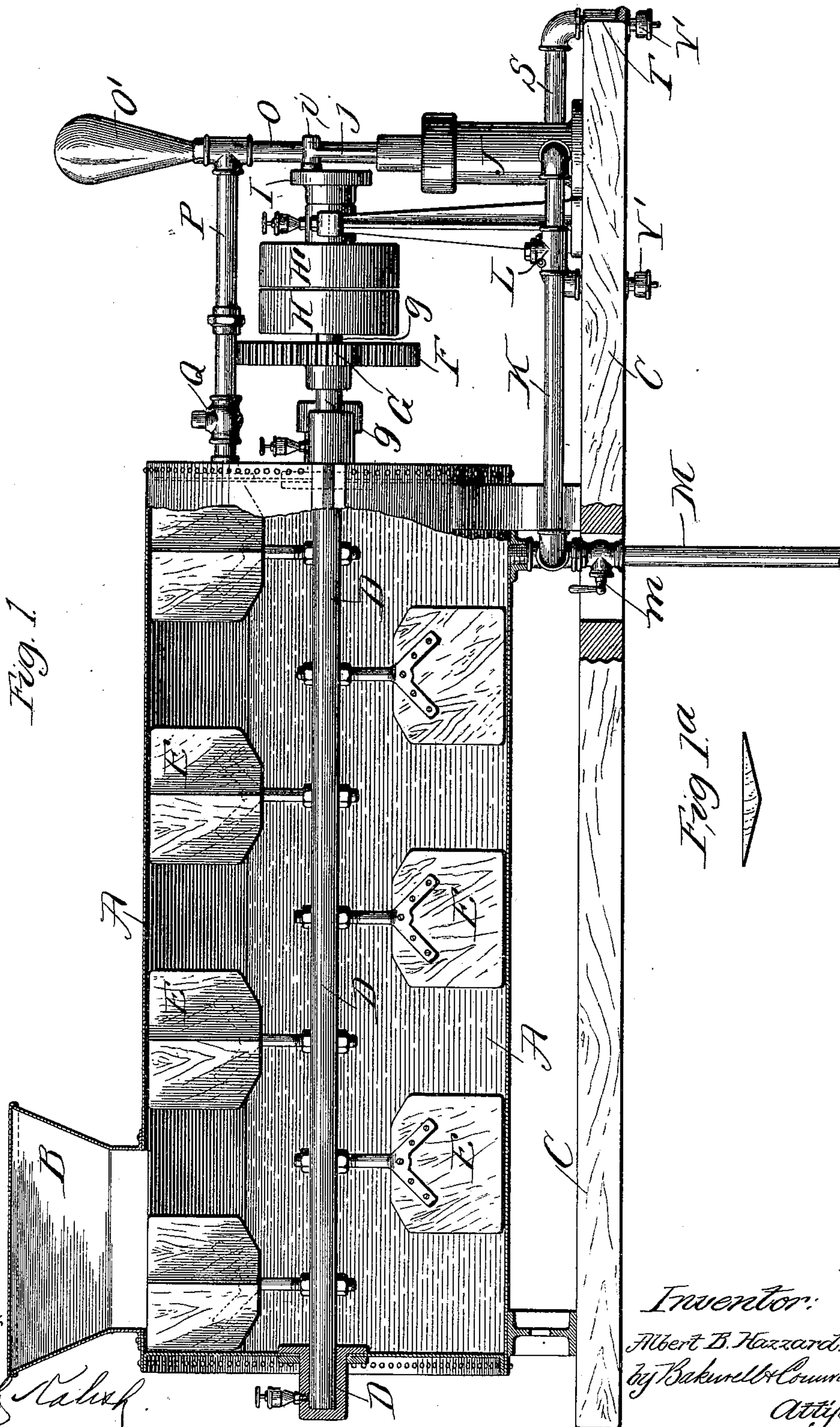
A. B. HAZZARD.

AUTOMATIC MEDICINE MIXING AND BOTTLE FILLING MACHINE.

(Application filed Aug. 6, 1898.)

(No Model.)

3 Sheets—Sheet 1.



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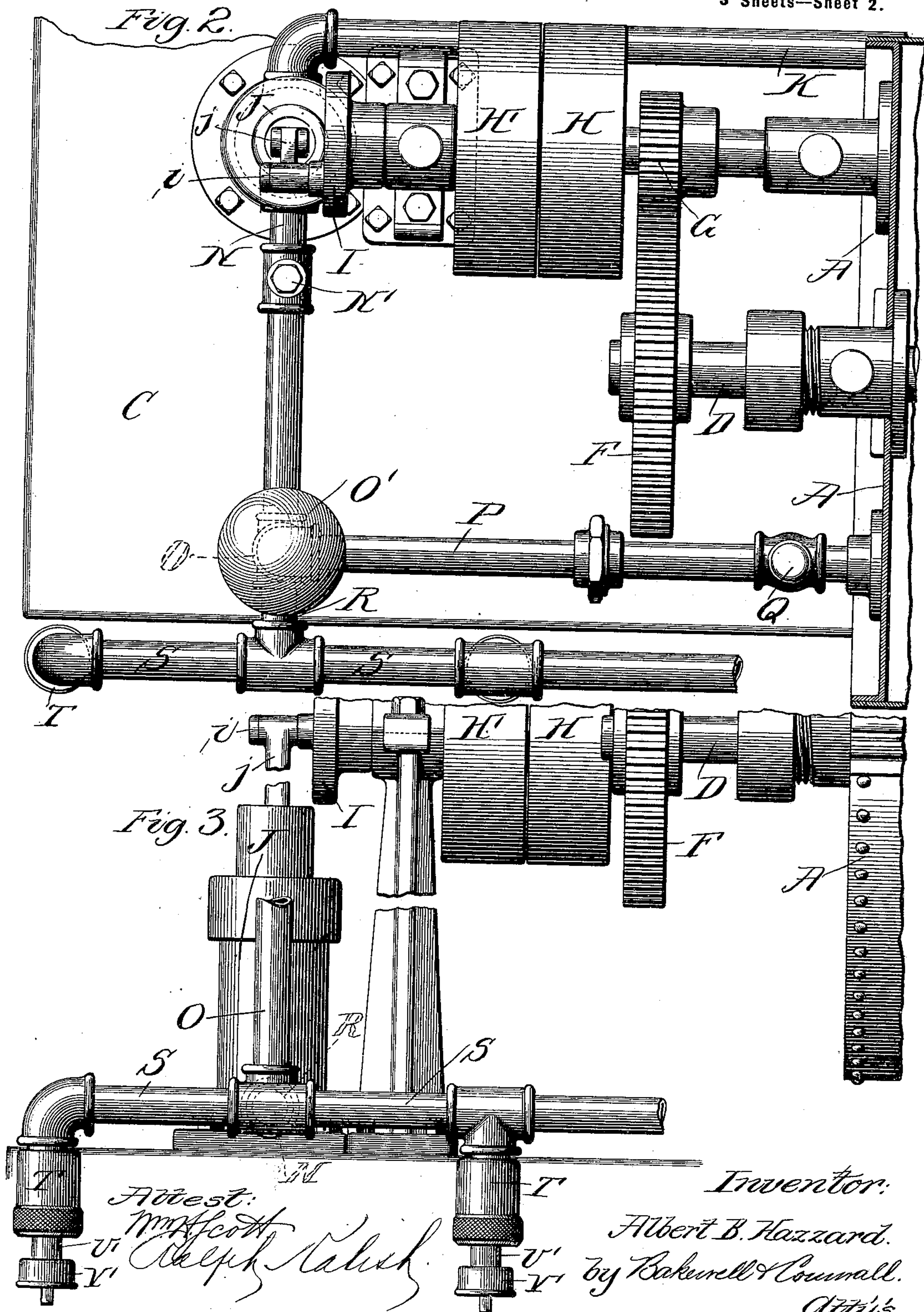
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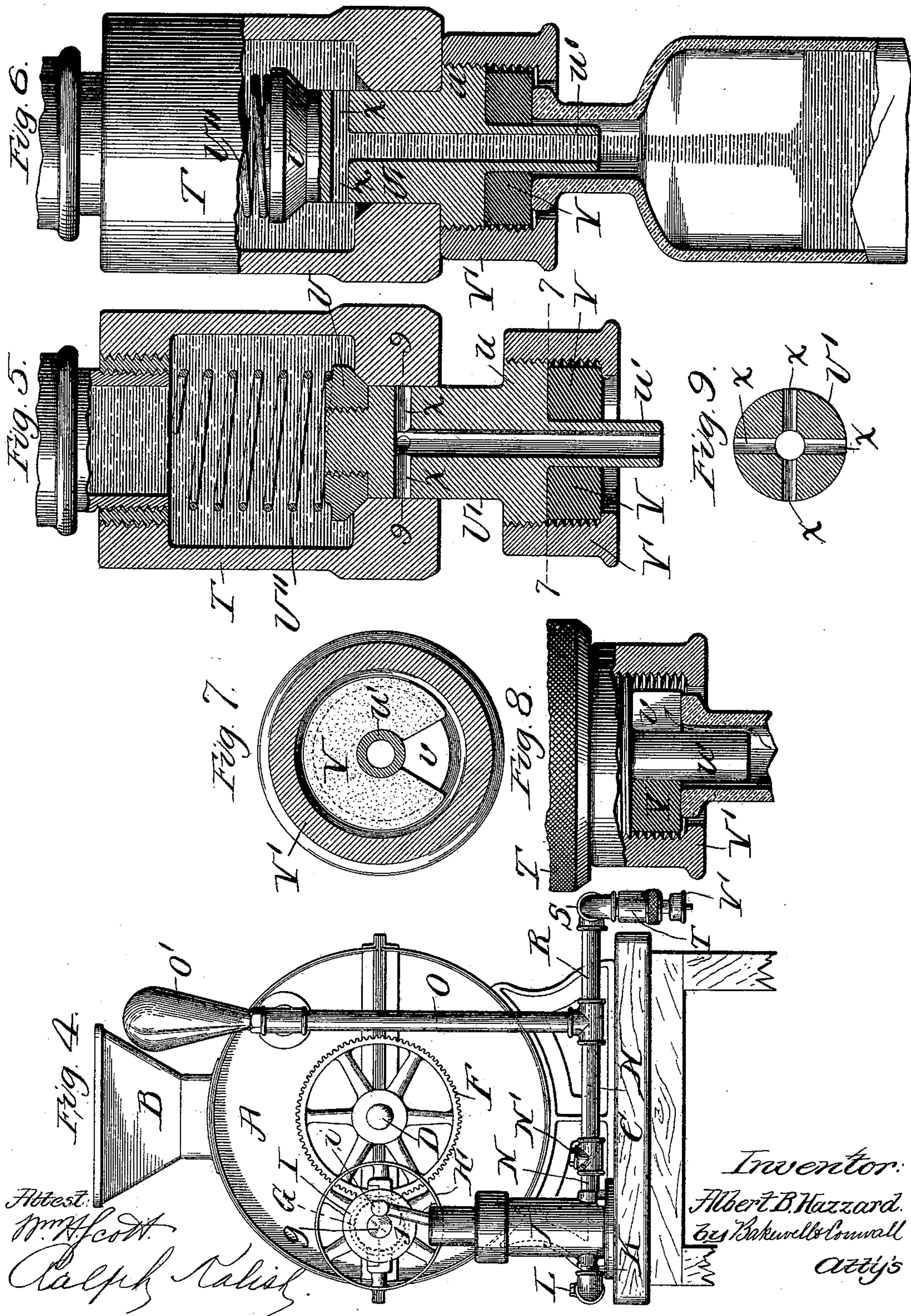
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

ALBERT B. HAZZARD, OF ST. LOUIS, MISSOURI.

AUTOMATIC MEDICINE-MIXING AND BOTTLE-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 622,429, dated April 4, 1899.

Application filed August 6, 1898. Serial No. 687,904. (No model.)

To all whom it may concern:

Be it known that I, ALBERT B. HAZZARD, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Automatic Medicine-Mixing and Bottle-Filling Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevational view, partly in section, of my improved automatic medicine-mixing and bottle-filling machine. Fig. 1^a is a top plan view of one of the agitating flights or blades employed in my machine for mixing or agitating the medicine prior to the filling of bottles with the same. Fig. 2 is a top plan view, somewhat enlarged, of the operating mechanism at the front end of the machine. Fig. 3 is a side elevational view, somewhat enlarged, of the front end of the machine as seen from the opposite side of the view shown in Fig. 1. Fig. 4 is a front elevational view. Fig. 5 is a sectional view of the bottle-filler. Fig. 6 is a similar view showing the bottle coöperating with said filler, in which the fluid is filling the bottle. Fig. 7 is a sectional view on line 7 7, Fig. 5, showing the cushion with which the mouth of the bottle coöperates. Fig. 8 is a sectional view similar to Fig. 6, but taken at right angles thereto, showing the manner in which air escapes from the bottle when the same is being filled; and Fig. 9 is a sectional view of the stem of the bottle-filler on line 9 9, Fig. 5.

This invention relates to a new and useful improvement in automatic medicine-mixing and bottle-filling machines, and particularly to that class in which the fluid is contained in a suitable receptacle, from which said fluid is taken and introduced into the bottle through a suitable valve, which I have termed the "bottle-filler." This bottle-filler is practically automatic in its action in that when the mouth of the bottle contacts therewith said filler is elevated and the fluid enters the bottle until said bottle is filled, whereupon the bottle is removed, said removal permitting the closure of the filler. One feature of my invention resides in the construction of this "bottle-

filler," as I have termed it, and particularly in the buffer or cushion for the mouth of the bottle to prevent chipping or cracking of the same and at the same time to permit the escape of air from the bottle when the same is being filled.

The apparatus shown in the drawings is designed to mix the ingredients, of different specific gravity, and in order to obtain a thorough admixture of such ingredients they are kept in constant agitation, and I also provide means for keeping up a circulation of said fluid to prevent the heavier particles from settling in any portion of the apparatus.

In practice I have filled bottles with a mixture comprising iron, quinine, and simple syrup, three ingredients which will stratify if permitted to remain inactive. I therefore provide agitating-blades in the main tank or vessel, which blades constantly stir and mix the ingredients together. In addition to this I provide a pump which draws the mixture, say, from the bottom of the tank and forces it past a check-valve to the bottle-filler, an incident to which bottle-filler is an air cushion or chamber, beyond which air-chamber is arranged a pressure-regulating valve which exerts a pressure on the fluid to force the same through the bottle-filler when said bottle-filler is open. In the event of the bottle-filler being closed the fluid passes beyond this pressure-regulating valve into the tank and at a point above that from which it was taken. In this manner the fluid is kept in constant circulation through the pipes leading to the bottle-filler, and as pressure is exerted on the fluid the same is forced through the bottle-fillers when said fillers are in use.

Another feature of my invention therefore consists in providing means for causing a circulation of the fluid through a pipe system, in which system is located the bottle-fillers; also, in providing suitable check-valves for causing this circulation to move in one direction; also, in the provision of a pressure-regulating valve for controlling pressure on the fluid above the bottle-fillers.

Other features of invention reside in the construction, arrangement, and combination of the several parts, all as will hereinafter be described and afterward pointed out in the claims.

In the drawings, A indicates a suitable tank in which fluid is placed, preferably through an opening or hopper B. This tank is supported on a suitable table or other support C.

5 D indicates a shaft extending through the tank, which shaft carries flights or blades E, said blades being preferably convexed or V-shaped on their front faces, so as to shed or displace the material to each side thereof and into the path of an adjacent blade with a view of thoroughly mixing the fluid in the tank. Shaft D extends through the end wall of the tank and carries at its end a spur-wheel F, with which meshes a pinion G, 10 mounted on a counter-shaft *g*. Shaft *g* carries a tight and loose pulley H and H', respectively, and at its other end a disk I, on the crank-pin *i* of which is connected a pitman *j*, attached to a plunger (not shown) arranged in a cylinder J, into the bottom of which 20 cylinder J leads pipe K from the bottom of tank A, in which pipe and between said tank and pump-cylinder is arranged a check-valve L, which opens toward the pump. A pipe 25 M also leads from the bottom of tank A and preferably from the pipe K, which pipe M is controlled by a plug-valve *m*, which valve can be opened with a view of running off the contents of tank A for the purpose of cleaning 30 said tank. The piston or plunger in the pump-cylinder J is solid, and when it rises draws the fluid through pipe K, past valve L, into cylinder J, and when said plunger descends valve L will close, and the fluid will 35 be forced by the plunger to pass through a pipe N and beyond a check-valve N', which opens outwardly relative to said cylinder.

We will assume for the present that the bottle-fillers are closed, in which event the 40 fluid will be forced through a pipe O, leading from and connected to pipe N into an air-cushion or reservoir O', which air-cushion or reservoir tends to cause an even flow of fluid through the pipes. Leading from pipe O at 45 the bottom of the air-cushion or reservoir O' is a pipe P, which enters tank A, above the fluid in said tank, in which pipe P is arranged a pressure-regulating valve Q. Pressure is exerted against this pressure-regulating valve 50 Q through the medium of a spring, and the valve resists the passage of fluid there-through.

Check-valves L and N' are preferably gravitating flat valves, which are sensitive in action and afford little or no resistance to the 55 passage of fluid.

Leading from the junction of pipes N and O is a pipe R, connecting with a pipe S, on which latter pipe are arranged the bottle-fillers. There may be any number of these bot- 60 tle-fillers, I having shown but two in the drawings, and preferably these bottle-fillers are placed a sufficient distance apart to give space to the operators to manipulate the bottles.

65 The construction of these bottle-fillers is best shown in Figs. 5 to 9, wherein it will be seen that a suitable casing T is provided, into the

upper end of which enters the fluid. In the lower end of casing T is arranged a valve-seat, with which coöperates a valve U, the 70 stem of said valve U extending downwardly through the casing and entirely filling the opening in the casing T. The lower end of stem U' is somewhat enlarged to form a head *u*, from which depends a filling teat or nip- 75 ple *u'*. Surrounding this nipple or teat is a rubber buffer or cushion V, which is held in place by a gland V', engaging the head *u*, said gland having an inwardly-extending flange at its lower end. As shown in Fig. 7, 80 a segment of buffer V is removed, leaving the space *v*, which is for the purpose of permitting the air to escape from the bottle, as shown by the arrows in Fig. 8. Were this buffer 85 continuous, the mouth of the bottle would be sealed and the fluid could not properly enter, as is obvious.

Valve U and its associate parts are held in a lower or normal position, in which said valve closes the opening of the bottom of casing T 90 by means of spring U'', bearing against the upper face of said valve. When a bottle is placed in position and pressure is exerted upwardly against valve U, the same is raised, so as to open ports *x* in its stem U' to the 95 fluid contents of the casing T, which ports communicate with an opening or bore extending down through the teat or nipple *u'*. In Fig. 5 the parts are shown in their normal position, in which no fluid can pass through 100 the teat, while in Fig. 6 the bottle is shown in position and the valve U and its associate parts raised to open the ports *x* to permit the fluid to pass through the teat and fill the bottle.

When the filler is in operation, the fluid 105 passes through the teat or nipple direct to the bottom of the bottle, and as the bottle fills the air on top is forced out through the opening of the bottle at the top and escapes through the opening *v* of the buffer V to the atmos- 110 phere.

The operation of the device may be briefly described as follows: The ingredients being placed in tank A and the belt thrust on tight, pulley H will cause the agitating-blades in 115 said tank to thoroughly mix said ingredients and keep them in a constant state of agitation. At the same time the plunger of the pump will draw a supply of material from the bot- 120 tom of the tank and force it into the top of the tank, thus keeping up a circulation of the fluid through the pipes. Any degree of pressure can be exerted on the fluid in the bottle-fillers by adjusting the compression of the spring behind the pressure-regulating valve 125 Q. When a bottle is filled through one of the bottle-fillers, the pressure-regulating valve affords a resistance to the entrance of the fluid back into the tank, and therefore the pump directs its energy to exerting the pressure 130 on the fluid through the bottle-fillers, so that the bottles are quickly filled. The air-cushion or reservoir O' relieves the pressure in any sudden opening or closing of the bottle-fillers

and prevents said fillers from hammering by reason of the pressure of the fluid thereabove.

I am aware that many minor changes in the construction, arrangement, and combination of the several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

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

1. The combination with a tank, of a shaft mounted to rotate therein, stirrer-blades mounted on said shaft for agitating and mixing the material in the tank, a pipe leading from the bottom of the tank to a pump, a pump, a pipe leading from said pump to the top of the tank for forcing a circulation of fluid through said pipes, bottle-fillers in communication with and receiving fluid from said pipe, and means in said pipe interposed between said bottle-fillers and the tank for exerting a back pressure on the material in the bottle-fillers; substantially as described.

2. The combination with a tank, of a pump, pipes leading to and from said pump and connected with said tank, bottle-fillers in communication with, and receiving fluid from the return-pipe, and a pressure-regulating valve also arranged in said return-pipe between the point of communication of the bottle-fillers thereto and the tank, substantially as described.

3. The combination with a tank, of a pump, a supply-pipe leading from the tank to the pump, a return-pipe leading from the pump to the tank, check-valves in said return and supply pipes, bottle-fillers in communication with, and receiving fluid from the return-pipe beyond said check-valves, a pressure-regulating valve arranged in said return-pipe between the point of communication of the bottle-fillers thereto and the tank, and a reservoir or air-cushion arranged in said return-pipe between the point of communication of

the bottle-fillers thereto and the pressure-regulating valve, substantially as described.

4. The combination with a tank, of a pump, means for driving said pump and agitating the fluid in said tank, a cleaning-pipe M leading from the bottom of the tank, a valve in said pipe, a pipe K leading from pipe M into the pump, a check-valve L arranged in pipe K, a pipe N leading from the pump, a check-valve N' arranged in said pipe, a pipe O rising from pipe N, a reservoir or air-cushion O' on top of said pipe, a pipe P leading from pipe O from the bottom of the reservoir or air-cushion O', and into the top of the tank, a pressure-regulating valve Q in pipe P, a pipe R leading from the junction of pipes N and O, and bottle-fillers which are fed by pipe R, substantially as described.

5. The combination with a tank, of a pump, pipes leading to and from said pump and connected with said tank, a bottle-filler in communication with and receiving fluid from the return-pipe, said bottle-filler comprising a suitable casing, a spring-pressed valve mounted in the lower end of the casing, a valve-stem projecting through said casing carrying a teat on its lower end, an opening through said teat which communicates with the handle of the valve-casing when the valve is raised, a buffer or cushion for the mouth of the bottle, which is mounted on the valve-stem around the teat, and which is so formed as to permit the escape of air from the bottle, and a pressure-regulating valve arranged in the return-pipe between the point of connection of the valve-casing of the bottle-filler thereto and the tank, substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 24th day of June, 1898.

ALBERT B. HAZZARD.

Witnesses:

RALPH KALISH,
HUGH K. WAGNER.