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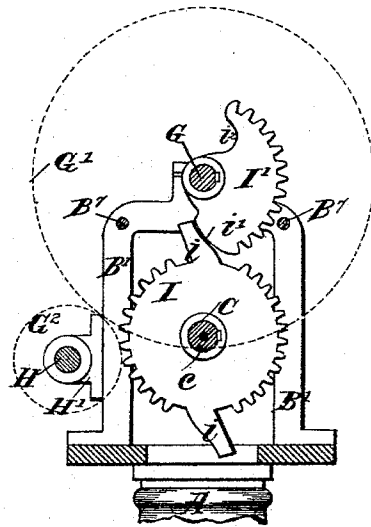
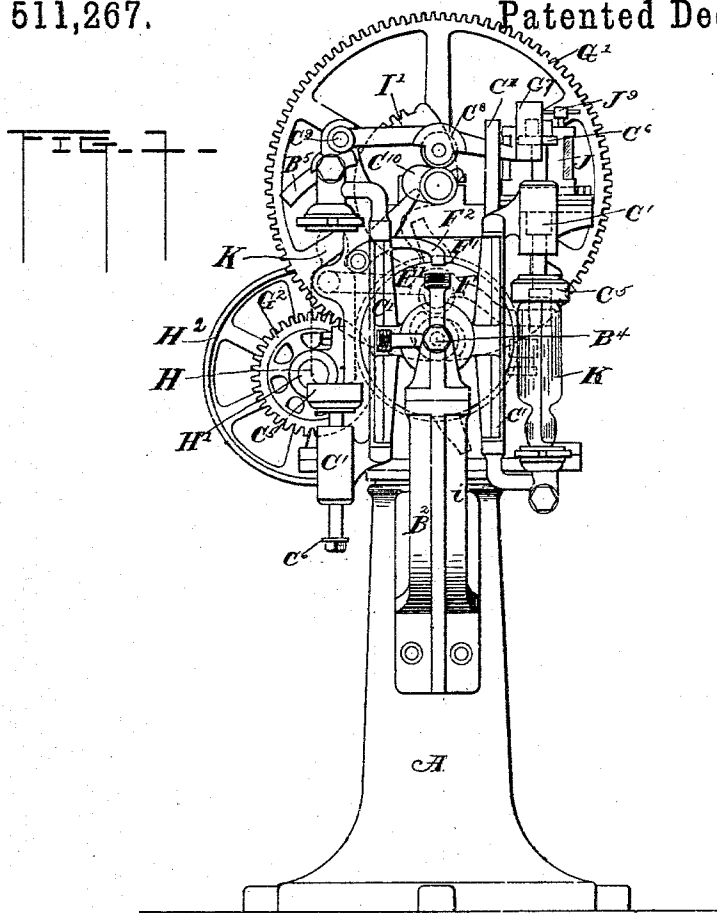
3 Sheets—Sheet 1.

T. FERGUSON.

APPARATUS FOR INJECTING SIRUP TO AND FILLING WITH AERATED
WATERS INTERNAL STOPPERED BOTTLES.

No. 511,267.

Patented Dec. 19, 1893.



Witnesses

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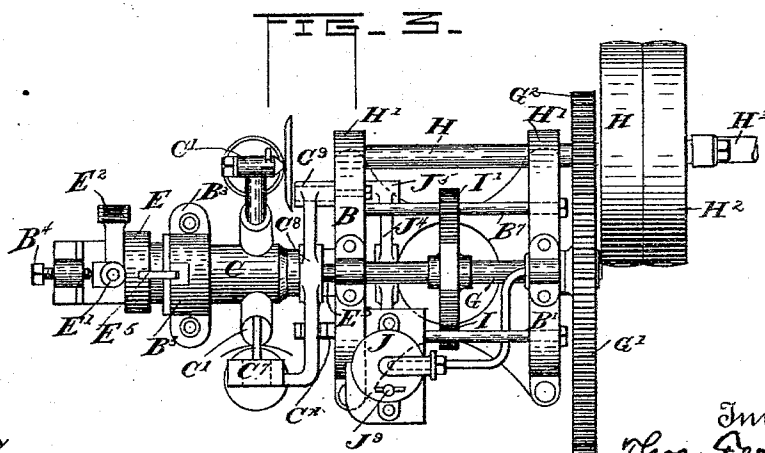
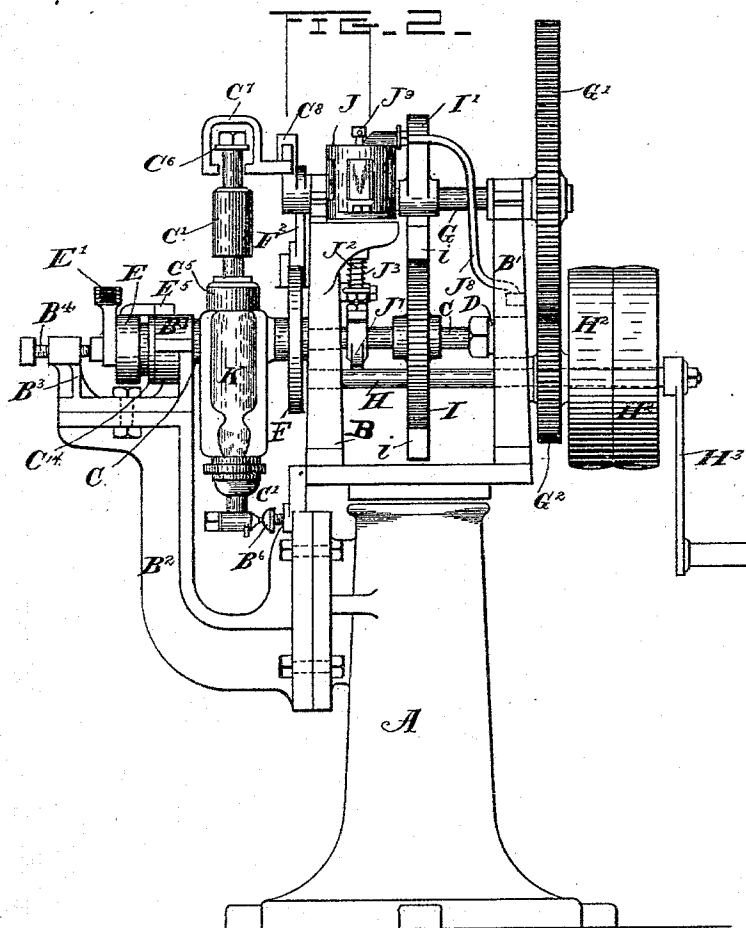
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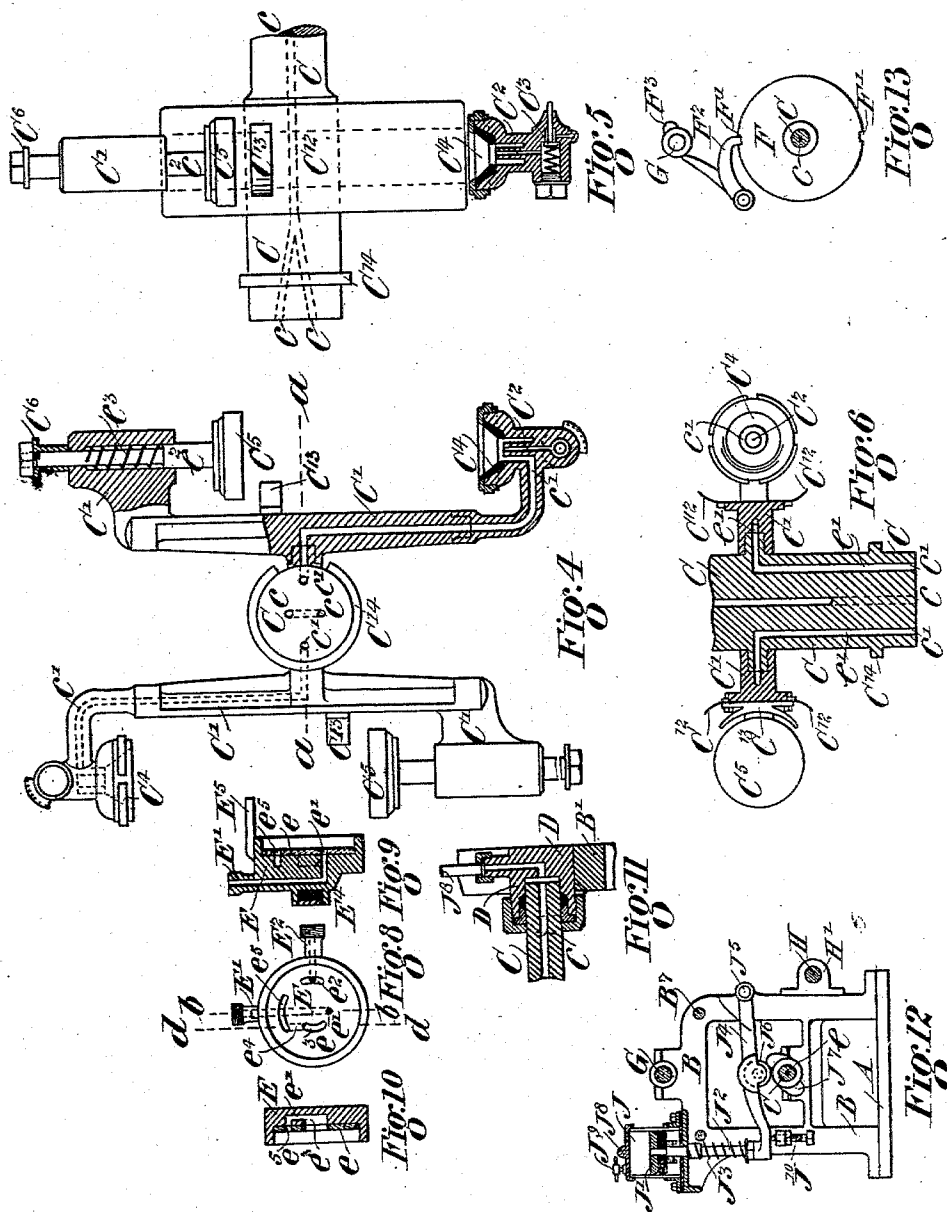
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Patented Dec. 19, 1893.



Witnesses:

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UNITED STATES PATENT OFFICE.

THOMAS FERGUSON, OF HAWKSURN, VICTORIA.

APPARATUS FOR INJECTING SIRUP TO AND FILLING WITH AERATED WATERS INTERNAL-STOPPERED BOTTLES.

SPECIFICATION forming part of Letters Patent No. 511,267, dated December 19, 1893.

Application filed April 28, 1892. Serial No. 431,092. (No model.) Patented in Victoria June 29, 1891, No. 8,839, and in England October 20, 1891, No. 17,942.

To all whom it may concern:

Be it known that I, THOMAS FERGUSON, a subject of Her Majesty the Queen of Great Britain and Ireland, and a resident of Oban Street, Hawksburn, in the British Colony of Victoria, have invented a new and useful Improvement in Improved Machines for Injecting Sirup to and Filling with Aerated Waters Internal-Stoppered Bottles, of which the following is a specification.

Applications for patents for this invention have been filed as follows: in the Colony of Victoria June 29, 1891, No. 8,839, and in Great Britain October 20, 1891, No. 17,942.

This machine is constructed with two bottle holders arranged back to back on one spindle and consequently rotating in the same plane so that the machine when in motion carries two bottles standing reversewise between the jaws of holders. Each bottle holder has a spring buffer or jaw to press against bottom of bottle and so hold its mouth in an india rubber cone in opposite jaw of holder while the bottle is filling; also each filling jaw has a vent or air escape valve. The main spindle carrying the two bottle holders lies horizontal being supported in bearings upon brackets carried by a pillar or stand. Said spindle has a combined spur-cam wheel on it that is driven by a half spur-cam wheel on a shaft above it that is supported in bearings in the aforesaid brackets. Said gear is designed to allow a pause in the revolution of bottle holder for removing the filled bottle and replacing it with an empty one, for the bottle in another head to be filled with aerated waters and for the pump to take in its charge of sirup. The upper spindle is driven by spur gear from a shaft at the back of machine and which may either have pulleys on it for being driven by belting or be furnished with a handle for manual power. The sirup pump is secured upon a bracket behind the bottle holders such pump drawing its supply through a hole formed at and along the center of the main spindle from a branch piece connected with a sirup cistern, the requisite quantity of sirup for injection into the bottle being again returned by the pump through the spindle. There are no valves attached to the pump.

The up stroke of pump is operated by a lever worked by a cam on main spindle while its down stroke is brought about by a coiled spring on its rod. Another cam and lever are provided to lift the spring buffers of bottle holders to allow the filled bottle to be taken out and be replaced by an empty one during the pause in motion. The bottle holder spindle is held at rest by a pawl engaging a notched disk the pawl being operated by a cam on upper spindle. The branch piece at front of machine to which the sirup and the aerated water supply pipes are attached has suitable passages in it to lead both said liquids into the bottles through ducts or ways formed in the spindle of bottle holder a peculiar arrangement of cut off or valve being produced by the faces of said fixed branch piece and the end of said spindle. The back end of main spindle revolves in a socket piece, a branch from which leads to the sirup pump. This machine is for injecting sirup to and filling with aerated water bottles having internal stoppers such as those known as "Codd's" and "Lamont's" the bottles being placed mouth downward in the holders and during their revolution the sirup is injected and aerated water allowed to flow in, the air from bottles escaping through suitable vents. The supply of each liquid is cut off at a determined period and each bottle when it returns to its starting position is full and in readiness to be removed from machine and be replaced by an empty one.

My invention will be best understood by describing it with reference to the accompanying sheets of drawings wherein the same letters of reference indicate the corresponding parts throughout.

Figure 1 is a front view, Fig. 2 a side view and Fig. 3 a plan of a machine constructed according to my invention. Fig. 4 is a view partly in section of the bottle holder; Fig. 5 a side view of same also partly in section and Fig. 6 a sectional view on line *a, a*, Fig. 4. Fig. 7 is a view showing the spur-cam gears for giving an intermittent motion to main spindle that carries bottle holder. Fig. 8 is a face view of the stationary branch piece or supply box; Fig. 9 a section at line *b b* in Fig. 8; Fig. 100

10 a section at line *dd* Fig. 8. Fig. 11 is a section through center of combined bearing and branch piece at back end of main or bottle holders spindle; Fig. 12 a sectional view showing sirup pump and its operating gears and Fig. 13 a view of the pawl and disk locking gear.

A is a pillar upon the top flange of which are bolted brackets B and B' while upon a vertical flange at side of pillar is bolted another bracket B².

B³ is a head piece and bearing seated upon and bolted to bracket B².

C is the main spindle to which the bottle holders C', C' are secured said spindle at its back end being journaled in branch piece D while at its front end outside of bottle holders it takes a bearing in the head piece B³.

E is the stationary valve box having branches E' and E² for connection to the aerated water supply and sirup supply pipes respectively. F is a disk keyed on spindle C and provided with notches F' to receive the pawl F² that is operated by cam F³ secured upon upper shaft G the latter running in bearings carried by brackets B and B'. Spindle G has a spur wheel G' keyed on it that gears with pinion G² keyed on driving shaft H which is supported in bearings H' also carried by brackets B and B'.

H² are belt pulleys on shaft H and H³ a crank handle so that the machine may be driven either by belting or by manual power.

I is a spur-cam wheel keyed on main shaft C and I' spur-cam wheel on upper shaft G and arranged to gear with aforesaid wheel I.

J is the sirup pump seated as shown on a bracket formed upon standard B.

J' is the pump piston, J² its rod and J³ the coiled spring upon rod J² the lower end of latter bearing on a lever J⁴ centered at J⁵ upon frame B and such lever is furnished with a small friction wheel J⁶ that is acted on by the two wing cam J⁷ secured on main spindle C. J⁸ is a pipe leading from top of sirup pump the branch piece D that supports end of hollow spindle C.

J⁹ is an air escape valve at top of pump.

To provide means for regulating the stroke of sirup pump a set screw J¹⁰ is screwed into a snug projecting from frame B under lever J⁴ and thus by said screw the lever can be lifted to regulate the stroke of pump or to lift it clear of the cam when it is not desired to work the pump.

Stationary valve box E fits neatly over end of spindle C a leather face *e* being arranged between them and made fast to the face of valve box while the outer end of valve box is supported on the pivot at end of adjusting screw B⁴, an india rubber buffer E⁴ being arranged under the pivot plate so that an elastic pressure is imparted to the leather face before referred to. To retain the valve box E stationary, that is to say to prevent its revolving a finger E⁵ projects from it and passes into a recess formed on cap or bearing B³.

The passage or way through sirup branch E' passes out through leather face at *e'* and during the pause in motion of bottle holders one or other of the holes *c, c*, that converge toward one another and then run through the whole length of shaft C at its center, is immediately opposite said hole *e'* and at this time the coiled spring J³ gives the down stroke to piston or pump and so the charge of sirup is taken in through said passages also during said pause one of the holes *c' c'* that lead from end or face of spindle C and through one arm of each holder to its filling cone is opposite the passage way leading through leather at *e'* from aerated water supply branch E² and thus the supply of aerated water leads into the bottle. The filling of the bottle with aerated water commences shortly before and terminates shortly after said pause such being regulated by the length of slot formed through leather face about the hole *e'*. The supply of sirup is retained in the hole *c* in spindle C and in the pump J until such time as said hole *c* by the rotation of spindle reaches the segmental recess *e'* when the pump piston taking its up stroke forces the sirup thereinto and from it through under passage *e'* into outer segmental slot *e'* which being opposite one of the holes *c'* allows the sirup to flow thereinto and through bottle holder into the bottle K.

To allow air to escape from bottle while it is being filled with aerated water a vent C² is provided at center of filling cone and leading to a valve C³ that is opened automatically by the valve spindle passing over the cam B⁵ secured to frame B and such valve is again opened just before the filled bottle is removed by the valve spindle passing over the button B⁶ the purpose of the latter being to relieve the pressure of liquid in passage of holder prior to the operator removing the bottle.

C⁴ is a conical india rubber washer to fit mouth of bottle K.

C⁵ is a buffer to press on bottom of bottle its spindle *c'* being pressed down by a coiled spring *c'*. To lift spring buffer C⁵ to allow the filled bottle to be removed a collar C⁶ is provided on the outer end of its spindle and such collar passes into the loop C⁷ formed at end of lever C³ which is centered at C⁹, said lever being lifted by cam C¹⁰ at the time that the collar C⁶ is within the loop and thus the buffer is lifted so as to remove its pressure from the bottle and allow of its being removed.

C¹¹ is a guide for lever C³, C¹² a guard secured to bottle holder and C¹³ a guide for bottle.

C¹⁴ is a collar formed upon shaft C said collar wearing against outer edge of bearing B³.

B⁷ are tie rods between brackets B and B'.

To impart an intermittent motion to main spindle C the spur-cam gear I, I' is employed. The part I' upon upper shaft G to which continuous motion is imparted has a cam face *i'* formed on it that contacts with the arm *i* on cam wheel I so that when upper spur cam

has completed about half a revolution its gap i^2 passes over the arm i of spur-cam I and so leaves the main spindle standing until such time as the upper spur-cam returns again to the position shown in Fig. 7 when another half revolution is given to main spindle C.

The mode of operation of the machine is as follows: Presuming it to be in motion and the supply of sirup and aerated water open to the branches E' and E^2 then when the bottle holder stops or is at the position shown in Fig. 1 the bottle at back is being filled with aerated water and the sirup is being drawn in by pump through spindle, and the bottle at front of machine being full, the spring buffer of holder is raised by its cam lever to allow said bottle to be taken out and be replaced by an empty one. Then the lock pawl F' is lifted and the top spur cam comes into gear with the lower one to impart half a revolution to the bottle holders and during such time immediately the hole c in end of spindle C passes on to hole e^3 in branch piece and hole c' on to hole e^5 the sirup is being forced or injected by the pump to the bottle and again when the end face of the spindle has traveled to a position so that the hole c' is brought opposite the slot e^2 the aerated water passes to the bottle. During such time the vent valve C^3 is traveling on cam B^5 to allow the air from bottle to escape. The upper spur cam now rotates out of gear with the lower spur cam and the pawl F' falls into gap in disk F so as to retain the holder with its bottles in an upright position while the front filled bottle is being removed and being replaced by an empty one and also while the sirup is being drawn into the spindle and the aerated water fed to the back bottle and during the time that the bottle holder is at a stand still the vent C^3 is kept open by the button B^6 .

I wish it understood that a one bottle machine can be constructed on the principle of this invention by having one bottle holder upon a spindle with only one of both the passages c and c' in said spindle C and by arranging the pump to take in and eject one charge during each revolution of the bottle holder. I however prefer a machine having two bottle holders as herein set forth.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. The combination with a pillar A, provided with brackets B, B' B^2 , of a horizontal spindle journaled in said brackets, a spur cam wheel I secured on said spindle, a driving shaft G journaled parallel with said spindle and carrying the spur cam wheel I' adapted to mesh with the wheel I, and a two armed bottle holder mounted on said spindle and adapted to hold two bottles reversewise, substantially as described.

2. The combination with the rotatable spindle having the longitudinal passage c , of a valveless pump communicating with one end

of said spindle, a bottle holder mounted on the spindle and connected with a passage c' in said spindle, a stationary valve piece co-acting with the other end of said spindle and serving to connect the passage c first with the sirup supply and then with the passage c' , and means for operating the pump to first fill the passage c with sirup and then discharge it into the passage c' , substantially as described.

3. In a filling machine, comprising two bottle holders carried on a rotatable spindle, said spindle containing ducts c' leading to said holders, and having a branched passage c , a stationary valve piece adapted to cooperate with said spindle, said valve piece containing the sirup hole e' , water hole e^2 , and the connected recess e^3 and slot e^5 , substantially as described.

4. A filling machine comprising one or more bottle holders carried on a rotatable spindle, said spindle containing separate passages leading to the bottle holders, and a third longitudinal passage opening at each end of the spindle, a stationary valve piece coacting with one end of the spindle to connect said longitudinal passage with a passage leading to the bottle holder, a pump connected with the other end of the longitudinal passage, and a source of fluid supply connected with the valve piece, and adapted to be put in communication thereby with the longitudinal passage in the spindle, substantially as described.

5. In a filling machine the combination with a spindle, of one or more bottle holders carried thereby, means for imparting an intermittent movement to the spindle, a stationary valve piece having ports connected with sirup and aerated water supply pipes, and controlled by the movement of the spindle, and a pump operated by a cam on the spindle, and connected with the sirup conveying parts, substantially as described.

6. In a filling machine the combination with a rotatable spindle, of bottle holders mounted thereon, a notched disk F secured thereto, and a detent F^2 to engage with said disk, a driving shaft G, and a cam F^3 thereon to trip the detent, substantially as described.

7. In a filling machine the combination with a rotatable spindle, of bottle holders mounted thereon, a spur cam gear and a notched disk secured thereon, a driving shaft parallel with the spindle, a spur cam gear and a cam secured thereon, and a detent to engage with said disk operated by said cam on the driving shaft, substantially as described.

8. In a filling machine, the combination with a spindle carrying one or more bottle holders, and having filling ducts and passages opening at one end thereof—of a stationary valve piece seated against the end of the spindle, a set screw pressing against the valve piece, and an elastic buffer between the screw and the valve piece—substantially as described.

9. In a filling machine, the combination with a rotary spindle, of one or more bottle hold-

ers mounted thereon, means for imparting an intermittent movement to said spindle, a notched disk on the spindle a detent engaging with said disk, and a cam shaft for tripping the detent, substantially as described.

- 5 10. In a filling machine the combination with a rotary spindle of one or more bottle holders mounted thereon, each containing a filling duct, and a vent duct separate therefrom, a
10 spring actuated valve controlling said vent duct, and a stationary cam to engage with the stem of said valve, and open the duct at a

given point in the revolution of the spindle, substantially as described.

In testimony that I claim the foregoing as
15 my invention I have signed my name, in presence of witnesses, this 27th day of November, 1891.

THOMAS FERGUSON.

Witnesses:

BEDLINGTON BODYCOMB,
FREDERICK CHAMBERLAIN,
JAMES HINGSTON.