

(No Model.)

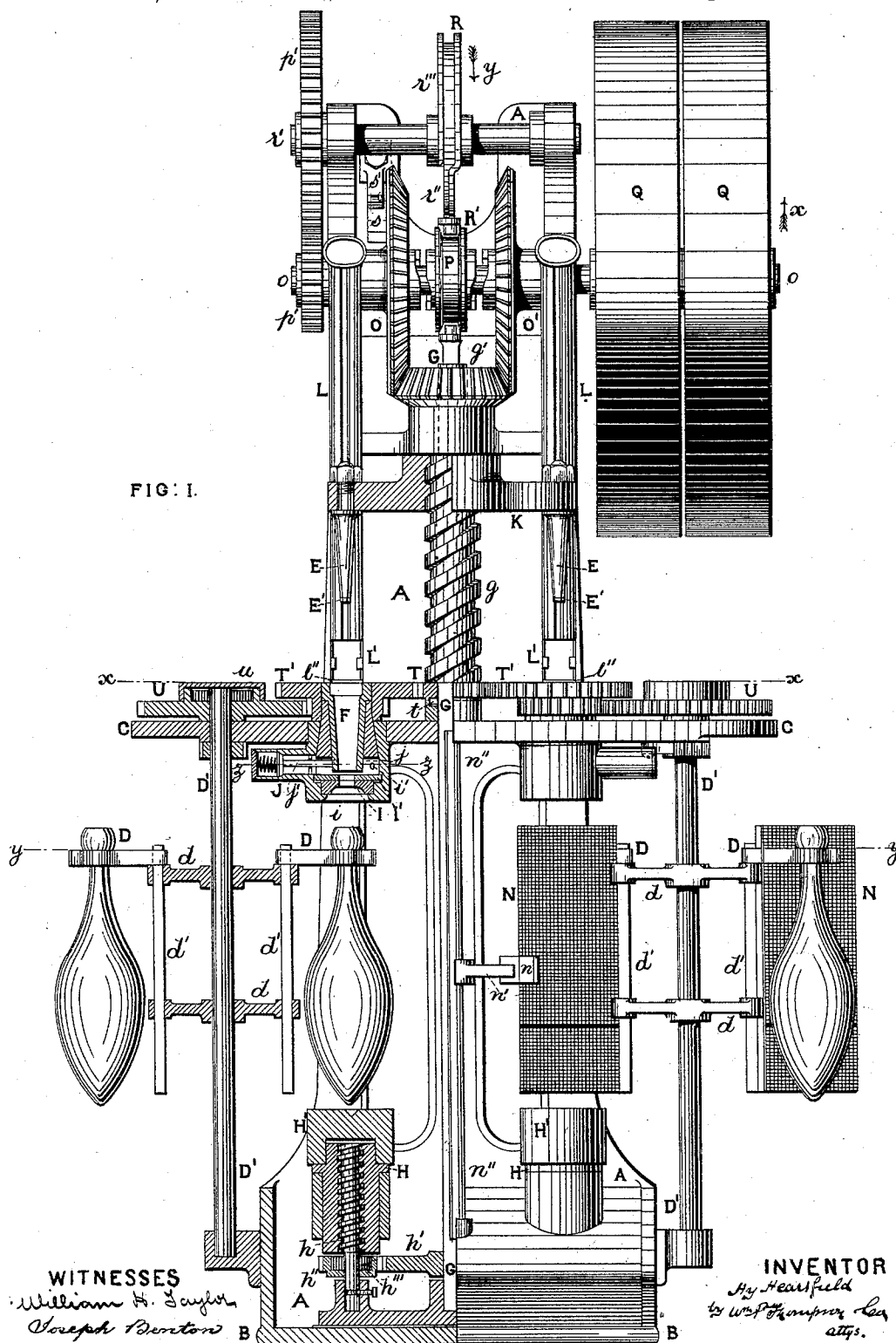
4 Sheets—Sheet 1.

H. HEARTFIELD.

MACHINE FOR FILLING AND CORKING BOTTLES.

No. 474,044.

Patented May 3, 1892.



WITNESSES

William H. Taylor
Joseph Benton

Joseph Benton

INVENTOR

My Heartfield
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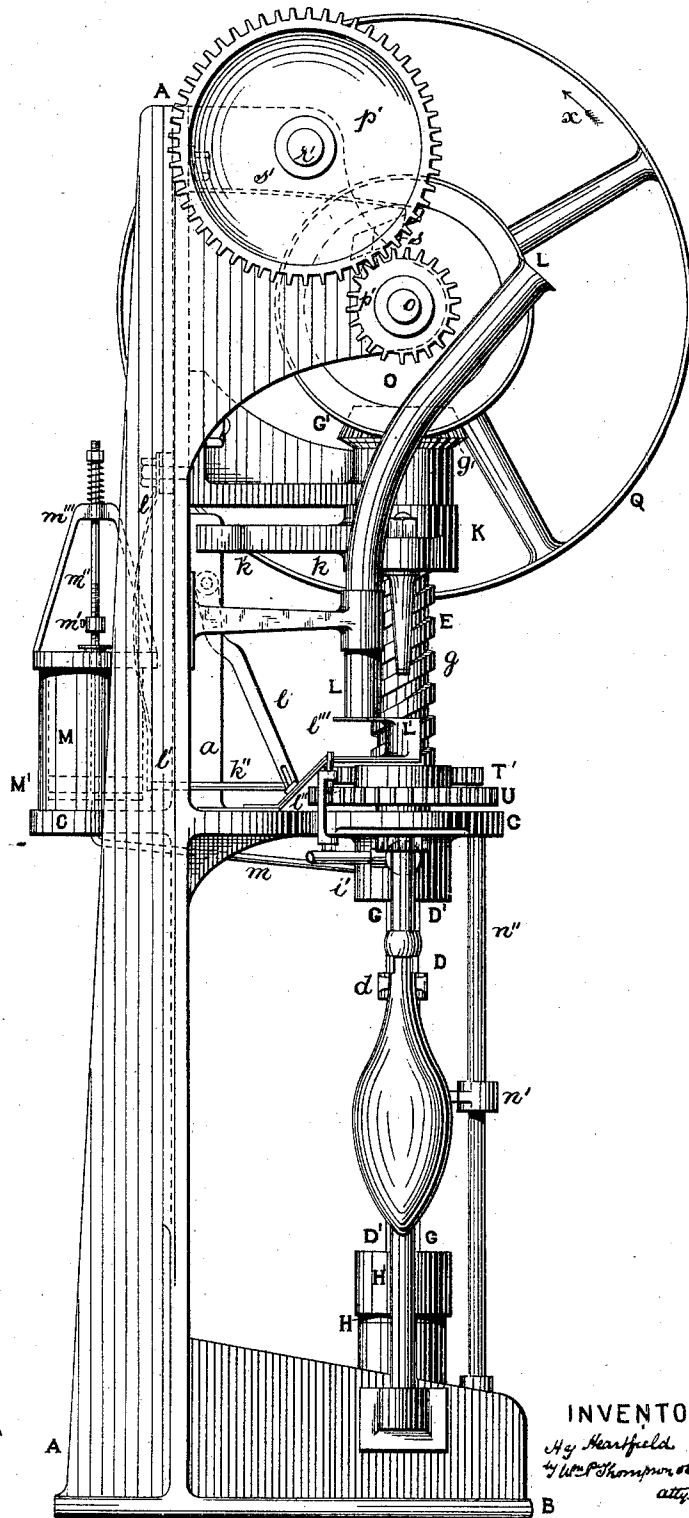
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FIG. 2.



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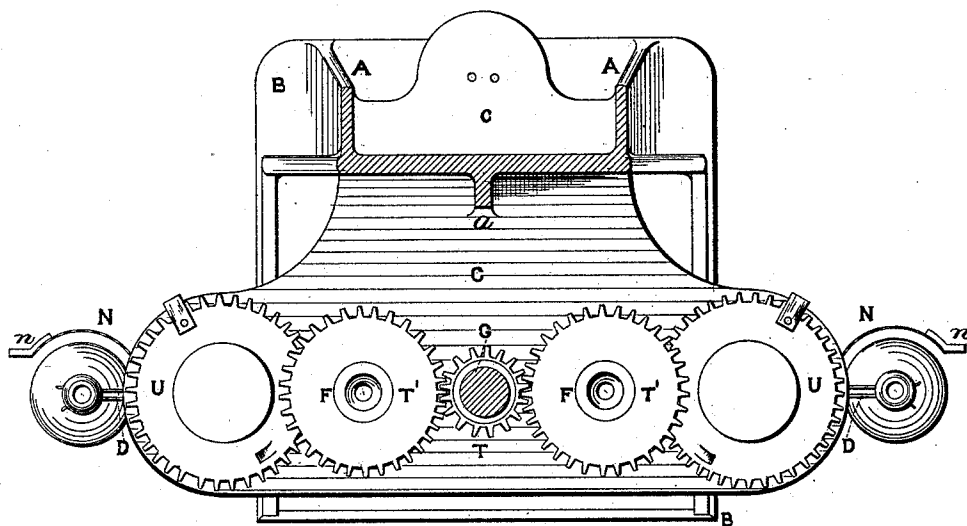


FIG. 3.

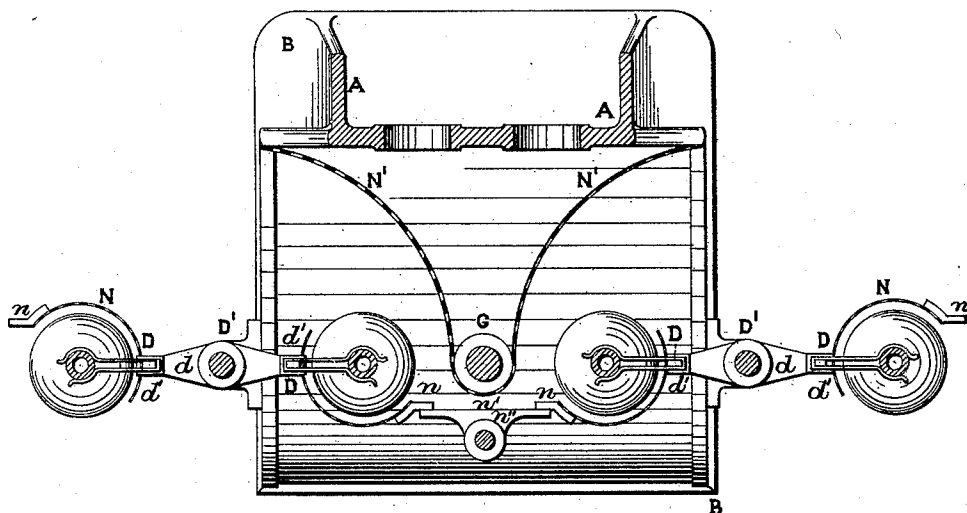


FIG. 4.

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(No Model.)

4 Sheets—Sheet 4.

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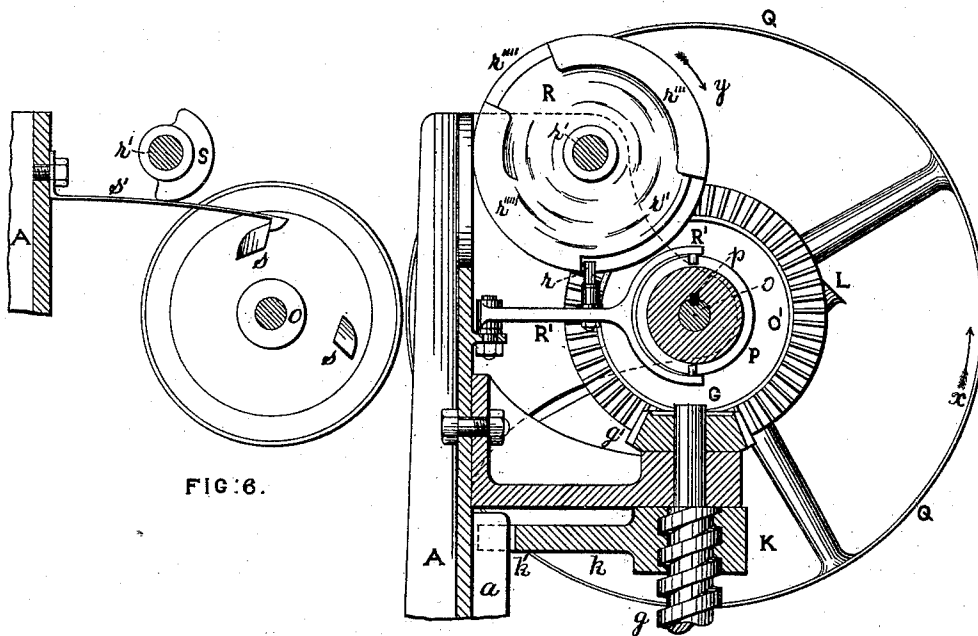


FIG:6.

FIG: 5.

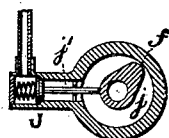


FIG: 7.



FIG. 8.

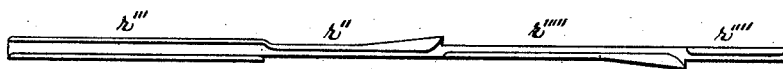


FIG:9.

WITNESSES

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UNITED STATES PATENT OFFICE.

HENRY HEARTFIELD, OF CROYDON, ENGLAND, ASSIGNOR OF TWO-THIRDS
TO THOMAS WEBB, OF STOCKPORT, ENGLAND, AND CHARLES HENRY
HEARTFIELD, OF NEW YORK, N. Y.

MACHINE FOR FILLING AND CORKING BOTTLES.

SPECIFICATION forming part of Letters Patent No. 474,044, dated May 3, 1892.

Application filed January 27, 1891. Serial No. 379,220. (No model.) Patented in England May 26, 1888, No. 7,756.

To all whom it may concern:

Be it known that I, HENRY HEARTFIELD, of Croydon, in the county of Surrey, England, a subject of the Queen of England, have invented certain new and useful Improvements in Machines for Filling and Corking Bottles, (for which I have obtained Letters Patent in England, No. 7,756, dated May 26, 1888,) of which the following is a specification.

The invention relates, chiefly, to apparatus for filling bottles with aerated or other liquors which require to be corked before leaving the filling-machine and for closing such bottles with plain corks, which may be driven or pressed in; and it is designed with the object of providing a machine with which a greater number of bottles may be filled and corked in a given time than with either of the machines at present used for the purpose.

The invention will be fully described with reference to the accompanying drawings, which show a bottle filling and corking machine constructed according to my invention.

Figure 1 is a front elevation with part in section; Fig. 2, a side elevation; Fig. 3, a sectional plan taken above table C on line *xx*; Fig. 4, a sectional plan taken below table C on line *yy*; Fig. 5, a part sectional side elevation; Fig. 6, a part sectional side elevation showing spring-catch arrangement; Fig. 7, a sectional plan of filling-chamber *j* on line *zz*; Fig. 8, an elevation, part in section, of pusher E; Fig. 9, a development of periphery of cam R.

The machine is constructed with an upright standard or framing A, of any suitable or convenient form, with a base B and a central horizontal table or shelf C. Below the shelf I place two or more sets of spring-clips D, mounted on rotary spindles D', which receive and carry the bottles into position to be filled. Above the table C, I arrange two or more plungers, E, one for each set of spring-clips D, which drive the corks through a compressing-funnel F into the bottles and also, preferably, the driving mechanism. The table C itself supports a central shaft G, the gearing which rotates the bottle-supporting clips, and the mechanism by which the filling-valve is opened and closed, and in the base B is placed a rising table or pusher H, which raises the bottle

and holds the mouth tightly against a packing-piece when in position to be filled.

In each machine there are arranged two or more, preferably two, sets of apparatus in which the cycle of operations, which comprises the receiving, filling, corking, and removal of the bottles, are performed, all actuated from the central shaft G, and in the specification I will refer to only one set of such apparatus, it being understood that the letters of reference refer to the similar parts of the other set. The clips D, which hold the bottles and carry them into position to be filled, are supported on a vertical spindle D' by the brackets *d*, each clip D being attached to a vertical sliding rod *d'*, capable of sliding up and down in bearings in the brackets *d*. The vertical spindle D' is supported in bearings at both ends, in which it is free to rotate, and is actuated at intervals in one direction by a spring and spur-wheel, as hereinafter more fully described. The clips D are formed of spring-steel or other elastic material to enable the bottles to be readily inserted between and withdrawn from them. Two or more, preferably two, sets of clips D are employed in conjunction with each spindle D', so that while the filling and corking of a bottle in one clip is being effected the removal of the bottle previously filled and carried by the other clip can also be effected and an empty bottle substituted for it. The bottles when carried into position for filling are raised up, so that the mouth comes against a soft packing-piece I to prevent escape of liquid or gas. The packing-piece I is fitted tightly in around the filling-opening *i* against a loose metal plate I', and consists of india-rubber or other suitable material. The bottles are raised by the movable table or pusher H, which is lifted and caused to bear against the bottom of the bottle by the screw *h*. The screw is rotated by the spur-wheel *h'* on the foot of the main shaft G, which gears with the wheel *h''* on the spindle of the screw. The wheel *h''* is connected to the spindle through the coiled spring *h'''*, one end of which is attached to the wheel and the other to the spindle. By this arrangement any slight variation in the length of the bot-

bles is compensated for. Should one bottle be slightly too long when the screw has raised it to its position against the packing-piece I, the screw ceases to turn, and any further movement of the wheel h'' merely causes the spring h''' to coil up a little more tightly. The block H' on the pusher H is loose and removable, and a block of any thickness may be substituted to suit the class or size of bottle under operation.

The liquor with which the bottles are to be filled is contained in any suitable reservoir at the required pressure and mixed with the required proportions of gas, and is supplied to the machine through the spring-valve J. The valve J opens into a small chamber j above the packing-piece I and beneath the cork-funnel F. The cork-funnel F fits closely into a conical bearing, in which it is rotated by a spur-wheel on its upper surface. At its lower end it is provided with a lug or cam piece f , which at each revolution comes in contact with the end of the spindle j' of the spring-valve J, opening it and holding it open for a part revolution, the time being adjusted so as to allow a flow of liquor sufficient to fill the bottle. An ordinary stop-cock is also arranged in the supply-pipe for regulating the quantity of liquor passing through the filling-valve J in a given time.

In a direct line above the cork-funnels F are placed two plungers E, carried in a cross-head K, which is raised and lowered by screw-thread g on the central shaft G, and as they descend carry with them the corks which have been previously deposited in the funnels F. The plungers E are made, as shown in Fig. 8, with a tip E' of india-rubber.

The magazines or tubes L contain a supply of corks, from which one cork is released and fed forward to the funnels F at each stroke of the plungers E. These magazines are in the form of tubes, below which slide short pieces of tube L' of the same diameter as the tubes L, but open in the front, serving as carriages for conveying the corks one at a time from the base of the said magazines to the funnels F. The conveying-tubes L' are moved in a backward direction at each downward stroke of the plungers E by a forked arm or projection k , attached to or formed integral with the back of the cross-head K, which as the cross-head descends comes in contact with a pivoted lever l , which at its lower end is forked or slotted and is connected to the carrying-tube L' by the fork or slot at its lower end engaging with a cross-bar, which extends across from one tube to the other. When the cross-head is raised and the arm k withdrawn from the pivoted lever l , the conveying-tubes are moved forward again by a spring l' (shown in dotted lines) attached to the frame. The fork k' of the arm, which bears against the end of the connecting-rod k'' , engages with and slides upon a web a on the upright frame A to prevent the cross-head revolving with the screw g of the central shaft G when being

raised and lowered thereby. The conveying-tube L' slides to and fro on a plate l'' to prevent each cork dropping through until it has arrived over the funnel F, and carries at its top edge a plate l''' , which as the tube L' is moved forward slides under the bottom end of the magazine L, and so prevents more than one cork being delivered at a time. The front of the magazine L may be formed of glass or with a slit, so that the corks contained therein may be seen.

An air vessel or chamber M is arranged to receive the air expelled from the bottles during the operation of filling through pipes m , connected at v' to each of the filling-chambers j . The air-vessel is provided with a spring-piston M', having an adjustable collar m' on its rod m'' . When the piston is raised, the collar m' strikes against a bracket m''' , whereby the motion of the piston is arrested. Any other suitable means may, however, be provided for regulating the capacity of the air-vessel.

By adjusting the position of the collar m' upon its rod m'' I am enabled to regulate the extent which the piston can move, and consequently also the capacity of the air-vessel. By this means I can control the quantity of liquid entering the bottles by regulating the capacity of the air-vessel, so that when a given quantity of liquid has entered the bottle the air forced therefrom into the air-chamber will be at the same pressure as that in the aerating-cylinder. By the use of the said air-vessel I can dispense with the ordinary snift.

The pipes m are arranged at a slight angle, as shown, so that any liquor that may be forced into the air-chamber M when the bottles are being filled will run out directly the said bottles are removed.

I sometimes dispense with the use of the air-vessel for regulating the quantity of liquor introduced into the bottles and employ it for regulating or reducing the pressure in such bottles. In this case the regulation of quantity is effected by means of the stop-cock hereinbefore referred to, which is adjusted to allow the required quantity of liquid to pass while the filling-valve is open. The pressure in the bottles is reduced by regulating the capacity of the air-vessel, so that the gas introduced with the liquid can expand sufficiently to lower its pressure to the desired point.

In order to prevent any injury that might occur to the operatives during the filling of the bottles through the bursting of the same, I provide wire guards N, which are attached to the vertical sliding rods d' and which surround the front part of each bottle, and wire guards N', which are attached to the stationary framing and inclose the back part of the bottle. (See Fig. 4.) The wire guards N rotate with the bottle-clips D, and to the outer edge of each is affixed a small stop piece or catch n , which serves to arrest the rotation of

the bottles when the empty one is in proper position for filling immediately beneath the filling-aperture by coming in contact with the stop-piece n' on the upright bar or rod n'' .
 5 When the bottle is raised up against the packing-piece I, the stop n is lifted above and clear of the stop n' , so that as soon as released it can continue its rotary movement. The lower part of the wire guard N is made
 10 telescopic or to slide upon the upper part to allow for the introduction of different sizes of bottles.

The several parts of the apparatus are actuated either directly by or from gearing connected with the central shaft G, which carries at its upper end a bevel-wheel g' . The shaft G is caused to rotate alternately in opposite directions by the bevel-wheels O O' on the shaft o , both of which rotate in the same
 20 direction and gear with the bevel-wheel g' on the end of central shaft G. The bevel-wheels O O' are loose on the shaft o and are both always in gear with the bevel-wheel g' , being alternately rotated by a clutch P, sliding on a key or feather p on the shaft o . The clutch is thrown into and out of gear with the bevel-wheels O O' by a cam R, to which a rotary motion is conveyed by the pinions p' from the shaft o and driving-pulleys Q. The
 30 cam R acts upon a bowl or runner r on a pivoted forked lever R', the forked end of which engages with the clutch to move it from one side to the other, and is geared to make one revolution for every three revolutions of the shaft o , and it is so designed or proportioned as to allow in every three revolutions of the shaft o that for a period equal to one revolution the clutch shall engage with the wheel O that for a period equal to another revolution of the shaft o the clutch shall engage with the bevel-wheel O', and that for a similar period the clutch shall be out of gear with both wheels. The period of contact with the bevel-wheel O is, however, subdivided and
 45 not continuous. Two stops s are placed on the side of the bevel-wheel O, with which a spring-catch s' engages to prevent any backward movement of the wheel O and shaft G taking place during the operation of filling or when the clutch is changing from the wheel O to the wheel O'. The normal position of the spring s' is out of contact with the stops s , and it is held down to engage with them, when required, by a cam S on the shaft r' .
 50 (See Fig. 6.) When the wheel O is rotated in the opposite direction, the catch s' rises clear of the stops s .

The motion of the central shaft G is conveyed to the filling apparatus and bottle-holding clips D by a pinion T, which is connected to the shaft G by a spring catch or pawl t or by ratchet-teeth or the like, so as to rotate only with the shaft G, preferably when it is actuated by the bevel-wheel O. This permits
 60 of the return of the cross-head K and cork pushers or plungers E, also the bottle-raising tables H to their normal position after each

bottle is filled and corked without operating the filling-valve J. The pinion T gears with the double pinion T', to which is connected the cork-funnel F, carrying the lug f to open the filling-valve. The pinion T' gears with the pinion U, in which is fitted a spring u , one end of which is attached to the pinion and the other to the vertical spindle D'. During the operation of filling, as the bottle is tightly held, the spindle D' cannot rotate; but during that time the movement conveyed through the pinions tightens or winds up the spring u sufficiently to rotate the spindle D and the bottles half a revolution as soon as the bottles are released.

The operation of the machine is as follows, assuming it to be in position for starting, with an empty bottle in position ready for filling and a cork in the funnel F, the several parts being in the position shown in the drawings: The driving-pulley Q is rotated in the direction of the arrow x , giving motion to the clutch P in the same direction and the cam R in the direction of arrow y . The part r'' of the cam R will then cause the clutch P to engage with the bevel-wheel O, thereby rotating it in the direction of the arrow x , and with it the central shaft G. The screw g on the central shaft G causes the cross-head K and plungers E to travel down, and the movement continues until they have traveled down about two-thirds of their whole movement and forced the corks tightly into the funnels F. During this movement the cork-conveying tubes L' are moved back by the action of the arm k on the pivoted lever l , the bottom table or pusher H is moved up by means of the spur-wheel h' and screw h , and forces the bottle which is above it against the packing-piece I, round the filling-opening i . The vertical rods d' slide in their bearings to allow of this movement, the upward movement of the bottle lifts the stop n clear of the catch n' , and the coil-spring u is wound up by means of the gear-wheels T, T', and U. When the plungers or pushers E have about moved down the distance described, the lug f on the cork-funnel F comes in contact with the spindle j' of the filling-valve J and opens the valve and the part r''' of the cam R, causes the clutch P to move out of engagement with the bevel-wheel O, thereby allowing the bottle to fill with the liquid admitted through the valve J, the air expelled by the inrush of the said liquid passing into the air-vessel. After the bottle is full the part r'''' of the cam R will move the clutch P again into engagement with the bevel-wheel O, thereby allowing the valves J to close and causing the plungers or pushers E to force the corks into the bottles and further wind up the springs u and h''' , and also further move back the tubes L' to beneath the magazines L to receive each another cork. The part r''''' of the cam R will then cause the clutch P to engage with the bevel-wheel O', thereby reversing the movement of the central shaft G and causing the

pushers E to move up to their first position. The table or pusher H will at the same time move down together with the filled bottle, which directly its mouth gets clear of the packing I will, by reason of the tension of the spring *u*, (and the stop *n* being out of engagement with the stop *n'*), be caused to move round and change place with the empty bottle, the stop *n* of which will, by reason of its lower position than that just mentioned, be caused to come against the stop *n'*. While the movements just described have been taking place, fresh corks will have been fed into the funnels F. The filled bottles can then be replaced by empty ones and the cycle of operations repeated.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a bottle-filling machine, a holder for containing the bottles to be filled, consisting of the spring-clips D, the brackets *d*, the sliding rods *d'*, the spindle D', and a coiled spring, by which it is automatically rotated to bring the bottles successively under and away from the filling-nozzle, substantially as described.

2. In a machine for filling bottles, the combination of the spring-clips D, the brackets *d*, the sliding rods *d'*, and the rotating spindle D', forming a holder for the bottles, substantially as described.

3. In a machine for filling bottles, the combination, with the holder formed of the spring-clips D, the brackets *d*, the sliding rods *d'*, and the rotary spindle D', of the gauze-wire guards N, the stops *n*, the stop-piece *n'*, and the upright rod *n''*, substantially as described and shown.

4. In a machine for filling bottles, the combination, with the bottle-holder formed of the spring-clips D, the supporting-brackets *d*, the sliding rods *d'*, and the rotating spindle D', of the coiled spring *u* and the gear-wheels U, T', and T, substantially as described.

5. In a machine for filling bottles, the combination, with the bottle-holder formed of the spring-clips D, the brackets *d*, the sliding rods *d'*, and the rotating spindle D', of the gear-wheels T, T', and U, and the coiled spring *u*, which give an intermittent motion to the bottle-holder, and the stops *n* *n'*, which arrest it when the bottle-mouth is under the filling-opening, substantially as described.

6. In a machine for filling and corking bottles, the combination, with the rotating cone F, through which the corks are introduced, and lug *f* on the side thereof, of the filling-valve J, through which the liquor passes, and valve-spindle *j'*, which is actuated by the lug *f* and opens the valve, substantially as described.

7. In a machine for filling and corking bottles, the combination, with the reciprocating plunger E, by which the corks are inserted in the bottle-mouths, the cross-head K, to which the plunger E is affixed, and the screw *g*, which gives a reciprocating movement to the cross-head and plunger, of the gear-wheels T T', con-

nected to the shaft G to give motion to the cork-funnel F, the rotating cork-funnel F to guide or deliver the corks to bottles provided with a lug *f*, which at each revolution engages with the spindle *j'* and opens the filling-valve J, the filling-chamber *j*, in which the cork-funnel rotates, provided with an inlet or opening *i*, and the filling-valve J, provided with a spindle *j'*, with which the lug *f* engages, through which the required amount of liquor passes.

8. In a machine for corking bottles, the combination, with the bottle-holders D, of the packing-piece I, against which the mouth of each bottle is pressed while being filled, the filling-chamber *j*, into which the liquor enters, the valve J, which controls the flow or admission of the liquor, the rotating cork-funnel F, provided with a lug *f*, which as the funnel rotates engages with the spindle *j'* and opens the valve J, and the pusher E, by which the corks are inserted.

9. In a machine for filling and corking bottles, the combination, with the cork-magazines L and sliding conveying-tubes L', of the cross-head K, forked arm *k*, pivoted lever *l*, connected to the tube L', and spring *l'*, substantially as and for the purposes described.

10. In a machine for filling and corking bottles, the combination, with the bottle-holder formed of the spring-clips D, the brackets *d*, the sliding rods *d'*, and the rotating spindle D', with the lifting pusher or table H and the screw *h*, substantially as described.

11. In a machine for filling and corking bottles, the combination, with the pusher H and screw *h*, of the gear-wheel *h'*, the wheel *h''*, and the spring *h'''*, substantially as and for the purpose described.

12. In a machine for filling and corking bottles, the combination, with a filling-chamber, of an air-vessel M, provided with a spring-regulated piston, by which its internal capacity is regulated to correspond with the capacity of the bottle, substantially as and for the purpose described.

13. In a machine for filling and corking bottles, the combination, with the filling-chamber *j*, of the air-chamber M, the piston M', the connecting-pipe *m*, the piston-rod *m''*, the adjustable collar *m'*, and the regulating-spring *m'''*, substantially as and for the purpose described.

14. In a machine for filling and corking bottles, the combination, with the reciprocating pusher or plunger E for pressing the corks into the bottles, the cross-head K for carrying the plungers, the central shaft G and screw *g*, which operate the cross-head, and the bevel-wheel *g'*, of the bevel-wheels O O', which alternately gear with and set in motion the wheel *g'*, the clutch P, which engages with the wheels O O', the shaft *o*, and the driving-pulleys Q, substantially as described.

15. In a machine for filling and corking bottles, the combination, with the bevel-wheels O O' and clutch P and bevel-wheel *g'*, of the central shaft G, the screw *g*, the cross-head K,

and plunger E, which insert the corks, and the gear-wheels T, T', and U, which rotate the bottle-holders, and the gear-wheels *h'* and *h''*, placed at the foot of the shaft G and which

5 raise the bottle-tables H, substantially as described and shown.

16. In a machine for filling and corking bottles, the combination, with the driving-pulley Q, bevel-wheels O O', shaft *o*, clutch P, the
10 wheels *p p'*, and cam R, of the central shaft G, the cross-head K, and plungers E, which insert the corks, and the bottle-holder formed of the spring-clips D, the brackets *d*, sliding rod *d'*, rotating spindle D', substantially as
15 described.

17. In a machine for filling and corking bottles, the combination, with the reciprocating plungers or pushers E, which press the corks into the bottles, the cross-head K, which carries the plungers, the central shaft G and screw
20 *g*, which operate the cross-head, of the bevel-wheel *g'*, the bevel-wheels O O', which alternately gear with and set in motion the wheel

g', the shaft *o*, the clutch P, which engages with the wheels O O', the wheels *p p'*, and the
25 cam R, substantially as described.

18. In a machine for filling and corking bottles, the combination, with the reciprocating plungers or pushers E, which press the corks into the bottles, the cross-head K, which carries the plungers, the central shaft G and screw
30 *g*, which operate the cross-head, of the bevel-wheel *g'*, the bevel-wheels O O', which alternately gear with and set in motion the wheel *g'*, the shaft *o*, the clutch P, which engages
35 with the wheels O O', the cam R, and the pivoted forked lever R', substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of
40 two subscribing witnesses, this 21st day of November, 1890.

HENRY HEARTFIELD.

Witnesses:

J. OWDEN O'BRIEN,
CHAS. OVENDALE.