

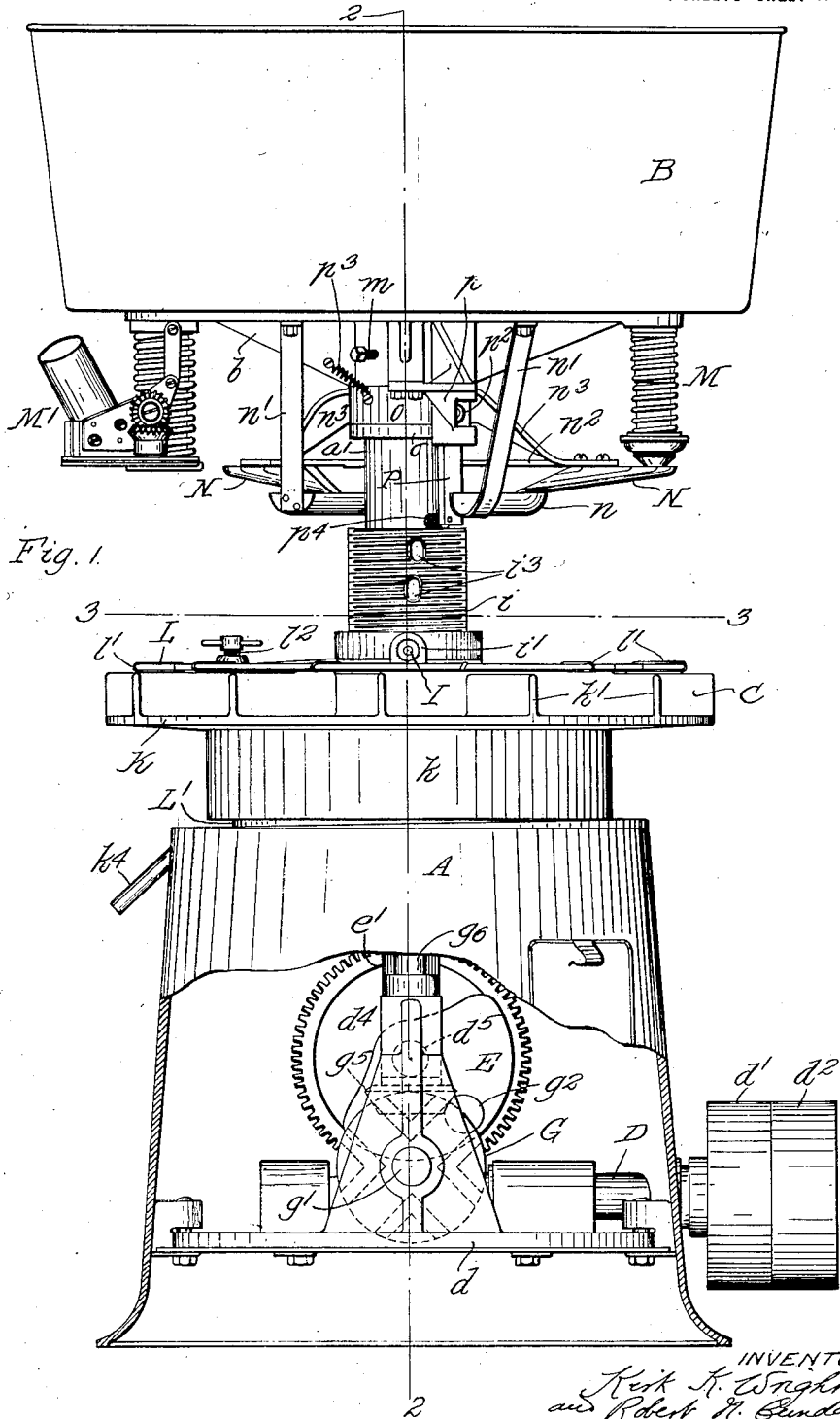
K. K. WRIGHT AND R. N. CUNDALL,
BOTTLE FILLING AND CLOSING MACHINE.

APPLICATION FILED APR. 29, 1919.

1,386,299.

Patented Aug. 2, 1921

4 SHEETS—SHEET 1.



INVENTORS,
Kirk K. Wright
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By *William Parker*
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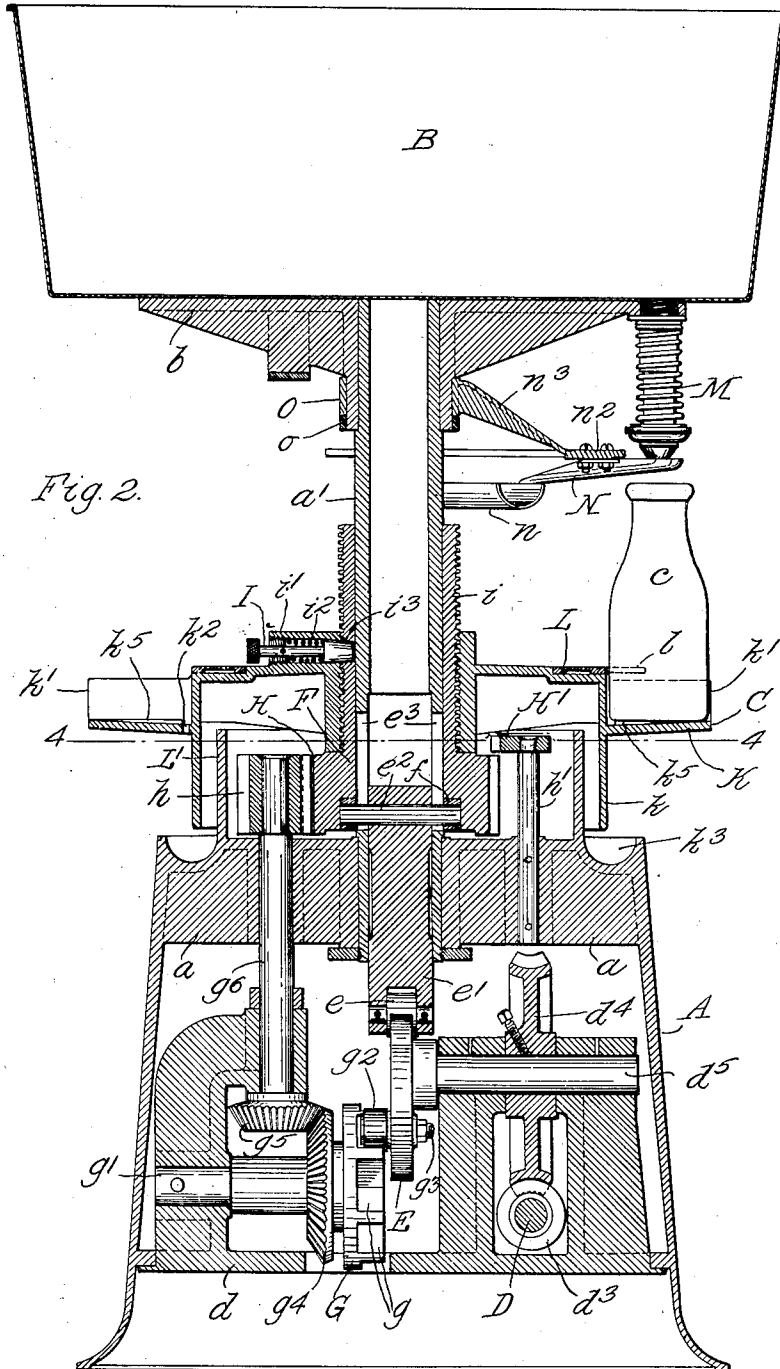


Fig. 2.

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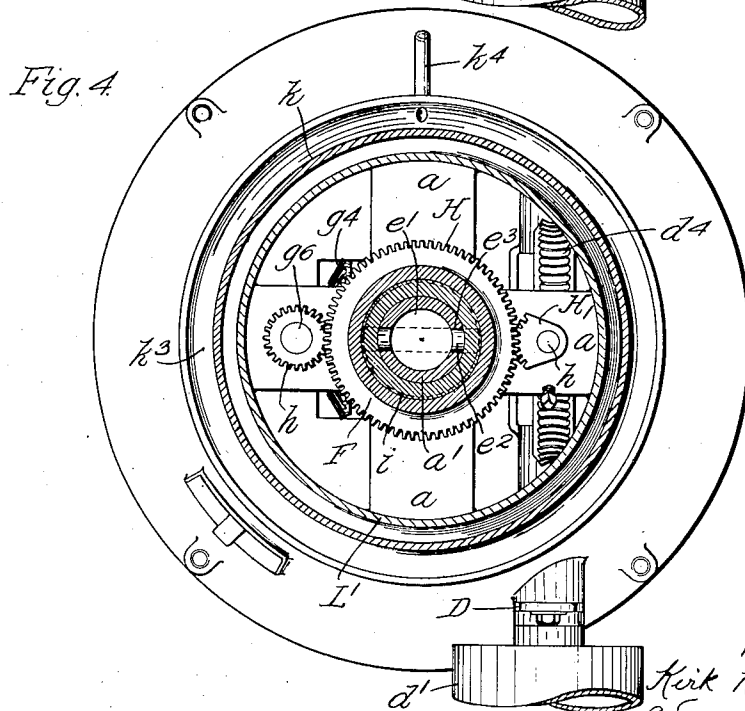
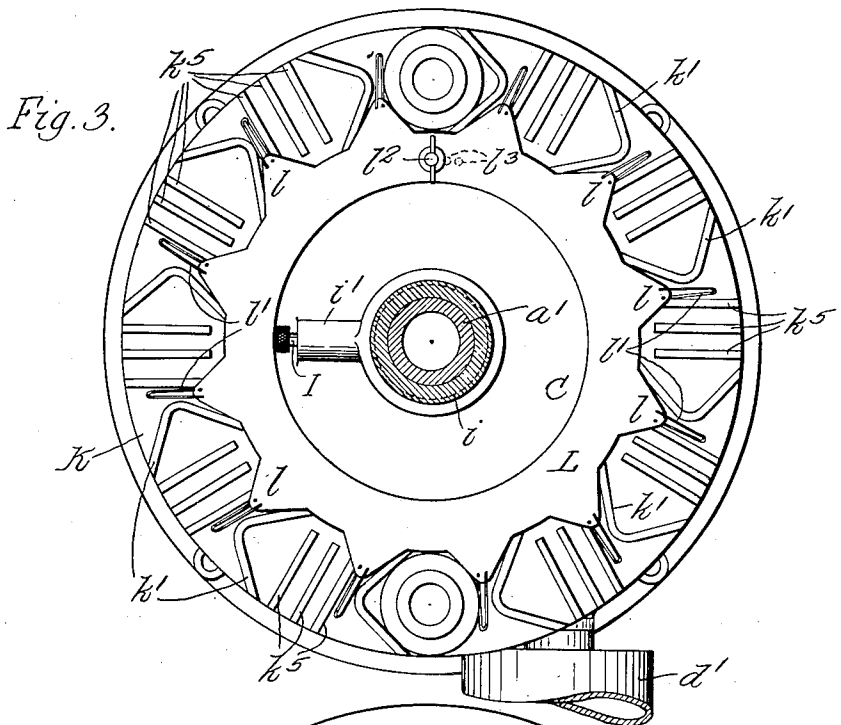
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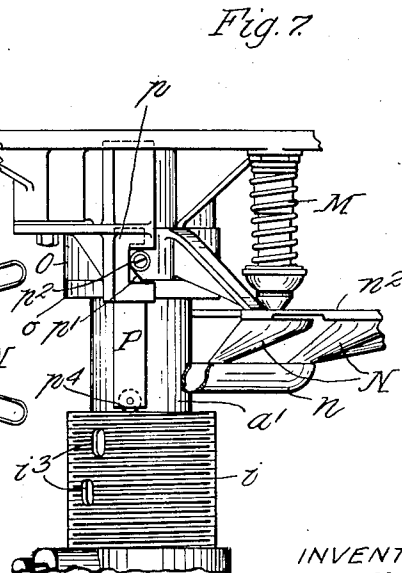
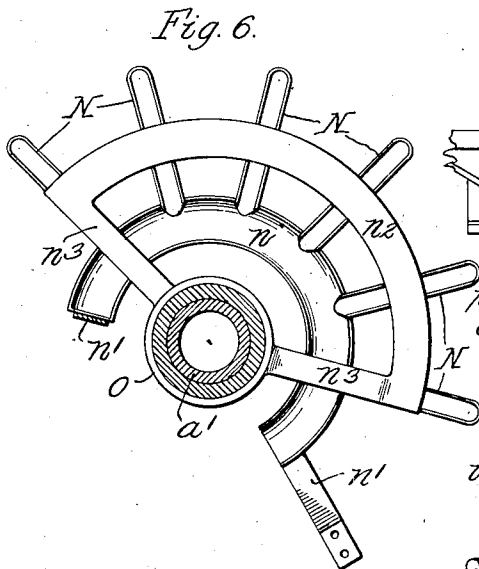
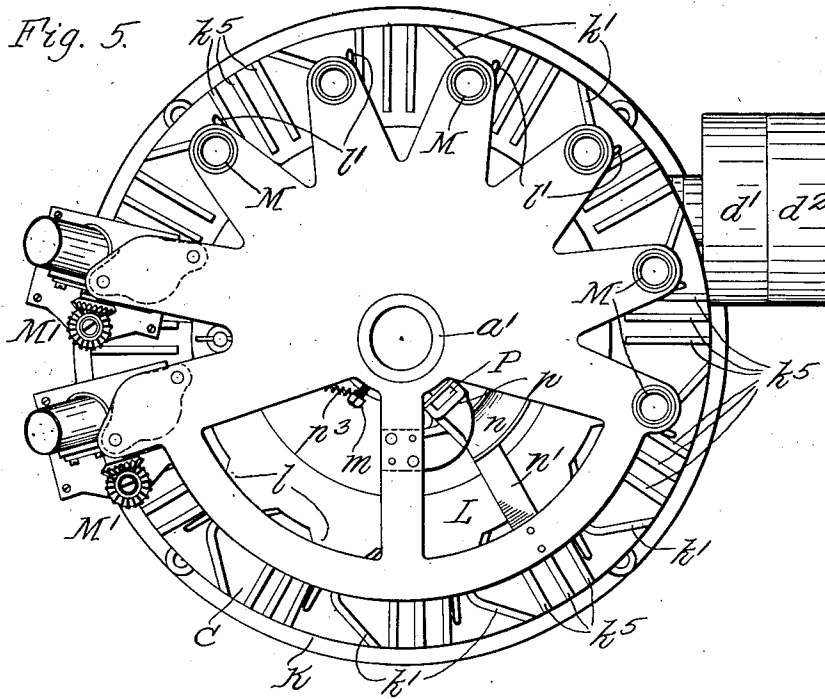
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APPLICATION FILED APR. 29, 1919.

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4 SHEETS—SHEET 4.



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BOTTLE FILLING AND CLOSING MACHINE.

1,386,299.

Specification of Letters Patent.

Patented Aug. 2, 1921.

Application filed April 29, 1919. Serial No. 293,454.

To all whom it may concern:

Be it known that we, KIRK K. WRIGHT and ROBERT N. CUNDALL, citizens of the United States, residing at Buffalo and Blas-

5 dell, respectively, in the county of Erie and State of New York, have invented a new and useful Improvement in Bottle Filling and Closing Machines, of which the follow-

10 ing is a specification.

This invention relates to machines of the kind in which empty bottles or other containers are placed on a movable carrier which conveys the bottles or containers to filling devices or to closing devices.

15 The objects of the invention are to produce a machine of this kind in which the tank or reservoir for the liquid and the filling and closing devices mounted thereon may be placed into a number of different positions relatively to the base; also to provide a machine of this kind with means of improved construction for quickly adjusting the table of the machine to different elevations for adapting the machine to operate

20 on bottles or containers of different sizes; also to provide a machine of this kind with means for preventing drippings from the filling devices from soiling the exterior of the bottles or packages; also to provide

25 mechanism of improved construction for actuating the carrier for advancing the bottles and to hold the carrier against advancing or retarding when the same is moved to place the bottles into operative relation to the filling and closing devices; also to provide

30 a machine of this kind with means of improved construction for holding bottles or other receptacles of different sizes on the carrier; also to improve the construction of apparatus of this kind in other respects hereinafter specified.

In the accompanying drawings:

Figure 1 is a front elevation of a bottle filling and closing machine embodying the invention, a part of the base of the machine

35 being shown broken away.

Fig. 2 is a central sectional elevation thereof on line 2—2, Fig. 1.

Fig. 3 is a sectional plan view thereof on

40 line 3—3, Fig. 1.

Fig. 4 is a sectional plan view thereof on

45 line 4—4, Fig. 2.

Fig. 5 is a top plan view thereof with the tank or container for the liquid removed

50 from the machine.

Fig. 6 is a plan view, partly in section, of the means for receiving the drip from the filling devices.

Fig. 7 is a fragmentary elevation thereof, showing the actuating mechanism for the

55 drip-receiving means.

Briefly stated, the machine embodying the invention which is shown in the drawings includes an intermittently rotatable table upon which the bottles or packages to be

60 filled are placed and which is adapted to be moved vertically to place the bottles supported thereby into operative relation to the filling devices and the closing or capping

65 devices, all of which devices are preferably mounted on the base of a tank containing a supply of the liquid with which the bottles are to be filled. The machine shown in the drawings is primarily intended for filling

70 and closing milk bottles, but it will be understood that the invention is not intended to be limited to machines for operating on milk bottles but may be used for filling and closing receptacles or packages of other

75 kinds and the word "bottle", hereinafter used for convenience, is intended to apply to receptacles or packages of all kinds. The machine as shown is intended to be used for filling and capping or closing the bottles,

80 but it will be understood that the bottle-capping or closing devices may be omitted if desired, or the machine may be used only for capping or closing bottles.

A represents the base or pedestal of the machine which may be of any suitable or

85 desired form or construction, that shown including a substantially annular pedestal portion, the lower edges of which are adapted to rest on the floor or other foundation. The pedestal is provided near its upper

90 portion with transversely extending members *a* which are preferably formed integral with the pedestal portion and on which some of the parts of the machine are supported. A

95 substantially upright hollow column or post *a'* is also arranged on the transversely extending members, being, in the construction shown, driven into a central hole in the transverse members and held in place by a

100 nut *a''*. On the upper end of the post *a'* a tank or container B for the milk or other substance is supported by means of a spider or frame *b* or the like secured to the upper end of the pillar or post *a'*. C represents a

105 table or support for the bottles *c*. This ta-

110

ble is intermittently rotatable about the pillar a' and is also movable vertically to place the bottles into operative relation to filling devices and capping or closing devices. The mechanism for imparting both reciprocatory and rotary motion to the table C is preferably arranged on the base or pedestal A of the machine and may be constructed as follows:

- 10 Power is transmitted to the machine by any suitable means, to rotate a main drive shaft D. In the construction shown this shaft is journaled on a base plate or member d suitably secured to the base or pedestal A and extends out of the base and is provided at its outer end with tight and loose pulleys d' d^2 by means of which the machine may be driven and stopped. Any other means for driving the shaft D may be provided. The shaft D has a worm d^3 which is rigidly secured thereto and which is adapted to drive a worm gear d^4 secured on a shaft d^5 . This shaft is provided at one end with a cam E adapted to cooperate with an anti-friction roller e secured at the base of a plunger e' suitably guided in the lower portion of the hollow column or post a' . This plunger is held against rotation by means of a pin e^2 extending through slots e^3 in the fixed hollow post or column a' . The pin e^2 also acts as the medium for transmitting reciprocatory movement from the plunger e' to the table C. For this purpose the table is provided with a hub portion F having an annular groove or depression in which a bearing ring f is arranged. The ends of the pin e^2 are secured to the bearing ring f so as to transmit reciprocatory movement to the hub F, which is journaled on the outer periphery of the upright post or member a' , and also to permit the hub F to rotate relatively to the ring f and pin e^2 . Means of any other suitable construction for transmitting reciprocatory movement to the table may be employed.

- In order to intermittently rotate the table, the following mechanism is preferably provided: G represents a Geneva wheel which, in the construction shown, is provided with four slots g and which is rotatably mounted on a stud shaft g' secured on the base plate d . The Geneva wheel G is actuated by means of a roller g^2 which is journaled on a pin g^3 secured on the cam E. Consequently the rotation of the shaft d^5 causes an intermittent rotation of the Geneva wheel G, which is secured to a beveled gear g^4 meshing with a beveled gear g^5 secured on an upright shaft g^6 . The shaft g^6 extends through the cross member a of the pedestal A and at its upper end is provided with a pinion h meshing with a gear H which is preferably formed integral with the hub F of the table C. The gear H and pinion h are preferably provided with wide teeth so

that the teeth will remain in mesh during the reciprocatory movement of the hub F and the gear H connected therewith. The Geneva wheel and gears are preferably so proportioned that at each actuation of the table C the bottles are advanced through a space equivalent to the space occupied by two bottles.

In order to prevent the table C from turning after the roller g^2 has disengaged the Geneva wheel G, a gear lock H' is preferably provided which is rigidly secured on a stud or post h' , also rigidly secured on the cross member a of the base. The gear lock H' is provided with teeth adapted to mesh with the teeth of the gear H when the same is raised and thus prevent the gear from turning. Any other means for intermittently rotating the table C through a definite distance and for holding the same against turning while the same is moved vertically may be employed.

In order to readily adapt the machine to operate on bottles of different sizes, means are provided for adjusting the table C vertically relatively to the hub F. In the construction shown for this purpose the hub F is provided with a threaded portion i adapted to engage with a correspondingly threaded portion of the table, so that the table may be raised or lowered by turning the same relatively to the hub F. Any desired means may be provided for holding the table in the various positions corresponding to the sizes of the bottles to be operated upon. In the construction shown for this purpose, a plunger I is arranged in a tubular housing i' preferably formed integral with the table C, and is pressed by means of a spring i^2 toward the hub F. The hub F is provided with a series of holes i^3 into which the plunger I may enter to hold the table in correct position relatively to the tank B for operating upon bottles of different sizes. For example, if the machine is intended to operate upon quart, pint and half pint bottles, the lowest of the holes i^3 will be so placed as to properly position the table C relatively to the filling and capping devices when used in connection with quart bottles. The intermediate hole will be correspondingly positioned for pint bottles and the upper hole for half pint bottles. Any other means for holding the table in proper relation relatively to the filling and capping devices may be employed.

The table C is provided with means of any suitable kind for supporting the bottles during the filling and capping or closing operations. In the construction shown for this purpose, the table is provided with a downwardly extending flange k having a platform K formed integral therewith below the upper edge of the flange k . In placing the bottles upon the platform they are placed

against the flange k and against additional supporting or positioning flanges k' which extend upwardly from the table and which assist the operator in properly positioning the bottles so that the same will come into proper operative relation to the filling or closing devices. The platform K is preferably inclined inwardly so as to drain any liquid from the exterior of the bottles, drain holes k^2 being provided at intervals which permit any liquid which may be spilled to drain into a trough k^3 in the pedestal A . A spout k^4 , Fig. 1, may be employed to drain the liquid from the trough k^3 into any suitable waste receptacle. The platform K is preferably provided with grids k^5 or the like upon which the bottles stand, the grids being substantially horizontal so that the bottles will be presented in proper relation to the filling or closing devices.

In order to enable the machine to operate on bottles or receptacles of different diameters, the table is preferably provided with an annular bottle holding plate or member L having outwardly extending projections l which are adapted to form with the positioning flanges k' pockets for the bottles. If desired, spring holding members l' may be provided on the projections l which yieldingly press the bottles against the positioning flanges k' . The annular plate or member L is so arranged on the table C as to be adjustable circumferentially so that the projecting portions l or the springs l' , in case the latter are used, may cooperate with bottles of different sizes. Any suitable means may be employed for holding the annular member L in the desired position. In the construction shown for this purpose, a set screw l^2 is employed which extends through the annular member L and which is adapted to engage with one or another of the threaded holes l^3 arranged in the table C .

The actuating mechanism of the machine is preferably so arranged under the base A and table C that none of the mechanism is exposed and that the mechanism is protected from moisture when the machine is washed. This is done in the construction shown by providing the base A with an upwardly extending flange L' which is preferably formed integral with the base adjacent to the inner edge of the trough k^3 . This flange is preferably arranged within the flange k of the table so that these two flanges prevent any liquid from injuring the parts of the driving mechanism arranged between the base and the table.

M represents the filling nozzles or devices which are secured on the base of the tank or reservoir B and which may be of any suitable or desired construction and of themselves constitute no part of this invention. Only one of these devices is shown in Figs. 1 and 2 but, as indicated in Fig. 5, six of

these filling devices are preferably employed on the machine shown. These bottle-filling nozzles or devices are preferably so made that when a bottle engages the lower part of a nozzle, a valve is opened which permits liquid to discharge from the nozzle to the bottle, the valve being closed as soon as the bottle is removed from engagement with the nozzle. The bottle-supporting platform K is, in the machine shown, divided into twelve spaces or compartments for bottles and since the bottle-supporting plate is advanced through a distance corresponding to two of the compartments at one time, two bottles at a time can be placed on or taken off the machine. By providing six filling devices, these devices can be so arranged that the first pair of filling devices will partly fill two bottles, the second pair will fill the bottles approximately with the desired amount of liquid, and the last two devices will complete the filling of the bottles with the exact quantity of liquid desired. In this manner the filling operation can be quickly effected since six bottles at a time are being filled, and since the bottles are filled gradually the foaming of the liquid will not interfere with the filling of the bottles. M' represents the capping or bottle-closing devices which are also mounted on the bottom of the tank or reservoir B . Two of these closing devices are provided which place the caps or other closing devices on two bottles at a time after the bottles have been filled. By means of this arrangement, when sufficient bottles are placed on the table, six bottles are being filled and two bottles are closed each time the table is raised by the cam E . Any other type of bottle filling or bottle-capping and closing devices may be employed, and any desired number of filling devices and closing devices may be provided.

The spider b on which the tank B is mounted, is preferably loosely journaled on the upper end of the hollow column or post a' , so that the tank or the bottle filling and closing devices mounted thereon may be turned to any desired position relatively to the base of the machine, and a set screw or analogous device m is provided for securing the spider in the desired position relatively to the column or post a' . By means of this construction any part of the base of the machine can be used as the front of the machine, so that the tight and loose pulleys d' or d^2 or other means for driving the machine may be located at the sides or back of the machine as may be desired. For example, in the machine shown in the drawings, the tank may be secured in twelve different positions relatively to the base. This enables the machine to be readily set up in a dairy or other place where the bottles are to be filled and to be connected with the source of power without necessitating any changing or re-

building of the machine to place the pulleys in any particular position in which they may be most conveniently connected with the line shaft.

5 In order to prevent the dripping of the filling devices from soiling the exterior of the bottles or other receptacles, means are preferably provided which move into operative relation to the filling devices as soon
10 as the bottles move out of operative relation thereto, to prevent the dripping of the filling devices from soiling the bottles. In the construction shown for this purpose, a plurality of radial arms or fingers N are provided which, in the construction shown, are
15 trough-shaped and are adapted to conduct any liquid dripping from the filling devices into a trough n from which the liquid may be conducted by any suitable means (not shown) to the trough k^3 formed in the base
20 of the machine, or if desired, the liquid from the trough n may be otherwise disposed of. The trough n , in the construction shown, is secured to the spider b by
25 means of straps or supports n' and the radial arms or trough-shaped members N are mounted to swing about the axis of the machine into and out of operative relation under the filling devices M. In the construction shown for this purpose, the radial
30 arms N are secured to an arc-shaped bar n^2 which is secured to arms n^3 extending outwardly from a collar O rotatably mounted on the hub of the spider b , a collar o secured to the hub of the spider serving to hold the oscillatory collar O in place. Means for causing the oscillation of the collar O and the arms N connected therewith are preferably constructed as follows:

40 P represents a bar which is movable vertically in a guide bearing p secured to the spider b . The bar P is provided with an inclined face p' adapted to engage a roller p^2 pivotally secured on the collar O. A
45 spring p^3 draws the collar O into a position in which the roller p^2 bears against the reciprocatory bar P. When the bar moves upwardly the inclined face thereof will cause the collar O to rotate in such a manner as to move the radial arms N out of operative relation to the filling devices M, and
50 when the bar P descends, the spring p^3 moves the radial arms N again into operative position under the filling devices M to catch any of the liquid which may drip from the filling devices. The reciprocatory movement of the bar P may be effected by means of the hub F and for this purpose the lower end of the bar P is provided with an anti-friction roller p^4 , or the like, resting on the
60 upper face of the hub F. Consequently when the table C is raised to bring the bottles into operative relation to the filling devices, the radial arms N are moved from a position
65 underneath the filling devices to permit the

bottles to move upwardly into operative relation thereto. As the table C descends and the bottles move away from the filling devices, the arms N again move into a position underneath the filling devices, in which position they remain while the table is rotated to advance the bottles to their next position. 70

In the operation of the machine described, the table C is raised by means of the cam E to place the bottles into operative relation 75 to the filling devices or closing devices. After the cam has moved into a position in which the table C is in its lowest position, the roller g^2 of the cam engages the Geneva wheel G and through the medium of the bevel gears g^4 g^5 and the gears h and H, the table is rotated to advance the bottles to their next position, after which the cam again actuates the plunger e' to raise the table. As the hub portion of the table is 85 raised, the gear lock H' engages with the teeth of the gear H so as to prevent the rotation of the table while the roller g^2 is out of engagement with the Geneva wheel G. If it is desired to change the machine to 90 operate upon bottles of a different size, the plunger I is withdrawn from the hole i^3 in the hub F and the table is rotated relatively to the hub until the plunger I enters into another of the holes i^3 corresponding to the 95 size of the bottles to be operated upon, the table being raised or lowered by means of the screwthreaded portion i of the hub F and the correspondingly threaded portion of the table C. In order to set the machine 100 to operate on bottles of different diameter, the annular plate L is adjusted so that the projections l thereof form with the projecting flanges h' of the table, compartments of the correct size to retain the bottles, and the 105 annular plate is then locked in the correct position by means of the set screw l^2 . When it is desired to change the front of the machine, it is merely necessary to loosen the set screw m and to turn the container B with 110 the parts connected therewith to any other position in which the bottles will come into proper relation to the filling and capping devices when the table C is raised.

The machine described has the advantages 115 of being compact in construction and reliable and quick in operation. The bottles can be readily placed in the correct position on the table, which insures proper operation of the machine. Since no dripping of the 120 filling devices can soil the exterior of the bottles, the machine is also sanitary. By employing a Geneva wheel in the mechanism for advancing the table, the table is started and stopped gradually and moves at its 125 greatest speed half way between its starting and stopping positions. The feeding of bottles to the machine and the removing of the same from the machine is greatly facilitated by the fact that the empty bottles are 130

fed to the same part of the machine at which the filled and capped bottles are delivered, so that one man can operate the machine.

We claim as our invention:

1. In a receptacle filling machine, the combination of a receptacle filling nozzle, a rotatable table adapted to place receptacles carried thereon in operative relation to said nozzle to be filled, a driven shaft for actuating said machine, a cam on said shaft, a plunger connected to said table and engaging said cam whereby said table is intermittently raised and lowered, a driving member for rotating said table, and connections between said driving member and said cam for rotating said table.

2. In a receptacle filling machine, the combination of a receptacle filling nozzle, a rotatable table adapted to place receptacles carried thereon in operative relation to said nozzle to be filled, a driven shaft for actuating said machine, a cam on said shaft, a plunger connected to said table and engaging said cam, whereby said table is intermittently raised and lowered, a gear and pinion arranged to rotate said table, and means for driving said pinion, said means including a Geneva wheel and an actuating member for said wheel mounted on said cam.

3. In a receptacle filling machine, the combination of a receptacle filling nozzle, a rotatable table adapted to place receptacles carried thereon in operative relation to said nozzle to be filled, a hub connected to said table, a gear on said hub, a pinion in mesh with said gear, means for intermittently driving said pinion, means for intermittently raising and lowering said table and hub, and a locking member positioned to engage said gear when the hub is raised, whereby said table is prevented from rotating until it has been lowered.

4. The combination of a table for supporting receptacles, devices arranged above said table for operating on said receptacles, means for raising said table to place the receptacles thereon into operative relation to said devices, means for intermittently rotating said table including a Geneva wheel and a train of gears driven by said Geneva wheel and connected with said table, and means engaging one of said gears to hold said train of gears and said Geneva wheel against rotation when said table is not being rotated.

5. The combination of a table for supporting receptacles, devices arranged above said table for operating on said receptacles, means for raising said table to place the receptacles thereon into operative relation to said devices, a Geneva wheel which is actuated at intervals to impart intermittent rotation to said table, a train of gears connecting said Geneva wheel with said table, and a lock for said train of gears with

which one of said gears moves into engagement when said table is raised to lock said table and gears against rotation.

6. The combination of a table adapted to support receptacles, devices arranged above said table for operating on said receptacles, power driven means for raising and lowering said table to place the receptacles thereon into and out of operative relation to said devices including a cam, means operated by said table-raising and lowering means for intermittently rotating said table including a Geneva wheel, and a part on said cam adapted to actuate said Geneva wheel to rotate said table when the same is in its lowest position.

7. The combination of a base, a substantially upright column secured to said base, devices arranged on said column and adapted to operate on the receptacles, a table for receptacles and adapted to be rotated about said column, a reciprocatory plunger arranged in said column, a bearing ring rotatable relatively to said table and connected therewith to impart reciprocatory movement thereto, and a part extending through slots in said column and connected with said plunger and said ring to impart reciprocatory motion from said plunger to said ring.

8. The combination of a base, a part intermittently rotatable and vertically reciprocatory with regard to said base, a table secured to said part and movable therewith and adapted to support receptacles, devices arranged above said table and adapted to operate on said receptacles, and means for adjusting the table with regard to said part to adapt the table to receive receptacles of different sizes.

9. The combination of a base, a part intermittently rotatable and vertically reciprocatory with regard to said base and having a screwthreaded portion, a table having a correspondingly screwthreaded portion secured to said part and movable therewith, said table being adapted to support receptacles, devices arranged above said table and adapted to operate on said receptacles, and means for holding said table in different positions relatively to said part to adapt the same to cooperate with receptacles of different sizes, the table being moved into various positions by turning the same relatively to said part.

10. The combination with a hub portion having a screwthreaded exterior portion, means for imparting reciprocatory and intermittently rotary motion to said hub, a table having a screwthreaded portion engaging the screwthreaded portion of said hub and adapted to support receptacles, stationary means above said table for operating on said receptacles when said table is raised, and means releasably securing said table to said hub, said table when released from said

hub being movable from one position to another relatively to said hub by turning said table relatively to said hub, to adapt the table to receive receptacles of different sizes.

5 11. The combination of a plurality of devices adapted to operate on receptacles, a rotary table provided with recesses adapted to receive said receptacles, an annular plate having yielding projecting parts adapted to
10 hold the receptacles in said recesses in the table, and means for securing said plate in different positions relatively to said table to adapt the table and plate to hold receptacles of different sizes.

15 12. The combination of a plurality of devices adapted to operate on receptacles, a rotary table having a platform adapted to receive receptacles and which is inclined to permit the liquid to drain from said platform, substantially upright walls extending
20 upwardly from said platform and formed integral therewith to form pockets in which the receptacles are to be positioned, and ribs formed on said platform and extending
25 above the bottom of the platform and having their upper edges substantially horizontal to support said receptacles in upright positions.

30 13. In a receptacle filling machine, the combination of a central column, a filling nozzle supported by said column, a receptacle supporting member adapted to raise a receptacle into operative relation to said nozzle, a device adapted to be moved into a position under said nozzle to catch liquid dripping from said nozzle, a ring rotatably mounted on said column and on which said device is mounted, and means for imparting movement to said ring to actuate said device.
40

40 14. In a receptacle filling machine, the combination of a central column, a filling nozzle supported by said column, a receptacle supporting member adapted to raise a receptacle into operative relation to said nozzle, a device adapted to be moved into a position under said nozzle to catch liquid dripping from said nozzle, a ring rotatably mounted on said column and on which said device is mounted, a rod having a part
50 adapted to impart movement to said ring

when said rod is raised by the movement of said supporting member, means for yieldingly opposing the movement of said ring by said rod and for returning said ring to a position in which said device is in a position under said nozzle. 55

15. In a receptacle filling machine, the combination of a central column, a filling nozzle supported by said column, a receptacle supporting member adapted to raise a receptacle into operative relation to said nozzle and to lower the receptacle from said nozzle, a device adapted to be moved into a position under said nozzle to catch liquid dripping from said nozzle, a ring rotatably mounted on said column and on which said device is mounted, and means actuated by raising or lowering movement of said receptacle supporting member for moving said ring to position said device. 60 70

16. In a receptacle filling machine, the combination of a central column, a filling nozzle supported by said column, a receptacle supporting member adapted to raise a receptacle into operative relation to said nozzle and to lower the receptacle from said nozzle, a device adapted to be moved into a position under said nozzle to catch liquid dripping from said nozzle, a ring rotatably mounted on said column and on which said device is mounted, and means including a cam member actuated by raising or lowering movement of said receptacle supporting member and a part on said ring for imparting movement to said ring to actuate said device upon raising or lowering of said receptacle supporting member. 75 80 85

Witness my hand, this 25th day of April, 1919.

KIRK K. WRIGHT.

Witnesses:

C. W. PARKER,
A. L. McGEE.

Witness my hand, this 25th day of April, 1919.

ROBERT N. CUNDALL.

Witnesses:

E. F. PROCHNOW,
A. L. McGEE.