April 24, 1945. D. W. BINGHAM 2,374,268

APPARATUS FOR FILLING CANS AND OTHER CONTAINERS

Filed July 18, 1941 5 Sheets-Sheet 1

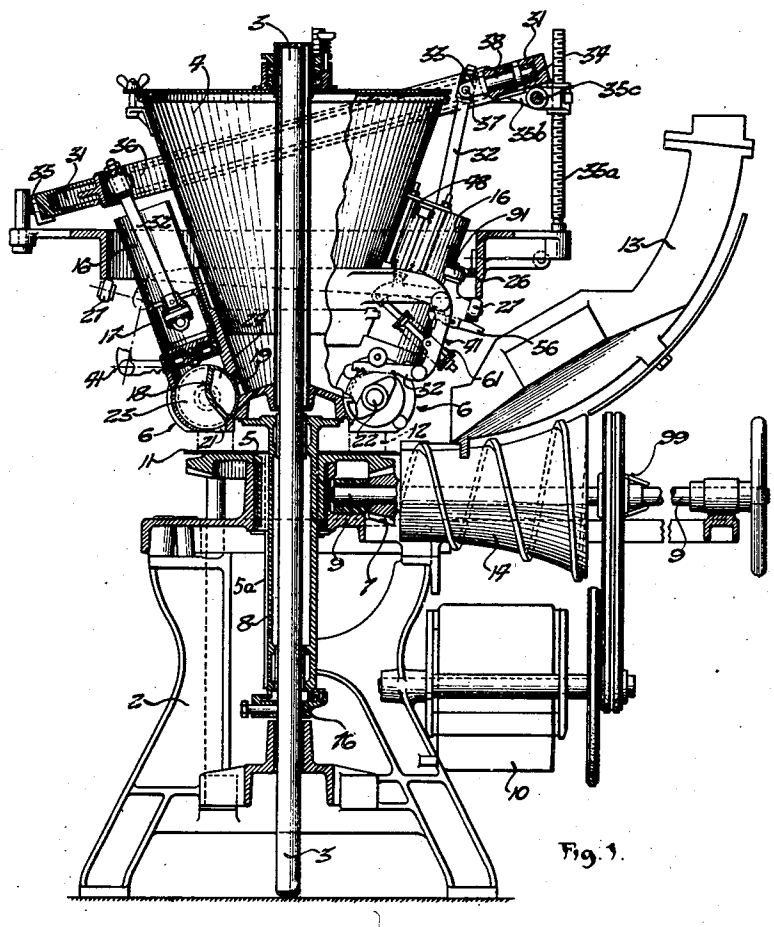


Fig. 1.

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APPARATUS FOR FILLING CANS AND OTHER CONTAINERS

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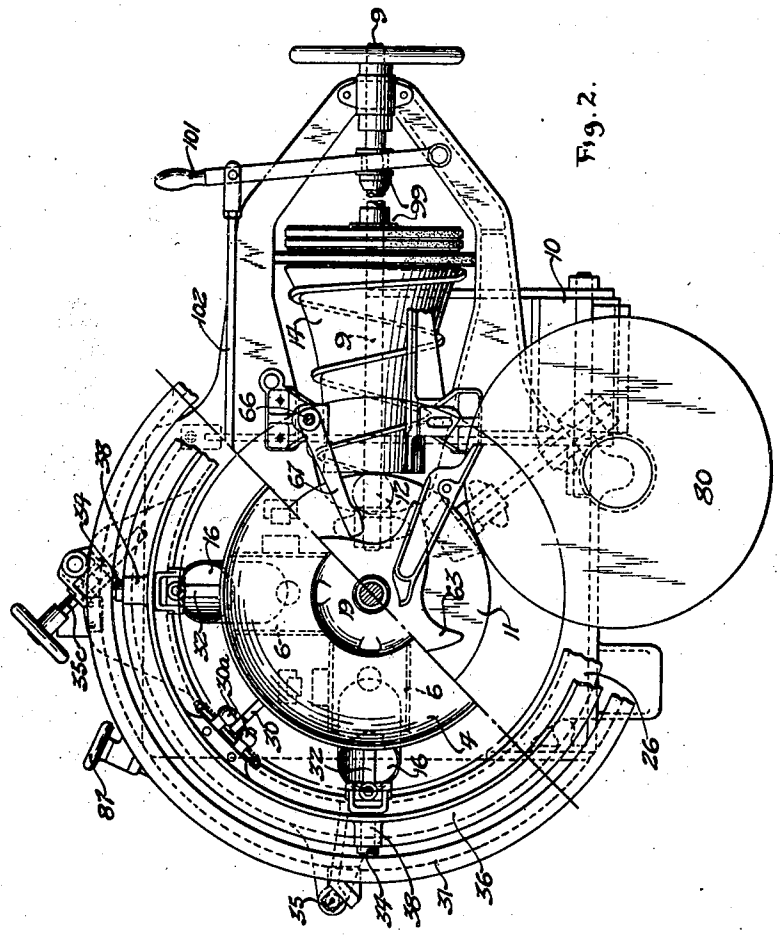


Fig. 2.

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APPARATUS FOR FILLING CANS AND OTHER CONTAINERS

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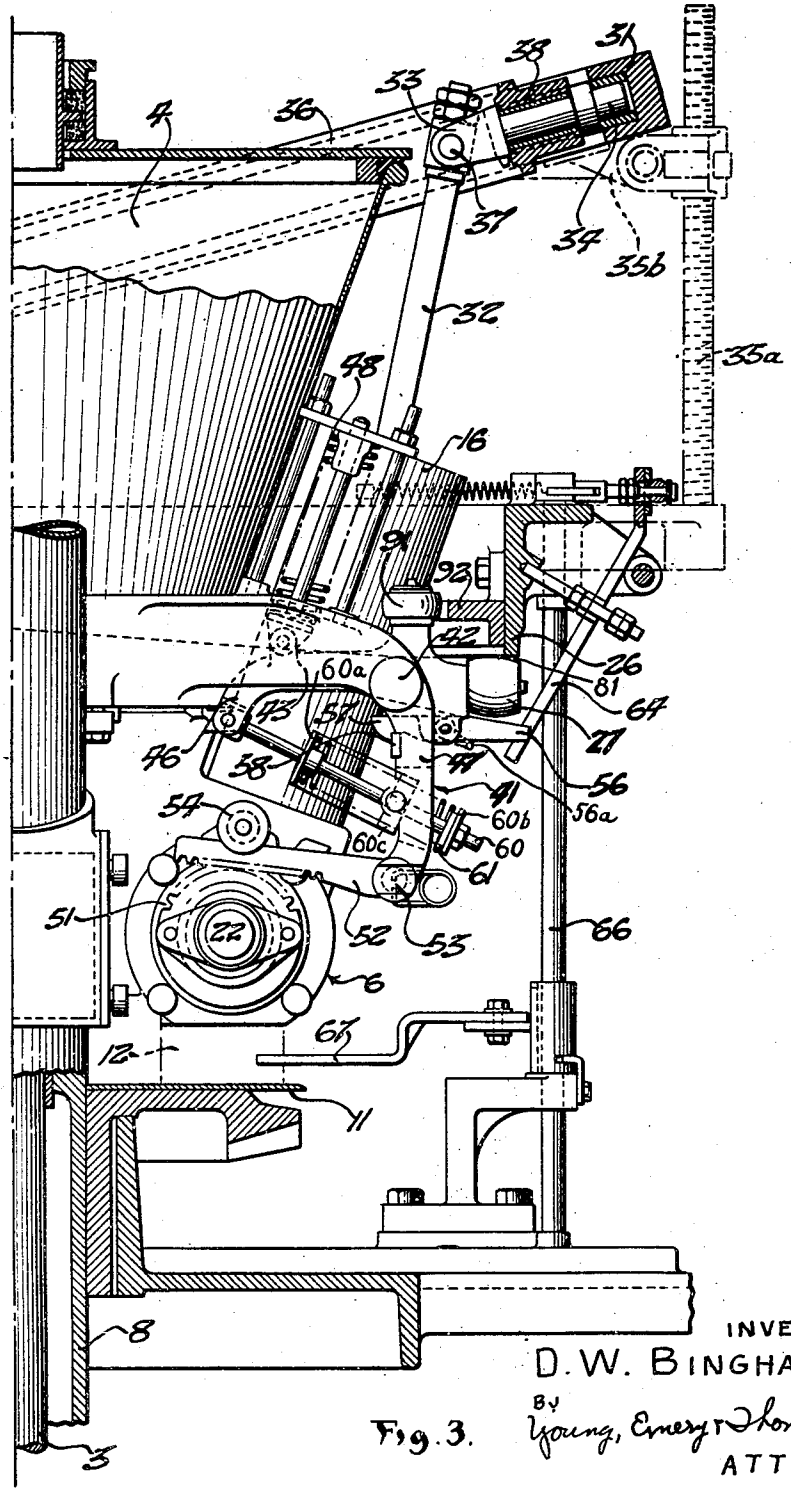


Fig. 3.

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APPARATUS FOR FILLING CANS AND OTHER CONTAINERS

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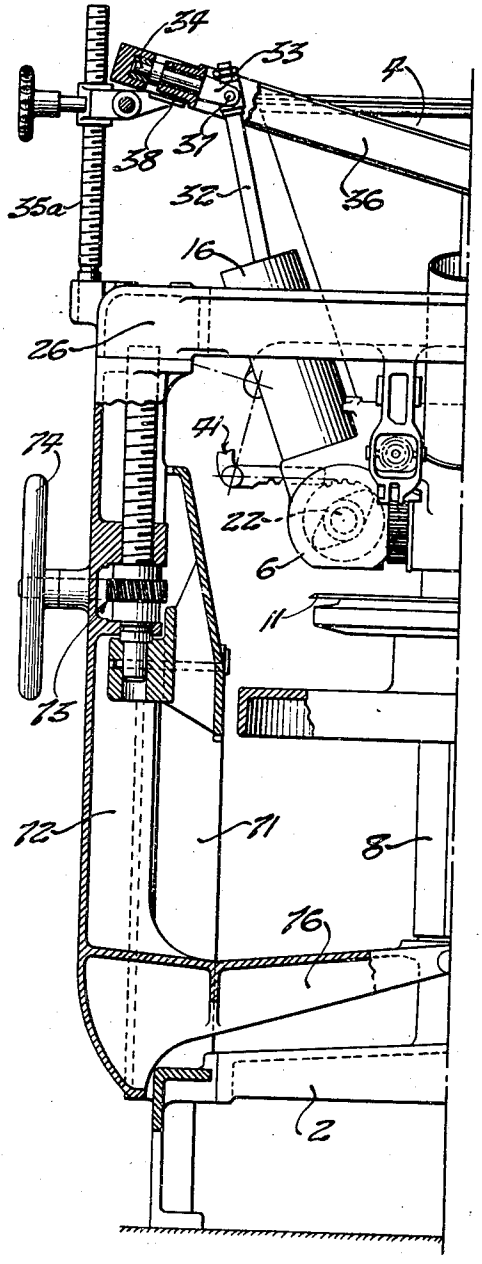


Fig. 4.

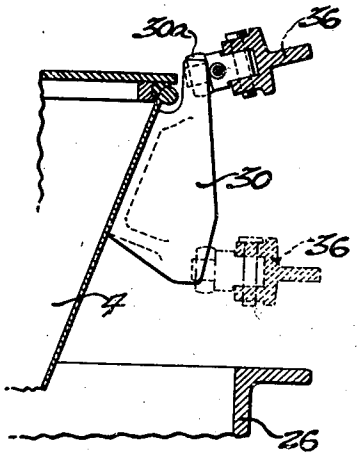


Fig. 5.

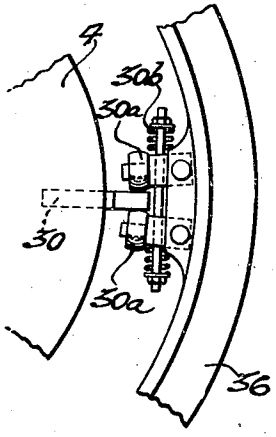


Fig. 6.

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APPARATUS FOR FILLING CANS AND OTHER CONTAINERS

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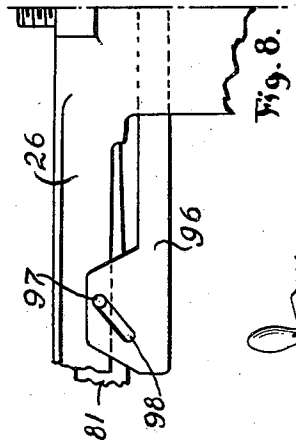


Fig. 8.

Fig. 7.

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UNITED STATES PATENT OFFICE

2,374,268

APPARATUS FOR FILLING CANS AND OTHER CONTAINERS

David William Bingham, Middle Brighton, Victoria, Australia

Application July 18, 1941, Serial No. 403,053
In Australia July 18, 1940

15 Claims. (Cl. 226—99)

This invention relates to apparatus for filling cans or like containers automatically with predetermined quantities of liquids, pastes or like material.

The apparatus is particularly adapted for canning food stuffs such, for example, as jams, soups, sauces, fish and meat pastes and various other substances especially those of a viscous nature. It is to be understood however, that the invention is not limited in use to the canning of such substances, but that it is also quite capable of handling less viscous materials, such as milk, cream, oils and the like.

One of the objects of the present invention is to provide an improved apparatus for the purpose indicated which is of more simple and compact design than hitherto with the result that the cost of production is reduced whilst the apparatus is capable of operating at a relatively high speed.

Another object is to provide an improved apparatus for the purpose indicated which is capable of being readily adjusted so as to vary the effective areas of a plurality of discharge ports in accordance with the viscosity of the substance which is being canned.

A further object is to provide an improved apparatus for the purpose indicated which is capable of being adjusted so as to accommodate cans or other containers of different heights or depths.

Various other objects and constructional features of the invention will be more readily apparent from the following description which refers by way of example to one practical embodiment of the invention.

Referring to the drawings which form part of this specification:

Figure 1 is a part sectional elevation of apparatus for filling cans in accordance with one practical embodiment of the invention.

Figure 2 is a plan view of Figure 1, parts being omitted for convenience of illustration.

Figure 3 is a side elevation on an enlarged scale, of one of the filling heads and the adjacent parts of the apparatus.

Figure 4 is a part sectional side elevation showing means for elevating the feeding head unit.

Figure 5 is a sectional detail of portion of the mechanism for effecting reciprocation of the pistons which form part of the filling heads.

Figure 6 is a plan view of the parts seen in Figure 5.

Figure 7 is a plan view of a circular cam and parts associated therewith for actuating the control valves of the filling head.

Figure 8 is a side elevation showing mechanism for automatically closing the discharge valves of the filling heads in the event of stoppage of the machine.

The improved apparatus includes a main supporting frame 2 carrying an upstanding central shaft 3 upon which is mounted an inverted truncated conical feed hopper 4 and a plurality of feeding heads 6. The latter are circumferentially spaced around the exterior of the hopper and are connected thereto in such a manner as to form a filling unit which is adapted to be rotated bodily in relation to the main supporting frame.

Any suitable means may be employed for effecting rotation of the hopper and its feeding heads. For example, inter-engaging bevel gearing 7 may be connected to a sleeve 8 supporting the hopper and to a laterally extending driving shaft 9 operatively connected to an electric motor 10 or any other suitable source of power.

Portion of the gearing 7 may be keyed as at 5 to the sleeve 8, the latter having a longitudinal keyway 5a formed therein so that the sleeve and the parts carried thereby may be raised or lowered without interrupting the drive as hereinafter described.

Mounted beneath the hopper and the feeding heads so as to rotate therewith, is a conveyor or table 11, upon which the cans 12 to be filled are automatically delivered from an associated magazine 13. The latter may comprise a sidewardly and upwardly curved chute into which the empty cans are stacked so that they gravitiate towards the table.

If desired, any suitable mechanical means such as a power operated worm or the like 14 may be employed for engaging each can as it arrives at the bottom of the magazine and mechanically positioning the can beneath one of the feeding heads.

Each of the aforesaid feeding heads 6 comprises a cylinder 16 and a piston 17 adapted to be reciprocated longitudinally therein. The cylinder is provided at its lower end beneath the piston with an oscillatory or any other suitable type of control valve 18 adapted to cooperate with an inlet port or passage 19 extending between the hopper 4 and the interior of the cylinder and also with a discharge port 21 at the lower end of the cylinder immediately above the table 11.

Each control valve 18 is preferably of circular formation and mounted upon stub shafts or a spindle 22 extending transversely of the cylinder. The valve member is preferably a free fit in its

casing so as to minimise friction and facilitate cleaning operations.

Portion of the valve wall is cut away so as to form a transfer passage **23** which is adapted to selectively establish communication between the hopper and the cylinder through the inlet port **19** or between the cylinder and the discharge port **21** in accordance with requirements. The remaining portion **24** of the circumferential wall of the valve is adapted to close the discharge port and open the inlet port whilst the cylinder is being filled and subsequently to close the inlet port and open the discharge port for filling one of the containers.

Means are provided for automatically actuating each control valve for filling and discharging its associated cylinder during rotation of the feeding heads. For this purpose, a stationary cam **26** of circular form in plan may be positioned around the hopper **4** and be adapted for engagement by a cam follower such as a roller **27** associated with each control valve. Said roller may be carried by a system of linkage or the like which is operatively connected to each valve spindle **22** for oscillating the valve during the travel of the roller or rollers around the stationary cam track as hereinafter described.

In combination with the foregoing, means are provided for automatically reciprocating each piston **17** during rotation of the feeding heads. Such means may comprise swash plate or like mechanism which includes an annular trackway **31** preferably of channel shape in cross section and extending around the feed hopper **4** above the cylinders, said trackway being adjustably mounted upon a supporting frame as hereinafter described.

The axis of the trackway **31** is inclined in relation to the axis of the upstanding shaft **3** carrying the hopper and each piston is provided with an upstanding connecting rod **32** fitted with a lateral extension **33** carrying a roller or slide **34** accommodated in the inclined trackway whereby during rotation of the hopper reciprocation is imparted to each piston.

A common support such as a ring **36** may be provided so as to maintain all of the piston rods **32** in the desired operative position relative to the trackway during reciprocation of the pistons. For example, each piston rod may be pivotally connected as at **37** to its extension **33** and said extensions may pass through circumferentially spaced bosses **38** in the supporting ring. The latter is floatingly mounted upon the hopper **4** in such a manner that it is free to rise and fall as it rotates therewith. For instance, the hopper may be provided with a plurality of circumferentially spaced and upstanding cheeks **30** each of which is accommodated between a pair of anti-friction rollers **30***a* on the supporting ring as seen more clearly in Figures 5 and 6 of the drawings. Said rollers are preferably spring influenced as at **30***b* so as to yieldingly maintain the rollers of each pair in engagement with the opposite side of the associated cheek.

In order to vary the quantity of material being discharged by the pistons **17** in accordance with the size of the cans being filled, means are provided for varying the effective strokes of the pistons. For this purpose, the annular trackway **31** may be pivotally mounted at one side as at **35** upon the machine frame and be adjustably supported at the opposite side so that the angular attitude of the trackway may be varied in accordance with requirements. Said adjustable support may comprise one or more upstanding screwed posts **35***a* fitted with nuts carrying lugs **35***b* which are pivotally connected to the annular trackway. The nuts may be actuated by a common spindle **35***c* fitted with a handwheel.

Should any interruption occur in the feeding of the cans from the magazine **13**, it is necessary to automatically prevent the opening of the discharge port of that feeding head **6** to which a can has not been delivered. Any suitable "no can, no feed" mechanism is provided for this purpose. Such mechanism may comprise a bell-crank lever **41**, the arms of which are not integral, but are formed separately and carried by a common pivot pin **42** mounted upon a bracket **43** on the hopper adjacent to each cylinder. For convenience of identification, the arms of this bell-crank lever will be hereinafter referred to as primary and secondary arms **46** and **47** respectively. The primary arm **46** may carry the roller **27** associated with the aforesaid circular cam **26**, and in order to maintain the roller in engagement with the cam, the primary lever arm is spring-influenced, for example, by means of a spring **48** extending between its supporting bracket **43** and an outstanding lug on the primary lever arm.

The secondary lever arm **47** is operatively connected to the valve spindle **22** for reciprocating the valve. Rack and pinion or like mechanism may be employed for this purpose and if so a pinion or toothed segment **51** may be fitted to the valve spindle and mesh with a rack bar **52** pivotally connected as at **53** to the secondary lever arm **47**. A jockey or guide roller **54** may be provided for maintaining the rack and pinion in operative engagement.

A means is provided for detachably connecting said primary and secondary arms **46**, **47** together, and such connecting means is adapted to be automatically disengaged so as to prevent the opening movement of the control valve **18** when a can is not fed thereunder. Said means for interconnecting the primary and secondary lever arms may comprise a latch **56** in the form of a lever which is pivotally connected to the primary arm **46** and provided at its inner end with a curved or inclined nose **57** and a shoulder associated therewith for engaging and pulling a stop member **58** carried by the secondary lever arm. The latch **56** is influenced by a spring **56***a* urging the nose **57** into engagement with the stop member **58**.

Spring means are preferably provided for preventing movement of the secondary lever arm **47** except when the latch **56** is in engagement with its associated stop **58** and for this purpose the primary and secondary lever arms may be interconnected, as seen more clearly in Figure 3 by a sliding rod **60** having a compression spring **61** associated therewith so as to draw the two lever arms **46**, **47** together when the latch and its stop are disconnected. The spring **61** is positioned between a stop **60***a* on the outer end of the rod **60** and another stop **60***b* carried by a ring **60***c* which is pivotally connected to the lever arm **47**. The stop **60***b* is slidable upon the rod **60** and the spring passes freely through the ring **60***c* so that the spring **61** may function to draw the two lever arms together as aforesaid. Furthermore, when the lever arms **46**, **47** are interconnected by the latch **56** and stop member **58** the lever arm **47** is pulled in one direction by the latch **56** and subsequently returned by the lever

arm 46 pulling on the rod 60 and its associated spring and stop members.

A means is provided for automatically tripping the latch 56 and disconnecting the primary and secondary lever arms should any interruption occur in the feeding of the cans. Mechanism for this purpose may comprise a spider or the like 63 positioned between the table 11 and the feeding heads 6 for reeciving each can as it leaves the magazine. Associated with the spider is a spring-influenced trip member 64 having an inclined lower edge which is normally located in the path of the outer end portion or tail of the latch lever. Said trip lever may be operatively connected to an upstanding rotable post 66 fitted with an outstanding arm 67. As each can leaves the magazine, it is adapted to engage the arm 67 and swing it sidewardly, thus partially rotating the post 66 and swinging the trip member 64 out of engagement with the latch lever 56.

The improved apparatus may also include means for regulating the distance between the feeding heads 6 and the rotary table 11 on to which the cans are fed, in order to accommodate cans of various heights in accordance with requirements. For this purpose elevating mechanism may be employed and such mechanism may comprise a guideway 71 upstanding at one side of the main supporting frame 2 and carrying a vertically slidable frame member 72 on which the circular cam 26 and the inclined trackway 31 are mounted. Suitable screw and nut mechanism 73 fitted with an operating handwheel or the like 74 may be provided for effecting adjustment of the vertically slidable frame member.

The hopper 4 and feeding heads 6 associated therewith are also carried by the vertically adjustable frame member 72, for example, by means of a laterally extending arm 76 located adjacent to the lower end thereof and rotatably supporting the aforesaid sleeve 8.

In use, the substance to be canned is introduced into the hopper 4 and a stack of cans 12 is inserted into the magazine 13 after the appropriate vertical adjustment of the feeding heads 6 has been effected in accordance with the height of the cans being filled. Rotation of the main driving shaft 9 is adapted to commence feeding of the cans on to the table 11 and also to cause the hopper and its feeding heads to rotate bodily within the stationary cam 26 and the inclined trackway 31. Assuming that a can has been positioned beneath a feeding head, the cylinder of which has been filled from the hopper, continued rotation of the feeding head and its can results in the can engaging the trip mechanism and swinging the trip member 64 out of alignment with the latch lever 56 which normally functions to connect the primary and secondary arms 46, 47 of the bell-crank lever 41 together with the result that as the associated roller 27 moves around the stationary cam 26 and rises and falls in accordance with the inclination thereof, rocking movement is imparted to the bell-crank lever against the influence of its spring 48 with consequential oscillation of the control valve 18 and automatic opening of the discharge port 21 during the down stroke of the piston for filling the container.

The latter operation is completed after the feeding head has traversed portion of its circular path whereupon the circular cam 26 and the associated bell-crank lever 41 function to automatically close the discharge port and open the inlet port 19 of the cylinder as the piston commences its upward or suction stroke.

Removal of the filled containers from the table 11 is preferably effected mechanically for example by a rotary disc 80 or in any suitable manner and the arrangement is such that the filling of each feeding head 6 is completed immediately before it returns to its original position opposite the magazine.

Should any interruption in the feeding of the cans occur with the result that a feeding head passes the magazine without being supplied with an empty container, the trip member 64 is not displaced, but functions to trip the latch lever 56 and automatically disengage the primary and secondary arms of the bell-crank lever 41. The secondary arm 47 is spring-influenced so as normally to maintain it in an inoperative position with the inlet port 19 in communication with the hopper. Whilst in this position the primary lever 46 is actuated by the associated cam and roller mechanism without displacing the secondary lever arm.

As the piston of the temporarily inoperative feeding head 6 commences its suction stroke, the normal upward movement of the primary lever arm 46 caused by the roller 27 tracking around the cam 26 functions to re-engage the latch lever 56 with the secondary lever arm 47, which has been stationary, prior to the return of the feeding head to its original position opposite the magazine.

It will be appreciated that the construction and arrangement of the elevating and driving mechanism is such that vertical adjustment of the hopper 4 and associated feeding heads 6 may be effected without interfering with the machine drive.

The effective area of the discharge port 21 of each filling head should be varied in accordance with the viscosity of the material being fed to the cans. For this purpose, the stationary cam 26 may be provided with a vertically adjustable section 81 which may be positioned at the inside of the main cam and be provided with any suitable means for adjustably securing it thereon. For instance, the adjustable cam section 81 may be secured to the main cam 26 by a plurality of spaced bolts, pins or the like 82 passing through inclined slots 83 in the cam section whereby longitudinal movement of the cam section 81 causes it to be raised or lowered in relation to the main cam. A screw and nut device 86 carried by the main cam and pivoted with a handwheel 87 may be operatively connected as at 88 to the adjustable cam section 81 for effecting longitudinal movement thereof as aforesaid. By this arrangement, the movement of the bell-crank levers 41 and their associated control valves 18 may be varied so as to increase or reduce the effective area of the discharge ports 21 as desired.

Under normal conditions the aforesaid spring 48 functions to maintain the roller 27 in engagement with the lower edge of the main cam 26 or the adjustable cam section 81 but if grit or any other foreign substance should gain access to one of the control valves 18 the strength of the spring 48 may not be sufficient to overcome the increased resistance. To take care of such an emergency, means may be provided for positively effecting movement of the bell-crank lever 41 in both directions. For example, the primary lever arm 46 may be provided with a second roller 91 adapted to engage a return cam 92 on the inside

of the main cam 26 so as initially to swing the roller 27 into engagement with the main cam at the commencement of each filling cycle. As the spring 48 is capable of maintaining such engagement after the preliminary assistance by the roller 91 the return cam 92 may be relatively short in length.

When the machine is stopped, it is desirable to automatically close the discharge ports of those heads 6 which are filling cans. For this purpose, a ramp or the like 96 may be connected to the main cam 26 by a series of spaced bolts or pins 97 passing through inclined slots 98 in the ramp as seen in Fig. 8. The main driving shaft 9 may be provided with a clutch 99 having a handle 101 which may be operatively connected by linkage 102 with the ramp 96. The arrangement is such that upon actuation of the handle to disengage the clutch, the ramp 96 is moved lengthwise and thus lowered by the pin and slot supports into the engagement with the tails of the pivoted latch members 56 of the adjacent filling heads whereby such latch members are disconnected from their stops 58 and thus permit the particular secondary lever arms 47 to return, under the influence of the springs 61, into the positions in which they are adapted to close the discharge ports 21.

In addition to the features previously mentioned, an important advantage of employing an inverted conical shaped hopper with the series of a filling heads mounted in circumferentially spaced relationship thereon, is that the discharge ports are relatively closely spaced with the result that the diameter of the track traversed by the cans during the filling operations is reduced to a minimum with a consequential reduction of the centrifugal force which may otherwise tend to spill the contents of the cans. Furthermore, each discharge port or passage is of minimum length so that little, if any, of the material from the hopper remains in the discharge ports after closing of the control valves. Adjustment of the machine to accommodate different sized cans may be quickly and easily effected, whilst during operation material from the hopper is not delivered through any one of the feeding heads unless an empty can is positioned thereunder. Finally upon stoppage of the machine those discharge ports which are normally open are automatically closed until the machine is again put into operation.

It is also to be understood that various other alterations, modifications and/or additions may be introduced into the foregoing construction and arrangement of parts, without departing from the spirit and scope of the invention as defined by the appended claims.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. Apparatus for the purpose indicated, comprising in combination, a frame, a feed hopper, a plurality of circumferentially spaced feeding heads mounted upon said hopper to form a rotary filling unit, each feeding head including a cylinder and a reciprocatory piston therein and a valve and inlet and discharge ports controlled by the valve, and means for automatically actuating each piston during rotation of the filling unit, said piston actuating means comprising an annular trackway carrying a rotatable ring member both of which surround said rotary filling unit, said annular trackway being stationarily mounted upon the said frame with its axis inclined in relation to that of the rotary filling unit, said ring member being operatively connected to said pistons and being floatingly connected to said filling unit so as to rotate therewith and rise and fall during the rotary movement.

2. Apparatus for filling containers, comprising in combination a feed hopper, a plurality of circumferentially spaced feeding heads mounted upon said hopper so as to form therewith a rotary filling unit, each said feeding head having a cylinder and a piston therein and a valve and inlet and discharge ports controlled thereby, means for automatically reciprocating said pistons during rotation of said filling unit, means for varying the effective strokes of said pistons, means for automatically actuating said control valves, and means common to all said valves for regulating the movement of each of them for varying the effective area of its discharge port, said piston reciprocating means including a fixed annular trackway whereof the axis is inclined to the axis of the rotary filling unit, and a ring member floatingly connected to the filling unit and rotatable in said trackway to which ring the pistons are jointedly connected in spaced relation.

3. Apparatus for filling containers, comprising in combination a feed hopper, a plurality of circumferentially spaced feeding heads mounted upon said hopper so as to form a rotary filling unit, each said feeding head including a cylinder and a piston therein and having a valve and inlet and discharge ports controlled thereby, means for automatically actuating said control valves for filling empty containers during rotation of the filling unit, said valve actuating means comprising a stationary cam of circular form, means for mounting said cam around the hopper and a plurality of cam followers each of which is operatively connected with one of said control valves and is adapted to engage said circular cam, and means for reciprocating said pistons including a fixed annular trackway whereof the axis is inclined to the axis of the rotary filling unit, and a ring member floatingly connected to the filling unit and rotatable in said trackway to which ring the pistons are jointedly connected in spaced relation.

4. Apparatus for filling containers, comprising in combination a feed hopper, a plurality of circumferentially spaced feeding heads mounted upon said hopper to form a rotary filling unit, each feeding head including a cylinder and a reciprocatory piston therein, and means for automatically actuating each piston during rotation of the filling unit, said piston actuating means comprising swash plate mechanism including a fixed annular trackway whereof the axis is inclined to the axis of the rotary filling unit, and a ring member floatingly connected to the filling unit and rotatable in said trackway to which ring the pistons are jointedly connected in spaced relation.

5. Apparatus according to claim 4 wherein means are provided for varying the inclination of said trackway.

6. Apparatus according to claim 4 wherein said annular trackway is pivotally mounted at one side upon a supporting frame and connected at or adjacent to its opposite side to screw and nut mechanism carried by one or more upstanding screwed posts, and constituting means for varying the inclination of the trackway.

7. Apparatus according to claim 4 wherein means are provided for varying the inclination of

said trackway, each said piston being provided with an upstanding connecting rod fitted with a lateral extension accommodated in said inclined trackway, said pistons having rods pivotally connected to their lateral extensions which pass through circumferentially spaced bosses in the rotatably mounted ring.

8. Apparatus according to claim 4 wherein means are provided for varying the inclination of said trackway, each said piston being provided with an upstanding connecting rod fitted with a lateral extension accommodated in said inclined trackway, said piston rods being pivotally connected to their lateral extensions which pass through circumferentially spaced bosses in said rotatably mounted ring, and wherein the floating ring member is mounted on the hopper with capacity to rise and fall as it rotates therewith.

9. Apparatus according to claim 1 comprising valve control mechanism for automatically preventing opening of any discharge ports without interrupting rotation of said filling unit should any interruption occur in the feeding of empty containers to the feeding heads, said valve control mechanism including a circular cam extending around the rotary filling unit and a plurality of bell crank levers one for each feeding head each bell crank lever having a pair of arms carried by a common pivot at its feeding head, one of said arms being provided with a cam follower adapted to engage operatively said cam while the other arm is operatively connected to said control valve, means normally rigidly connecting the arms of each of said pairs, and means responsive to the absence of a can in filling position for automatically tripping said connecting means so as to permit the lever arms to swing towards each other about said common pivot whereby relative movement may occur between the lever arms of each pair without opening the associated control valve.

10. Apparatus according to claim 1 comprising valve control mechanism for automatically preventing opening of any discharge ports without interrupting rotation of said filling unit should any interruption occur in the feeding of empty containers to the feeding heads, said valve control mechanism including a circular cam extending around the rotary filling unit and a plurality of bell crank levers one for each feeding head each bell crank lever having a pair of arms carried by a common pivot at its feeding head, one of said arms being provided with a cam follower adapted to engage operatively said cam while the other arm is operatively connected to said control valve, means normally rigidly connecting the arms of each of said pairs, and means responsive to the absence of a can in filling position for automatically tripping said connecting means so as to permit the lever arms to swing towards each other about said common pivot whereby relative movement may occur between the lever arms of each pair without opening the associated control valve, and wherein said second-mentioned lever arm is operatively connected to its associated control valve by rack and pinion mechanism.

11. Apparatus according to claim 1 comprising valve control mechanism for automatically preventing opening of any discharge ports without interrupting rotation of said filling unit should any interruption occur in the feeding of empty containers to the feeding heads, said valve control mechanism including a circular cam extending around the rotary filling unit and a plurality of bell crank levers one for each feeding head each bell crank lever having a pair of arms carried by a common pivot at its feeding head, one of said arms being provided with a cam follower adapted to engage operatively said cam while the other arm is operatively connected to said control valve, means normally rigidly connecting the arms of each of said pairs, and means responsive to the absence of a can in filling position for automatically tripping said connecting means so as to permit the lever arms to swing towards each other about said common pivot whereby relative movement may occur between the lever arms of each pair without opening the associated control valve, and wherein one of the arms of each pair is provided with a spring influenced latch member adapted to engage a stop on the other arm, and wherein said tripping means comprises a spring influenced trip member normally located in the path of the latch member and operatively connected to an outstanding arm adapted to be engaged by each empty can after it is delivered to its filling position, whereby the outstanding arm is swung sidewardly and displaces the trip member out of the path of the latch member.

12. Apparatus according to claim 1 comprising valve control mechanism for automatically preventing opening of any discharge ports without interrupting rotation of said filling unit should any interruption occur in the feeding of empty containers to the feeding heads, said valve control mechanism including a circular cam extending around the rotary filling unit and a plurality of bell crank levers one for each feeding head each bell crank lever having a pair of arms carried by a common pivot at its feeding head, one of said arms being provided with a cam follower adapted to engage operatively said cam while the other arm is operatively connected to said control valve, means normally rigidly connecting the arms of each of said pairs, and means responsive to the absence of a can in filling position for automatically tripping said connecting means so as to permit the lever arms to swing towards each other about said common pivot whereby relative movement may occur between the lever arms of each pair without opening the associated control valve, and wherein means are provided for positively urging said bell crank lever into operative engagement with said circular cam, said last-mentioned means comprising a return cam carried by said circular cam, and a roller or the like carried by said bell crank lever and adapted to engage said return cam.

13. Apparatus according to claim 1 comprising valve control mechanism for automatically preventing opening of any discharge ports without interrupting rotation of said filling unit should any interruption occur in the feeding of empty containers to the feeding heads, said valve control mechanism including a circular cam extending around the rotary filling unit and a plurality of bell crank levers one for each feeding head each bell crank lever having a pair of arms carried by a common pivot at its feeding head, one of said arms being provided with a cam follower adapted to engage operatively said cam while the other arm is operatively connected to said control valve, means normally rigidly connecting the arms of each of said pairs, and means responsive to the absence of a can in filling position for automatically tripping said connecting means so as to permit the lever arms to swing towards each other about said common pivot

whereby relative movement may occur between the lever arms of each pair without opening the associated control valve, and wherein means are provided for positively urging said bell crank lever into operative engagement with said circular cam, said last mentioned means comprising a return cam carried by said circular cam, and a roller or the like carried by said bell crank lever and adapted to engage said return cam, and further comprising a clutch controlled driving shaft, means for automatically closing the individual discharge ports of those heads which are occupying positions for filling containers when said driving shaft is declutched for stopping the machine, said means for automatically closing the discharge ports comprising an adjustable ramp and pin and inclined slot connections between said ramp and said circular cam, and means for effecting longitudinal movement of said ramp so as to raise or lower said ramp into or out of the path traversed by said valve control mechanism.

14. Apparatus according to claim 3, in combination with means common to all of the valves for regulating the movement of each of them and thus varying the effective area of the discharge port of each filling head in accordance with the viscosity of the material being fed to the containers.

15. Apparatus according to claim 3, in combination with means common to all of the valves for regulating the movement of each of them and thus varying the effective area of the discharge port of each filling head in accordance with the viscosity of the material being fed to the containers, said valve control means comprising an adjustable cam section mounted upon said circular cam, and means for effecting transverse adjustment of said cam section relative to the circular cam so that said cam followers also engage said cam section.

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