

Jan. 5, 1943.

C. E. GOLLMER

2,307,214

ADJUSTABLE CAM

Filed May 13, 1940

2 Sheets-Sheet 1

FIG. 1

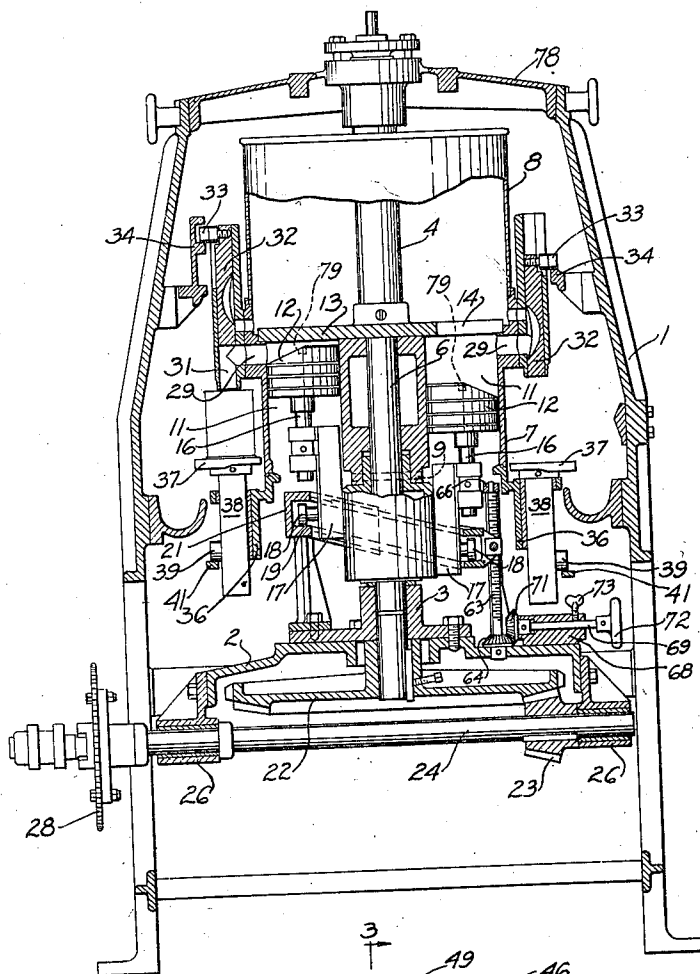
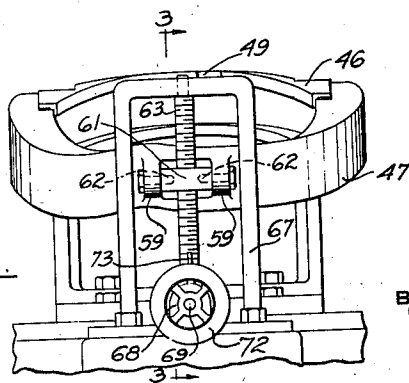


FIG. 2



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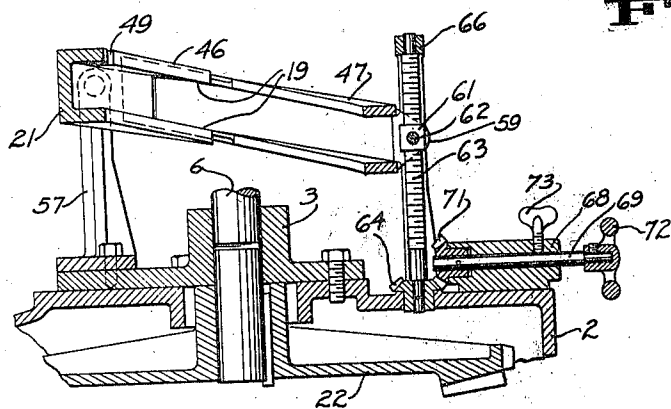


FIG. 3.

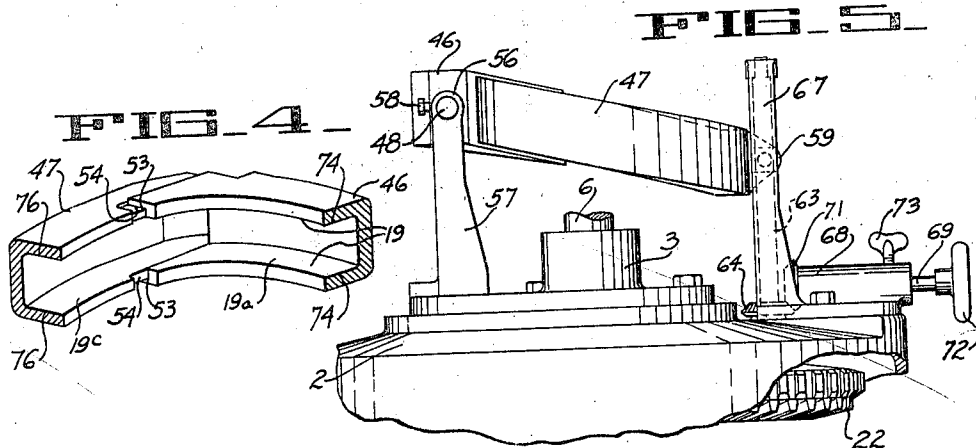


FIG. 5.

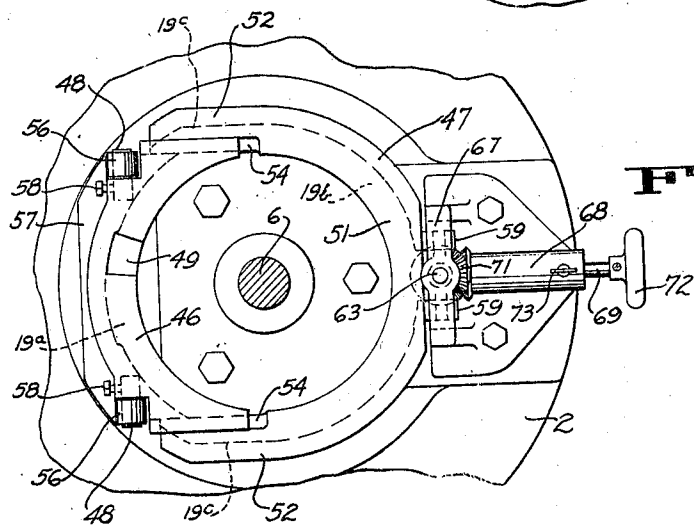


FIG. 6.

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ADJUSTABLE CAM

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9 Claims. (Cl. 74-568)

The present invention relates to improvements in filling machines for filling cans or containers with liquids or semi-liquids such as fruit or vegetable juices, soups, oils or the like.

The primary object of the invention is to provide an improved mechanism for filling machines for adjusting the amount of fill thereof.

Another object of the invention is to provide an improved cam structure for filling machines which is quickly and accurately adjustable for varying the amount of fill of the machine without causing any appreciable loss of time in the operation thereof.

Another object of the invention to provide an adjustable cam structure for filling machines which may be adjusted during the operation of the machine for varying the amount of fill thereof.

Other and further objects and advantages of the present invention will become apparent from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a vertical section of the machine of the present invention.

Fig. 2 is a front view of the adjustable cam structure and certain parts of the filling machine associated therewith.

Fig. 3 is a sectional view of Fig. 2 taken along lines 3-3 thereof.

Fig. 4 is a perspective view of a portion of the adjustable cam structure.

Fig. 5 is a side elevation of a portion of the machine shown in Fig. 1, illustrating primarily the construction of the adjustable cam thereof.

Fig. 6 is a top view of Fig. 5.

Referring now to Fig. 1 of the drawings, 1 indicates the frame structure of the filling machine within which a stationary gear casing 2 is mounted. Rotatably arranged within a bearing 3, secured to the gear casing 2, and a stationary bearing sleeve 4, fixed to the upper portion of the frame structure 1, is a vertical shaft 6 which carries a cylinder housing 7 provided with a tank or reservoir 8 and keyed to the shaft as shown at 9 for rotation therewith.

The cylinder housing 7 comprises a plurality of pump cylinders 11 within which pistons 12 are arranged. Interposed between the tank 8 and the cylinder housing 7 and fixed to the stationary bearing sleeve 4 is a stationary cut-off plate 13 snugly overlying the tank bottom formed by the cylinder housing 7.

The cut-off plate 13 is cut away over a portion of the path of travel of the pump cylinders 11, as shown at 14, so that the upper ends of the cyl-

inders are uncovered as they pass beneath the apertured portion of the cut-off plate to permit flow of the liquid from the tank into the pump cylinders.

The pistons 4 are provided with piston rods 16 which are secured to slides 17 carrying rollers 18 adapted to travel along the cam track 19 of a cam 21 during rotation of the shaft 6, cylinder housing 7 and tank 8, thereby causing reciprocation of the pistons 12.

Keyed to the lower end of the shaft 6 is a bevel gear 22 cooperating with a bevel gear 23 fixed upon a drive shaft 24 mounted within bearings 25 carried by the gear casing 2 of the machine. One end of the drive shaft 24 extends from the frame structure 1 and is provided with a sprocket wheel 28 adapted to be driven from a source of power by means of a sprocket chain not shown.

Each pump cylinder 11 is provided with a discharge passage 29 communicating with the interior of a nozzle 31 secured to the tank and the cylinder housing of the machine. Mounted within each nozzle is a reciprocating slide valve 32 which is operated by a cam roller 33 which travels along a cam track 34 supported on the frame structure 1 of the machine.

Fixed to the cylinder housing 7 is a circular table support 36 within which can tables 37 which are in alignment with the nozzles 31 are slidably mounted by means of table guides 38 provided with cam rollers 39 adapted to travel along a cam track 41 supported by the frame structure 1 in any convenient manner, so that upon rotation of the cylinder housing 7 the table guides 38 are reciprocated to raise and lower the tables 37.

The cam 21 previously referred to, see Figs. 2 to 6, consists of cooperating cam sections 46 and 47. The cam section 46 is of semi-circular configuration and is provided with stud shafts 48 and an opening 49, which is in communication with the portion 19a of the cam track 19 of the cam. The cam section 47 consists of a semi-circular portion 51, having a semi-circular cam track 19b, and parallel straight cam portions 52 provided with straight cam track portions 19c forming the continuation of the cam track 19b, see Fig. 4.

The free ends of the cam section 46 are provided with guide ways 53 and the straight portions of the cam section 47 comprise slide portions 54 which are received within the guide ways 53 so that both cam sections are slidably joined to form a continuous substantially circular cam track 19.

The cam section 46 is pivotally mounted with-

in bearings 56 of a U-shaped bracket 57, by means of the pivot studs 48 above referred to, which are removably secured to the cam section 46 by set screws 58, so as to permit the assembly of the parts as shown in Fig. 6. The bracket 57 is secured to the bearing 3 of the machine, as will be best seen from Figs. 1 and 3.

The cam section 47, see Fig. 2, comprises a pair of lugs 59 between which a block 61 is movably mounted by means of pivot studs 62 screwed to the lugs 59 and extending into openings of the block 61. The block 61 comprises a threaded opening within which an adjusting screw 63 is received. The lower end of the adjusting screw 63 is keyed to a bevel gear 64, the hub portion of which is rotatably mounted within the gear casing 2 above referred to. The upper end of the adjusting screw 63 is freely rotatable within a bearing 66 of a supporting bracket structure 67 provided with a bearing 68. Rotatably mounted within the bearing 68 is a shaft 69 to which a bevel gear 71 is fixed, see Fig. 3, which intermeshes with the bevel gear 64. The shaft 69 is provided with a hand wheel 72, and a lock screw 73 is employed to lock the shaft 69 against rotation.

When the lock screw 73 is unlocked and the hand wheel 72 is rotated in one or the other direction, a corresponding rotation of the adjusting screw 63 is effected and the block 61 is raised or lowered, causing raising or lowering of the cam 21 around bearing 56 of the bracket 57. During the adjustment of the cam 21 as above described, the cam sections 46 and 47 telescope so that the cam may be freely adjusted to any desired position within the range of adjustment provided by the adjusting screw 63.

Due to the fact that the cam portions 52 are parallel with respect to each other and the cam track section 46 is slidably arranged between the same, the cam track surfaces 74 of the cam section 46 remain in alignment with the cam track surfaces 76 of the cam section 47 during expansion or contraction of the cam, and an interruption between the cam surfaces 74 and 76 is therefore eliminated. In this way, a continuous cam track 19 with uninterrupted cam surfaces is provided irrespective of the adjustment of the cam sections 46 and 47.

When the cam is in the position as shown in Fig. 1 and the drive shaft 24 is rotated, gears 23 and 22 effect rotation of the vertical shaft 6, tank 8, cylinder housing 7, the can tables 37 and nozzles 31. The pistons 11 revolve with the cylinder housing 7 around shaft 6, and the cam rollers 13 travel along the continuous cam track 19 of the adjustable cam 21, so that the pistons are thereby reciprocated. As each cylinder passes beneath the apertured portion 14 of the cut-off plate 13, the associated valve 32 is in lowered position to close the discharge passage 29 and the piston 12 is lowered at this time to draw a charge of the liquid within the tank 8 into the cylinder. At this time the can table 37 is likewise in lowered position, as will be clearly seen from Fig. 1. As the tank and cylinder housing continues to revolve, the cylinder passes under the cut-off plate 13, after which the table 37 with a can positioned thereon, is raised and the valve 32 is lifted to uncover the discharge passage 29. The piston 12 is thereupon elevated to discharge the liquid from the pump cylinder through the nozzle 31 and into the can positioned therebeneath. The filled can is thereupon discharged from the machine and re-

placed with an empty one by means of a can feeding and discharge mechanism not shown, and the cycle of operation described above is repeated, it being understood that the same cycle of operation, as described, takes place in connection with each of the pump and nozzle units in succession.

The measured amount of liquid discharged into the containers during the operation of the machine depends upon the stroke of each piston 11 during the cycle of operation of the same. Therefore, to vary the amount of fill of the machine, the stroke of the pistons must be changed, which is accomplished by rotating the hand wheel 72, after unlocking of the lock screw 73, in one or the other direction so as to cause a corresponding rotation of the adjusting screw 63 and upward or downward movement of the block 61. The above described movement of block 61 effects a pivotal movement of the cam 21 around the bearings 56, and the end of the cam adjacent the lugs 59 is raised or lowered to thereby position the cam 21 in a certain predetermined relation with respect to the cylinder housing 7 and to adjust the stroke of the pistons 11, so that a desired amount of fill will be obtained as necessary for a certain size of cans to be handled by the machine. This adjustment may be performed, if desired, while the machine is operating, so that the operator may observe the amount of fill obtained by the same, or may be performed while the machine is at rest. In either case, an accurate adjustment of the measured quantity of liquid dispensed by the machine will be obtained, whereupon the shaft 69 is locked in adjusted position by tightening the lock screw 73.

In this way, the cam 21 may be properly and very accurately adjusted for any amount of fill desired, depending upon the can size and the head space desired in each can.

It should be further observed that due to the pivotal mounting of the cam section 46 the uppermost position of the piston 11 is maintained substantially the same irrespective of the position of the cam 21, so that a proper discharge of the liquid from the cylinders is obtained and the pistons 12 do not contact the cut-off plate 13.

Due to the pivotal mounting of the cam 21 and the travel of the block 61 in a straight path during adjustment of the cam, the sliding connection of the cam sections 46 and 47 is necessary so that the cam structure may be contracted or expanded to permit adjustment of the same. The adjustment of the cam sections with respect to each other is very slight, and the cam track 19 remains substantially circular, so that the rollers 18 remain in proper engagement with the same.

The upper frame structure designated 78 is removably secured to the frame structure 1, and during the assembly of the machine the rollers 18 are introduced into the cam track 19 through the opening 49 in the cam section 46 before the sleeve bearing 4 and cut-off plate 13 are installed. To facilitate the assembly the pistons 12 may be preferably provided with threaded openings 79 into which handles, not shown, may be screwed, so that the pistons 11, piston rods 16 and slides 17 may be raised or lowered to enter the rollers 18 through opening 49 into the cam track 19. These handles are removed before the cut-off plate 13, sleeve 4 and frame portion 78 are installed.

I desire it to be understood that the invention is not limited to the particular application or precise details of construction illustrated herein, as the same may be used in connection with other types of filling machines, and various applications, modifications and variations may be resorted to without departing from the spirit or scope of the invention, and I deem myself entitled to all such applications, modifications and variations as come within the scope of the claims appended hereto.

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

1. An adjustable cam comprising a pair of generally semi-circular cam sections, means pivotally mounting one of said sections, and means associated with the other section for adjusting and guiding it along a path extending transversely to and non-concentric with the pivotal axis of said pivoted section, said cam sections having their ends telescopically joined to cause the cam to move as a whole and to permit it to contract and expand during said adjustment.
2. An adjustable cam comprising a pair of cam sections, means pivotally mounting one of said sections, and means associated with the other section for adjusting and guiding it along a path extending transversely to and non-concentric with the pivotal axis of said pivoted section, said cam sections having their ends telescopically joined to cause the cam to move as a whole and to permit it to contract and expand during said adjustment.
3. An adjustable cam comprising a pair of cam sections, means for pivotally mounting one of said sections, and a rotatable screw operatively associated with the other of said sections for guidingly adjusting the cam about said pivotal mounting, said screw extending in a direction transversely to the pivotal axis of the pivoted section, said cam sections being adjustably interfitted to cause movement of the cam as a whole and to permit expansion and contraction of the cam during adjustment thereof by said screw.
4. An adjustable cam comprising a pair of generally semi-circular cam sections, means for pivotally mounting one of said sections, and means including a rotatable screw operatively associated with the other of said sections for guidingly adjusting the cam about said pivotal mounting, said screw extending in a direction transversely to the pivotal axis of the pivoted section, said cam sections being telescopically joined to cause movement of the cam as a whole and to permit expansion and contraction of the cam during adjustment thereof by said screw.
5. An adjustable cam comprising a pair of generally semi-circular cam sections, means for pivotally mounting one of said sections, and means including a screw operatively associated with the other of said sections for guidingly adjusting the cam about said pivotal mounting, and a hand wheel for operating said screw, said screw extending in a direction transversely to the pivotal axis of the pivoted section, said cam sections being telescopically joined to cause movement of the cam as a whole and to permit expansion and contraction of the cam during adjustment thereof by said screw.
6. An adjustable cam structure comprising a pair of complementary generally semi-circular cam sections, a pivotal mounting for each of said cam sections to support them for pivotal movement about parallel axes, and means for adjusting one of said pivotal mountings in a direction transversely to and non-concentric with the axis of the other pivotal mounting, said cam sections having their ends slidably joined together to cause the cam to move as a whole and to permit it to contract and expand during adjustment.
7. An adjustable cam comprising rigidly coupled cam sections, opposed means pivotally supporting said sections, and means moving one of said opposed means in a rectilinear path for adjusting the cam, said cam sections being telescopically joined to permit expansion and contraction of said cam during adjustment thereof to compensate for variations in distance between said opposed means.
8. An adjustable substantially circular cam comprising rigidly coupled cam sections, diametrically opposed means for pivotally supporting said sections, and means moving one of said diametrically opposed means in a rectilinear path for adjusting the position of said cam, said cam sections being telescopically joined to permit expansion and contraction of said cam during adjustment thereof to compensate for variations in distance between said diametrically opposed means.
9. An adjustable cam comprising a pair of generally semi-circular cam sections, means pivotally mounting one of said sections, and means guidingly associated with the other section to direct it over a path extending transversely to and non-concentric with the pivotal axis of said pivoted section, said cam sections having their ends telescopically joined to cause the cam to move as a whole and to permit it to contract and expand upon adjustment of the cam with reference to said pivotal axis.

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