Dec. 28, 1937. B. E. JOHNSON 2,103,817

APPARATUS FOR FILLING CONTAINERS

Filed March 18, 1936 2 Sheets-Sheet 1

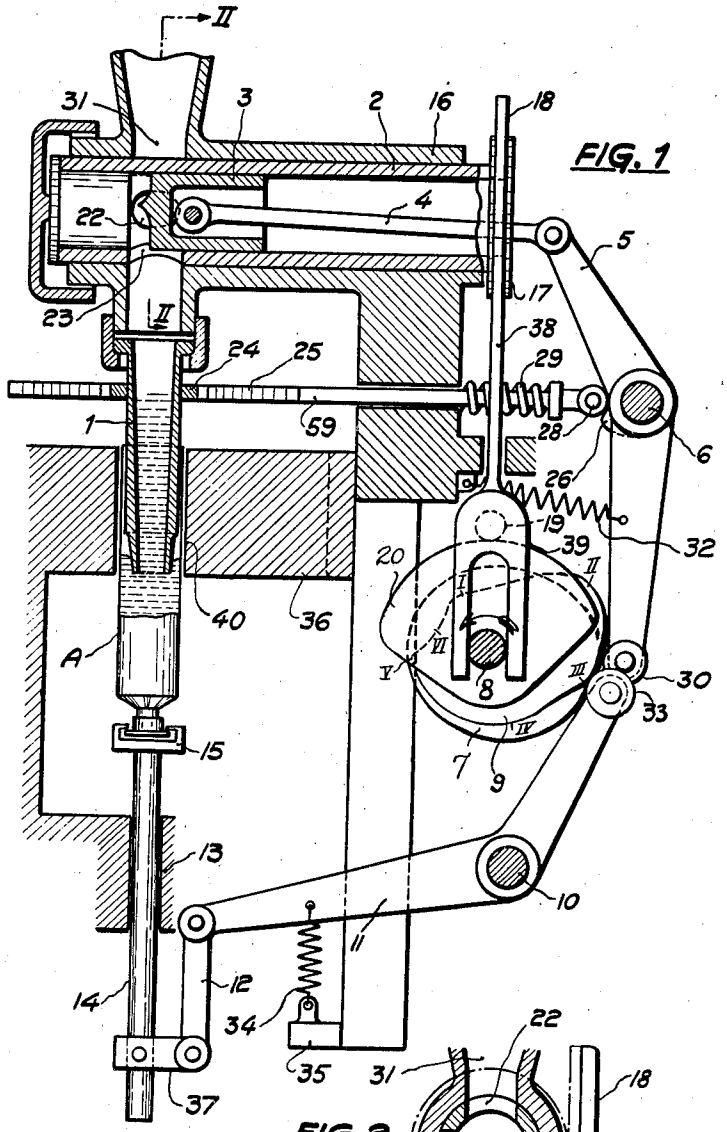


FIG. 1

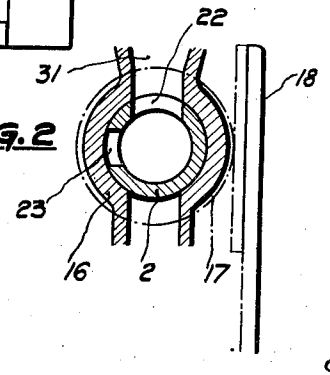
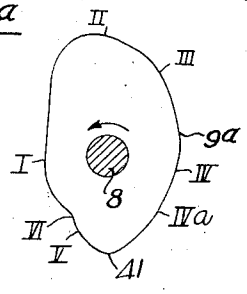


FIG. 2

FIG. 1a



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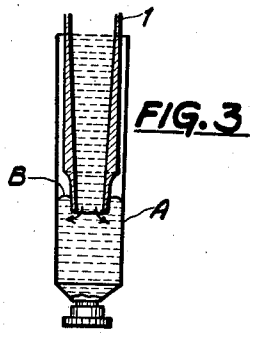


FIG. 3

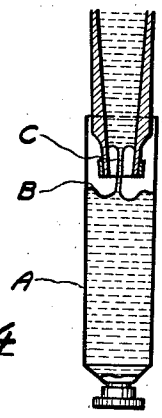


FIG. 4

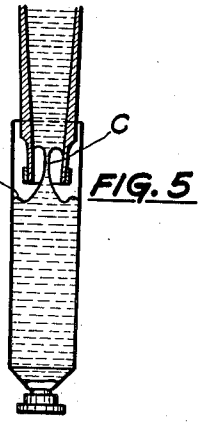


FIG. 5

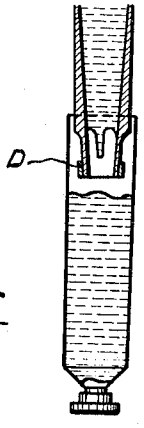


FIG. 6

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APPARATUS FOR FILLING CONTAINERS

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Application March 18, 1936, Serial No. 69,575
In Sweden March 4, 1935

8 Claims. (Cl. 226—125)

This invention relates to an apparatus for filling containers, particularly for filling tubes such as collapsible tubes, with more or less viscous material, for instance paste.

When filling containers, for instance tubes, with a viscous material such as paste the tubes are usually telescoped onto a spout and then during the supply of paste retracted from the spout, and when finishing the paste supply there will arise a string of material between the material supplied to the tube and the material remaining in the spout.

A main object of this invention is to ensure a correct breaking of said string so as to avoid adherence of said string to the walls of the container when the latter is at rest or is removed laterally from the filling station.

Another object of this invention is to correctly tear off said string when filling collapsible tubes so as to avoid adherence of part of said string to the wall of the tube above the level of material supplied thereto and is squeezing out of the tube end when the latter is sealed on collapsing its end.

Still another object of this invention is to prevent said string of material from adhering to the outside of containers to be filled that are moved laterally into position at the filling station.

A further object of this invention is to provide means for evenly distributing material when finishing the supply of said material substantially with the view of avoiding squeezing of the material out of collapsible tubes thus filled and thereafter sealed on collapsing their ends.

With these and other objects in view the invention comprehends the construction as hereinafter described and illustrated by way of example in the drawings.

In the drawings:—

Fig. 1 is an elevational view of the apparatus, partly in section;

Fig. 1a shows a modified shape of a cam of the apparatus of Fig. 1.

Fig. 2 is a section on the line II—II of Fig. 1, and

Figs. 3 to 6 show various steps when filling a tube.

A spout 1 is turnably connected to a pump housing 16 in which is rotatably journalled a sleeve 2. A piston 3 is pivoted to a connecting rod 4 and reciprocated in the sleeve 2. The connecting rod 4 is also pivoted to a double-armed lever 5 which is secured to a rotatably journalled shaft 6. The free end of the lever 5 carries a roller 30 and a spring 32 actuating the lever 5 presses the roller 30 against a cam disc 7 secured to a rotary driving shaft 8. On another cam disc 9 secured to the shaft 8 rides a roller 33 which is mounted on the free end of a double-armed lever 11 which is pivotally journalled on a shaft 10 and actuated by a spring 34 one end of which is secured to a fixed part 35 of the frame 36 of the apparatus. The other end of the lever 11 is pivotally connected to a link 12 which is in turn pivoted to a clamp 37 adjustably connected to the rod 14. The rod 14 is movable up and down in a guide 13 in the frame and its upper end is formed with a carrier member 15 for the tube A.

The sleeve 2 is formed with a toothed flange 17 which meshes with a toothed rack 18 which constitutes the end of a rod 38. The lower, forked end 39 of the rod 38 carries a roller 19 which rides on a cam disc 20 secured to the shaft 8 and the forked end of the rod is guided on shaft 8. The sleeve 2 has an inlet opening 22 and an outlet opening 23 for material.

The lower end of the spout 1 is contracted exteriorly as well as interiorly and is formed with a gear wheel 24 which meshes with a toothed rack 25 which forms an end of a rod 59. The other end of the rod 59 carries a roller 28 which, by means of a contractile spring 29, is pressed against a cam 26 secured to the shaft 6. The rod 59 is axially movable in the frame 36. The spout 1 projects into a bore 40 which serves to guide the tube A when the latter is sleeved onto and drawn off the spout 1.

The cams 7, 9, 20 and 26 are shaped and secured to th eshafts 6 and 8 so as to impart to the piston 3, the carrier 15, the sleeve 2 and the spout 1 timed movements in a manner hereinafter described.

The tube A is moved laterally in a direction parallel to the shaft 8 by a conveyor into an initial position below the spout 1 and is sleeved onto said spout by upward movement of the carrier 15 when the roller 33 rides on the portion I—II of the cam 9. Thereafter, the piston 3 moves to the left and forces a quantity of material, for instance, paste, out of the opening 23 and the spout 1. At the same time, the carrier 15 is allowed by the portion II—III of the cam 9 to descend, drawing the tube A downwards, whilst paste is continuousuly pressed down into the tube so that part of the paste is slightly pressed upwards between the spout end and the tube, as shown in Fig. 3, forming a ring B of paste between the end of the spout and the mantle of the tube. When the tube A on its downward movement is at a predetermined position defined by the roller 33 resting on the portion III of the cam

9 the piston 3 will have attained its end position shown in Fig. 1, i. e. supply of paste to the tube is finished. However, the outlet 23 is still open. Now when the roller 32 rides on the portion III—IV of the cam 9 the tube A is moved further downwards into a predetermined position of rest or dwell, and the piston commences a sucking movement to the right when the roller 33 is at IV on the cam 9 so that some paste is drawn upwards within the spout 1. The tough paste in the spout will, however, adhere to the paste supplied to the tube A and a paste string C will be formed (Fig. 4) when the roller 33 rides on the first part of the concentric portion IV—V of the cam 9. Then the rack 18 will swing the sleeve 2 so that the outlet opening 23 is shut and the inlet opening 22 will register with a supply channel 31 for paste whilst the piston continues its retracting movement to the right, sucking a portion of paste into the sleeve 2.

When the roller 33 rides on the portion IV—V of the cam 9 the tube A occupies the position of rest or dwell above mentioned and the paste string will sink down by its own gravity so that its thinnest cross section moves upwards into the mouth of the spout (Fig. 5) and at the same time the paste string will change its interior structure whereby its elasticity is decreased. Since the end of the spout 1 is contracted interiorly having a width materially smaller than the tube A the said displacement of the smallest cross section of the paste string will be accelerated. At the end of or after having finished the relatively short period of rest or dwell above mentioned the rod 39 is moved axially to turn the gear wheel 24 so that the spout 1 is rotated and thereby the paste string C will be distorted. As the paste string is weakened by this distortion it will be broken off (Fig. 6) when the tube on accelerated movement is lowered into its bottom position. This occurs when the roller 33 rides from V to VI on the cam 9. Thereafter the tube is moved laterally to a sealing device.

By suitably shaping the cam disc 9 it is obviously possible to impart to the tube A a short upward, i. e. reciprocating movement, instead of maintaining it at rest for the short period above mentioned. Such shape of the disc 9*a* is shown in Fig. 1*a* as distinguished from the shape of the cam disk 9, Fig. 1, when adapted for a short period of rest. Then the roller 33 rides from IV*a* to V on a hump 41 on the cam 9*a*.

By thus timing the movements of the different operating members and adapting the shape of the spout 1 the paste string C will be torn off within the spout (Fig. 6). The lower part of the torn off paste string will fall down and fill the cavity within the paste ring B (Figs. 5 and 6) so that a smooth surface of paste will be obtained in the filled tube. Therefore, at subsequent sealing of the tube the paste will satisfactorily fill up the tube without being squeezed out of the sealing folds. Moreover, there will not arise any long paste string projecting out of the spout 1 and tending to adhere to the tube when the latter is moved laterally into or out of its position below the spout. Nor will paste stick to the upper part of the inner wall of the tube mantle during the filling operation and then be squeezed out. A small ring D of paste will, of course, adhere to the mouth of the spout 1 where the latter is in contact with the paste ring B, but this does not involve any inconvenience as the spout end is contracted exteriorly and as the tube A is guided laterally in the bore 40 so that the paste ring D will never touch the tube.

I claim:—

1. In a machine for filling containers, the combination with a filling spout and a carrier for the container, of means for relatively moving said carrier and said spout to position said container around said spout, means providing relative withdrawing movement between said container and spout, means for supplying material through said spout to the container during said withdrawing movement, means for interrupting the supply of material, means for retarding said withdrawing movement at a predetermined moment after interrupting said supply, and means for thereafter accelerating said withdrawing movement.

2. In a machine for filling containers, the combination with a filling spout and a carrier for the container, of means for relatively moving said carrier and said spout to position said container around said spout, means providing relative withdrawing movement between said container and spout, means for supplying material through said spout to the container during said withdrawal movement, means for interrupting the supply of material, means for stopping said receding movement at a predetermined moment after interrupting said supply, and means for thereafter again starting said withdrawing movement.

3. In a machine for filling containers, the combination with a filling spout and a carrier for the container, of means for relatively moving said carrier and said spout to position said container around said spout, means providing relative withdrawing movement between said container and spout, means for supplying material through said spout to the container during said withdrawing movement, means for interrupting the supply of material, means for stopping and momentarily reversing said withdrawing movement at a predetermined moment after interrupting said supply, and means for thereafter starting again said withdrawing movement.

4. In a machine for filling containers, the combination with a filling spout and a carrier for the container, of means for relatively moving said carrier and said spout to position said container around said spout, means providing relative withdrawing movement between said container and spout, means for supplying material through said spout to the container during said withdrawing movement, means for interrupting the supply of material, means for retarding said withdrawing movement at a predetermined moment after interrupting said supply, means for thereafter relatively turning said spout and said carrier together with the container, and means for thereafter accelerating said withdrawing movement.

5. In a machine for filling containers, the combination with a filling spout and a carrier for the container, of means for relatively moving said carrier and said spout to position said container around said spout, means providing relative withdrawing movement between said container and spout, means for supplying material through said spout to the container during said withdrawing movement of the spout and carrier together with the container, means for interrupting the supply of material, means for thereafter imparting to said supplying means a sucking movement, means for retarding said withdrawing movement at a predetermined moment after the interrup-

tion of said supply, and means for thereafter accelerating said withdrawing movement.

6. In a machine for filling containers, the combination with a filling spout and a carrier for the container, of means for relatively moving said carrier and said spout to position said container around said spout, means providing relative withdrawing movement between said container and spout, means for supplying material through said spout to the container during said withdrawing movement, means for interrupting the supply of material, means for thereafter imparting to said supplying means a sucking movement, means for retarding said withdrawing movement at a predetermined moment after interrupting said supply, means for thereafter relatively turning said spout and said carrier together with the container, and means for thereafter accelerating said withdrawing movement.

7. In a machine for filling containers, the combination with a filling spout and a carrier for the container, of means for relatively moving said carrier and said spout to position said container around said spout, means providing relative withdrawing movement between said container and spout, means for supplying material through said spout to the container during said withdrawing movement, means for interrupting the supply of material, means for retarding said withdrawing movement at a predetermined moment after interrupting said supply, and means for thereafter accelerating said withdrawing movement, said spout having an exteriorly contracted discharge end.

8. In a machine for filling containers, the combination with a filling spout and a carrier for the container, of means for relatively moving said carrier and said spout to position said container around said spout, means providing relative withdrawing movement between said container and spout, means for supplying material through said spout to the container during said withdrawing movement, means for interrupting the supply of material, means for retarding said withdrawing movement at a predetermined moment after interrupting said supply, and means for thereafter accelerating said withdrawing movement, said spout having an interiorly contracted discharge end.

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