Oct. 3, 1933. N. L. EUDALY ET AL 1,929,275

MACHINE FOR CAPPING FIBROUS CONTAINERS

Filed July 22, 1931

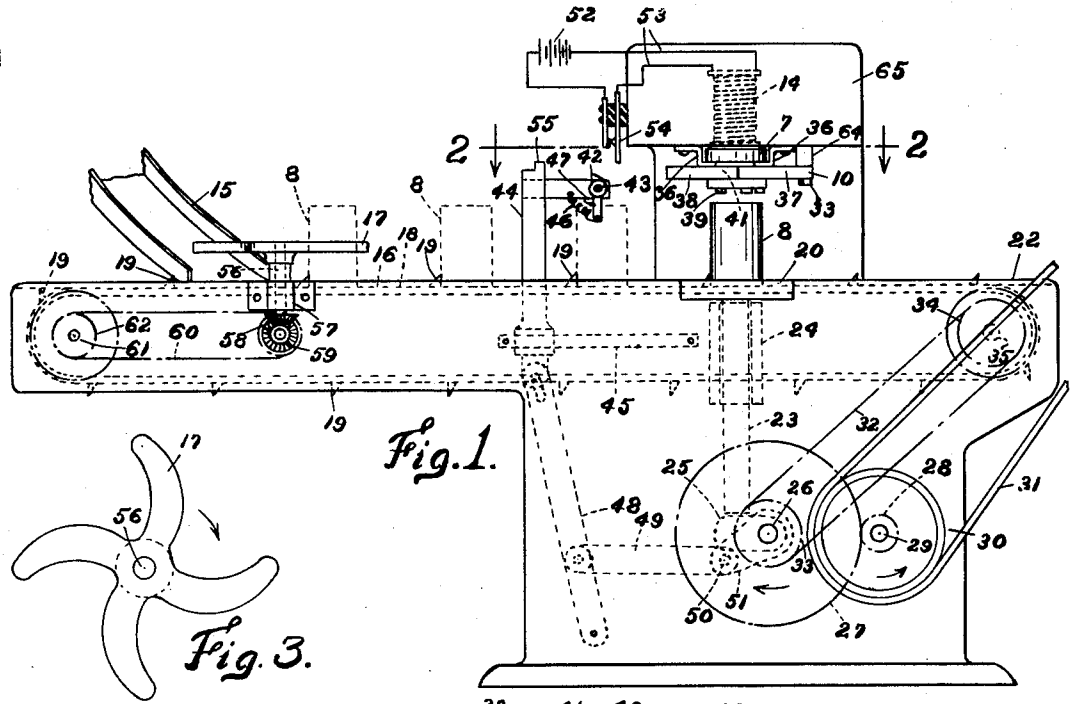

Fig. 1.

Fig. 3.

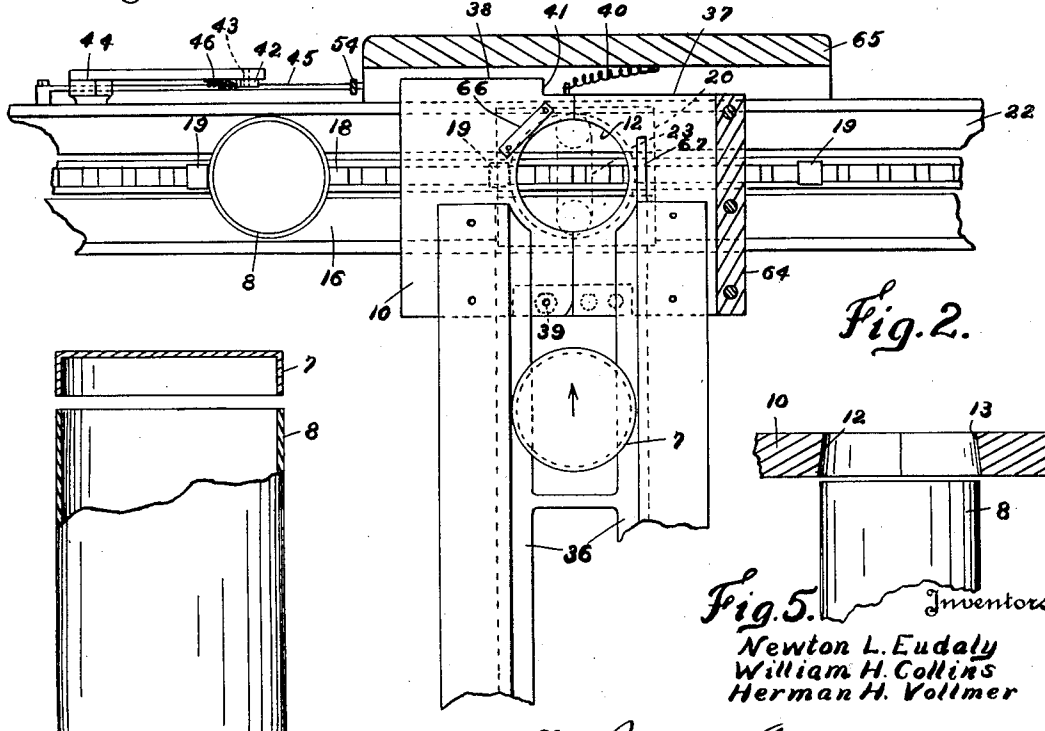

Fig. 2.

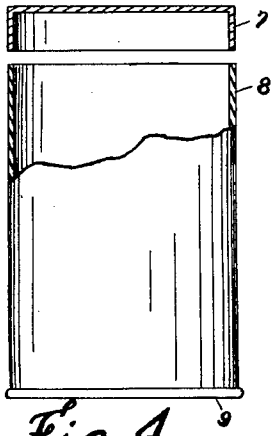

Fig. 4.

Fig. 5.

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Patented Oct. 3, 1933 1,929,275

UNITED STATES PATENT OFFICE

1,929,275

MACHINE FOR CAPPING FIBROUS CONTAINERS

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Application July 22, 1931. Serial No. 552,446

4 Claims. (Cl. 226—80)

This invention relates to a machine for capping or applying lids to fibrous containers such as are commonly used in the packing of powdered or granulated materials.

An object of the invention is to provide magnetic means for holding the caps or lids, whereby to greatly simplify the mechanical movements of the machine and to eliminate expensive and intricate mechanisms heretofore used for the purpose.

Another object is the provision of a contracting die for reducing the size of the fibrous container edge prior to application of the cap or lid, whereby there is secured a tight closure for the container.

A further object of the invention is to provide a machine for the purpose above stated, which is dependable and simple of operation, there being but few parts to become out of order and to require replacement and adjustment.

These and other objects are attained by the means described herein and disclosed in the accompanying drawing, in which:

Fig. 1 is a side elevational view of one type of capping machine embodying the invention.

Fig. 2 is a cross-sectional view taken on line 2—2 of Fig. 1, parts being broken away.

Fig. 3 is a plan view of a conventional spacer and feeder for containers to be subjected to the capping operation.

Fig. 4 is an elevational view of a container and lid, or cap, showing their relative diameters prior to the lid applying operation.

Fig. 5 is a cross-sectional detail view showing diagrammatically the function of the tapered contracting die as applied to the upper edge of the fibrous container which, as shown, is about to be forced through the die opening.

The machine of this invention is adapted to perform the operation of applying lids or caps 7 to containers such as indicated at 8. The cap 7 is of sheet metal, and the cylindrical body of the container preferably is of cardboard or other fibrous material. The bottom of the container is closed by means of a plate 9 of metal or other suitable material. It should be apparent from the disclosure in Fig. 4 that the flange of the lid is cylindrical in shape and of slightly smaller diameter than the exterior upper portion of the container. Application of the lid to the container is effected by means of the die 10, the opening 12 of which has an annular wall tapering upwardly and inwardly to provide an upper constricted portion 13 for contracting or swaging inwardly the top portion of container 8 so that the undersized lid or cap may be applied thereto. In accordance with the invention, the lid or cap is held directly over the die opening by means of a suitable magnet indicated at 14 in Fig. 1. The magnet may be of the permanently magnetized type, or it may be an electro-magnet such as is indicated in the drawing.

In the operation of the machine, filled or partly filled containers 8 of the character above referred to, are conveyed to the machine in any suitable manner, for example, by means of the chute indicated at 15. Upon reaching the machine, the containers are spaced and fed, one by one, onto the track or guide 16 by means of any suitable type of spacer and feeder wheel or the like, a conventional form of which is shown at 17. The track 16 preferably is divided to accommodate the upper run of a conveyor 18 which has upwardly extending projections or abutments 19 thereon for contacting the containers and moving them along the track or guide to a capping position on the capping table 20. The capping table is adapted to be vertically reciprocated for forcing the upper portion of a container through the die and into the lid 7. After application of the lid, the die parts are expanded or moved relatively, to release the container and permit it to remain on the capping table as the table moves downwardly to the normal position indicated in Fig. 1. The projections 19 thereupon again engage the container and move it to the discharge end 22 of the machine.

Vertical reciprocation of the capping table 20 may be accomplished by any suitable known means. As indicated in Fig. 1, the table has fixed to, and depending therefrom, a suitable bifurcated connecting rod 23 operating in a vertical guide 24, the connecting rod being reciprocated by means of a cam 25 fixed to the main shaft 26 of the machine. The main shaft has fixed thereto a gear 27 engaging a pinion 28 on the pulley shaft 29, which shaft may carry a pulley 30 over which passes a power driven belt 31. The conveyor 18 may be driven from the main shaft by means of a chain 32 engaging sprockets 33 and 34 fixed to the main shaft and to the conveyor shaft 35, respectively. It is to be understood that the machine may be supplied with power by means other than that disclosed and that other forms of means may be employed for reciprocation of the capping table.

The lids or caps may be fed either manually or automatically to an operative position covering the opening 12 of the die, in which position they are successively held by means of the magnet 14. As shown in Fig. 2, the lids or caps may be ad-

vanced toward the operative position along the guides 36, which guides may be suitably mounted on the frame of the machine in close proximity with the die.

The die preferably is a bi-part construction, one half 37 thereof being fixed relative to the machine frame. The counterpart 38 of the die preferably has a hinge mounting at 39 so that the opening 12 of the die may be enlarged immediately after the lid applying operation. The movable part 38 of the die may be held in a normally operative or closed position by means of a strong spring or the like 40 having one of its ends attached to the movable die part, with the other end secured to a stationary part of the machine. The die part 38 preferably is provided with an abutment 41 adapted to be engaged by an extending latch or abutment 42 which is pivoted at 43 on a bodily reciprocating arm 44. It should be clear from the disclosure in Fig. 1, that as the arm 44 is moved along the guide 45 the member 42 will pass beneath the die member 38 and assume a position in abutment with the abutment 41 of the die, then upon movement of the arm 44 in the opposite direction, the latch 42 will effect movement of the die part 38 about its pivot 39, for releasing its hold on the container 8. It should be noted that the latch or abutment 42 is limited in a clockwise direction of rotation, by means of an extending pin 47, and that counterclockwise rotation thereof is permitted, in opposition to the resistance of a suitable spring or the like 46.

From the foregoing it should be readily understood that upon each reciprocation of the arm 44 along the guide 45, the latch 42 will grip a part of the movable die and cause it to open or expand for release of the containers. The arm 44 may be reciprocated by any suitable means, for example a pair of pivoted links 48 and 49, one of which has an eccentric mounting at 50. The eccentric mounting may be in the form of a crank 51 or a properly shaped cam.

Although for all practical purposes the electromagnet 14 may be constantly energized by reason of its electrical connection to a source of electricity 52, by means of the conductors 53, it may be desirable in the handling of very light weight containers and contents thereof, to provide means for breaking the electrical circuit to the magnet preceding the releasing movement of the die. In order to provide for such breaking of the electromagnet circuit, there may be provided in the circuit a suitable normally closed electrical switch 54, which may be opened at a predetermined time, by reason of the movement of some regularly moving part of the machine, for example the upper or extending end 55 of the arm 44. It is not desired, however, to limit the invention to the particular means shown for breaking the electrical circuit, for other and equivalent means for the purpose will readily suggest themselves to those skilled in the wiring of electrical switch devices.

The spacer and feeder 14, may be mounted upon one end of a shaft 56 journalled in a bearing 57, the shaft having secured on its opposite end a gear 58 for engagement with a gear 59 that may be driven by a chain or other power transmission means 60 associated with the conveyor shaft 61 on which may be mounted a sprocket 62. The stationary die part 37 may be bolted, as at 63, to a suitable flange 64 extending from the overhanging head or arm 65 of the machine. The members 66 and 67 of Fig. 2, represent stops that properly position the container lids over the opening 12 of the die. The stops may be secured to the die parts, as shown.

It is to be understood that various modifications and changes in the structural details of the device may be made within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed is:

1. In an apparatus for capping filled containers in an upright position, the combination of a horizontal container support, a conveyor for advancing the containers to said table in spaced relationship, and a container contracting die disposed above the container support, the die being of two parts and having an opening gradually constricted as to diameter size and into which opening may be forced a flexible container carried by the support, whereby to decrease the diameter of a portion of the container as it is forced through the die opening, intermittently operative means for relatively moving said support and die, an abutment for container lids disposed in alignment with the die opening and providing a backing for the lids as the lids and containers are joined upon relative movement of the support and die members and projection of the containers through the constricted die opening, means for intermittently increasing the opening of the die for release of the container, said means being constituted of a reciprocating member movable parallel to the conveyor and including a latch member arranged to engage and move one of the die parts, means for returning said movable die part to a normal position in abutment with the other die part, upon release thereof by the latch member, the container support being permitted to gravitate to return the container to the conveyor, during the period of inaction of the intermittently operative means.

2. In an apparatus for capping filled containers in a vertical position, the combination of a horizontal container support and a container contracting die mounted for relative movement, the die having an opening gradually constricted as to diameter size and into which opening may be forced a flexible container carried by the support, whereby to decrease the diameter of a portion of the container, means for relatively moving said support and die, and an intermittently magnetized abutment for container lids disposed in alignment with the die opening and providing a backing for the lids as the lids and containers are joined upon relative movement of the support and die members and projection of the containers through the constricted die opening, means including a reciprocating latch member for increasing the opening of the die for release of the container approximately at each demagnetization of the lid abutment, and a member reciprocable with the latch member for effecting substantial de-magnetization of the magnetized abutment.

3. Apparatus for capping filled containers comprising in combination an endless conveyor, a feed for containers disposed in a vertical position, and means for spacing the containers equal distances apart on the conveyor, a capping table, means for reciprocating the capping table beneath the containers for moving said containers to elevated positions relative to the conveyor, a container contracting die disposed above and in alignment with the capping table, said die having an opening gradually constricted as to diameter size and into which opening may be forced a flexible container supported vertically on the capping

table whereby to decrease the diameter of a portion of the container, the contracting die being constituted of a stationary part and a complementary movable part normally in closed cooperative relationship, means for guiding container lids to a position above the die, electromagnetic means for holding the lids in position above the die, a member arranged for reciprocating movement longitudinally of the conveyor, a latch finger on said member, and a shoulder on the movable die member disposed in the path of movement of the latch finger whereby upon movement of the reciprocating member the movable die part is separated from the stationary die part, and means for returning the movable die part to the normal position in abutment with the stationary die part upon release of the movable part by the latch finger.

4. Apparatus for capping filled containers comprising in combination an endless conveyor, a feed for containers disposed in a vertical position, and means for spacing the containers equal distances apart on the conveyor, a gravitational capping table, means for lifting the capping table beneath the containers for moving said containers to elevated positions relative to the conveyor, a container contracting die disposed above and in alignment with the capping table, said die having an opening gradually constricted as to diameter size and into which opening may be forced a flexible container supported vertically on the capping table whereby to decrease the diameter of a portion of the container, the contracting die being constituted of a stationary part and a complementary movable part normally in closed cooperative relationship, means for guiding container lids to a position above the die, electromagnetic means for holding the lids in position above the die, a member arranged for reciprocating movement longitudinally of the conveyor, a latch finger on said member, and a shoulder on the movable die member disposed in the path of movement of the latch finger whereby upon movement of the reciprocating member the movable die part is separated from the stationary die part, means for returning the movable die part to the normal position in abutment with the stationary die part upon release of the movable part by the latch finger, an electrical switch having an actuating lever disposed in the path of movement of the reciprocating member, an electrical circuit including the switch, the electromagnet, and a source of electricity, the switch being normally closed except when the actuating lever is engaged by the reciprocating member, the lifting means being arranged to permit gravitation of the capping table for returning the capped container to the conveyor while the switch is open.

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