May 21, 1957 E. M. BALDWIN, JR., ET AL 2,792,678

APPARATUS FOR CAPPING VACUUM BOTTLES

Filed Dec. 3, 1953 2 Sheets-Sheet 1

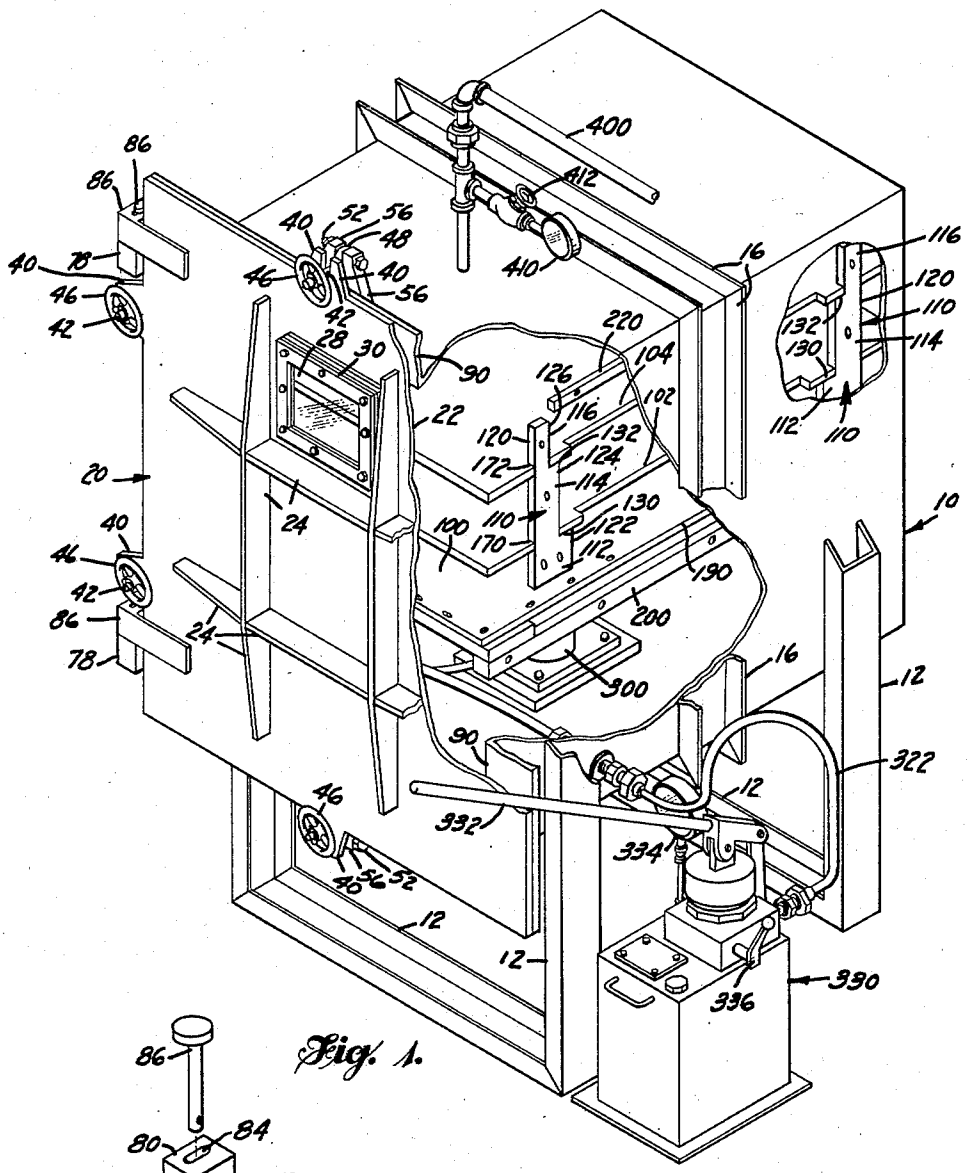


Fig. 1.

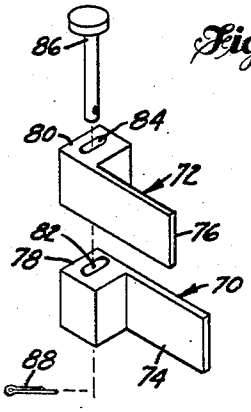


Fig. 2.

INVENTORS.
DR. EARL M. BALDWIN, JR.
& JOHN E. CHRIST

BY

May 21, 1957 E. M. BALDWIN, JR., ET AL 2,792,678

APPARATUS FOR CAPPING VACUUM BOTTLES

Filed Dec. 3, 1953 2 Sheets-Sheet 2

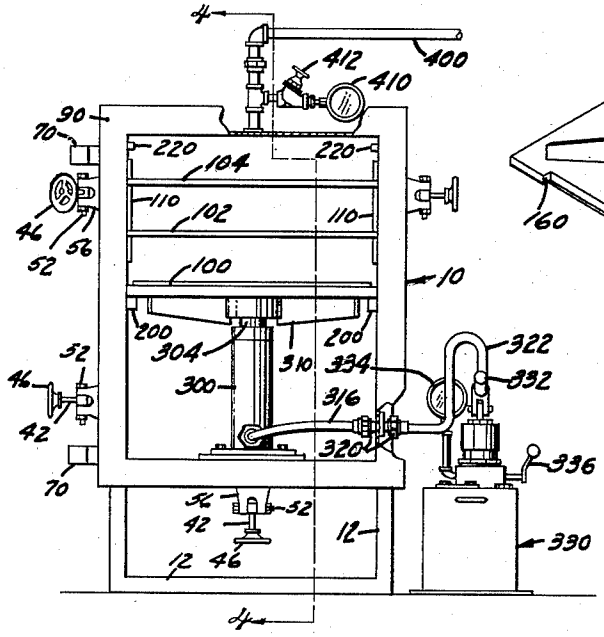


Fig. 3.

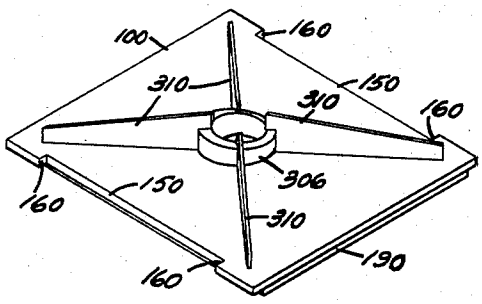


Fig. 5.

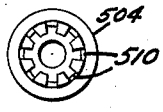


Fig. 6.

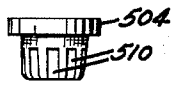


Fig. 7.

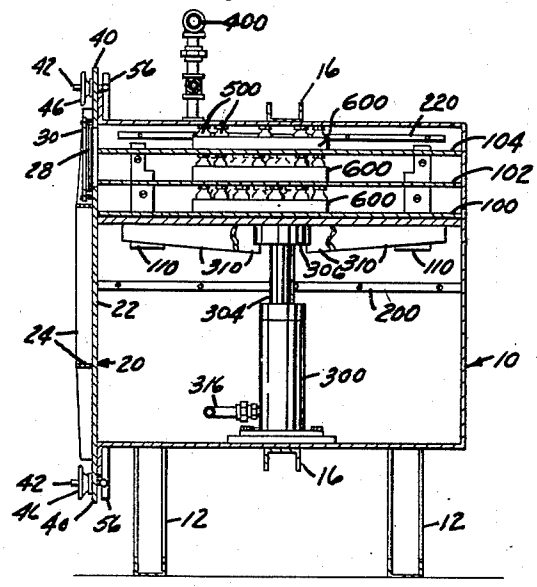


Fig. 4.

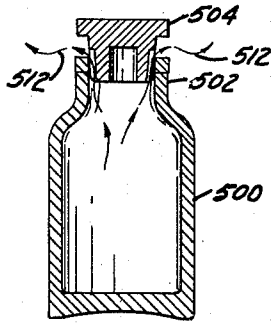


Fig. 8.

INVENTORS.
DR. EARL M. BALDWIN, JR
& JOHN E. CHRIST
BY A. Sturges
Agent

United States Patent Office 2,792,678
Patented May 21, 1957

2,792,678

APPARATUS FOR CAPPING VACUUM BOTTLES

Earl M. Baldwin, Jr., and John E. Christ, Omaha, Nebr.

Application December 3, 1953, Serial No. 395,938

4 Claims. (Cl. 53—101)

This invention relates to the capping of vacuum bottles and more particularly it is an object of this invention to provide an apparatus for capping vacuum bottles more rapidly than heretofore.

More particularly it is an object of this invention to provide means in a vacuum cabinet and controllable from the outside of the vacuum cabinet for pressing the the caps of vacuum bottles into closing positions at times when a vacuum exists in the vacuum cabinet.

More particularly it is an object of this invention to provide a plurality of shelves in a vacuum cabinet, each shelf being for supporting a plurality of vacuum bottles upon which caps are disposed in positions in which the bottles are not sealed, the shelves being disposed one above another and being vertically movable whereby hydraulic or other means can be operated for pressing the lowermost shelf toward the shelf above it and that shelf toward the one above it successively until a point is reached in which the caps on the uppermost bottles engage the upper side of the vacuum chamber whereupon a continued upward pressure causes all vacuum bottle caps to be forced into their respective bottles. The vacuum is obtained by drawing a vacuum on the vacuum cabinet after the bottles are placed on the shelves and the door of the vacuum cabinet is closed, a sufficient vacuum existing at the time the caps are pushed into the bottles.

A further object of this invention is to provide a hydraulic jack in a vacuum chamber for pushing upwardly on the lowermost shelf and further to provide means on the outer side of the vacuum cabinet and in communication with the jack for supplying hydraulic fluid under pressure to the jack.

A further object of the invention resides in the provision of guide means for controlling the movement of the shelves.

Yet another object resides in the provision of stop means for arresting the downward movement of the shelves after capping.

A further object of the invention is to provide a lower shelf in the assembly described which is braced on its under side for strength.

Another object resides in the provision of a hinge assembly for the door of the vacuum cabinet, the hinge assembly being one permitting the swinging open of the door while also permitting the door to be pressed tightly shut by pressure applying means of the invention, preferably hand wheels mounted on threaded members anchored to the cabinet.

Other and further objects and advantages of the present invention will be apparent from the following detailed description, drawings and claims, the scope of the invention not being limited to the drawings themselves as the drawings are only for the purpose of illustrating a way in which the principles of this invention can be applied.

Other embodiments of the invention utilizing the same or equivalent principles may be used and structural

changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

Figure 1 is a perspective view of the vacuum cabinet with portions broken away for showing the position of shelves therein.

Figure 2 is an exploded view showing a hinge assembly for supporting the door of the vacuum cabinet of Figure 1.

Figure 3 is a frontal elevation of the vacuum cabinet of Figure 1 shown with its door removed for convenience of illustration.

Figure 4 is a view-in-section taken along the line 4—4 of Figure 3 showing a section of the door in position for closing the cabinet and showing the shelves in positions which they are in at the end of capping.

Figure 5 is a perspective view showing the lower shelf in an inverted position to illustrate the reinforcing web thereunder.

Figure 6 is a top plan view of a vacuum bottle cap of the type used with the invention.

Figure 7 is a side elevation of the cap of Figure 6.

Figure 8 is a vertical cross-section of a vacuum bottle shown with the cap of Figure 7 disposed therein in a position for the exhaustion of air therefrom.

The vacuum bottle capping apparatus of this invention includes a vacuum cabinet generally indicated at **10** in Figure 1 and supported on legs **12**. The cabinet **10** is preferably braced around its center by reinforcing members **16**.

The cabinet **10** has a forward door **20** which is preferably in effect a forward wall. The door **20** comprises a sheet of material **22** having bracing members **24** disposed in criss-cross fashion on its outer side. The door **20** preferably has a window **28** having a frame **30**. On the outer edges of the door **20** and its spaced apart points are outwardly extending pairs of ears **40**. The pairs of ears **40** are preferably spaced at least one to a side of the door **20** and are adapted to receive therebetween a threaded bolt **42** of a lock means.

Each lock means further includes a hand wheel **46** threadedly fitted to the bolt **42**.

The inner end of each bolt **42** has an eye **48** disposed about a bolt **52** which latter is mounted between other spaced apart ears **56** attached to and extending outwardly from the remainder of the cabinet **10**.

As it is described it will be seen that the wheels **46** can be turned, when in the position shown in Figure 1, for tightly pressing the door **20** into place. Also it will be seen that, when the wheels **46** are in outer positions, the bolts **42** can be swung outwardly of the ears **40** for releasing the door.

The purpose of this construction is best understood by an inspection of the hinges, one of which is illustrated in Figure 2. Each hinge preferably comprises a lower member **70** and an upper member **72**. The members **70** and **72** each have portions **74** and **76** respectively which are fixed respectively to the cabinet **10** and to the door **20**. Each end section **70** and **72** further has a bolt receiving portion **78** and **80** respectively having an elongated slot therethrough shown at **82** and **84** respectively.

The slots **82** and **84** receive hinge bolts **86** held in place by cotter pins **88**.

It will be seen that the hinges permit the door **20** to be moved inwardly of the cabinet **10** a certain distance sufficient for clamping the door against adjacent flanged portions **90** of the cabinet **10**.

This is because the slots **82** and **84** are elongated as seen in top plan view in a direction parallel to inward and outward movement of the door **20**.

Inside the cabinet **10** a plurality of shelves **100, 102**

and **104** are arranged one above another in horizontal position.

The shelves are held in place by guide and support members **110** best seen in Figures 1 and 4.

The guide and support members **110** are provided with a plurality of rectangular portions **112**, **114** and **116** each disposed one above another. These portions have vertical side walls and have successively lesser widths so as to provide the guide members **110** with outer side edges **120** which are vertical and straight and inner side edges **122**, **124** and **126** respectively which are vertical and straight and stairstepped with respect to each other for providing shoulders or steps **130** and **132**. The lower shelf **100** is provided with notches **150** in its outermost extremities and at its sides, the notches **150** being disposed sufficiently deep and so placed as to receive the lower end portion **112** of each guide member **110** therebetween in such position that the outer edge **120** of each guide member engages and guides the respective end wall **160** of the respective notch **150**.

Likewise the upper shelves **102** and **104** have notches **170** and **172** in their side edges for receiving respectively the portions **114** and **116** of the guide members **110** with a snug vertically slidable fit for guiding the shelves **102** and **104** vertically upwardly and downwardly.

The lowermost shelf **100** has a facing member **190** on its upper side secured thereto by screws.

Horizontally disposed supports **200** are provided and are disposed one on each side of the cabinet and secured thereto for receiving and upholding the lower side of the lower shelf **100**.

A similar pair of horizontally disposed side members **220** are fixed to the sides of the cabinet above the upper shelf **104**. These function as bumpers to prevent the upper shelf **104** from being pushed off of its guide track portion **116**.

A hydraulic jack **300** is mounted in the cabinet beneath the lower shelf **100** and secured to the floor of the cabinet. The jack **300** stands upright and has a piston **304** engagedly disposed within a circular collar **306** fixed to the lower side of the lower shelf **100**. For further strength braces **310** extend outwardly from the collar **306** in four directions, the braces **310** being fixed to the collar **306** and to the lower shelf **100**.

A hose **316** leads from the jack **300** outwardly through suitable vacuum type fittings **320** to a conduit **322** leading to a hydraulic pump assembly **330** disposed alongside the cabinet **10**.

The assembly **330** has a pump handle **332** for pumping hydraulic fluid to the jack **300** and further has a gauge **334** for indicating the hydraulic pressure applied.

A control lever **336** is provided for releasing hydraulic pressure from the jack **300** when desired. Suitable means not shown are provided for drawing vacuum in the cabinet **10**. Such means are in communication with a conduit **400** disposed in communication with the interior of the cabinet **10** through the upper end thereof and also disposed in communication with a vacuum gauge **410** through a hand controlled valve **412**.

Referring to Figure 8 a vacuum bottle **500** is there shown having an open neck **502** for receiving a vacuum bottle cap **504** of conventional construction the latter having a plurality of vertical grooves **510** in the outer circumference of the lower portion thereof. The purpose of the special cap **504** is to permit air to be drawn out of the bottle **500** through the grooves **510** along the line indicated by the arrows in Figure 8 at times when the cap **504** is disposed in the position shown in Figure 8.

In operation trays **600** full of vacuum bottles **504** are disposed on the shelves when the shelves are in the position shown in Figure 3.

The door **20** is then tightly closed and a suitable vacuum is drawn in the cabinet. The operator then operates the hydraulic pump **330** until the shelves have moved upwardly in the position shown in Figure 4. In these positions the caps **504** are pressed into place by abutting the shelves thereabove, or, in the case of the uppermost shelf **104**, by abutting the upper side of the cabinet **10**.

Thereafter, the level **336** can be operated to permit the jack **300** to lower the shelves, the door is opened and the capped vacuum bottles removed.

As thus described it will be seen that this invention makes possible the capping of great quantities of vacuum bottles with a single vacuum drawing operation.

It will also be seen that this invention fulfills the objects herein above set forth.

From the foregoing description it is thought to be obvious that an apparatus for capping vacuum bottles constructed in accordance with our invention is particularly well adapted for use, by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that our invention is susceptible of some change and modification without departing from the principles and spirit thereof, and for this reason we do not wish to be understood as limiting ourselves to the precise arrangement and formation of the several parts herein shown in carrying out our invention in practice, except as claimed.

We claim:

1. An apparatus for capping vacuum bottles comprising: a vacuum cabinet having openable and closable doorway means, means in communication with said cabinet for exhausting sufficient air therefrom to draw a vacuum therein, a plurality of shelves in said cabinet disposed one above another, means for supporting said shelves in spaced apart positions for receiving vacuum bottles on said shelves at times when said vacuum bottles have their vacuum caps disposed in the tops thereof in positions not completely closing said bottles, means for guiding upward and downward movements of said shelves, means in said cabinet for causing a lower one of said shelves to move upwardly until the caps in the bottles on said lower shelf bump against the underside of an adjacent upper shelf until said adjacent upper shelf is caused to move upwardly until the caps on the bottles on said adjacent upper shelf bump against a fixed portion of said cabinet and thereafter moving said shelves upwardly until the caps in said bottles are pressed into said bottles, said means for causing said lower shelf to raise being controllable from the outside of said vacuum cabinet at times when a vacuum exists in said cabinet for controlling said upward movement of said lower shelf and for arresting said upward movement at a time when said caps are in their bottles and for thereafter permitting said lower shelf to move downwardly.

2. The combination described in claim 1 in which said means for causing said lower shelf to raise comprises a hydraulic jack.

3. The combination described in claim 1 in which each of said shelves is provided with slots opening upon and extending into the outer edge thereof and extending vertically therethrough and in which said guide means comprises guide members mounted on said vacuum cabinet and fitting into said slots, said guide members each having vertically extending guide surfaces on the sides thereof for slidable contact with the walls of said slots.

4. The combination described in claim 1 in which each of said shelves is provided with slots opening upon and extending into two oppositely disposed outer edges thereof, said slots extending vertically through said shelves, and in which said guide means comprises guide members mounted on the interior of said vacuum cabinet for fitting into said slots, said guide members each having a bottom portion and a plurality of upper portions, said bottom portion being of a greater horizontal width than said upper portions and each upper portion being of a greater horizontal width than the portion disposed immediately therebeneath, and the sides of said slots in each shelf being greater than a shelf disposed immediately thereabove and smaller than a shelf disposed immediately therebeneath, the sizes of the slots corresponding to the sizes of cor-

responding portions of said guide members whereby each shelf is free to slide upwardly and downwardly upon corresponding portions of said guide members but is arrested from excessive downward movement by the greater width of the portion of the guide member disposed immediately beneath the portion of the guide member upon which said shelf is vertically slidable whereby such portion disposed immediately beneath will support the shelf and prevent the shelf from moving downwardly, each portion of each guide member being of a sufficient vertical length so as to cause the shelves to be spaced apart sufficiently to receive vacuum bottles and caps therebetween when said shelves are so supported.

References Cited in the file of this patent

UNITED STATES PATENTS

294,571	Boomer	Mar. 4, 1884
789,699	Lorenz	May 9, 1905
831,527	Landsberger	Sept. 18, 1906
856,688	Farquhar et al.	June 11, 1907