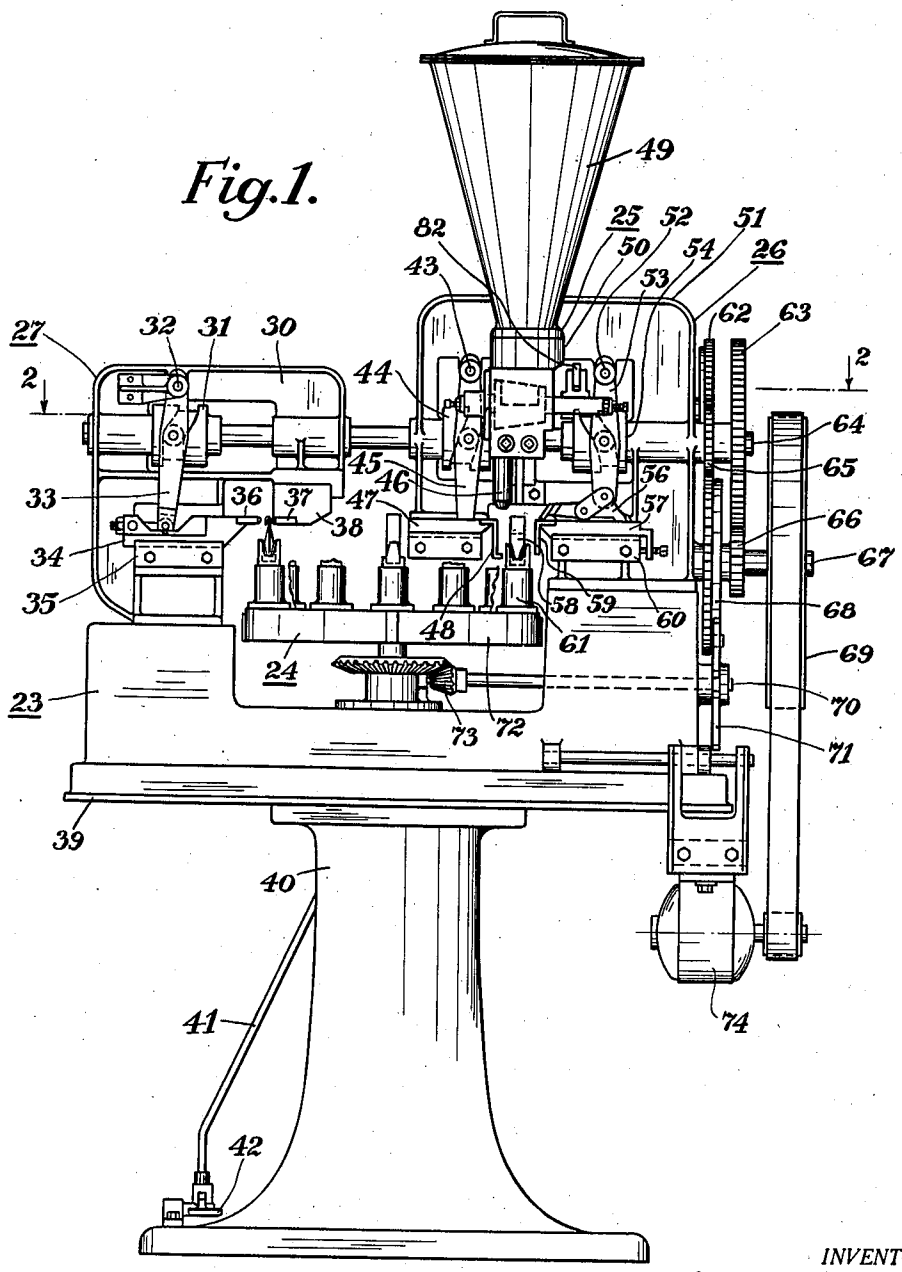
March 18, 1941. C. J. WESTIN 2,235,345

SUPPOSITORY-MAKING MACHINE

Filed May 2, 1938 3 Sheets-Sheet 1

*Fig.1.*




*INVENTOR.*

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*BY*

Augustus B. Stoughton

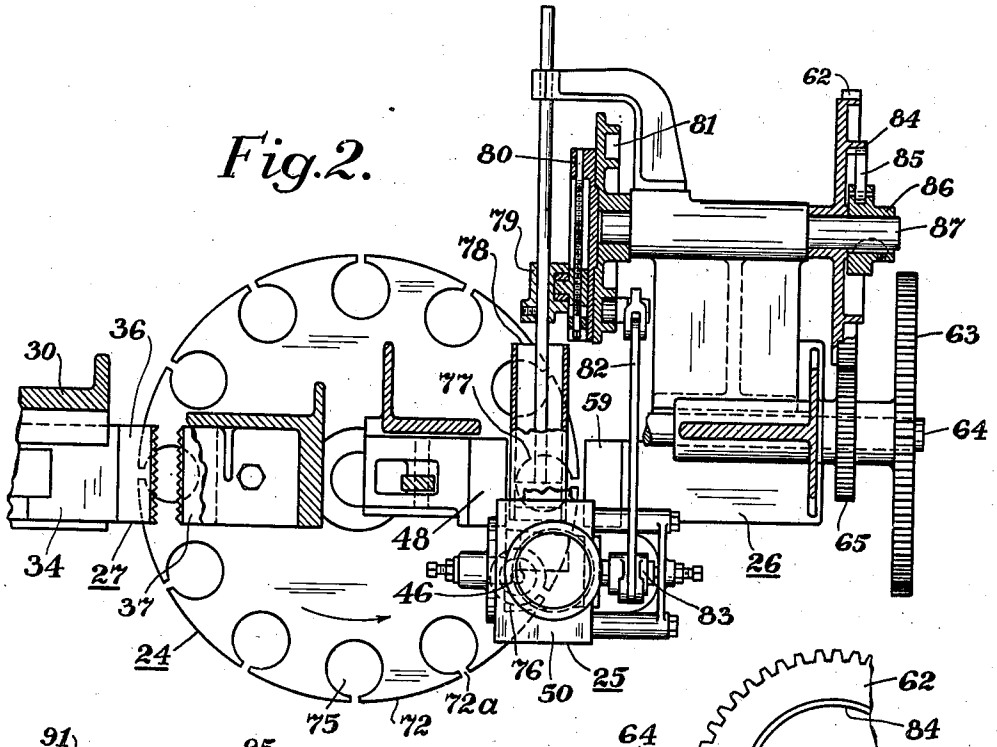
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SUPPOSITORY-MAKING MACHINE

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Fig.2.



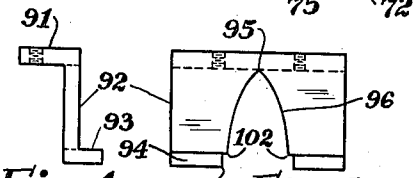




Fig.4. Fig.5.

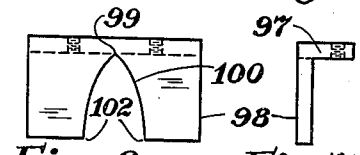



Fig.6. Fig.7.

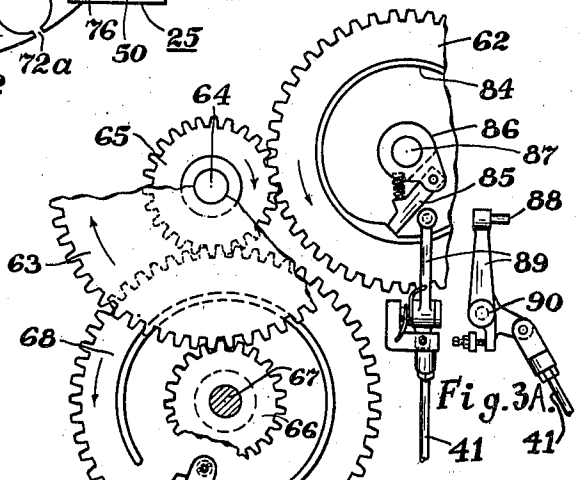



Fig.3A.

Fig.3.

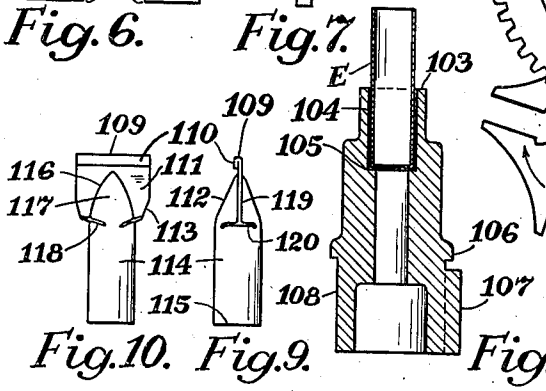



Fig.10. Fig.9. Fig.8.

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SUPPOSITORY-MAKING MACHINE

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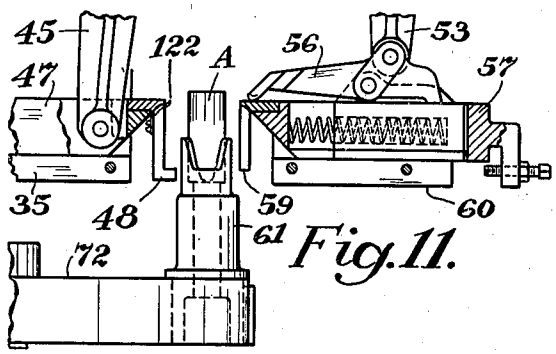



Fig.11.

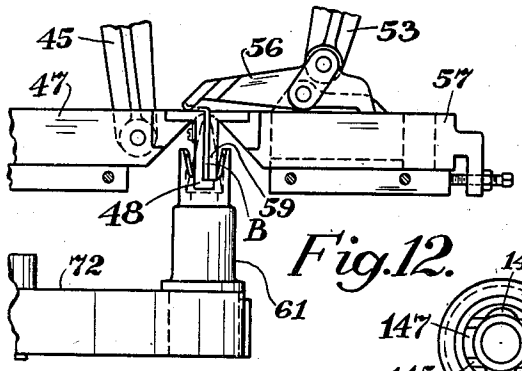



Fig.12.

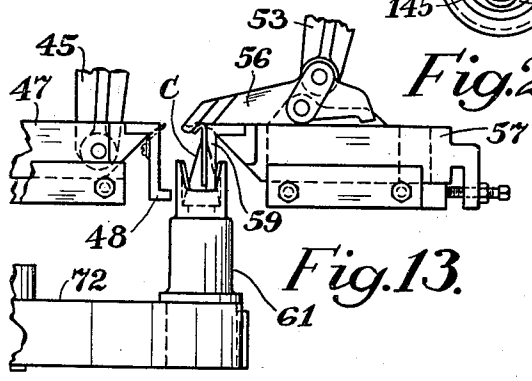



Fig.13.

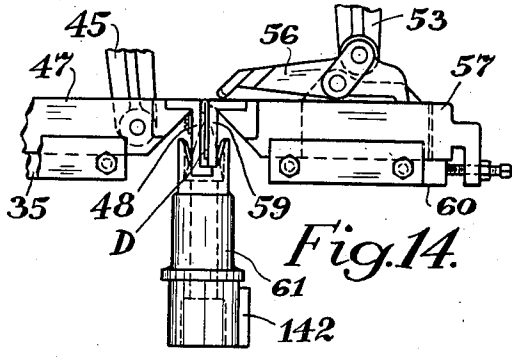



Fig.14.

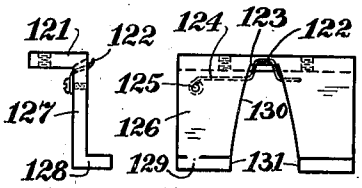



Fig.15. Fig.16.

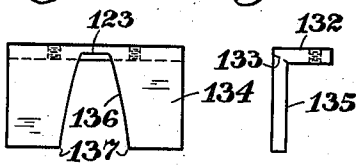



Fig.17. Fig.18.

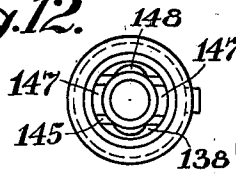



Fig.21.

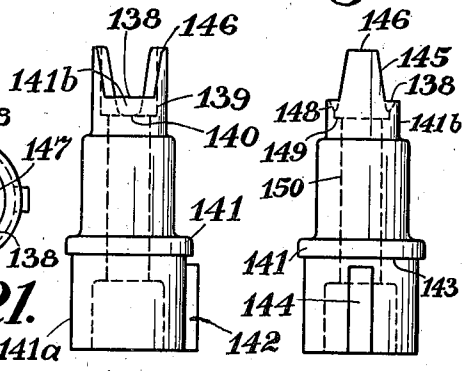



Fig.19. Fig.20.

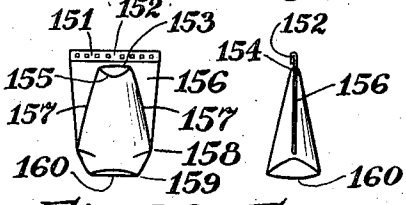



Fig.22. Fig.23.

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Patented Mar. 18, 1941 2,235,345

# UNITED STATES PATENT OFFICE

2,235,345

## SUPPOSITORY-MAKING MACHINE

Charles J. Westin, Philadelphia, Pa., assignor to F. J. Stokes Machine Company, Philadelphia, (Olney Post Office), Pa., a corporation of Pennsylvania

Application May 2, 1938, Serial No. 205,485

12 Claims. (Cl. 113—1)

This invention relates to improvements in machinery used for the manufacture of "encased" suppositories; and, more particularly, to the machinery and methods used in efficiently and sanitarily producing self-contained suppositories.

Suppositories are solid bodies intended for insertion into various openings or passages of the body to produce medicinal action. The consistency and shape varies with the intended use. Usually the medicated suppository mass is formed into the desired shape either by pressing the cold mass into dies or by pouring the hot or warm mass into suitable molds and allowing it to cool. The pressed or molded suppository bodies then are individually wrapped in paper or tin foil or some other protective covering. Most suppositories have a very low melting point and are therefore quite soft unless chilled by some refrigeration and they therefore must be handled very carefully when being wrapped to prevent distortion. The wrapping is a very expensive item and has many disadvantages, as the wrapper can hardly be expected to furnish much support in maintaining the proper shape but rather serves only as a protection against contamination. The ideal, therefore, is the self-contained suppository in which the wrapper is used as a means for forming the suppository into the desired shape, retaining within its protective casing the original sanitary mass as the unit is cooled or chilled.

This invention includes such novel and useful features as the combination of means for supporting, conveying, measuring the desired quantity of the mass, filling this into the casing, closing and forming the casing with the contained plastic mass into the desired shape. Other features are: the novel construction of the casing or capsule holders; the method and means used for forming the casing and the contained mass, etc.

The machine here shown and described is one of the general type of machines suitable for supporting and conveying the capsule casings, measuring out a definite quantity of the suppository mass, placing this quantity in the casing, closing the casing and forming it into the shape desired, and then sealing the closure of the soformed capsule to protect the content and retain the shape. The principles embodied in my invention can be used to advantage in any machine of similar construction.

The purpose of my invention is to provide simple and efficient means for the manufacture of self-contained or "clad" suppositories of various suitable standard shapes and sizes. The covering may be in the form of a capsule, having a cylindrical body with a solid bottom extruded from such metals as tin, aluminum, etc. These metals are ductile and can readily be formed into the desired shape of the suppository but are stiff enough to retain their shape and thus form individual molds which mold the confined liquid or plastic suppository mass into the final shape as the mass sets or hardens. Other material than metal may, of course, be used for the capsule as long as the material is aseptic and will remain neutral to the contained material. Any such material or combination of material, possessing the desired rigidity of the casing could be efficiently handled in my device.

For a further explanation of my invention, reference may be had to the annexed specification and drawings at the end of which my invention will be specifically pointed out and claimed.

In the drawings:

Fig. 1 is a side elevation of the machine, chosen for the purpose of illustrating the principles of my invention.

Fig. 2 is a detailed view in horizontal cross-section on line 2—2 of Fig. 1.

Fig. 3 is a detailed right-hand view of some of the driving mechanism and clutch parts.

Fig. 3A is a detailed view at right angles to Fig. 3 of the lever shown in Fig. 3.

Figs. 4, 5, 6 and 7 are detailed views of the rectal suppository forming means.

Fig. 8 is a sectional view showing the capsule holder for the rectal suppository.

Figs. 9 and 10 show the finished rectal suppository.

Figs. 11, 12 13 and 14 are detailed views showing the forming, closing and sealing means for the vaginal suppository.

Figs. 15, 16, 17 and 18 show the forming means for a vaginal suppository.

Figs. 19. 20 and 21 are detailed views showing the capsule holder for vaginal suppositories.

Figs. 22 and 23 show the finished vaginal suppository.

As seen in the drawings and especially in Fig. 1, my machine consists of a frame **23**, mounted on base **40**, supporting the forming and closing device **26**, and sealing device **27**, with their various mechanisms. A dial or conveying means **24** is also supported on frame **23**. Power for operating may be derived from any suitable source such as **74** and belted to pulley **69** which is fast to gear **66** and thus transmits its rotary motion to gear **63**, fast on cam shaft **64**. A gear **65**, mounted on cam shaft **64**, turns gear **68** on which are

formed necessary parts to impart a quarter-of-a-turn to Geneva star 71 for each revolution of gear 68. The Geneva star 71 is fast to shaft 70 which imparts an intermittent motion to the dial 24 in timed relation to the rest of the mechanism through the bevel gears 73.

Dial 72 has, as is best seen in Fig. 2, a plurality of openings 75 into which the interchangeable capsule holder 61 may be placed and kept from turning out of their proper alignment by means of the key 144, shown in Fig. 20, fitting slidably into the slot 72a, associated with opening 75. As can best be seen in Figs. 11, 12, 13 and 14, it is very important, and as a matter of fact necessary, that the capsule holder 61 is kept in proper alignment because the prongs of formers 48 and 59, as best seen in Figs. 16 and 17, must straddle the capsule support 145 shown on capsule holder (Fig. 20).

On the closing and forming device 26 is also mounted the measuring and filling device 25. In this case, the measuring device consists of a piston pump 78 of the usual construction and arranged so that, with each stroke of the piston, a charge of desired volume is drawn from hopper 49 through the three-way valve 50 into the pump cylinder; and, at the proper time in the cycle of operation with the valve turned to the discharge position by means of lever 83 and linkage 82 actuated by cam 81, the piston will discharge the measured quantity of suppository mass into the capsule placed in alignment with nozzle 46 by the conveyor 24. The pump is operated by an adjustable cross-head 79, mounted on disc 80 which is attached eccentrically to the cam 81 and rotated in timed relation with the other mechanism through the shaft 87 and gear 62. Gear 62 of course receives its motion from gear 65 on the cam-shaft 64. As it is not always possible for an operator to keep the conveyor filled with capsules, a clutch is provided on shaft 87 so that the operator can engage or disengage the measuring and filling device 25, and thereby avoid spilling and wasting a charge if no capsule is in place under nozzle 46. This clutch consists of a pawl 85 (Fig. 3) carried by a pawl-arm 86, attached to shaft 87 and by means of the foot-treadle 42 connected by a link 41 to the trip lever 89, which is fulcrumed on a bracket 90 attached to frame 26 and provided with a trip-pin 88, so arranged that, when the operator steps on the treadle, the trip-pin 88 is pulled out of the way, permitting pawl 85 to engage with the cam face on ring 84, fastened to gear 62. The so engaged gear 62 and shaft 87 turn as a unit to operate the measuring and filling device. If the operator removes the foot from the treadle, the pin 88 drops into the path of pawl 85, thus disengaging the pawl from the cam face on ring 84, and the measuring and filling unit stops in a position ready to immediately discharge a measured quantity the moment the operator again engages pawl 85. Provision is made to vary the volume of measured quantity by the usual adjustments consisting of the means for sliding cross-head 79 farther or closer to the center of shaft 87; thus, by increasing the stroke of the piston, a larger charge will be measured off and finally delivered to the capsule.

For the closing and forming of a vaginal suppository shown in Figs. 22 and 23, a capsule holder of the unique construction shown in Figs. 19, 20 and 21 must be used. The holder must of necessity properly support the capsule in a vertical position with the open end up and without permitting any play between the capsule and the holder which might cause misalignment in forming the suppository to the desired shape. It will be noted that the holder consists of a cylindrical body 141, having a shoulder 143 of suitable size to rest on top of dial 72, while the lower portion of the body is of the proper diameter to fit into the opening 75 of the dial. On this lower portion of the body, a key having faces 142 and 144 is provided which slidably engages slot 72a of the dial. In the upper end of the body is a recess 139 formed of a diameter to suit the capsule handled. At the bottom of the recess, a shoulder 148 and 149 is provided for the capsule to rest on, while a portion of the cylindrical body is cut away on each side so as to leave prongs 146 extending up for the support of the capsule sidewise. The side of the body is not cut away all the way down to the shoulder 140 and 149 but a suitable portion 138 is left and this portion beveled out at 148 to help in forming the large portion of the suppository as shown at 158 (Fig. 22). The height 138 and bevel 148 are carefully worked out to suit the size of capsule being formed and the shape desired for the finished article. Wrinkles and creases in the capsule would seriously effect the shape of the suppository and of course detract from the appearance of the finished covered-suppository. The prongs 146 are provided with tapered sides 145 to suit the taper or slope 130 and 136 of the forming jaws (Figs. 16 and 17) and the slope 157 (Fig. 22) of the finish-formed suppository. Through the center of the body of the capsule holder an opening 150 is provided so that, if automatic ejection is desired, the capsule or rather the finished covered-suppository may be lifted out of the conveying means 24 by means of an ejector rod (not shown).

The closing and forming jaw inserts are made of suitable shape for the particular type of suppository desired. These inserts 48 and 59 (Fig. 11) are made interchangeable and therefore detachably attached to the closing and forming jaws 47 and 57 by means of screws extending into the angles 121 and 132 (Figs. 15–18). The closing-forming insert 48 (Figs. 15 and 16) has a plate body 127 with the angle 121 at the top for attaching to the jaws and another angle 128 and 129 at the bottom but on the opposite side from 121. The insert 59 (Figs. 17 and 18) is of the same construction. In the center of plate 126 is cut out a form 130 to suit the shape of suppository desired but without angle 128. The angles or guides 128 and 129 are also cut at 131 but on parallel vertical lines to line up with the maximum width of shape 130. These faces 131 engage on opposite sides the body of the capsule holder 141 at a point 141b so as to insure perfect alignment and the symmetrical forming of wings 156 (Fig. 22) of the covered-suppository. As will be best seen in Figs. 17 and 18, the forming edge 136 may extend above the bottom surface of angle 132 so as to form additional room up to 123 on a bevel like at 133. When making the fold as shown in Fig. 12, the capsules sometimes have a tendency to hang up on the top face of jaw 47 and be pulled along with this jaw as it opens to permit folder shoe 56 to form the 45° angle of the first fold as shown in Fig. 13. To avoid the spoiling of a capsule by such an accident, a spring 122 (Figs. 15 and 16) is provided which has a tendency to urge the capsule away from this side of the closing and forming mechanism when the jaw 47 retracts. This

spring may be shaped in any suitable manner as shown on the drawings in Figs. 15 and 16 so that loop 122 will be pressed back into the recess below 123 while the capsule is being formed as shown in Fig. 12 or the fold finished as shown in Fig. 14. Spring 122 may of course be attached in any suitable manner as indicated, for example by an extending arm 124 attached by a screw to the insert at 125.

The capsule "A," after receiving its measured charge, is delivered by the conveying means 24 between the closing and forming jaws 47 and 57 as shown in Fig. 11. As the jaws close in to form the capsule, the guide faces 131 of the angles 128 and 129 engage the capsule holder at 141b and positively center the capsule in the recess 130 of the insert. The capsule, with its contained liquid or plastic suppository mass, is shaped to the outline shown in Figs. 22 and 23 by the combined action between formers 48 and 59 with the holder 61. Part of the capsule is pressed by the shapes 130 and 136 into the upper frustum having the sides 157 and a top slightly beveled from 153 to 155. The excess material in the capsule-wall is flattened as at 156 into wings extending out from each side of the upper frustum, while the lower frustum takes the shape 158—159 with a slightly curved top as at 160. A common base for the two frustums is assumed to lie along an imaginary plane located at the point 158 where the wings terminate. The contained suppository mass is forced into the shape of the cavity thus formed, any excess of mass being squeezed out at the top where the fold is made. When the suppository mass cools or is chilled, it sets into the shape of the mold thus formed by the capsule. The walls of the capsule are stiff enough to provide ample protection for the capsule mass and permit the ready handling of the "clad-supository" even before the mass has had time to set or harden. With the closing of the jaws, the folder shoe 56 slides forward over the portion extending above the faces of the jaws and bends the capsule first at a 90° angle as in Fig. 12 and then with jaw 47 retracted into the angle shown in Fig. 13. From this point the folder shoe 56 retracts and the closing jaw 47 advances to make the final bend of the single fold shown in Fig. 14. Should a double-fold be desired, the operation just recited for the formation of a single fold would be repeated but in that case, of course, the capsule holder would have to be lifted a certain distance to provide the necessary stock required for a second fold.

From the closing and forming station the suppository may be ejected as a finished article but, if it is desired to strengthen the closure by means of crimping as well as to ornament the folds, the formed capsule may be carried by the conveying means 24 around to the crimping station 27, where crimps or indentations may be made in the fold and/or code numbers or identifying marks pressed into the fold as indicated in Fig. 22 at 151. The uncrimped single fold is shown at 152.

The above-described forming-mechanism would produce or does produce a vaginal suppository of the general shape of a double-frustum with the bases of the frustum placed against each other. It would at least have such an appearance when viewed from the side shown in Fig. 22 while, when viewed from the edge as shown in Fig. 23, it appears in the shape of a wedge. The closest description, however, expressed in the briefest term possible would no doubt be a "double ended frustum." To obtain a perfectly formed vaginal suppository, the capsule would be filled with a charge of the required volume of suppository mass. The charge may even be slightly in excess of the required volume so that a small portion will be squeezed out into the wing 156 and up through the fold 152 to insure a perfectly homogeneous and dense suppository. Too much excess material, however, is detrimental because it interferes seriously with the neat forming of the fold in the closure and the measuring device, therefore, must be accurate in its function.

Many varying shapes and forms may, of course, be obtained by slight modifications in the means described for the forming of covered vaginal suppositories. In some cases, for example, it may be desired to eliminate most of or all of the space between the bottom 159 and the expanded portion at 158. In such a case, the bottom 160 would, of course, take a more pronounced curvature than shown in Fig. 23 and the capsule holder as well as the forming jaw inserts would of necessity be modified to suit the requirements.

A "rectal" type of suppository is shown in Figs. 9 and 10. This type has a straight body portion extending down from the bullet-shaped tops 112 and 116. For this type of suppository a modified form of capsule holder must be provided as the straight body part 114 of the capsule must be supported all the way up to the point where the forming takes place. The closing and forming jaw inserts are of the same general construction having the angles 91 and 97 for attaching to the jaws and the guides 93 and 94 on the opposite side but at the bottom of insert 48. To form the bullet-shape, the plate 92 would be cut to a shape indicated at 96 or 100 with a point or apex at 95 or 99. The guide spaces 101 are cut back to suit the body of the capsule holder while the base 102 of the forming portion of the insert should be of the same diameter as the body 114 of the capsule. In Fig. 8 a capsule holder is shown with a capsule "E" in place. The conveying means are so adjusted that the top face 103 of the capsule holder just allows sufficient clearance for the creases 118 and 120 between the face 103 and the points 102 of the insert. It is desirable to have the walls of the capsule forming these creases 120 and 118 pressed as closely together as possible in order to keep out as much as possible of the suppository mass from between these walls. What was said in regard to the vaginal capsule filling and forming also holds true in this case. It is desirable to have very accurate filling so that only a small portion of excess suppository mass is needed in order to produce a dense suppository, without having excess material squeeze into the space between the walls of the capsule forming the wings 111 or 119 as well as into the fold 110. The bullet-shape indicated by the lines 112, 116 and 117 may be modified to the frustum-shape by using suitable shaped forming jaw inserts. The frustum-shape is easier to make because the creasing at 118 and 120 is omitted and is therefore also considerably easier on the metal in the capsule wall.

I do not limit myself to the two specific shapes shown in the drawings. They are only representative of the two more popular shapes but may be modified as referred to above to suit varying needs and conditions.

I do not intend to be limited save as the scope

of the prior art and of the attached claims may require.

I claim:

1. In a machine for forming and encasing an object, the combination comprising, means for conveying a plurality of filled casings each containing a plastic mass, a pair of closing and forming jaws mounted adjacent said means so as to operate on each of the casings on said means in succession, said jaws having oppositely disposed openings therein adapted to receive portions of said casings in said openings, portions of one of said jaws projecting therefrom so as to pass beyond the operating face of the other of said jaws when said jaws are in their closest position, and means for moving said jaws towards and away from each other.

2. In a machine for forming and encasing an object, the combination comprising, means for conveying a plurality of ductile casings each containing a plastic mass, a pair of closing and forming jaws mounted adjacent said means for operation on a casing and on the plastic mass therein, said jaws having flat operative faces disposed parallel to the longitudinal axis of said casing and each having an opening in its operating face adapted to receive a portion of the casing therein, at least a portion of the edge of the opening being formed at right angles to said operating face, one of said jaws having thereon projecting portions spaced from each other a greater distance than the adjacent dimension of said opening, said projecting portions being arranged to pass the operating face of the opposite jaw when said jaws are in their closest position, and means for moving said jaws toward and away from each other.

3. In a machine for forming and encasing an object, the combination comprising, means for conveying a succession of casings each containing a plastic mass, holders mounted on said means and each adapted to support a casing on said means, closing and forming jaws mounted adjacent said means for successive operation on each of the casings carried by said means, said jaws having in their opposite portions openings arranged to receive portions of a casing therein, and one of said jaws having projections thereon arranged to engage each of said holders in succession and to thereby center the casing carried by said holder with relation to said jaws, and means for moving said jaws toward and away from each other.

4. In a machine for forming and encasing an object, the combination comprising, movable means for conveying a succession of hollow casings each containing a plastic mass to be formed and encased, holders each having a recess therein for supporting one of said casings on said means, a pair of closing and forming jaws mounted adjacent said means so as to operate in succession on each of said casings, inserts mounted on each of said jaws and having openings therein opposite each other and arranged to receive portions of a casing in said openings, projections extending from one of said inserts toward said holders and arranged to engage each of said holders in succession and to thereby center the casing carried by said holder in the openings in said inserts, and means for moving said jaws toward and away from each other.

5. In a machine for forming and encasing an object, the combination comprising, means for conveying a plurality of capsules each containing a plastic mass, a plurality of holders mounted on said means and each having a recess therein for supporting a capsule, the upper edge of said recess having projecting prongs adjacent the capsule, a pair of closing and forming jaws each having a recess therein opposite the other and opposite said prongs so as to pass one of said prongs into each of said recesses and to engage the capsule carried by the holder, projections on one of said jaws arranged to engage said holder and to thereby center the capsule in respect to said jaws, and means for moving said jaws toward and away from each other.

6. In a machine for forming and encasing an object, the combination comprising, means for conveying a plurality of hollow casings each containing a plastic mass, a pair of closing and forming jaws mounted adjacent said means and arranged to operate in succession on each of the casings carried by said means, each of said jaws having a recess therein arranged opposite each other and adapted to engage and outline a portion of said casing, a spring mounted on one of said jaws and arranged to overlie a portion of the outline of one of said openings and to thereby disengage that portion of the casing opposite the opening at that point, and means for moving said jaws toward and away from each other.

7. In a machine for forming and encasing an object, the combination comprising, means for conveying a plurality of hollow capsules each containing an object, a pair of jaws mounted adjacent said means and arranged for movement toward and away from each other so as to compress successively each of said capsules carried by said means between said jaws, at least one of said jaws having an operative face having an opening therein arranged to receive a portion of the capsule in said opening, a portion of the wall forming said opening being arranged at a bevel with said operating face so as to be moved opposite a portion of said capsule.

8. An insert for the closing and forming jaw of a machine for forming and closing casings each containing an object, comprising, a flat plate having an opening extending through one edge thereof, a portion of the outline of said opening being arranged at an acute angle to the face of said plate and opposite that portion of said opening which is in the edge of said plate, and means for attaching said insert to a jaw.

9. An insert for the closing and forming jaw of a machine for forming and closing ductile casings each containing an object, comprising, a flat plate having an opening extending through one edge thereof, a spring mounted on a non-operating face of said plate and extending through and overlying the wall of a portion of said opening, and means for attaching said insert to a jaw.

10. A holder for a capsule for use in a machine for forming and closing a wrapper containing a mass of fluid material, comprising, a body having walls forming an open-ended recess therein arranged to receive a capsule in said recess, portions of the end of the walls of said recess adjacent said capsule forming projecting prongs overlying portions of said capsule, the walls of said recess intermediate said prongs being beveled so as to provide sharp edges and to provide pockets at a lower level than the edges of said walls intermediate said prongs, and means for supporting and locating said holder on and relative to a conveyor.

11. In a machine for holding a mass of fluid

material within a semi-rigid casing which supports and encloses it, the combination of, a holder having a recess therein suitable for receiving a casing in said recess, the edge of said recess having projecting prongs lying against a portion of said casing, and a pair of movable closing and forming jaws arranged to contact with said casing and to thereby form said casing and the material therein, said jaws each having a recess therein arranged to receive one of said prongs in said recess when said jaws contact with said casing.

12. In a machine for molding a mass of fluid material within a semi-rigid casing which supports and encloses it, the combination of, a holder having a recess therein arranged to receive a filled casing in said recess, a pair of closing and forming jaws mounted for movement into and out of contact with said casing to thereby form said casing and the material therein, said jaws having openings therein arranged to receive portions of said casing in said openings, and projections on one of said jaws arranged for contact with said holder upon movement of said jaw towards said casing so that said projections center said casing in said opening.

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