

Feb. 1, 1938.

J. K. M. HARRISON

2,106,739

CONTAINER BOTTOM AND TOP APPLYING AND SEALING MACHINE

Filed March 20, 1936

2 Sheets-Sheet 1

FIG. I.

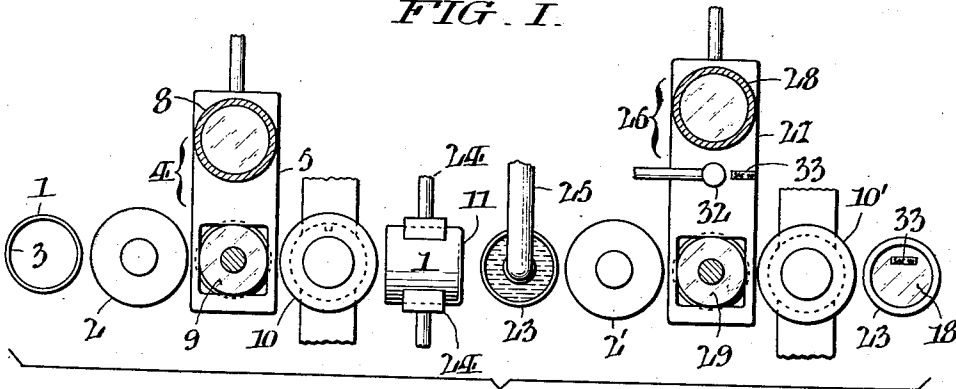


FIG. II.

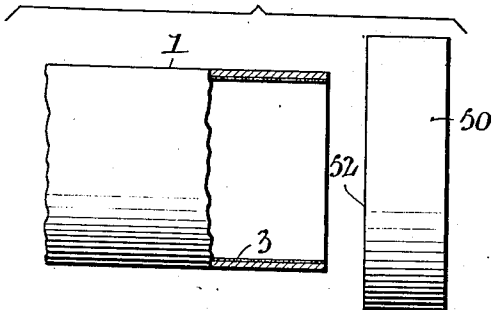


FIG. III.

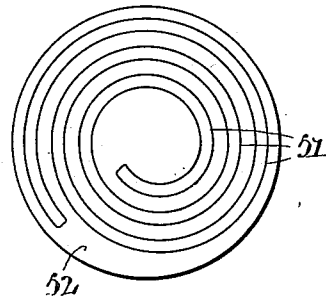


FIG. IV.

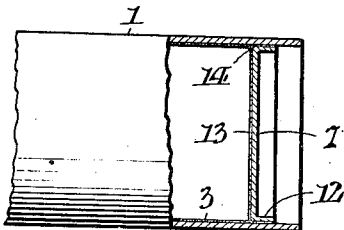
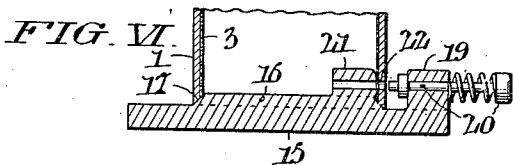
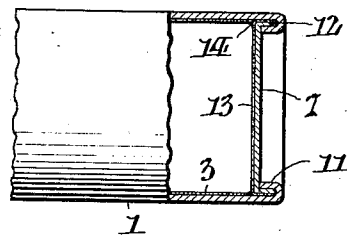


FIG. V.



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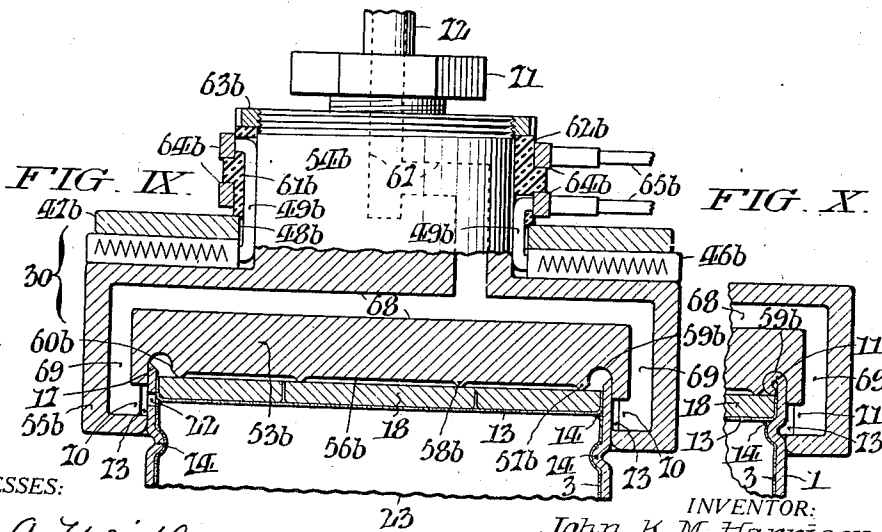
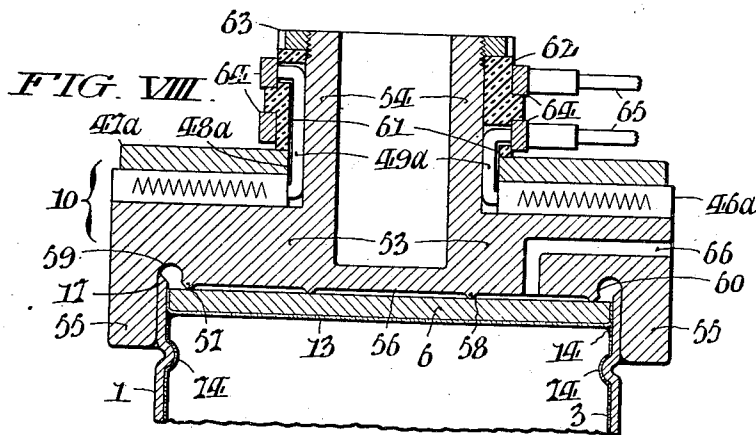
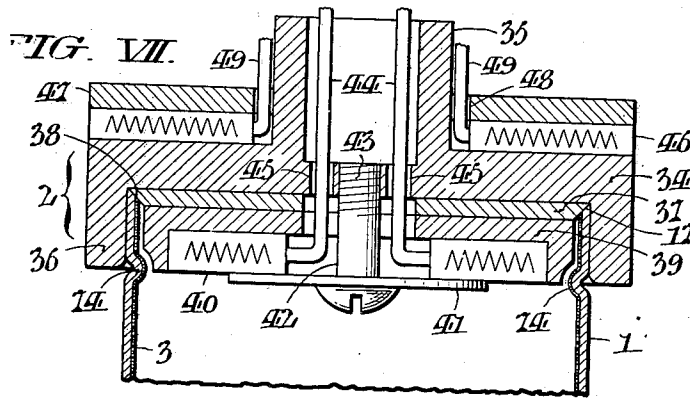
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CONTAINER BOTTOM AND TOP APPLYING AND SEALING MACHINE

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2 Sheets-Sheet 2



WITNESSES:

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UNITED STATES PATENT OFFICE

2,106,739

CONTAINER BOTTOM AND TOP APPLYING
AND SEALING MACHINE

John K. M. Harrison, Ogontz, Pa.

Application March 20, 1936, Serial No. 69,805

10 Claims. (Cl. 93—55.1)

This invention has general reference to machines adapted for formation, application and sealing of bottoms and tops to preformed container bodies or units; and it relates, more particularly, to machines for producing paper, fiber or analogous material containers.

Fundamentally the present invention aims to provide novel means whereby bottoms and tops are applied to and sealed in paper, fiber or analogous material, tubular body shells or units to constitute leak-proof containers of predetermined capacity.

Another object is to provide novel means whereby paper, fiber or analogous material end discs having a thermoplastic coating on one face and the surrounding edge, or which have a "cellophane" or similar material facing, or a fusible enamel, are inserted and sealed into corresponding material body shells or units, having an interior coating of said thermoplastic, by coalescing union.

A further object is the provision of means which takes a "cellophane" faced paper strip, punches out a cup-shaped bottom for pressure into a container body shell with applied heat and then spins over the confronting end edges to effect fused union of said parts; whereupon the container thus formed is automatically filled and similarly closed by a correspondingly-formed top.

Other objects and advantages, more or less ancillary to the foregoing, and the manner in which they are realized in practice, will be apparent from a more complete examination of the following description, which, considered in connection with the accompanying drawings, sets forth a practical embodiment of the inventive features.

Generally stated, this invention consists of the novel devices, combinations of means, and arrangements of parts hereinafter disclosed, illustrated by the drawings, and more definitely expressed in the claims at the conclusion hereof.

In the drawings:—

Fig. I is a schematic bracketed view illustrative of operably coordinative means adapted for carrying out this invention.

Fig. II is a bracketed detail view illustrative of a means adapted for preparing the end of a pre-formed internally-coated container unit by thermo-radiation ready for insertion of an end closure.

Fig. III is a face view of the thermo-radiator of the preceding illustration.

Fig. IV is a part sectional and part outside view of the end portion of a container having one form of end closure inserted therein in accordance with this invention.

Fig. V is a similar view to Fig. IV, but showing how the end of the container body portion is spun

into sealing-reinforcing relation with respect to the closure disc bottom or top.

Fig. VI is a detail view of a tube end support with an associated punch means, hereinafter more fully described.

Fig. VII is a sectional view of a heater head adapted to initially flare the end of the container body portion ready for insertion of an end piece.

Fig. VIII is a similar view to the previous figure of a combination bottom-advancing rotary heater head including means for inwardly-retroverting or spinning the container end into sealing engagement with the inserted bottom.

Fig. IX is a like view, showing a modified form of rotary head more particularly designed to exhaust air pressure from within the container, after being filled, as the closure or top is applied and forced into sealing position with concurrent spinning of the container top edge inwardly; and,

Fig. X is a sectional detail illustrative of the sealed joint effected by the means of the preceding figure.

Referring more in detail to the drawings, the various devices schematically indicated in bracketed Fig. I are all adapted for embodiment in conventional multiplex end-inserting and container-filling machines; accordingly, it is deemed unnecessary to herein specifically illustrate such a machine, as all who are acquainted with the art will readily appreciate their relative arrangement and operative coordination.

In Fig. I, an open-ended pre-cut section of paper, fiber or analogous material, tubing is designated by the reference character 1, the same having its inner surface coated with a suitable thermoplastic, such as synthetic-resin. This section or container body shell 1 is appropriately moved into registration with a stationary heating head 2, either by elevation of the former or descent of the latter, such head being preferably of the form shown in Fig. VII, for the purpose of somewhat softening the thermoplastic inner coating 3. From the heating head 2, the section 1 passes to a bottom-feeding and placing mechanism, comprehensively designated as 4, and including a reciprocatory slide 5 adapted to feed a suitably faced paper, fiber or analogous material, disc bottom 6, Figs. VIII-X, or a similarly faced and peripherally-flanged bottom 7, Figs. IV and V, from a storage 8 thereof. As shown in Figs. IV and V, the bottoms 7 are of cup-shaped diametric cross-section. Each bottom 6 or 7 is individually and consecutively transferred from the storage 8 into the confronting open end of a tube section 1, whereupon an associated plunger 9 presses said bottom partially thereinto, as shown in Figs. VIII and IX, for a purpose later on more fully explained.

The tube section 1 with the partially-inserted bottom 6 or 7 next moves into registration with

a rotary combined inserting and spinning-head 10 to effect full insertion of said bottom with concurrent inward-retroversion of the tube end as indicated at 11, whereby said retroversion is sealed into overlapping relation with the bottom outer peripheral portion and the adjoining inner face of the tube section end, as shown in Fig. X; or into similar lapping relation with the surrounding bottom flange 12, as indicated in Fig. V. Consequent upon insertion of either form of bottom 6 or 7, it will be readily understood that, incidental to the applied heat, the interior thermoplastic coating 3 will be partially displaced inwards by the advancing "cellophane" facing 13 of said bottom, and thus form a surrounding fillet-union 14 with the coating 3, in an obvious manner. It is also to be remarked, at this juncture, that during the full-insertion and end spinning operation just described, the open or upper end of the section or body shell 1 is moved into engagement with a discous head 15, Fig. VI, having a circumferentially-tapered embossment 16 adapted to enter said section upper end and flare the surrounding edge 17 for centralizing the top or closing member 18, Fig. I, when subsequently applied, as hereinafter further set forth. In addition, the discous head 15 is provided with an offset 19, or a plurality of circumferentially-spaced such offsets, affording bearing for an outwardly-influenced punch 20, arranged for inward projection and coaction with a die-projection 21 by suitable actuator means, not shown, to produce a vent orifice 22, Figs. VI and IX, or a plurality of same when more than one punch is provided, at a predetermined location in the container wall, for a purpose hereinafter set forth.

The bottom 6 or 7 having been inserted and sealed in the tube section 1, as aforesaid, to form a container unit hereinafter designated as 23, the latter is inverted by suitable turning means 24, Fig. I, and progressed to a filler 25, of that fluid, oleaginous product, or any other substance or composition of matter, said container is intended to hold. From the filler 25, the container 23 is suitably transferred to a second head 2', for heating the interior coating around its top, whereupon it is moved to registration with a top-feeding and placing mechanism 26, corresponding to the bottom mechanism 4 previously described. This mechanism 26 includes a slide 27 for transferring successive tops 18, individually, from a storage 28 into the province of a plunger 29, whereby the top is pressed part-way into the registering filled container 23, in an obvious manner. From the mechanism 26, the container 23 passes to a rotary combined inserting and spinning head 10', Fig. VIII; or it may be to a vacuum spinning head 30, such as shown in Figs. IX and X, as later on further amplified. Either of the spinning heads 10' or 30 effects secure closure and sealing of the filled container 23 with incidental formation of a fillet-union 14 as before described, to complete the cyclic operation and provide the sealed container 23. In association with the top-feeding and placing mechanism 26, there may be provided a suitable stamping device 32, for impressing on the top exposed face an appropriate marking 33 as to the character of the container content.

Referring now to the preferred type of heater head 2 or 2', as illustrated to best advantage in Fig. VII, the same comprises a body portion 34 having a tubular attaching section 35, and a cupped extension 36 of an internal diameter to

snugly receive the tube section 1. Interiorly of the cupped-extension 36 is a disk 37, of suitable material, having its peripheral edge tapered, as shown at 38, for beveling or flaring the confronting open end of the tube section or body shell 1, as previously indicated by the reference 17, Fig. VI. The disk 37 is, conveniently, held in place intermediate a flanged holder 39 housing an annular electric heater 40, by means of a clamp washer 41 and screw 42 threadedly engaged at 43 into the body portion 34; and said heater has wires 44 in circuit with a suitable source of electrical current. The wires 44, preferably, pass through holes 45 into the tubular attaching section 35; and it is to be observed the flanged holder 39 is of an outside dimension for free passage within the tube section or body shell 1, whereby the heat conducted thereby from the annular heater 40 radiates radially within said body shell to the confronting coating 3. In addition, there is suitably mounted on top, or at the back, of the body portion 34 a second or discous heater 46 with an insulating material covering annulus 47, through the pore 48 of which the conducting wires 49 pass to any appropriate source of electric current, not shown. The heater 46 serves as the main heater for the body portion 34, while the annular heater 40 functions as a "booster" for augmenting the thermo-capacity of the head 2 or 2' where it is most needed; that is to say interiorly of the body shell 1 to render the coating 3 plastic.

In some instances, such as where the bottom and tops are of the type shown in Figs. IV and V, use can conveniently be made of the radiator type of heater 50, indicated in Figs. II and III, said heater embodying a spiral coil 51 so that its heat is evenly diffused over the face 52 of said heater. With this form of heater 50, which is diametrically larger than the tube section or body shell 1, it will be readily understood that all of the heating is effected by radiant action, rather than by direct contact heating as is in part effected by the cupped wall 36 surrounding the tube end in Fig. VII.

Referring now to the rotary end-inserting and spinning heads 10, 10', shown to best advantage in Fig. VIII, each of the same comprises a body portion 53, having an attaching section 54, and cupped extension 55, substantially conformative with the disclosure relating to the heating heads 2, 2'. The cupped extension 55 differs materially, however, in that it is provided with an interior concentric embossment 56 having a peripheral ridge 57, with one or more inner ridges 58, one only being shown, which serve to impinge and support the disc ends 6, 18 during insertion into the tube section or body shell 1 and keep them level, or in correct planar relation with respect to the wall of said section. It is also to be particularly observed that circumambient to the embossment 56 there is formed a groove 59 affording, in conjunction with the outer tapering edge of the ridge 57, a return bend 60 functional to effectively project the retroverted edge 11 of the container wall into sealing adherence with said wall, or the closure disc peripheral flange 12 of Figs. IV and V, during the spinning operation, as will be clearly apparent on an examination of the drawings. Surmounting the body portion 53 there is provided a disc heater 46a, having conducting wires 49a and a covering annulus 47a of insulating material, all as described in connection with the showing of Fig. VII. The wires 49a, however, in this case, pass through longi-

tudinal grooves 61 in an insulating material sleeve 62, clamped to the attaching section 54 by a lock nut 63, and respectively connect with spaced stationary slip rings 64, having electric conductors 65; said rings being supported by the sleeve 62, in accordance with known practice. It is also to be noted the head 10 is, preferably, provided with a vent passage 66 for relief of air pressure as the container 23 is moved into registration with, and engagement by, the cupped extension 55 of said head.

The vacuum type of inserting and spinning head 30 shown in Figs. IX and X substantially conforms to the disclosure of Fig. VIII, accordingly all parts corresponding thereto have like reference characters applied with the distinguishing exponent "b", in order to avoid unnecessary repetitive description. It is, however, to be observed that the spinning head 30 is formed with a solid attaching section 54b, having an angled passage 67 in communication with a diametric passage 68, or a plurality of radial passages, in turn having the ends 69 passing through the wall of the cupped extension 55b with outlet apertures 70 thereinto. Fitted into the upper end of the attaching section 54b, as by a coupling gland 71, is a pipe 72 connecting with any suitable exhauster means, not shown, whereby air pressure from within the filled container 23 can be drawn out through the vent orifice 22, or vent orifices when more than one is provided, by way of the apertures 72, and passages 69, 68 and 67, in an obvious manner. Incidentally, the inner surface of the cupped extension 55b is provided with a surrounding groove 73, into which the apertures 70 open, in order that the exhausting of the container entrained air pressure is properly accomplished irrespective of the position of the container 23 relative to the head 30 circumferentially.

In the forms of tube sections 1 and container upper ends 23, shown in Figs. VII-X, inclusive, the same are each depicted as being optionally provided with an inwardly directed rib 74, located proximate the point whereto the bottom and top discs 6, 18 respectively are pushed to form the fillet-unions or sealing joints 14; while said ribs also serve to prevent the discs 6, 18 from being forced too far into the tube sections 1.

From the foregoing disclosure it is thought the invention will be clearly understood, and its advantages appreciated, and while the description is necessarily of a detailed character in order to properly set forth the invention, it is to be understood that the specific terminology is not intended to be restrictive or confining. Furthermore, it is also to be borne in mind that various other arrangements of parts and modifications of structural details may be resorted to without departing from the spirit or scope of the invention as hereinafter claimed.

Having thus described the invention, I claim:

1. In paper tube bottom and top applying and inserting machines, the combination of a stationary heater head having a hollow for the individual reception of the tube ends, an inner concentric peripherally-flanged heater holder, and an intervening disc having a tapering peripheral edge adapted to flare the tube edge.

2. In paper tube bottom and top applying and inserting machines, the combination of a stationary heater head embodying an attaching section and cupped-extension for snug reception of the

tube ends individually, a beveling disc with a tapering circumferential edge in the cupped extension, a peripherally-flanged holder abutting the disc and housing an annular electric heater, and means for clamping said parts together for the purpose specified.

3. In paper tube bottom and top applying and inserting machines, the combination of a stationary heater head embodying an attaching section and cupped-extension for snug reception of the tube ends individually, a beveling disc with a tapering circumferential edge in the cupped extension, a peripherally-flanged holder abutting the disc and housing an annular electric heater, a discous heater at the back of the heater head with a thermo-insulating outer covering, and means for securing said parts together for the purpose specified.

4. In paper tube container bottom and top element applying machines, the combination of a rotary head embodying an attaching section and a cupped extension, a concentric projection in the cupped extension, an annular heater with a thermo-insulating cover at the back of said head and concentrically about the attaching section, and slip ring means with suitable connections for supplying electric current to the heater aforesaid.

5. The combination of claim 4 wherein the rotary head extension projection is provided with concentric ridges one of which adjoins the projection edge and defines therewith a return head effective to retrovert the container edge during the spinning operation, and a passage is provided in the heater head for venting of air pressure during the bottom and top insertion cycle.

6. The combination of claim 4 wherein the rotary heating head is provided with means for venting pressure air from within a filled container as the top closure is applied and sealed thereto.

7. The combination of claim 4 wherein the rotary heating head is provided with passages therethrough opening into the cupped extension at one end and communicating at the other end with a suitable air exhauster means, and said cupped extension has an inner surrounding groove into which the head passage opens for the purpose specified.

8. In container forming machines, the combination of means for forcibly inserting the bottom and top elements into the container body with production of sealing junctures therebetween, and means for releasing pressure from within the container concurrent with insertion of the top element.

9. In container forming machines, the combination of means for forcibly inserting the bottom and top elements into the container body with production of interior sealing junctures therebetween, and means venting pressure from within the container simultaneous with insertion of the top element after filling.

10. In container forming machines, the combination of means for forcibly inserting the bottom and top elements into the container body with concurrent production of inner filler sealing juncture therebetween, and means for exhausting air pressure from within the filled container and incidental to its closure during insertion of the top element.

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