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E. TEBBUTT
PACKAGING OF LIQUIDS

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2 Sheets-Sheet 1

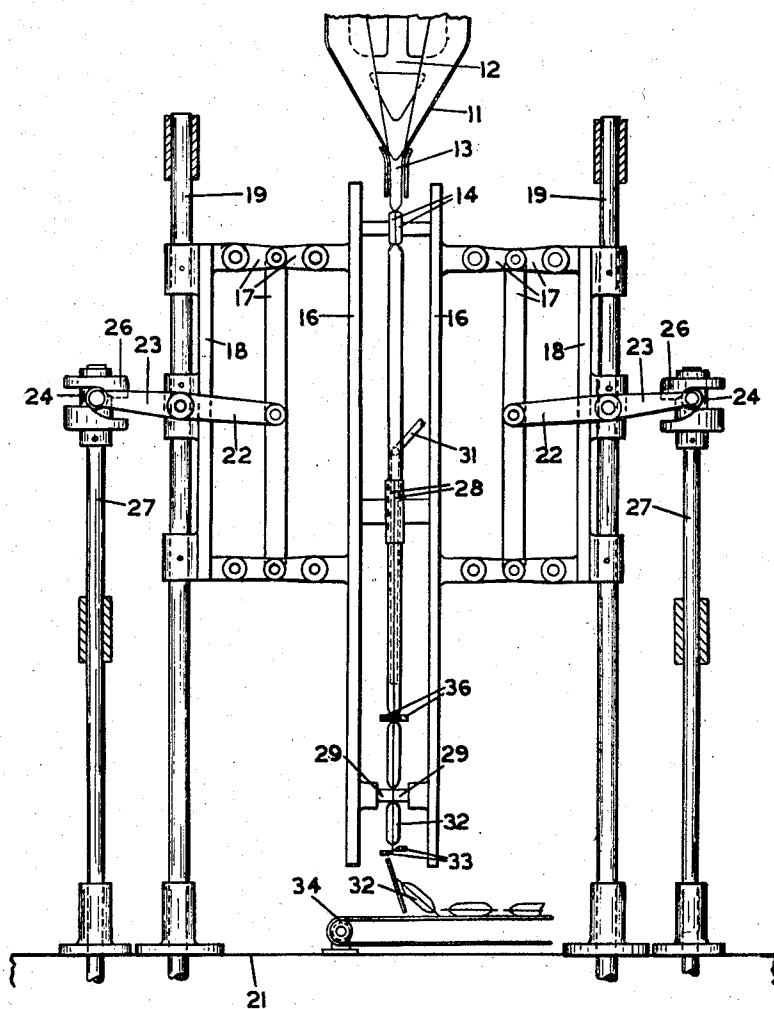


FIG. I.

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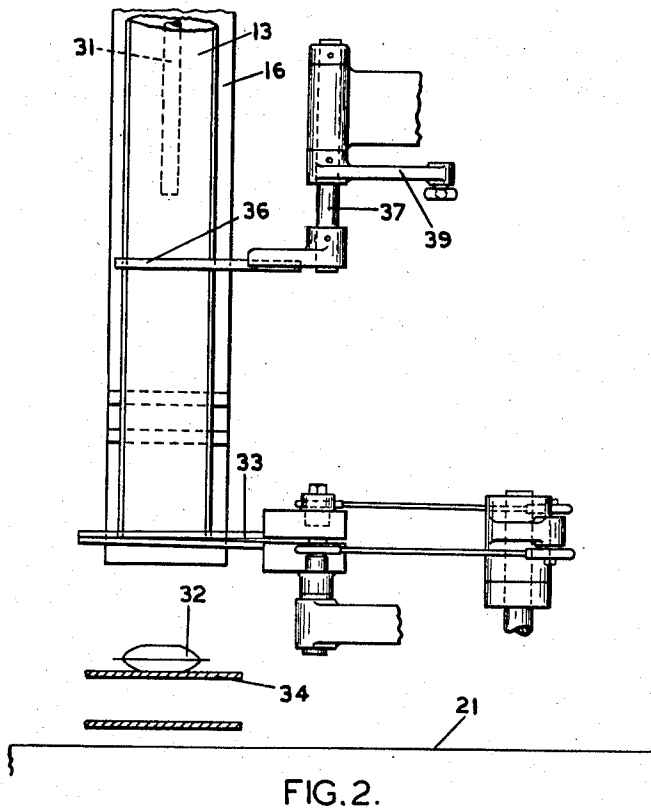
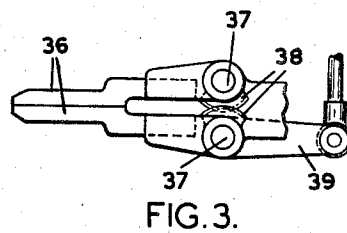
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PACKAGING OF LIQUIDS

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Claims priority, application Great Britain June 2, 1956

3 Claims. (Cl. 53—180)

This invention relates to the packaging of liquids in containers formed from heat sealing sheet materials, the material being fed intermittently in strip form and providing two opposed portions which are first sealed longitudinally to form a continuous tube, and then transversely at spaced intervals to form a succession of packages, the liquids being introduced into the tube as it is formed. The two opposed portions of material may be provided by two separate webs, or a single web may be folded upon itself to provide the two portions.

In packaging liquids in this manner, particularly liquids such as shampoos which readily produce froth when agitated, difficulty has been found in preventing the entrainment of air with the liquid with resulting bubbles in the finished packages. Even when the transverse sealing takes place below the level of the column of liquid in the tube, this difficulty has been found to persist, when operating at economical speeds, presumably because of the turbulence created by the upward surge of the liquid in the tube as transverse sealing takes place.

In apparatus for producing containers in this manner, it is customary to provide transverse sealing mechanism that is movable with the tube so that a period of time is consumed during movement of the sealing means between sealing operations, and an object of the present invention is to utilise that period of time in performing a preliminary nipping operation on the tube.

According to the present invention, packages are formed in the above manner (hereinafter referred to as the "described method") by maintaining a substantial head of liquid in the tube above the transverse sealing position, and, prior to each transverse sealing operation, nipping the tube above the sealing position to displace the liquid in the tube, sealing then taking place substantially simultaneously with the release of the nipping pressure. In this manner the main upward surge of the liquid (normally taking place as the transverse sealing elements engage the tube) takes place before sealing, e.g., at the end of the movement of the tube to form a preceding package. The nipping may thus take place relatively slowly over the time taken for the sealing members to return to the sealing position after the completion of the preceding package. The upward surge is thus caused more gently than is the case when it is caused by the sealing members themselves, and less turbulence is created. With the release of the nipping pressure substantially simultaneously with the application of the sealing pressure, it is found that there is a much reduced surge caused by the sealing members.

The tube is conveniently formed in a substantially vertically downward direction in known manner, the liquid being fed into the tube by a pipe extending downwardly into the sealed portion of the tube a distance equal to the depth of several packages, say up to eight for liquids prone to the ready production of froth, the liquid being syphoned from a header tank through the pipe.

In this manner, the head of liquid in the tube is main-

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tained substantially constant. Preferably, the pipe extends into the tube to a position approaching the transverse sealing position.

Sheet materials of a thermo-plastic resin composition such as vinyl resin and in particular polyvinyl chloride, are particularly suitable for this method of packaging, the sealing operations being performed by electrodes to which a high frequency current is applied. When using such materials and sealing the tube in this manner, it is preferable to feed the tube by means other than the sealing means so as to avoid tension being imparted to the tube by the sealing members during the sealing action when the portion of the tube being sealed is in a soft condition. Thus, the tube may be fed forward by a pair of pulling members spaced from the sealing members, both sets of members being mounted on a common reciprocating carriage and being movable synchronously into engagement with the tube.

A single web of such material may be folded flat upon itself and sealed along one edge to form the tube, a further sealing operation being simultaneously performed, if desired, along the opposite edge to provide a symmetrical appearance.

The invention is illustrated schematically by the accompanying diagrammatic drawings, in which

Figure 1 shows in elevation part of a machine for packaging liquid shampoo in sachets of polyvinyl chloride,

Figure 2 shows a detail of Figure 1 to a larger scale and

Figure 3 shows a plan of the detail of Figure 2.

A web 11 of polyvinyl chloride is passed over a guide 12 and folded upon itself to form a tube 13 the folded tube being fed downwardly by a pair of opposed pulling members 14 mounted on carriers 16 each connected by toggle linkage 17 to a frame 18 secured to a non-rotatable shaft 19 mounted in a bed 21 for reciprocation in a vertical direction. Each linkage 17 is pivotally attached to an arm 22 pivotally mounted on the frame 18 and having an extension 23 carrying a roller 24 arranged in engagement with a cam 26 secured to a rotatable shaft 27 that is mounted in the bed 21 for vertical reciprocation in synchronism with the shafts 19.

The carriers 16 carry opposed longitudinal sealers 28 for sealing the marginal edges of the tube 13, and also transverse sealers 29 for effecting the transverse seals, the sealers 28 and 29 constituting electrodes to which a high frequency current is applied.

The liquid is fed into the tube 13 by a pipe 31 passing into the unsealed portion of the tube and extending downwardly into the sealed portion of the tube a distance equal to the depth of several packages, the liquid being syphoned from a header tank (not shown), through the pipe 31. The packages 32 are completed by the sealers 29 and severed by a cutting device 33 to fall onto a delivery conveyor 34.

Arranged above the level of the sealers 29 is a pair of nipping members 36 pivotally mounted on shafts 37 and connected by racks 38, the members 36 being oscillated by a cam-operated arm 39 extending from one of the members 36.

The frames 18 and linkages 17 are operated to cause the carriers 16 firstly to move laterally to cause the pullers 14 to engage the tube 13 and then downwardly to feed a length of tube equal to the length of a package 32, the sealers 28 being moved into engagement with the tube at the same time to seal a length of the tube somewhat greater than the length of a package and the sealers 29 to effect the transverse seal. Similarly, the cutting device 33 operates simultaneously to sever a complete package.

As the carriers 16 move upwardly and outwardly to return the pulling members 14 and sealing members 28

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and 29 to the starting position, the nipping members are caused to move relatively slowly (i.e., during the full period of the return movement of the carriers 16) into engagement with a filled portion of the tube 13 to displace the liquid in the tube in readiness for the next sealing operation, the nipping pressure being released substantially simultaneously with the engagement of the tube by the sealing members 29 as they again move inwardly.

I claim:

1. Apparatus for packaging liquids in heat sealing materials, comprising means for forming a tube from a web of material, a pair of reciprocating carriers provided with pulling members, longitudinal sealing members and transverse sealing members, said carriers being movable transversely to cause the pulling and sealing members to move into operative engagement with the tube to effect the forwarding of the tube and its longitudinal and transverse sealing, and a pair of nipping members adapted to engage a filled portion of the tube prior to each transverse seal-

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ing operation to displace the liquid in the tube, the transverse sealing of the tube being effected substantially simultaneously with the release of the nipping pressure.

2. Apparatus as in claim 1, wherein the carriers are attached to a reciprocating framework by toggle linkages, and means are provided for operating the linkages to produce the transverse movement of the carriers.

3. Apparatus as in claim 2, wherein the operating means are reciprocated in synchronism with the framework.

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