United States Patent [19]

Rowell

[11] **3,824,908**

[45] **July 23, 1974**

[54] **APPARATUS FOR PRODUCING PACKAGING ARTICLES**

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[22] Filed: **Nov. 1, 1972**

[21] Appl. No.: **302,856**

[52] **U.S. Cl.** ..... **93/8 VB,** 53/29, 93/1.1, 93/18, 93/35 PC, 156/91, 156/324, 93/82

[51] **Int. Cl.**..... **B31b 19/60,** B31b 1/64

[58] **Field of Search**..... 93/35 R, 1.1, 8 R, 8 W, 93/18, 19, 20, 33 R, 33 H, 77 R, 82, 94 R, 1 R, 35 PC, 8 VB; 156/91, 324

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[57] **ABSTRACT**

The invention provides a method of producing material for use in packaging, and apparatus for carrying out that method, which includes the steps of providing first and second continuous webs of sheet material each having longitudinally on a face thereof a respective one of a pair of elongated male and female closure formations, moving said first and second webs along closing paths with the respective formations presented towards each other, applying pressure to the male and female formations across the plane of separation of the webs so as to cause them to become interengaged and thereby define one of a first pair of opposed boundaries of the receptacle, said webs being initially, simultaneously, or subsequently joined longitudinally at a position spaced from said formations so as to define the other of said first pair of opposed boundaries.

1 Claim, 6 Drawing Figures

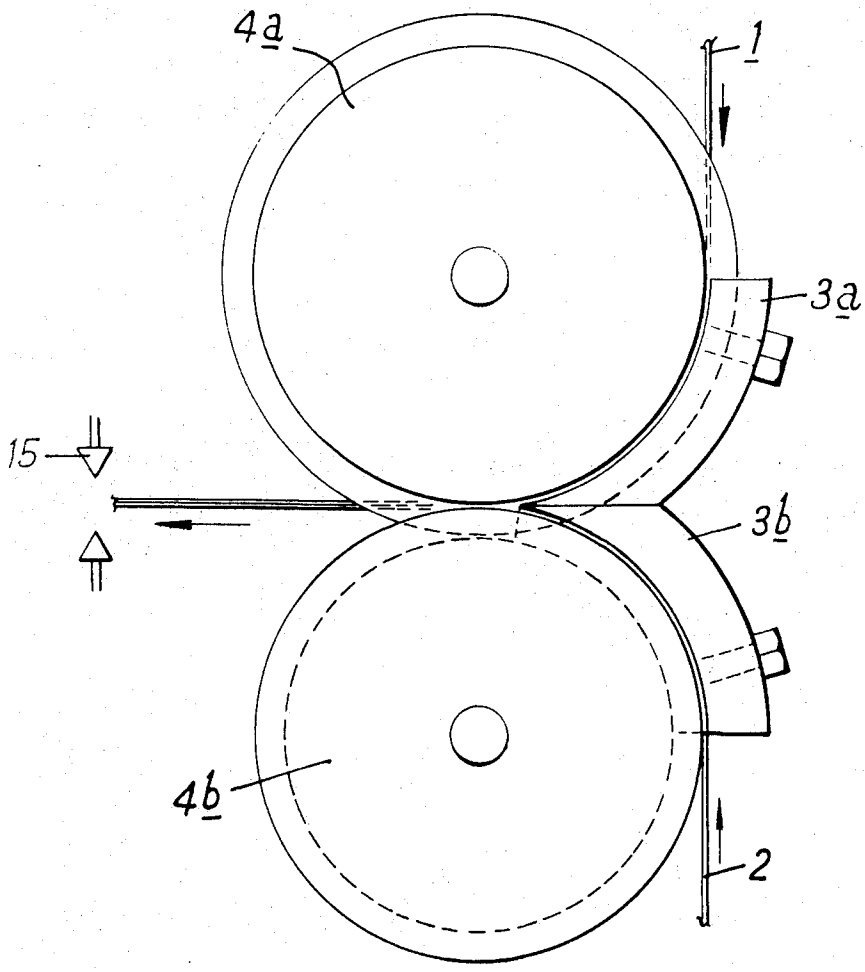


FIG. 1

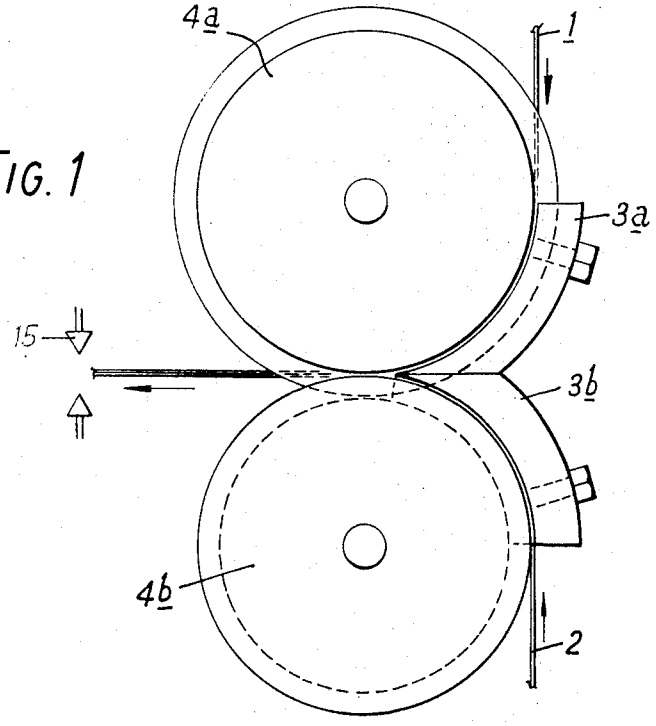
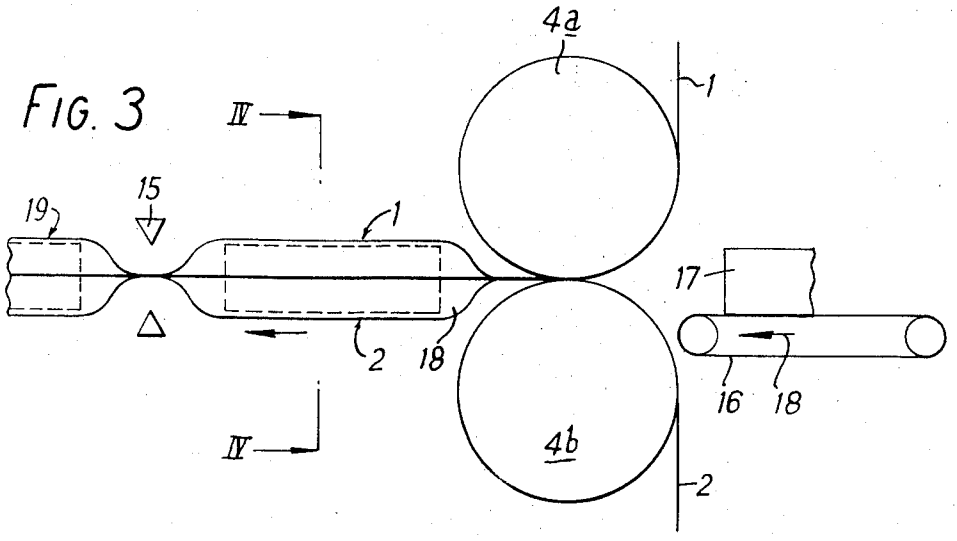


FIG. 3



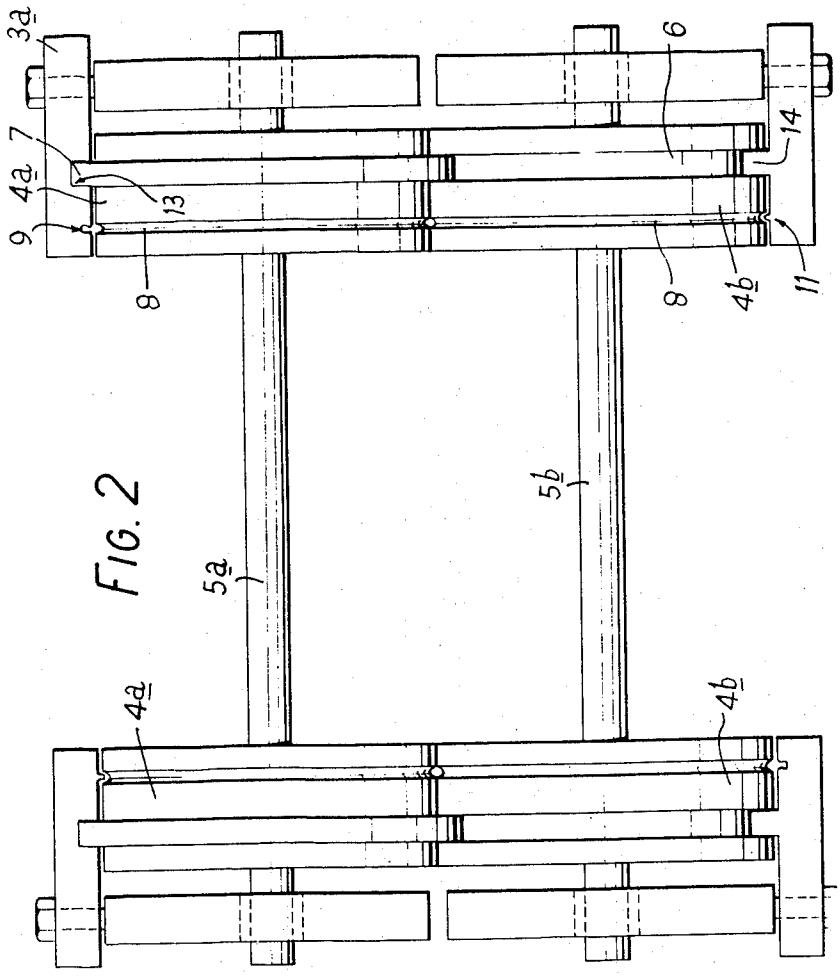


FIG. 2

FIG. 4

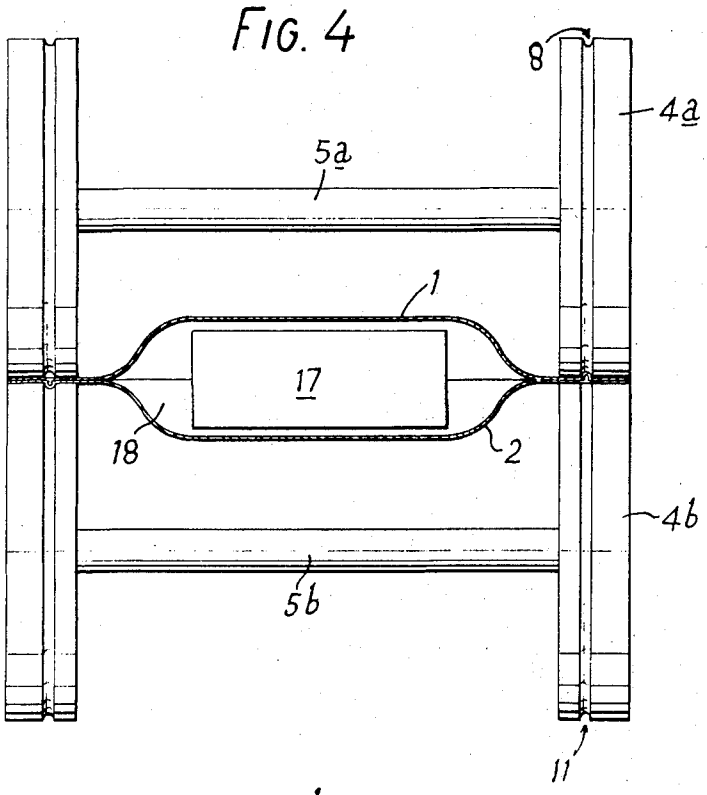


FIG. 5

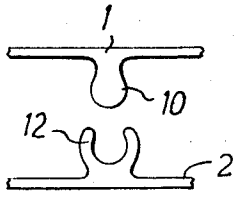


FIG. 6

APPARATUS FOR PRODUCING PACKAGING ARTICLES

This invention relates to sheet plastics packaging material incorporating two webs, one having an elongated male closure formation, and the other having an elongated female closure formation. The two formations are presented in alignment and are then pressed into holding engagement by pressure applied across the plane of separation of the webs. It is usual to press the two closure formations into engagement by applying pressure between the finger and thumb, or by passing the two webs through a die which causes the formations to be urged into engagement.

Because the closure takes place along the line of the formations, i.e., across the opening of a bag, it has hitherto not been possible to provide for automatic mechanical closing of a bag, after insertion of goods, in a machine in which there is continuous longitudinal feed of the bag making material.

According to the present invention a method of producing material for use in packaging includes the steps of (i) providing first and second continuous webs of sheet material each having longitudinally on a face thereof a respective one of a pair of elongated male and female closure formations, (ii) moving said first and second webs along closing paths with the respective formations presented towards each other, (iii) applying pressure to the male and female formations across the plane of separation of the webs so as to cause them to become interengaged and thereby define one of a first pair of opposed boundaries of the receptacle, said webs being initially, simultaneously, or subsequently to step (iii), joined longitudinally at a position spaced from said formations so as to define the other of said first pair of opposed boundaries.

In a first form, the other of said first pair of opposed boundaries is a fold line of a sheet of material common to both of the two webs.

In another form, the other of the said first pair of opposed boundaries is formed simultaneously by joining the webs longitudinally by carrying out the steps (i), (ii) and (iii) thereat.

In yet another form, the webs are joined longitudinally at the other of said first pair of opposed boundaries by effecting a heat-seal, bond, adhesion joint, or a line of stitching.

The webs may be joined transversely at spaced positions to define a second pair of opposed boundaries of a receptacle, e.g. by heat-sealing, possibly combined with severing of the webs transversely at or adjacent to the heat-seal.

A method of packaging articles comprises the steps of (a) producing packaging material in accordance with the method described above, (b) introducing an article between the two webs, and (c) joining the webs transversely at two spaced positions to define a second pair of opposed boundaries of a receptacle for the article. The webs are advantageously of compatible heat-sealable plastics material, and step (c) is a step of joining the webs transversely by heat-sealing. The webs may thereafter be severed transversely adjacent to or at the join performed in step (c) so as to produce separated article-containing packages.

Apparatus suitable for use in producing material for packaging articles comprises means for moving first and second webs along closing paths with respective

closure formations presented towards each other, means for applying pressure to the formations across the plane of separation of the webs so as to cause them to become interengaged to define a first boundary of a receptacle. Means may be provided for joining said webs longitudinally at a position spaced from said formations so as to define a second opposed boundary of the receptacle.

In a first form of apparatus, the means for moving the webs along closing paths and the means for applying pressure to the formations comprise a pair of rollers each having at its periphery a groove to receive a respective one of the closure formations, the grooves of the two rollers being aligned and dimensioned such that the closure formations are caused to be pressed into engagement with each other.

Guide means adjacent to each roller, may have, in alignment with the groove, a counterpart to the closure formation, the counterpart engaging with the formation to ensure that the formation remains aligned with the groove and is correctly fed into the groove.

In another form of apparatus the means for moving the webs along closing paths comprise a pair of rollers each having in its periphery a groove to receive a respective one of the closure formations, the grooves being aligned and being dimensioned to receive the closure formations without causing them to be pressed into engagement with each other, and the means for applying pressure to the formations to cause them to become engaged comprise a die.

In both forms of apparatus, the means for joining the webs longitudinally to define the second opposed boundary may comprise similar means as are provided for defining the first boundary.

The apparatus may further comprise means for joining the webs transversely to the direction of the closure formations, e.g. a heat-sealing means, which may effect a pair of joins spaced longitudinally of the closure formation. The joining means may reciprocate in the longitudinal direction of the closure formations.

Articles may be introduced between the webs manually or by feeding means.

Two embodiments of packaging machine and their method of operation are described with reference to the accompanying drawings, wherein:

FIG. **1** is a side elevation of engaging rollers;

FIG. **2** is an end elevation of the engaging rollers;

FIG. **3** is a schematic side elevation of a first form of packaging machine;

FIG. **4** is a section taken on the line IV—IV of FIG. **3**;

FIG. **5** is a section, to a very much enlarged scale, of a portion of two webs to show engagement of male and female formations;

FIG. **6** shows a second form of packaging machine.

For packaging articles in bags made of heat-sealable sheet plastics material, an upper web **1** and a lower web **2** are each fed from a reel through a pair of feeding cylinders, and then through respective guides **3***a* or **3***b* and over an arcuate path into the nip of the two pairs of formation-engaging rollers **4***a*, **4***b* spaced on common axles **5***a*, **5***b*. Each web has a male or a female closure formation (see FIG. **5**) slightly inboard of each edge. Each roller **4***b* has a channel **6** in which a flange **7** of the other roller **4***a* engages so as to retain the two rollers in precise axial relationship. Each roller also has a

shallow circumferential groove **8** aligned with the groove **8** of the other roller to receive the male or female closure formation, the combined depth of the two opposed grooves **8, 8** being such that the formations are pressed into full engagement. To keep each formation in alignment with a groove **8,** the guides **3***a* and **3***b* are formed to engage with the closure formation. The guide **3***a* has a shallow recess **9** to receive as a sliding fit the male rib **10** (FIG. **5**). The guide **3***b* has a rib **11** received as a sliding fit within the female closure formation **12.** In FIG. **2,** the guides **3***a* and **3***b* are shown at 180° separation, but during use of the machine they are positioned as shown in FIG. **1.**

The guide **3***a* has a recess **13** to receive the flange **7,** and the guide **3***b* has a tenon **14** to engage in the channel **6,** whereby each guide is kept positively in axial alignment with its respective rollers.

As the two webs **1** and **2** progress, the formations **10** and **12** are pressed into firm engagement, and the webs become thereby coupled together along both edges. Feed take-up means (not shown) may be provided downstream of the rollers to convey the completed bags along the feed path. Downstream of the closing rollers **4***a*, **4***b* there is a carriage supported device **15** for forming a transverse heat-seal, or tear-seal or cut-seal, at intervals in the superposed webs, to form the second pair of (transverse) boundaries. For step-by-step motion, the sealing means may be situated stationarily with respect to the feed movement, and operated sequentially as described, but two such sealing means **15** may be provided at an interval along the feed path, each to make one of the second pair of boundaries. For continuous movement, the sealing means **15** may reciprocate along the feed direction, and perform the heat-sealing without interrupting the feed movement.

FIGS. **3** and **4** show enclosing of an article between the two webs. A conveyor belt **16** feeds articles **17** in the direction of the arrow **18** between the two axially-spaced pairs of rollers **4***a* and **4***b*. The articles **17** become positioned between the webs **1** and **2** in an envelope or pocket **18.** A sealing means **15** effects transverse sealing, or tear-sealing, or sealing and cutting of the webs, resulting in a succession of enclosed articles **19.** The webs **1** and **2** are coupled longitudinally by the male and female engaging portions, and transversely by the two seals. The package can be opened by pulling apart the webs along one or both of the longitudinal edges.

In FIG. **6** the webs **1** and **2** pass round respective rollers **20***a* and **20***b* which are the same as the rollers **4***a* and **4***b* but which have grooves corresponding to the grooves **8, 8** which are deep enough to receive the respective closure formations without pressing them into mutual engagement. Accordingly, the rollers **20***a* and **20***b* serve to bring the webs into parallel position, and the upper roller **20***a* is spring-loaded so that the two webs are gripped between the rollers, at each side of the closure formations, and the rollers thereby assist in moving the webs along their path. The parallel webs pass to a simple closure die **21** in which the webs travel along convergent paths until their closure formations engage. The remainder of the operation is as described above for FIGS. **3** to **5.**

I claim:

1. Apparatus, for producing material for use in packaging, comprising respective pairs of rollers for moving along closing paths first and second continuous webs of sheet material each having longitudinally on a face thereof a respective one of a pair of elongated male and female closure formations, the respective closure formations being presented towards each other, each roll having in its periphery a groove to receive a respective one of the closure formations, the grooves being aligned and being dimensioned to receive the closure formations without causing them to be pressed into engagement with each other, and a die for applying pressure to the formations across the plane of separation of the webs so as to cause them to become interengaged to define a boundary of a receptacle.

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