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Kuhnle

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[54] **APPARATUS FOR INFLATING BAGS**

[75] Inventor: **Paul Kuhnle,** Winnenden, Germany

[73] Assignee: **Fr. Hesser Maschinenfabrik,** Stuttgart, Germany

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[52] **U.S. Cl.** **53/385**

[51] **Int. Cl.** **B65b 43/36**

[58] **Field of Search** 53/385; 141/68, 166; 15/304

[56] **References Cited**

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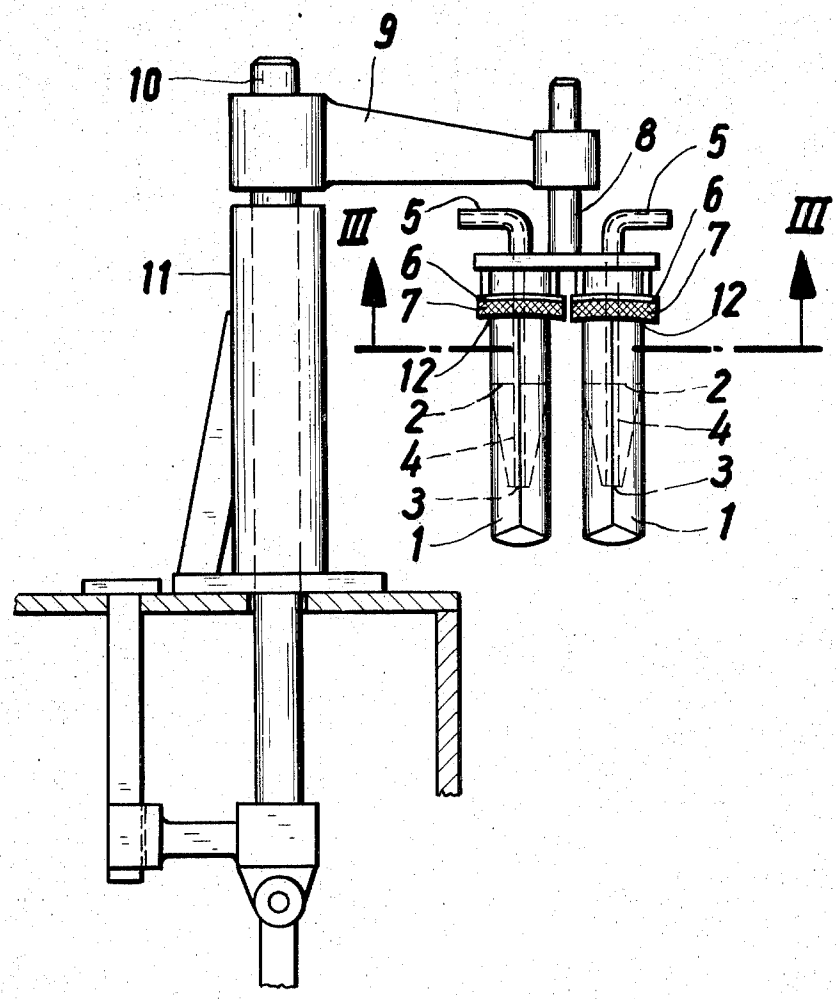
Primary Examiner—Travis S. McGehee

Attorney—Edward E. Sachs

[57] **ABSTRACT**

Apparatus for inflating a bag, as part of a process for automatically filling the bag, by inserting a mandrel, provided with an air outlet, into the bag and causing an elastomeric collar on the mandrel to engage the edges of the bag opening to provide a temporary seal therebetween.

7 Claims, 3 Drawing Figures



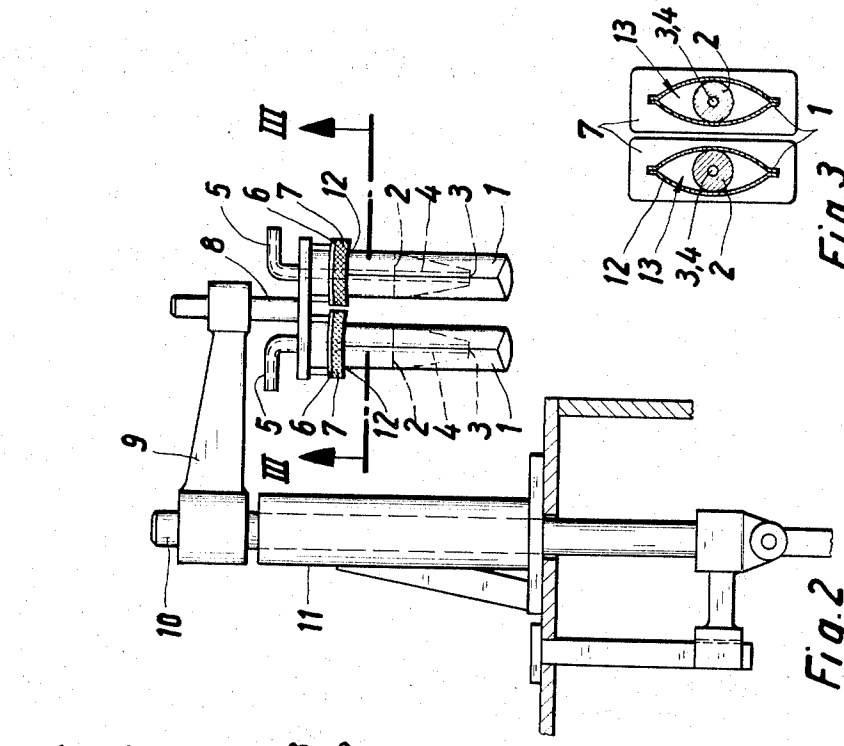


Fig. 2

Fig. 3

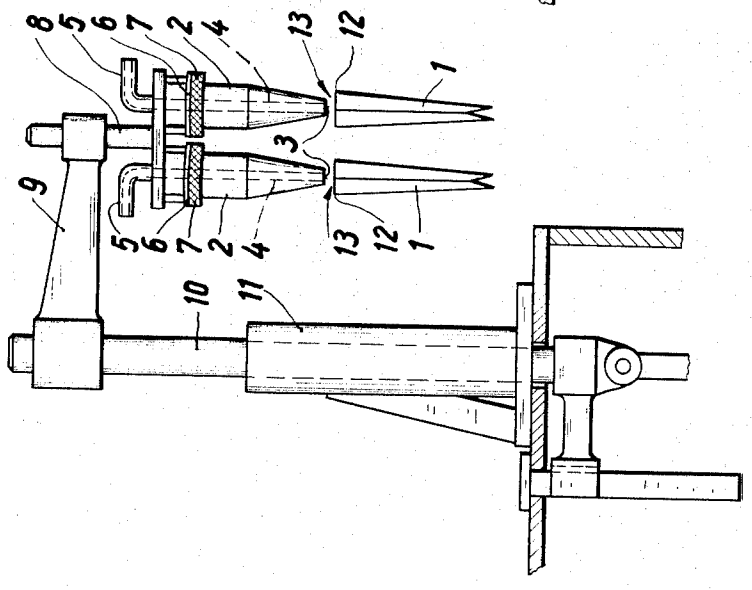


Fig. 1

APPARATUS FOR INFLATING BAGS

The invention relates to an improved packaging apparatus by means of which bags are opened by compressed air. Such devices are used in conjunction with, or as a part of, automatic bag filling and closing equipment.

In the prior art a device is already known for inflating square-bottom bags. The device comprises a chamfered mandrel, an air blow nozzle connected to an air-supply line and a pair of aspirators. The mobile aspirators make it possible to open square-bottom bags by inserting the mandrel into the neck of the bag so that the air emerging from the nozzle is effective to unfold and inflate the bag. In order to keep the consumption of air within acceptable limits, the cross section of the mandrel is selected to establish relatively small air-outlet gaps between the mandrel and the bag. As long as the neck of the bags always has the same peripheral dimensions, the device operates satisfactorily. However, when the effective circumference of the neck is less than the predetermined minimum dimension, the bag is frequently damaged at the time the mandrel is inserted, or bursts while being inflated. On the other hand, if the peripheral dimension of the bag is relatively too large, the pressure introduced into the bag is insufficient to inflate it, or an arrangement must be provided to automatically increase the air supply.

These disadvantages are a particular problem with bags of the type which are formed by applying transverse sealing seams to center fold endless web packing material. Herein, the transverse seams are centered in relation to the pressure pattern which only occurs when a certain displacement of the pressure pattern in relation to the seams is exceeded. This produces bags in which the dimension of the seams deviate from the standard or desired dimension.

In order to eliminate these disadvantages, it is proposed according to one aspect of the present invention to arrange around the mandrel a resilient collar, in such a manner that when the mandrel is introduced into the bag, the collar bears resiliently against the edge of the bag opening.

Another aspect of the present invention resides in the provision of a packaging apparatus in which the resilient collar is made of an open pore foam-like material to enable that the resilient collar can deform easily and adapt itself to the dimension of the bag opening without damaging the bag.

It is therefore the primary object of the present invention to provide a more versatile packaging apparatus by means of which bags can be quickly inflated, in conjunction with automatic machinery, without damaging the bags.

For a better understanding of the present invention, together with other and further objects thereof, reference is had to the following description taken in connection with the accompanying drawings, and its scope will be pointed out in the appended claims.

In the drawings:

FIG. 1 is a schematic side view of the apparatus showing the bags below the mandrels;

FIG. 2 is a view similar to FIG. 1, illustrating the bags in situ; and

FIG. 3 is a cross sectional view taken along line III—III of FIG. 2.

Referring now to the drawings, there is shown an apparatus designed to open and inflate simultaneously two bags 1, and equipped, to this end, with two tapered mandrels 2, each having a nozzle outlet 3 and containing therein a conduit 4 terminating at the outlet 3. The conduit 4 extends through the mandrel and is connected to an air supply pipe 5, which in turn is connected to a conventionally regulated source of air under pressure. Attached to the top of each tubular mandrel 2, substantially transversely to the longitudinal axis thereof, is a retaining plate 6 carrying secured to its bottom face a resilient collar 7 which circumferentially encloses the mandrel 2.

The mandrels 2 are jointly attached to a support means 8 composed of a suspending rod and plate structure, with the rod receiving an arm 9 which in turn is connected to a rotatable shaft 10. The shaft 10 is mounted in a bearing 11 so that it can move parallel with the axis of the bag to be inflated and the shaft is raised and lowered by means of a drive, not shown.

The bags 1 to be inflated are placed in a pre-opened condition below mandrels 2 by means of a conveyor device known per se, but not shown, for example, conveyor tongs fitted to a chain. The mandrels 2 are then lowered into the bags until the flat bottom face of each resilient collar 7, which extends perpendicular to the length direction of the bag, abuts edge 12 of openings 13 of the bag so as to establish a seal therebetween. The insertion of the mandrels 2 into bags 1 causes the opening of the bags to be widened. Thereafter, air is blown through the nozzle outlets 3 into the bags to completely open them. The air supply is shut off before mandrels 2 are withdrawn. During this process step, the seal between the edges 12 and the collar is maintained.

The resilient collars 7 are preferably made of an elastomeric porous foam material, or an equivalent thereof. As already indicated above, the bottom faces of collars 7 are biased against edges 12 of bags 1 into an abutting relationship, causing a slight deformation without, however, doing damage to the peripheral edges 12. A certain amount of the air can escape through the pores of the foam material, thus restricting the pressure within the bags within certain limits, thereby establishing a degree of air pressure control. This ensures that the bag will be adequately inflated but will not burst.

The cross section of mandrel 2, in the vicinity of its upper end, is suitably selected to be similar to the cross section of the filler connection of a bag filling device, not shown. The mandrel 2 and the filling device can both be aligned with the path along which the bag is conveyed on the pack-again machine (not shown). This has the advantage of ensuring that the openings 13 of the inflated bags are positioned to coincide correctly with that of the filling device.

The arrangement of the resilient collars 7 makes it possible to inflate bags of a variety of circumferential dimensions utilizing a single mandrel; the main consideration being that the edge 12 does not protrude beyond the radial periphery of the collar. However, a mandrel of a different size may be desirable or necessary when the cross section of the filling device outlet is not suitably designed to accept such other sizes.

For many types of bags the most desirable configuration of plate 6 and collars 7 will be concave; however, ultimately, such configuration is dictated by the spatial projection of the bag during the inflating step.

At least one of retaining plates **6** is, optionally, adjustable in height relative to the mandrel which carries the plate, so that the depth of penetration of one bag edge **12** into the resilient collar **7**, is independent of the penetration of the adjacent bag of the second collar.

While there have been described what are at present considered to be the preferred embodiments of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is aimed, therefore, in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. In a packaging system having an apparatus for inflating bags, comprising:

a bag opening mandrel; an air conduit terminating with a nozzle within said mandrel and together being adapted to be inserted into a bag for inflating the latter;

a collar of resilient material arranged around the circumference of said mandrel at a location spaced from said air nozzle and effective to resiliently bear against the edge of the bag opening upon insertion of the mandrel into the bag for establishing a seal therebetween.

2. Apparatus according to claim **1**, wherein the bottom face of said collar is flat and extends radially from the mandrel.

3. Apparatus according to claim **2**, wherein the plane of said flat face of the collar is arranged perpendicular to the length direction of the bag.

4. Apparatus according to claim **1**, wherein said collar is composed of an open pore foam material.

5. Apparatus according to claim **4**, wherein said material is elastomeric.

6. Apparatus according to claim **1**, and structural means supporting said collar for relative vertical motion between said collar and said mandrel.

7. Apparatus according to claim **2**, wherein said bottom face has a concave configuration.

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