Sept. 5, 1967 M. J. H. HALEY 3,339,441

FEEDING AND CORRUGATING MEANS FOR PACKAGE WRAPPING MACHINE

Filed May 17, 1965 2 Sheets-Sheet 1

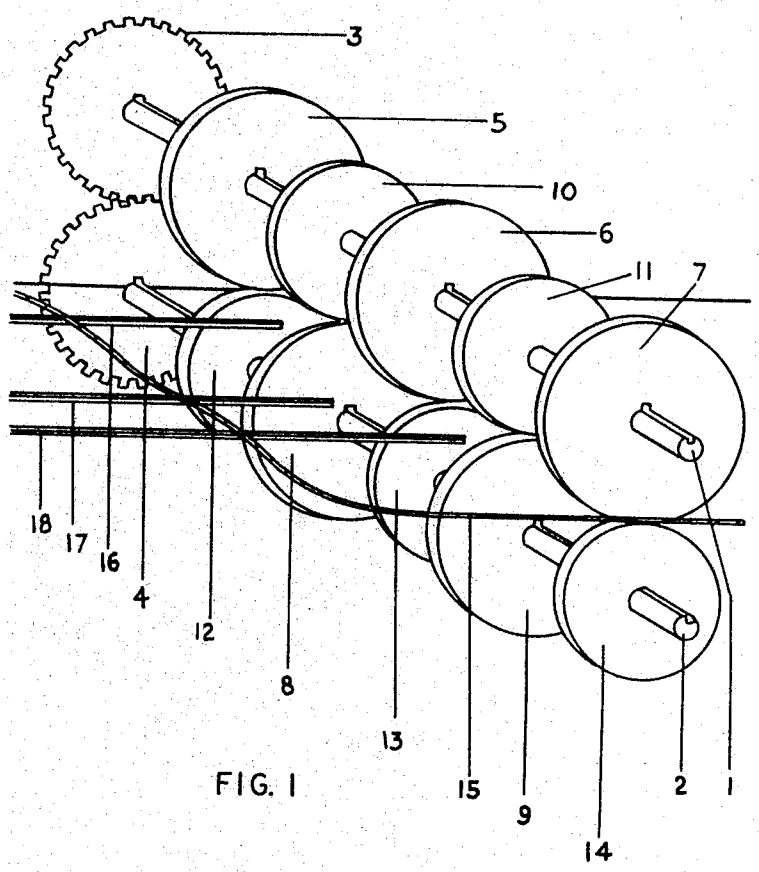


FIG. 1

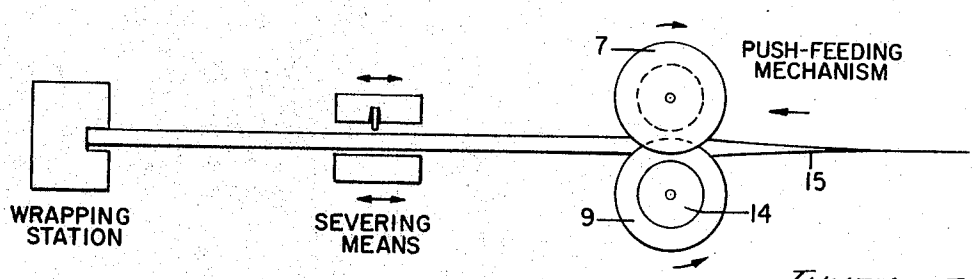


FIG. 3

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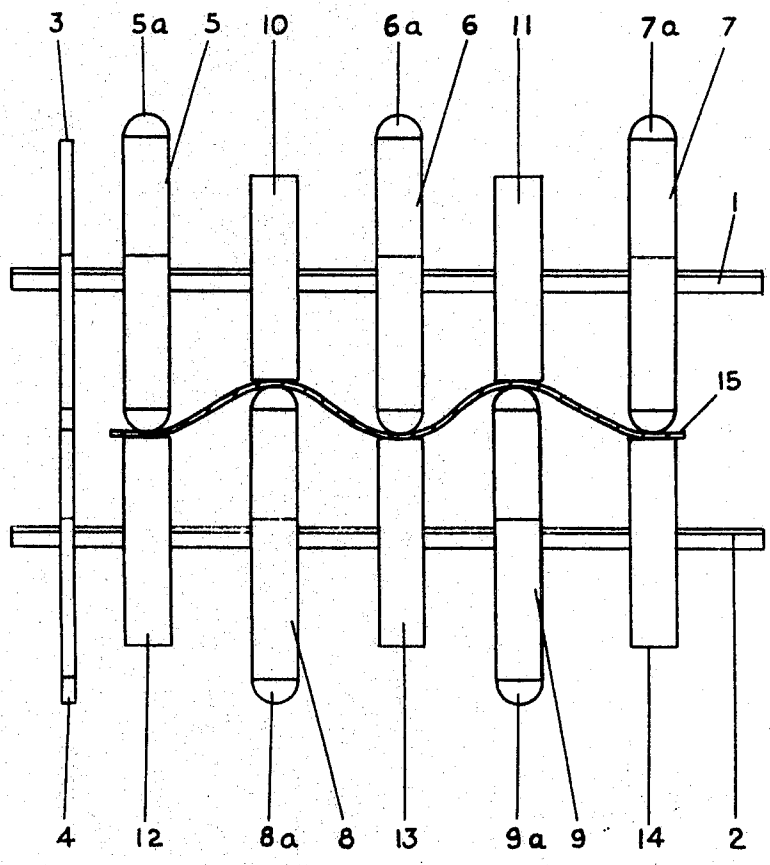


FIG. 2

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FEEDING AND CORRUGATING MEANS FOR PACKAGE WRAPPING MACHINES

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5 Claims. (Cl. 83—176)

This invention relates to improvements in or relating to packaging machinery.

In packaging machines where an article is wrapped in film, such as organic thermoplastic film, it is often necessary to feed the film over a considerable distance between the film off-wind station and the wrapping station. For at least the latter part of this distance the film has to be push-fed rather than pulled. With thin films, particularly those less than 0.001 inch in thickness, such push feeding becomes very difficult to achieve without buckling and crumpling the film, and various devices have been used to overcome this defect. For example, the film leaving the push-feeding device, which may consist of a pair of parallel contra-rotating rollers forming a nip through which the film passes, can be fed onto a wire frame which is arranged so that longitudinal corrugations are formed in the film, thus making it less likely to buckle. The change of shape from flat, on leaving the feeding rollers, to corrugated in iteslf requires a certain rigidity in the film in order to overcome the bending and frictional forces encountered and for thin films this method is not always satisfactory.

It is an object of our invention to overcome this fault. Accordingly we provide a packaging machine comprising a film wrapping station, means for push-feeding continuous lengths of the film to the wrapping station and means for severing portions of said film of predetermined length, the severing means being positioned between the push-feeding means and the wrapping station and adapted to act upon said film in co-operating relationship with the push-feeding means, wherein the push-feeding means is adapted to impart longitudinal corrugations to said film.

The push-feeding means may conveniently comprise two parallel shafts adapted to be contra-rotated at equal speeds on which are mounted at intervals along the length of the shafts pairs of rollers consisting of a first roller mounted on one shaft and a second roller of smaller diameter than said first roller mounted on the other shaft, one of said rollers in each pair being keyed to its shaft and the other free to rotate about its shaft, so that when film is passed between the opposed surfaces of two rollers constituting a pair, the freely rotatable roller in each pair is driven by frictional forces transmitted through the film from the driven roller in said pair, each shaft carrying both large and small rollers, each roller of one size being keyed to its shaft and each roller of the other size being free to rotate about its shaft.

The corrugations imparted to the film by the push-feeding means are preferably maintained during its passage to the wrapping station by means of parallel longitudinal members over which the peaks and troughs of said corrugations are adapted to move. These longitudinal members may consist of a number of parallel wires over which the film is passed and which are arranged in such a way that the peaks of the corrugations in the film imparted by the push-feeding means pass over alternate wires and the troughs of the corrugations pass under the others.

Our invention also provides a process for transporting a continuous length of film to a cutting zone where it is cut transversely to produce portions of film of a suitable size for wrapping articles therein, in which the film is

forwarded to said cutting zone by push-feeding means which imparts longitudinal corrugations to said film and is thereafter subjected to a series of spaced apart transverse cuts in said cutting zone.

The invention is illustrated but in no way limited by reference to the accompanying drawings wherein:

FIGURE 1 is a perspective view of the push-feeding mechanism of a film wrapping machine according to our invention.

FIGURE 2 is a sectional elevational view through the push-feeding mechanism.

FIGURE 3 is a schematic view of various components used in combination with the feeding mechanism of this invention.

In the figures the push-feed mechanism is shown to be operating in the horizontal plane but our invention is in no way limited to this method of operation.

In FIGURE 1 parallel shafts **1** and **2** carry at one end identical intermeshing gears **3** and **4** which are keyed to their shafts. Rollers **5**, **6** and **7** are keyed to shaft **1** and rollers **8** and **9** to shaft **2**. Rollers **5** to **9** are identical in size and are fitted with rubber tyres **5***a* to **9***a* as shown in FIGURE 2. Freely rotating ball races **10** and **11** are mounted about shaft **1** so that they are in circumferential contact with rollers **8** and **9**, and ball races, **12**, **13** and **14** are similarly arranged about shaft **2**.

In operation, shaft **1** is driven by means not shown and drives shaft **2** through intermeshing gears **3** and **4**, and film **15** is forwarded from right to left in FIGURE 1, being forced to adopt a corrugated shape on passage through the system of rollers, which shape is maintained by wires **16**, **17** and **18** along which it is fed to the cutting and wrapping mechanisms (not shown).

The drive to the rollers may be continuous or intermittent. In the case of a continuous drive the cutting mechanism is adapted to travel along with the film while making the cut, for instance by mounting the cutting blade on a rotating cylinder, the circumference of which travels at the same linear speed as or fractionally faster than the film. In the case of an intermittent drive, there may be used a cutting blade which has a reciprocating action normal to the direction of movement of the film and operates during the stationary part of each intermittent motion of the rollers. These alternative methods of working ensure that the cutting means and the push-feeding means act in co-operating relationship.

It will be understood that the diameters of the fixed rollers and of the ball races and the differences between these diameters may be varied over any convenient range. The numbers, the spacing and the width of the rollers and the ball races may be varied so that any desired width and depth of corrugation may be obtained in the film. The profiles of the rollers and/or ball races may be varied at the point of contact with the film, for instance, by altering the shape of the tyre fitted to the rollers.

Our invention is suitable for use over the normal range of film speeds used in packaging machinery, e.g. from 50 ft./min. to 175 ft./min., although faster speeds may be attained if necessary, and films of thickness down to about 0.0005 inch can be successfully fed without buckling.

Suitable wrapping materials which may be used in conjunction with our invention include films made from such polymeric materials as polythene, polypropylene, polyvinyl chloride, polyethylene terephthalate and cellulose acetate and other sheet materials such as paper and aluminium foil.

I claim:

1. In a packaging machine having a film wrapping station and a severing means for severing portions of film of predetermined length, the improvement comprising a

push-feeding means adapted to impart longitudinal corrugations to said film and positioned such that the severing means is between said push-feeding means and the wrapping station, said push-feeding means further comprising two parallel shafts adapted to be contra-rotated at equal speeds on which are mounted at intervals along the length of the shafts pairs of rollers consisting of a first roller mounted on one shaft and a second roller of smaller diameter than said first roller mounted on the other shaft, one of said rollers in each pair being keyed to its shaft and the other free to rotate about its shaft.

2. A packaging machine according to claim 1 in which the drive to the rollers is continuous.

3. A packaging machine according to claim 1 in which the drive to the rollers is intermittent.

4. A packaging machine according to claim 1 in which the severing means is adapted to travel along with the film while making the cut.

5. A packaging machine according to claim 3 in which the cutting mechanism is a cutting blade which has a reciprocating action normal to the direction of movement of the film and operates during the stationary part of each intermittent motion of the rollers.

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