

Nov. 19, 1957

A. HOPTON
WRAPPING MACHINES

2,813,387

Filed May 11, 1956

3 Sheets-Sheet 1

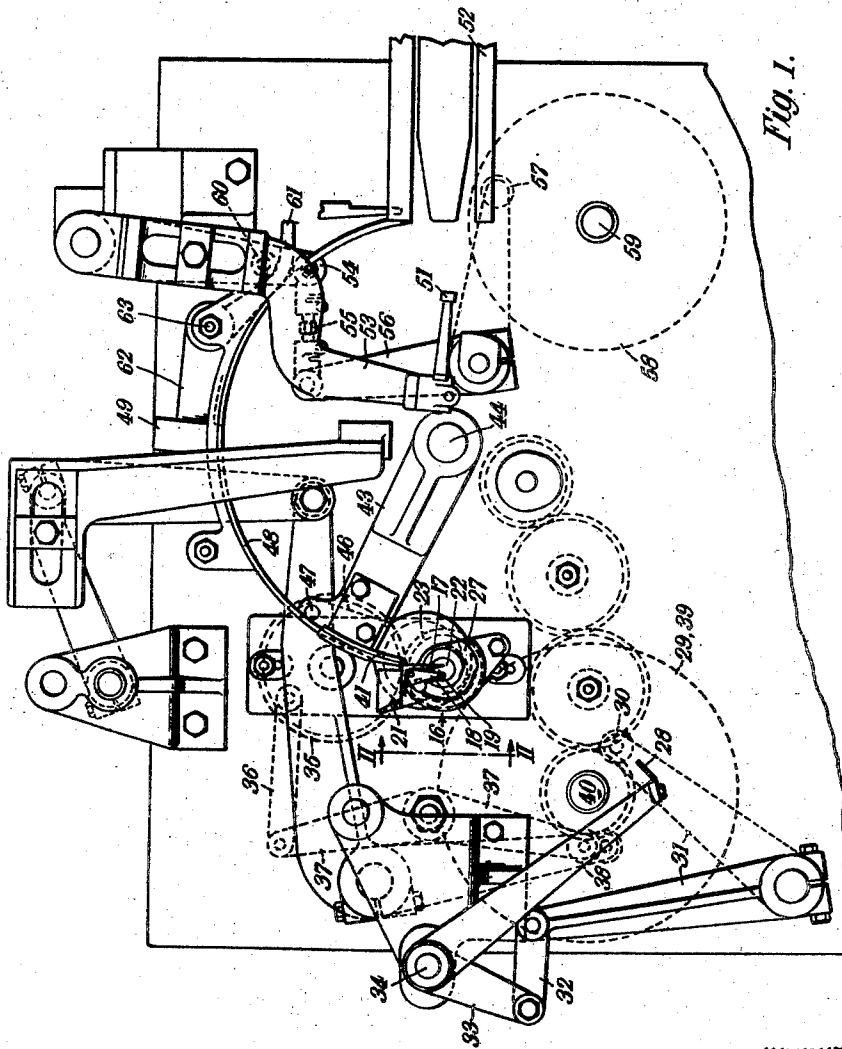


Fig. 1.

INVENTOR

ALAN HOPTON

By

Watson, Cole, Grindle & Watson

ATTORNEYS

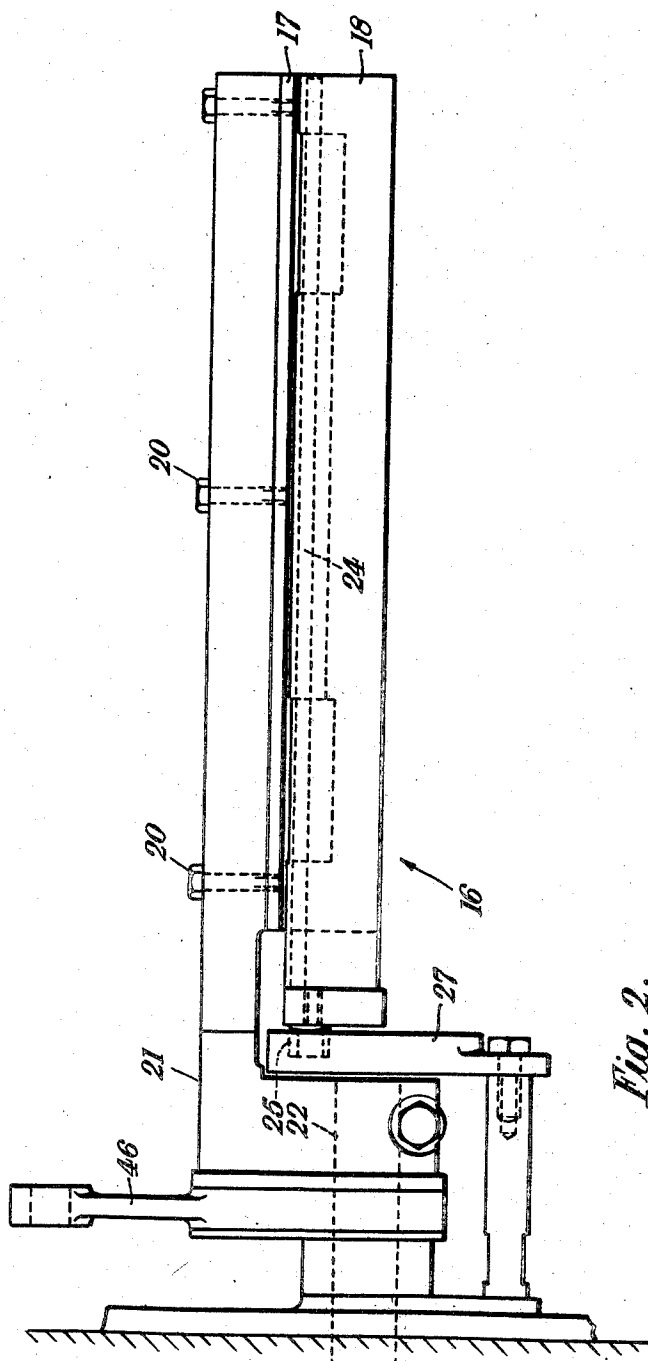
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3 Sheets-Sheet 3

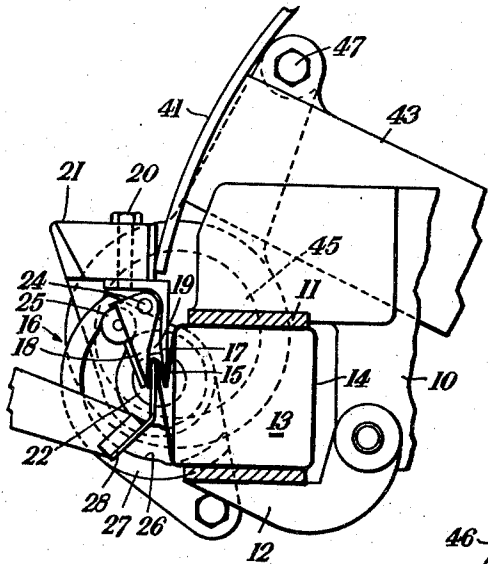


Fig. 3.

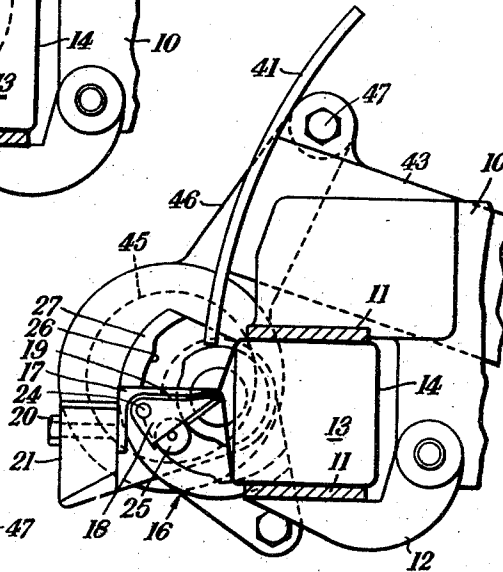


Fig. 4.

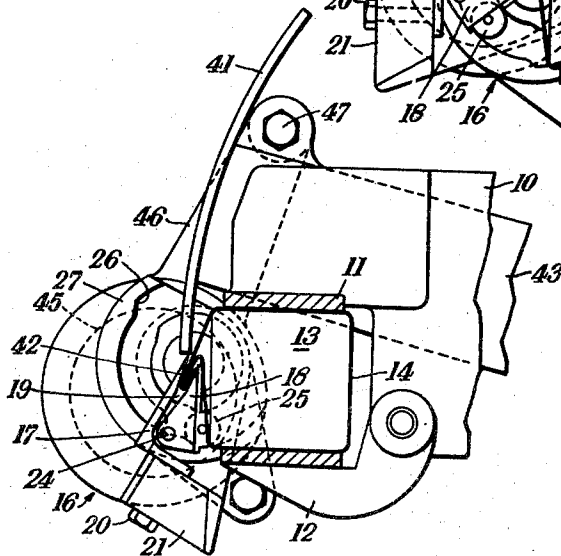


Fig. 5.

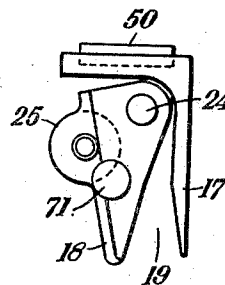


Fig. 6.

INVENTOR

ALAN HOPTON

By
Watson, Cole, Grindle & Watson
ATTORNEYS

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WRAPPING MACHINES

Alan Hopton, Stourton, Leeds, England, assignor to The Forgrove Machinery Company Limited, Leeds, England, a British company

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Claims priority, application Great Britain February 23, 1956

3 Claims. (Cl. 53—229)

This invention relates to a wrapping machine for wrapping stacks of loose biscuits, or other thin articles of similar shape, of the type comprising an intermittently moving wrapping wheel, mounted to rotate on a horizontal axis, for transporting the stacks of biscuits in succession, each with a wrapper folded in U formation about it, from a loading station to a folding station, a rotary folder at the folding station mounted for rotation about an axis parallel to that of the wrapping wheel, an oscillating tucker blade for pressing into a cleft in the rotary folder the projecting wings of the wrapper associated with each stack of biscuits arriving at the folding station, thereby forming the first portion of a double fold, and means for rotating the rotary folder, after withdrawal of the tucker blade from the cleft, in relation to the stationary biscuits to form the second portion of the double fold, the rotation of the rotary folder moving the same from its receiving position to a discharge position in which it permits of withdrawal of the double fold from the cleft on continued rotation of the wrapping wheel.

This mechanism, which is described in United States Patent No. 2,612,740, and more fully in U. S. Patent No. 2,672,717, has been found effective to form the double fold in the wrapper when the wrapper is a relatively thin single wrapper of a material such as a heat sealing cellulose film. Recently, however, thicker wrapping materials have come into common use, for example laminated materials of various kinds and also double wrappers, e. g. of cellulose film and vegetable parchment. These less pliable wrapping materials, or combinations of wrapping materials, tend to offer high resistance to insertion into the cleft in the rotary folder by the oscillating tucker blade if the cleft in the rotary folder is made too narrow, while if the cleft is made wider to reduce this resistance the wrapping material is not sufficiently well creased to form a good double fold.

According to the present invention, the cleft in the rotary folder of a wrapping machine of the above type is defined by a pair of relatively movable jaws which define a relatively wide cleft when the rotary folder is in its receiving position and cam operated mechanism is provided which serves, as a rotary folder moves from its receiving to its discharge position, first to approach the jaws so as positively to crease the double fold in the wrapping material, and thereafter to open the jaws again. In this way, the cleft can be made sufficiently wide to ensure that the wrapping material will be effectively inserted into the cleft by the oscillating tucker blade and also sufficiently wide, when the rotary folder is in its discharge position, to allow of easy withdrawal of the double fold, while at the same time the wrapping material will be effectively creased during movement of the rotary folder from its receiving to its discharge position to form a good double fold.

In the machine described in United States Patent No. 2,612,740 the stacks of biscuits are carried by the wrapping wheel from the folding station to a pressing station and

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thence to a discharge station. At the pressing station a presser presses the double fold and, in the case of a wrapper of heat sealing material, the presser is constituted by a heat sealing member which forms a heat seal on the package at the double fold. I have found that with the thicker wrapping materials, or combinations of wrapping materials, the heat sealing member does not dwell in contact with the package for long enough to transmit the heat through the folded thicknesses of wrapping material and so seal the double fold down on to the package itself.

According to the present invention, this difficulty is circumvented by embedding heating elements in or attaching them to one or both jaws of the rotary folder. These heating elements are preferably electrical. When thick or multiply heat sealing wrappers are used, the heating element or elements associated with the rotary folder may be switched on, with the result that, owing to the pre-heating of the double fold by the rotary folder, there will be considerable residual heat in the double fold by the time it reaches the pressing station, and this ensures that the additional heat applied by the heat sealing member at that station will securely seal the double fold to the package. When non-heat-sealing wrapping materials, e. g. vegetable parchment, are being handled the heating elements at the folding station and at the pressing station may be switched off.

One specific embodiment of wrapping machine according to the invention will now be described in detail, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a front elevation of part of the machine, with the wrapping wheel removed, showing the mechanism for forming the double fold,

Fig. 2 is a section on the line II—II in Fig. 1,

Figs. 3—5 are detail views on a large scale, showing successive positions assumed by the mechanism for forming the double fold, and

Fig. 6 is a view, on a still larger scale, showing the jaws of the rotary folder.

Like reference numerals designate like parts throughout the figures.

The machine illustrated in the drawings is, in principle, similar to that described in United States Patent No. 2,672,717. It includes a wrapping wheel 10 (Figs. 3—5) fixed to a horizontal shaft which is given an intermittent motion by means of a Geneva mechanism, turning through 90° at each step. The wrapping wheel has four holding pockets, each constituted by a fixed jaw 11, a movable jaw 12 spring-pressed towards the fixed jaw, and a pair of tuckers (not shown) for gripping the end biscuits of a stack of biscuits contained within the pocket. The intermittent movement of the wrapping wheel moves the stacks of biscuits in succession from a loading station to a folding station, then to a pressing station and finally to a discharge station.

The stacks of biscuits (one of which is indicated at 13 in Figs. 3—5) are lifted in succession into the pockets at the bottom position of the wrapping wheel, which constitutes the loading station, a wrapper (shown at 14 in Figs. 3—5) being fed, by any suitable wrapper feed mechanism, into position between the lifter and the wrapping wheel at each cycle of operation of the lifter, so that the wrapper is carried by the article into the pocket and thereby folded in U-formation about the article.

The wrapping wheel then rotates through 90° to bring the stack of biscuits to the folding station. Here, as indicated in Fig. 3, the upper projecting wing 15 of the wrapper comes into contact with a rotary folder 16 (see also Fig. 1) constituted by a pair of jaws 17, 18 forming a cleft 19 between them.

The jaw 17, which is of angle section, is fixed by bolts

20 (Fig. 2) to a carrier 21 attached to a shaft 22 carrying a gear wheel 23 (Fig. 1) by which rotary motion is imparted to the folder as later described. The other jaw 18, which is of triangular shape, is hinged by a pin 24 and to the jaw 17 carries a follower 25 (Figs. 3-5) which coacts with a track 26 in a fixed cam 27.

On arrival of an article at the folding station, the cleft 19 in the rotary folder is open as shown in Fig. 3. An oscillating tucker blade 28 is then moved from the position shown in Fig. 1 to that of Fig. 3 to force the projecting wings of wrapper into the cleft, as shown in Fig. 3, to form the first part of a double fold in the wrapper, and thereafter returns to the position of Fig. 1. The tucker blade 28 is actuated by a cam 29 (Fig. 1) on the cam shaft 40 through the agency of a follower 30, a bell crank 31, a link 32 and an arm 33 fixed to a shaft 34 carrying the tucker blade.

The gear wheel 23 for rotating the rotary folder meshes with a gear wheel 35 coupled by a link 36 to a bell crank 37 carrying a follower 38 coacting with a cam 39 on the cam shaft 40. After the tucker blade 28 has withdrawn from the cleft 19 in the rotary folder, the cam 39 actuates the gear wheel 35 to rotate the folder 16 from the receiving position shown in Fig. 3, in which the cleft 19 faces downwardly, to a discharge position, shown in Fig. 5, in which the cleft faces upwardly, this action forming the second part of the double fold. As the rotary folder moves from the position of Fig. 3 to that of Fig. 5, the follower 25 first presses the movable jaw 18 against the fixed jaw 17, as shown in Fig. 4, to crease the double fold in the wrapping material and thereafter moves the jaw 18 away from the jaw 17 so that, by the time the rotary folder reaches the discharge position (Fig. 5) the cleft 19 is again open to permit of easy withdrawal of the double fold from the rotary folder as the result of continued rotation of the wrapping wheel.

As the rotary folder moves into the discharge position a fold retaining blade 41 is moved into position, as shown in Fig. 5, to press the double fold 42 against the package as it is pulled out of the cleft 19 in the rotary folder. The retaining blade 41 is mounted on an arm 43 pivoted to the wrapping wheel shaft 44 (Fig. 1) and coupled to the rotary folder by an eccentric 45 fixed to the rotary folder, a link 46 embracing the eccentric and a pin 47. This coupling, as already stated, brings the retaining blade 41 into the operative position shown in Fig. 5, when the rotary folder 16 is rotated into the discharge position, and returns the retaining blade 41 into inoperative position when the rotary folder 16 is afterwards turned back into its initial receiving position (Fig. 3), this action taking place after the wrapper has been withdrawn from the rotary folder.

An arcuate plate 48 extends around the wrapping wheel between the folding station and the pressing station and maintains the double fold pressed against the package. Here a heated sealing member 49 is caused to descend on the double fold. This heat sealing member, which is moved from the ejector mechanism which will shortly be described, presses resiliently on the double fold and forms a heat seal in the package at that point. Where a non-heating sealing wrapping material is used, e. g. parchment paper, the heat sealing member is not heated and serves merely to press the double fold. The effect of heat sealing the double fold is to lock the wrapper securely to the package, so that it cannot come off except if it be torn. An electrical heater 50 is inserted into the fixed jaw 17 of the rotary folder as shown in Fig. 6 for the

purpose of preheating the double fold at the folding station. The heater is, of course, switched off when non-heat-sealing wrapping materials are being handled. The heater may, alternatively or in addition, be fitted at 71 to the movable jaw 18 of the double folder. Alternatively, heaters may be fitted to both jaws of the double folder. Again the heater or heaters may be embedded in the jaw or jaws of the double folder.

The next step of movement of the wrapping wheel brings the package to the discharge station. Here a cam operated ejector plunger 51 (Fig. 1) acts to force the package out of the wrapping wheel and on to a discharge platform 52. The ejector plunger 51 is mounted on an arm 53 fixed to an arm 54. The arm 54 is coupled by a link 55 to a bell crank 56 carrying a follower 57 coacting with a cam 58 on a cam shaft 59. The arm 54 carries a roller 60, which coacts with a tail 61 on an arm 62 carrying the top presser 49 to rock the arm 62 about a pivot 63, and so imparts the necessary movements, under control of the cam 58, to the heat sealing top presser.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a wrapping machine for wrapping loose biscuits and the like, the combination of a wrapping wheel mounted for intermittent rotation about an axis and arranged to transport in succession to a folding station stacks of biscuits, each with a wrapper folded around it in U-formation, a rotary folder at the folding station mounted for rotation about an axis parallel to that of the wrapping wheel from a receiving to a discharge position, said rotary folder comprising a pair of relatively movable jaws defining between them a cleft of substantial width when said rotary folder is in the receiving position, an oscillating tucker blade which operates, on arrival of each stack of biscuits at the folding station, to press the projecting portions of the wrapper into said open cleft and thereby to form the first portion of a double fold in the wrapper, means for rotating said rotary folder, after withdrawal of said tucker blade from said cleft, into its discharge position, said rotary folder forming the second portion of the double fold by such rotation and permitting in its discharge position the double fold to withdraw from said cleft on continued rotation of said wrapping wheel, and jaw operating means operative during rotation of said rotary folder from the receiving to the discharge position first to approach said jaws so as positively to crease said double fold and thereafter to open said jaws again.

2. A combination as claimed in claim 1, wherein one of the jaws of said rotary folder is fixed and the other jaw is pivoted to said fixed jaw and wherein said jaw operating means comprises a stationary cam and a follower attached to said pivoted jaw and cooperating with said stationary cam.

3. A combination as claimed in claim 1, wherein said rotary folder comprises a heating element for preheating said double fold during formation thereof at the folding station and comprising a heat sealing member for applying pressure to said double fold after withdrawal thereof from the cleft in the rotary folder.

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