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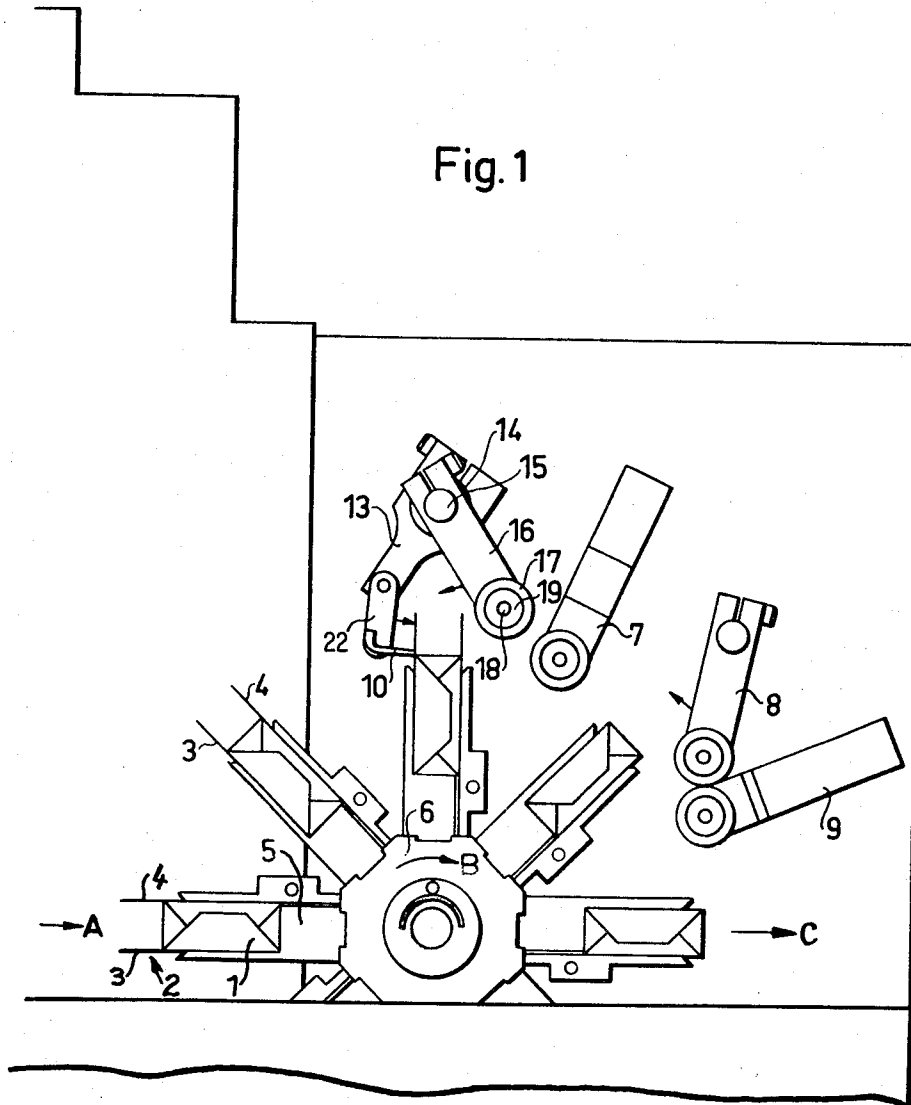
3,669,805

DEVICE FOR FOLDING ONTO, AND JOINING WITH, ONE ANOTHER TWO  
SIDE EDGE PORTIONS OF A HEAT SEALING FOIL

Filed Nov. 19, 1969

4 Sheets-Sheet 1

Fig. 1



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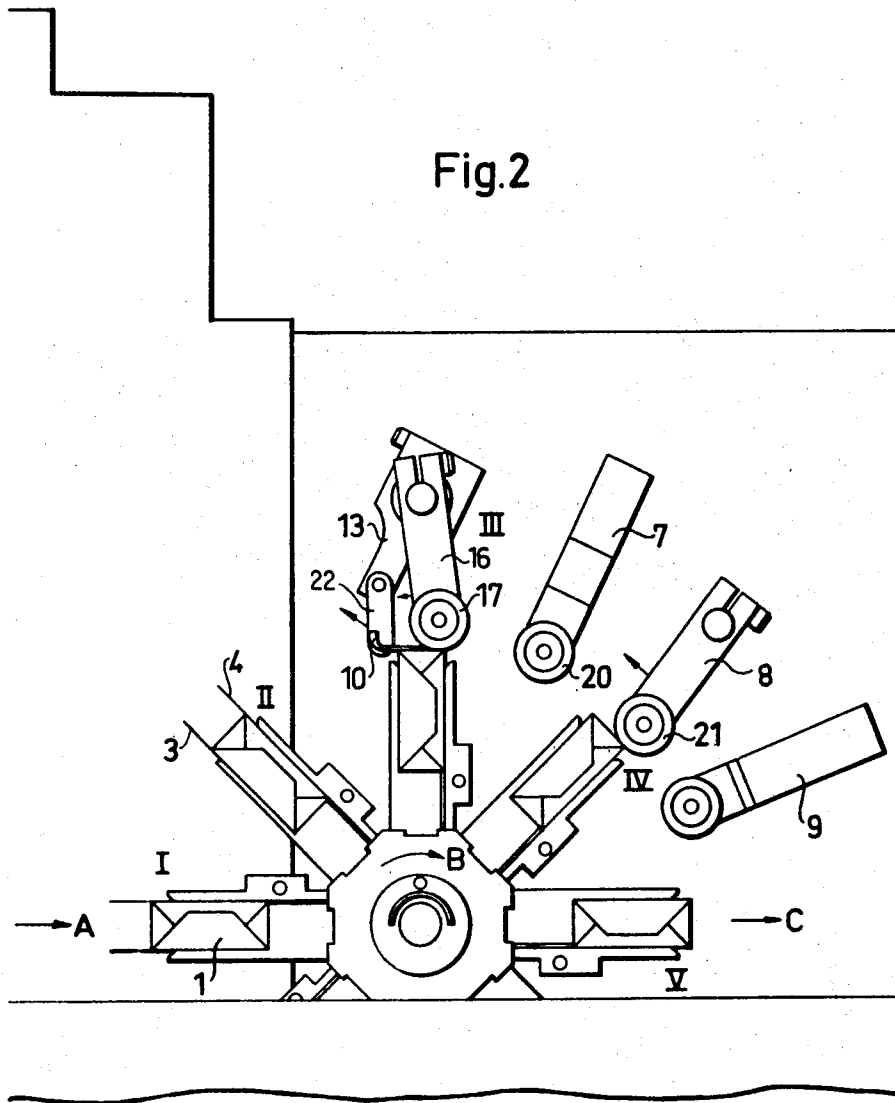
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Fig.2



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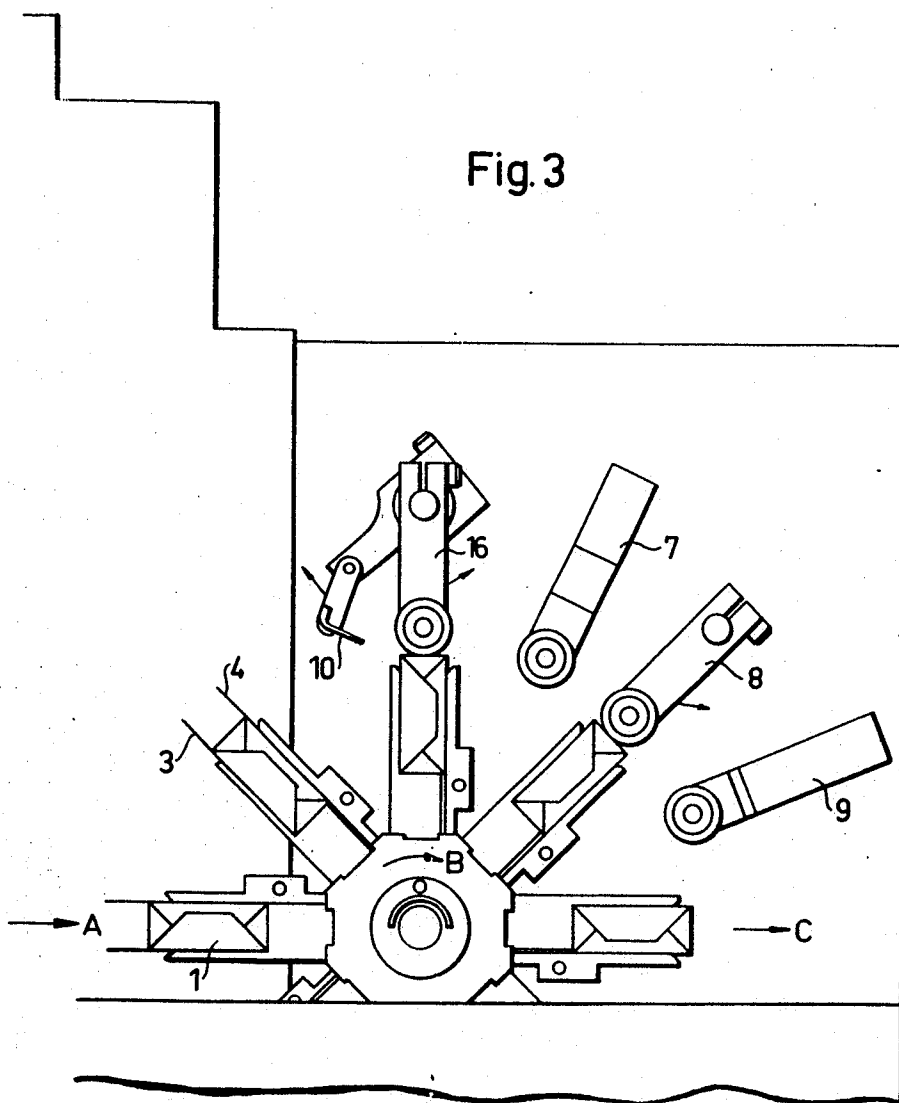
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Fig. 3



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Fig. 4

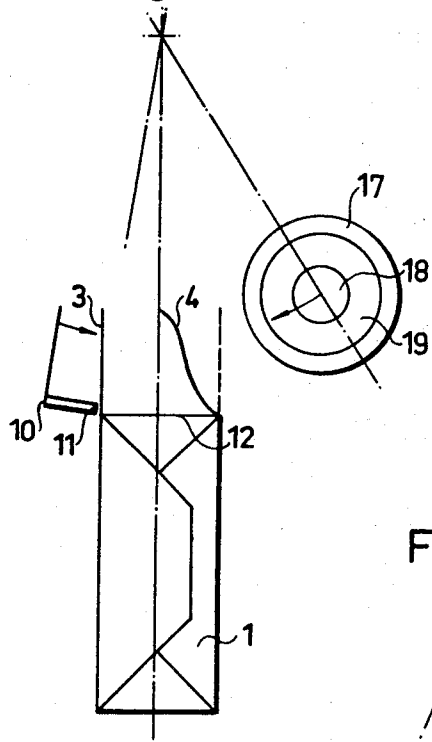


Fig. 5

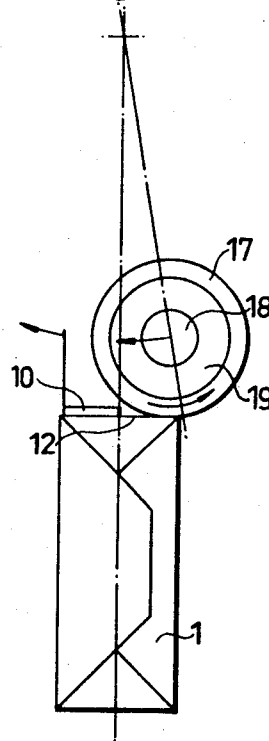
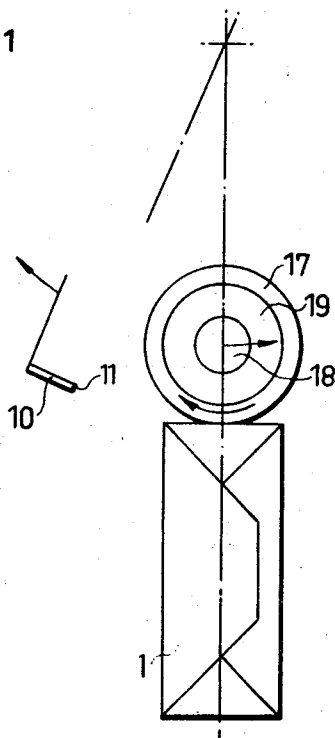


Fig. 6



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## DEVICE FOR FOLDING ONTO, AND JOINING WITH, ONE ANOTHER TWO SIDE EDGE PORTIONS OF A HEAT SEALING FOIL

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2 Claims

### ABSTRACT OF THE DISCLOSURE

An apparatus for folding over and joining together the opposite flaps of a heat sealable foil wrapped around three sides of a cigarette pack. At the folding and sealing station a first shoe is moved across the fourth side of the pack to fold down the first flap. As this shoe is retracted a freely rotatable heated cylindrical roller is pivotally swept across the fourth side from the opposite direction, simultaneously folding the second flap over the first one and heat sealing the two flaps together.

This invention relates to a device for folding onto, and uniting with, one another two side edge portions of a heat sealing foil, which is applied around three plane side walls coherent with one another through mutually parallel edges of a parallelepipedon-shaped package in such a manner that the two side edge portions project from two opposite edges of the fourth side wall of the package annexed to said three walls, said device including a first folding member movable over the surface of the fourth side wall to fold a first of said edge portions onto said side wall and a second folding member movable over the surface of said fourth side wall to fold the second side edge portion onto the first already downwardly folded side edge portion, said second folding member being in cooperation with heat supply means.

In known devices of this kind the folding members usually consist of two rail or bar shaped implements, which are brought to operation the one after the other in order to fold the two side edge portions of the foil projecting from the fourth side wall downwardly onto said side wall surface and to retain said side edge portions in an overlapping position relative one another. After the bending down operation has been completed, a hot sealing implement is pressed against that area of the foil where the side edge portions overlap one another. By supply of heat from the sealing implement the side edge portions are fused together or at least brought into sticky condition whereby a reliable sealing is effected. The foil may consist of any type of fusible plastic material and may, for example, consist of a wrapping foil on a cigarette, a chocolate-box or the like. Irrespective of the type of package which is provided with a foil, for example an entirely transparent one, the package will be denoted packet in the following description.

A drawback inherent to known devices of the type in consideration consists firstly in the difficulty of bringing about a good sealing in spite of the little space accessible for the sealing implement between the folding means when these retain the side edge portions pressed against the side wall surface and secondly the fact that the necessity of operating three members in sequence considerably limits the capacity of the machine.

One main object of the invention is to provide a simple device which permits reliable sealing of the wrapping foil and which is capable of being operated substantially more rapidly than known devices due to the fact that

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the number of members displaceable relatively to one another has been reduced to two.

Further objects and advantages of the invention and its most essential features will become apparent from the following description, considered with reference to the accompanying drawings which form part of this specification and of which

FIG. 1 shows a detail of a packing machine having a turrethead for packets of which one packet has been advanced to the folding device, FIG. 2 shows the machine of FIG. 1 upon completion of the folding down of the first side edge portion of the foil, FIG. 3 shows the machine of FIG. 1 with the second side edge portion also folded downwardly, FIG. 4 is a highly simplified representation illustrating the step of folding down the first side edge portion, FIG. 5 illustrates the step of folding down the second side edge portion and FIG. 6 shows the positions of the two folding members upon completed folding down and sealing operations.

FIGS. 1 to 3 show diagrammatically a folding station forming part of a packing machine. Finished packets 1 are advanced in the direction of the arrow A by means of members not shown towards a foil or thin sheet 6, which at the outset stands vertically and which during the advancing movement of the packet is applied around three coherent sides of packet 1 with two backwards directed side edge portions 3 and 4 projecting from opposite edges of the fourth annexed side wall. The packet 1 with the foil 2 applied thereonto is guided into a retainer 5 on a turrethead 6 equipped with a plurality of retainers 5, which turrethead is revolved in the direction of the arrow B by a mechanism (not shown) in such a manner that the positions I-V indicated in FIG. 2 are successively reached by each packet 1 fed into and carried by the turrethead. In the position III a folding station constructed according to the invention is met by the packet 1, between the positions III and IV a first stationary wiper 7, in the position IV another movable wiper 8, between the positions IV and V a third stationary wiper 9, and in the position V the packet 1 provided with the foil sealed wrapping is discharged from the turrethead 6 and conveyed further in the direction of the arrow C.

The device shown in the drawings does not accomplish more than a folding of the side edge portions 3 and 4 towards one another and a sealing of the portions resting the one upon the other in such a manner that a sleeve of thin sheet wrapping material is formed around the packet 1. If a folding together of the end portions is to be accomplished, other folding stations must of course be provided.

The folding device according to the invention comprises a conventional folding member 10 having the form of a rod or rail with an active edge 11, which edge 11 (FIG. 4) extends along that entire or substantially entire side wall surface 12 of the packet 1 against which the side edge portions 3 and 4 of the foil shall be folded down. The rail 10 is rigidly secured to a holder member having one or several arms 22. The arm 22 is adjustably mounted on a swinging arm 13 which is fixed onto a shaft 14 which by means not shown here is rotated from a main shaft which also drives the turrethead 6 so that timed movements which will be described later, are produced. Mounted on a shaft 15 suitably coaxial with the shaft 14 is another swinging arm 16, which on its free end carries a freely rotatable roll 17. The shaft 15 is driven (turned) through a mechanism not shown from the main shaft of the machine so that additional timed movements which will be described later, are produced. The roll 17 consists suitably of some heat-resistant plastic material such as Teflon (polytetrafluoroethylene) or of some metal coated with plastic material or some other suitable material. The roll 17 is mounted

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on a shaft 18. In the illustrated embodiment an electric heating element 19 to which current is supplied from a voltage source not shown is located between the roll 17 and the shaft 18 to heat the roll 17 to such a temperature that two foil portions pressed against one another are brought into at least a sticky state so that they adhere to one another and a reliable joint is obtained. It is obvious that the heating element can be provided in a plurality of different manners such as, for example, molded into the roll 17, positioned in a central bore in the shaft 18, consisting of a passage for steam through the shaft etc. The essential features are that sufficient heat is supplied to the entire outer wall surface of the roll so that a sealing effect is produced and the roll is freely rotatable about the shaft 18 with as low friction as possible. The element 19 extends in the same manner as the roll 17 along the upper side wall surface 12 of the packet 1.

FIG. 1 shows one packet 1 advanced to position III. During the advancing turn of the packet 1, the folding rail 10 has been kept in the position shown in FIG. 3 and thus in FIG. 1 the downward folding of the side edge portion 3 has just been commenced by the rail edge 11 (FIG. 4) having reached the upper left-hand edge of the packet 1. During the continuing counter-clockwise rotation of the arm 13 and therewith the arm 22 and the rail 10 the side edge portion 3 is folded downwardly towards the packet side 12 as is shown in FIGS. 2 and 5. Simultaneously with this folding operation, the arm 16 is turned clockwise together with the hot roll 17 and begins to fold the side edge portion 4 of the foil downwardly as soon as the edge portion 3 has been bent downwardly sufficiently to be positioned safely below the edge portion 4. Immediately after that the roll has been turned in clockwise direction so much that the edge portion 4 has been folded down, in which situation the roll 17 has advanced for a little distance on the side wall surface 12 (FIG. 5), the arms 22 and 13 turn the rail 10 clockwise away from the packet 1 while simultaneously the roll 17 continues in its movement in clockwise direction while freely rolling on the foil deposited on the surface 12. This rolling operation is effected under slight pressure against the packet and heating of at least the side edge portion 4 of the foil to sticky state whereby this edge portion is united with the first side edge portion 3 positioned therebelow. The turning in clockwise direction of the roll 17 is continued in the embodiment shown to substantially the center line of the surface 12, in which position the rail has had time to be returned into its starting position. Thereafter the roll is returned in counter-clockwise direction under free rolling contact and thus without any displacement of the foil on the surface 12 into the position shown in FIG. 1, and simultaneously therewith an advance for one step of the turrethead is suitably effected for the joining together of the side edge portions of the foil applied to the next following packet.

The whole wrapping operation is performed within 0.1 second or less which in turn results in a very favorable effect in the most critical point, namely the downward folding step effected by the heated roll 17. As is shown in FIG. 4, the side edge portion 4 due to the rapid turning of the turrethead and the air resistance will be positioned from the outset bent to a curve over the side wall surface 12. In this way the risk is eliminated that damage by heat be produced on the foil edge portion 4, as the roll 17 will initially reach the foil at the left-hand side edge of the surface 12 as shown in FIG. 4, at which place a rapid rolling is started. If the foil edge portion 4 had taken the position indicated in FIG. 4, by dashed lines, the roll 17 would have made its first contact with the foil approximately half-way between the upper and the lower edges thereof and thus affect the intermediate area so long a time that damages by heat could be produced.

Of course, the foil edge portion 3 will also be "blown" in left-hand direction according to FIG. 4, which, however, is of no importance since the rail 10 is cold and thus does not affect the material of the foil.

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During advance for one step of the turrethead from the position III to the position IV the surface 12 travels below the stationary wiper 7, which here is shown to have a freely rotatable roll 20, and in the position IV a further wiping of the seal joint is effected by means of the movable wiper 8, which preferably is provided with a freely rotatable roll 21. The relative position of said wiper 8 during different time periods are evident from FIGS. 1 to 3. A further wiper 9 with freely rotatable roll which is of the same type as the wiper 7 affects each packet during the displacement thereof between the stations IV and stations V. All said wipers have for their purpose to compress the welded joint produced at the folding station so that a perfect seal is obtained, and at the same time to conduct away heat from the joint so that the same is stabilized.

It is obvious that even if the new folding device has been shown applied to a packet conveyer of revolver type, every arbitrary conventional conveyer may be utilized just as well.

While one more or less specific embodiment of the invention has been shown and described, it is to be understood that this is for purpose of illustration only, and that the invention is not to be limited thereby, but its scope is to be determined by the appended claims.

What is claimed is:

1. An apparatus for folding and joining together two opposing flaps of a heat sealable foil wrapped around three of the four side walls of a parallelepiped-shaped package in such a manner that the two flaps project from opposite edges of the fourth side wall of the package, including a rotatable turrethead means having holder members for rotating packages through an arc during which a sealing action is effectuated comprising:

- (a) a first folding member movable over the surface of the fourth side wall to fold a first one of the flaps toward the side wall;
- (b) a second folding member movable over the surface of the fourth side wall to
  - (1) fold a second one of the flaps toward the side wall and over the first flap, and
  - (2) to fusibly heat seal the first and second folded flaps together;
- (c) the second folding member comprising:
  - (1) a pivotably support arm,
  - (2) a cylindrical roller freely and rotatably mounted on the support arm,
  - (3) the support arm being oriented to move the roller across the surface of the fourth side wall to fold the second flap over the first flap and simultaneously press the two flaps together, and
  - (4) heat supply means disposed within the cylindrical roller to fusibly heat seal the first and second foil flaps together as the roller passes over them; and
- (d) a series of rollers for compressing and cooling the sealed first and second foil flaps, whereby the series of rollers is positioned about the arc through which the holder members rotate the packages.

2. The apparatus of claim 1 wherein the first folding member is pivotably mounted, and further comprising means for rotating said folding member into inoperative position as soon as the roller has commenced the downward folding of the second flap.

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