Aug. 16, 1960 M. ZWARYCZ 2,949,002

WRAPPER FEED MECHANISM

Filed April 22, 1959 2 Sheets-Sheet 1

FIG. 1

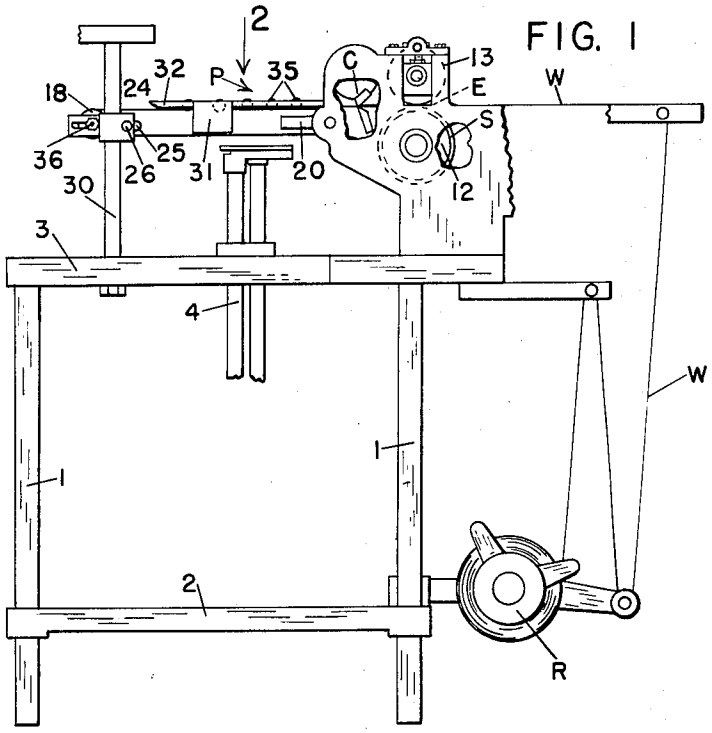


FIG. 6

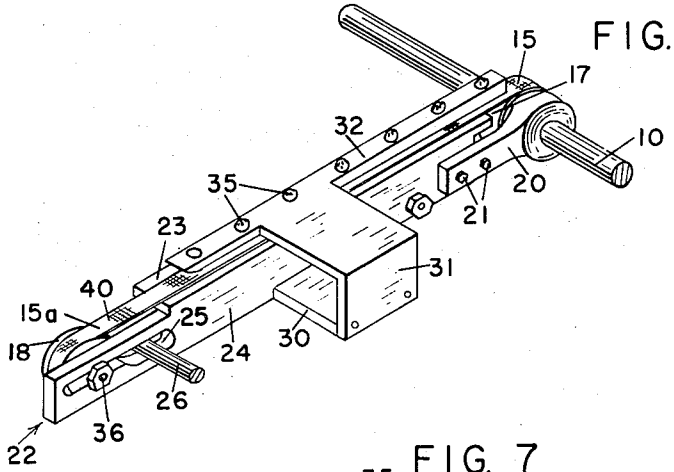
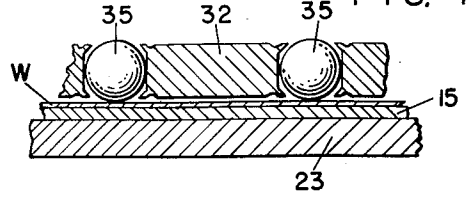


FIG. 7



INVENTOR
MICHAEL ZWARYCZ
Chas. T. Hawley
ATTORNEY

Aug. 16, 1960 M. ZWARYCZ 2,949,002

WRAPPER FEED MECHANISM

Filed April 22, 1959 2 Sheets-Sheet 2

FIG. 2

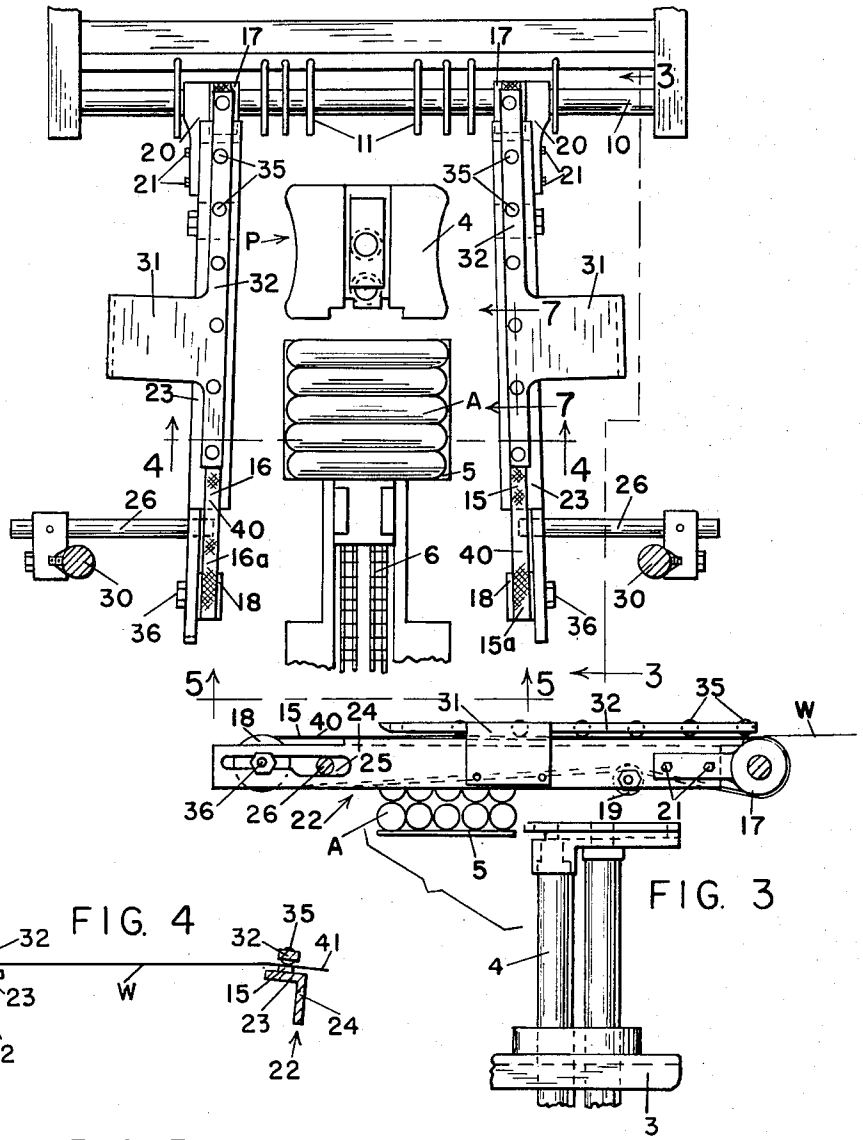
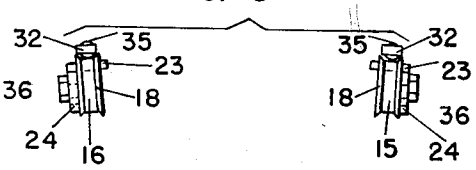


FIG. 3

FIG. 4

FIG. 5



INVENTOR
MICHAEL ZWARYCZ
Chas. T. Hawley
ATTORNEY

United States Patent Office

2,949,002

Patented Aug. 16, 1960

2,949,002

WRAPPER FEED MECHANISM

Michael Zwarycz, Wilbraham, Mass., assignor to Crompton & Knowles Packaging Corporation, Holyoke, Mass., a corporation of Massachusetts

Filed Apr. 22, 1959, Ser. No. 808,218

10 Claims. (Cl. 53—389)

This invention relates to improvements in wrapping machines and it is the general object of the invention to provide means for moving and positioning a sheet of wrapping material in proper position for the subsequent wrapping operation.

Some wrapping operations utilize very thin transparent, flimsy film wrapping material which is difficult to hold sufficiently taut for the initial step of the wrapping operation. In the past it has been difficult to hold such material over the elevator mechanism of the machine in proper position with respect to the article to be wrapped. It is an important object of the present invention to move sheets of wrapping material to a wrapping position by conveyor means including belts or the like which not only diverge in the direction of advance of the wrapping material but are also inclined downwardly and away from each other so as to make it possible to hold the sheet taut as it moves to wrapping position.

In wrapping machinery of the type to which the invention more particularly relates it has been customary in the past to draw sheets from a roll and move them one at a time by conveyor belts over an elevator onto which the articles to be wrapped are deposited one by one from a conveyor. When very thin wrapping material is used it is difficult to geep the sheets flat and free enough from sag so that they can be moved to wrapping position without interference with the articles under them. Conveyor belts have been utilized in the past to advance sheets from an entering station to the wrapping position and such conveyors have been found satisfactory with heavy gauge wrapping material but they are not satisfactory for flimsy, thin sheets which may have a thickness of approximately .001".

It is an important object of the present invention to provide the formerly used conveyor belts with inclined guide means which not only cause the belts to spread the sheet of wrapping material but also tend to bend the edges of the sheet downwardly in such manner as to require the edges to be moved upwardly before any sagging of the sheet can occur. It has been found for instance that by tilting the conveyor belts a small amount, such for instance as 4°, sufficient transverse strains can be set up in the sheet to hold it in proper shape for the wrapping operation.

In machines of the type already mentioned it is common practice to use a feed roll which by its rotation advances the sheets while still connected to the supply roll from an entering station to a wrapping position. With particularly thin wrapping material of certain types it has been found that there is a tendency for the material to adhere to the feed roll so that the advancing belts are required not only to move the sheet to proper position for the wrapping operation but must also exert enough force to strip the material from the feed roll. In order to reduce to a minimum the amount of force which must be exerted by the feed belts it is a further object of the invention to make at least the surface of

the feed roll of a material such as silicone rubber from which the sheet may be easily stripped and fed in a tangential direction from the feed roll. When the feed roll is made of such material the advancing belts have little more to do than merely move the sheet to wrapping position and they are not required to overcome the tendency of the sheet to adhere to the feed roll.

In order that the invention may be clearly understood reference is made to the accompanying drawings which illustrate by way of example the embodiments of the invention and in which:

Fig. 1 is a side elevation of part of a wrapping machine showing the invention applied thereto,

Fig. 2 is a plan view on an enlarged scale looking in the direction of arrow 2, Fig. 1,

Fig. 3 is a vertical section on line 3—3, Fig. 2, looking in the direction of the arrows,

Figs. 4 and 5 are vertical sections on lines 4—4 and 5—5 respectively, Fig. 2,

Fig. 6 is a perspective view of one of the mounting means and the associated feed belt, and

Fig. 7 is an enlarged detailed vertical section on line 7—7, Fig. 2.

Referring more particularly to Fig. 1, the machine has upright supporting posts 1 connected at their lower ends by cross plate 2 and supporting at their upper ends a table 3. Associated with the table is an elevator mechanism 4 operated in known manner to have rising and falling motions to move an article to be wrapped in an upward direction. The article A shown in the present instance as an illustration of articles which can be wrapped is a group of frankfurters resting on a supporting cardboard or the like 5 which is delivered from a conveyor system 6 to a wrapping position P over the elevator mechanism in known manner. The elevator mechanism then rises and forces the article upwardly against the wrapper and through a form not shown herein but well understood in the art to cause draping of the sides of the wrapper down around the article. As soon as the article is in high position another mechanism not shown herein but well understood folds the under sides of the draping parts of the wrapper under the article and the latter is then moved to a sealing position and thence to a second conveyor not shown which moves the wrapped and sealed article away from the machine.

As shown more particularly in Figs. 1, 2 and 3 the machine includes a driving shaft 10 over which extend wire guides 11 to direct a sheet of wrapping material W. The wrapping material is fed in a downward direction as viewed in Fig. 2 and to the left as viewed in Fig. 1 and passes between a lower feed roll 12 and an upper pressure roll 13. The feed roll is turned intermittently in usual manner in a counterclockwise direction as viewed in Fig. 1 to advance a wrapper sheet from a supply roll R to cutter mechanism designated generally at C and as the sheet passes beyond the cutter mechanism it is delivered to two flexible conveyors or belts 15 and 16 located respectively at the right and left sides of the machine, as viewed in Fig. 2. The belts have exterior wrapper engaging surfaces 15*a* and 16*a* respectively. The feed roll 12 and supply roll R may be considered to be means to supply sheets of wrapping material.

The belts are trained around driving rolls 17 which are secured in any approved manner to the shaft 10 and the outer ends of the belts, lower ends as viewed in Fig. 2, are trained around freely turning guide pulleys or rolls 18. Each belt is also trained over an idler 19 the vertical position of which can be adjusted in known manner.

Also mounted on the shaft 10 but not secured thereto are carriers 20 which as shown in Figs. 2 and 3 are

secured as at 21 to belt mounting means designated generally at 22. Each of the latter means includes a horizontal support section 23 for the associated belt connected to a vertical web 24. The rear part of web 24 as viewed for instance in Fig. 6 is secured to its carrier 20 and the forward part of the web is provided with a slot 25 through which extends a supporting rod 26 held in fixed position in any approved manner on the machine. The support rods 26 may if desired be held as suggested in Fig. 2 to vertical posts 30 which are secured to and extend upwardly from the table 3.

Extending laterally from each vertical section 24 is a flat arm 30 the outer end of which is secured as shown in Fig. 6 to an arm 31 which extends first upwardly from arm 30 and then inwardly with respect to the machine and supports a bar 32 which overhangs the upper reach 40 of the associated belt 15 or 16. A detail of this support is shown in Fig. 7 wherein weighted means such as balls 35 are held for limited vertical motion with respect to the bar 32 but are free when in their lowest position to exert their weight and therefore a downward restraining force on a wrapper resting on the associated belt. As seen in Fig. 2, the belts 15 and 16 and also the ball support diverge from each other in the direction of feed of the wrapping material, the divergence in one form of the machine to which the invention has been applied being a total of 5°, that is, each belt diverging from the central line of the machine by 2½°.

An important feature of the invention resides in the mechanism which causes the belts to be slanted downwardly and away from each other as they recede from the entering or feeding station E. In order to accomplish this result the belt mounting 22 after being made as already described is twisted slightly on itself so that the support 23 at each side of the machine will be inclined downwardly and away from the opposite support. It has been found for instance that if this declination is of the order of 4° sufficient restraint can be placed on the wrapper by the weighted balls to hold it taut as suggested in Fig. 4. The twisting of the mountings also accomplishes downward inclination of the guide roll axes, the guide rolls being rotatable on studs 36 secured to their respective vertical webs 24, see Fig. 6.

This twisting can easily be accommodated by the play or lost motion between the supporting rods 26 and the slots 25 in the vertical webs 24. The invention of course is not limited to this particular degree of inclination but the figure specified has been found to operate satisfactorily with thin, flimsy wrapping material of the kind already mentioned and having a thickness of approximately .001". Not only are the supports 23 inclined but the carriers 32 for the weighted balls are also inclined to conform generally to the tilting of the belts.

In the operation of the invention the feed roll 12 unwinds the sheet material from the roll R and feeds it beyond the cutter mechanism C and into the bight between the top runs or reaches 40 of the belts 15 and 16 and the weighted balls 35. As the belts advance at a rate faster than the feed roll advances the sheet their divergence helps to maintain cross tension in the wrapping material and the fact that the edges of the material are inclined downwardly as indicated for instance at 41 in Fig. 4 prevents sagging of the central portion of the wrapper. After the wrapper has been moved from the feeding station E at the upper end of Fig. 2 to a wrapping position P over the elevator and an article on the elevator the feed roll and belts stop and the cutter mechanism C comes into action in known manner to sever the sheet from the roll R. Thereafter the elevator mechanism 4 will operate as already described to push the article upwardly against the sheet and through the forming means (not shown).

As a specific type of belt 15—16 the invention has been used successfully with a Tilton endless 4-ply woven belt treated with neoprene and having a thickness of approximately 5/64", a width of ½", and an over-all circumference of 34¾". The invention of course is not limited to belts of these dimensions. As the article is pushed up against the wrapper the edges of the latter are drawn inwardly from the weighted rolls 35 which turn freely to permit such inward motion of the wrapper edges.

Another feature of the invention resides in the feed roll 12 which in the present instance has the surface S thereof which contacts with the wrapping material made of a silicone rubber, see Fig. 1, a feature of which is that the wrapping material can be drawn from the roll 12 substantially tangentially from the latter. Feed rolls which have been used in the past have shown a tendency to cause a wrapping material to adhere to the rolls so that the feeding means such as the belts 15—16 have been required not only to advance a wrapping material but also to effect as far as they were able to do so a separation of the wrapping material from the feed roll. By using a feed roll having a silicone rubber surface which gives immediate release to the wrapping material the belts are required merely to move the material from the entering station to the wrapping position.

From the foregoing it will be seen that the invention sets forth simple means by which a wrapping machine can be adapted to operate with very thin flimsy film-like wrappers with assurance that the latter will be held sufficiently taut over the article to be wrapped on the elevator so that the latter can lift the article against a properly positioned wrapper. This result is accomplished by the simple expedient of inclining the axes of the guide rolls 18 as suggested for instance in Fig. 5 so that they are oblique with respect to each other and to the axes of the feed rolls. It is to be understood that the feed rolls 17 have their axes aligned horizontally because of the fact that they are mounted on shaft 10 so that the belts as they leave the feed rolls are subjected to a progressive tilting until they reach the guide rolls. The fact that the weighted means such as the balls 35 are mounted in inclined carriers assists in holding the wrapper taut and overcoming any tendency which it might have to sag prior to rising of the elevator. The surface of the belts 15—16 may be considered as being of the ruled type where the inclination increases progressively from the feed rolls to the guide rolls. The belts have their upper reaches 40 resting on and supported by the supports 23 of the mounting means 22.

Having now particularly described and ascertained the nature of the invention and in what manner the same is to be performed, what is claimed is:

1. In a wrapping machine having a vertically movable elevator for an article to be wrapped and having means to supply sheets of wrapping material to be moved from a feeding station to a wrapping position over the elevator, a pair of endless flexible conveyors moving from the feeding station along diverging paths effective to carry a sheet thereon to the wrapping position, the conveyors having parts thereof in engagement with the sheet inclined downwardly and away from each other, and weighted means holding the sheet down on said conveyors and said inclined parts thereof.

2. The wrapping machine forth in claim 1 wherein the weighted means are balls resting on the sheet mounted to rotate as the conveyors move the sheet under them.

3. The wrapping machine set forth in claim 1 wherein the machine has supports under the upper reach of the conveyors to assist the latter to support the weighted means and said supports are inclined downwardly and away from each other to conform to the conveyors.

4. The wrapping machine set forth in claim 1 wherein the means to supply sheets of wrapping material includes a feed roll having a material engaging surface made of silicone rubber from which the sheets are readily released and thus requires no force to be exerted by the conveyors to disengage the sheets from the feed roll.

5. The wrapping machine set forth in claim 1 wherein the conveyors are flexible belts driven by driving rolls adjacent to the feeding station and the belts are trained around freely turning guide rolls adjacent to the wrapping position.

6. The wrapping machine set forth in claim 5 wherein the driving rolls have horizontal axes and the guide rolls rotate around axes which are inclined downwardly and away from each other.

7. The wrapping machine set forth in claim 5 wherein the axes of the driving rolls are horizontal and aligned and the axes of the guide rolls are oblique with respect to each other and with respect to the axes of the driving rolls.

8. The wrapping machine set forth in claim 7 wherein the paths of the belts diverge by an angle of approximately 5° and the axes of the guide rolls are inclined from the horizontal by approximately 4°.

9. In a wrapping machine having a vertically movable elevator for an article to be wrapped and having means to supply sheets of wrapping material to be moved from a feeding station to a wrapping position over the elevator, sheet moving means presenting a pair of traveling conveying surfaces which diverge from the feeding station and are inclined progressively from the feeding station downwardly and away from each other, means to drive the moving means to advance a wrapping sheet thereon from the feeding station to the wrapping position over the elevator, and weighted means effective to hold the sheet on said surfaces.

10. In a wrapping machine having a vertically movable elevator for an article to be wrapped and having means to supply sheets of wrapping material to be moved from a feeding station to a wrapping position over the elevator, sheet moving means presenting a pair of traveling conveying surfaces which diverge from the feeding station and are formed as ruled surfaces inclined downwardly and away from each other, means to drive the moving means to advance a wrapping sheet thereon from the feeding station to the wrapping position over the elevator, and weighted means effective to hold the sheet on said surfaces.

References Cited in the file of this patent

UNITED STATES PATENTS

1,761,771	Brownell	June 3, 1930
2,110,437	Couch	Mar. 8, 1938
2,608,408	Gibbon	Aug. 26, 1952
2,614,953	Anglada	Oct. 21, 1952
2,678,679	Bergstein	May 18, 1954
2,792,219	Frank et al.	May 14, 1957