July 18, 1939. K. W. LUM ET AL 2,166,473

WRAPPING MACHINE

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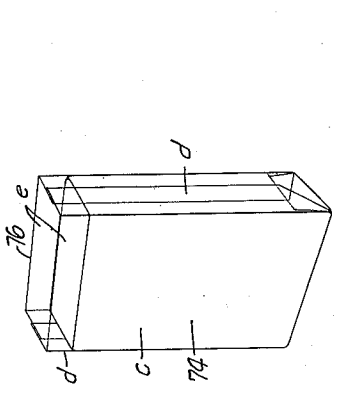


FIG. 6.

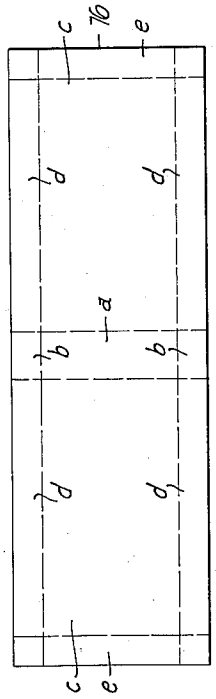


FIG. 5.

FIG. 1.

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FIG. 2.

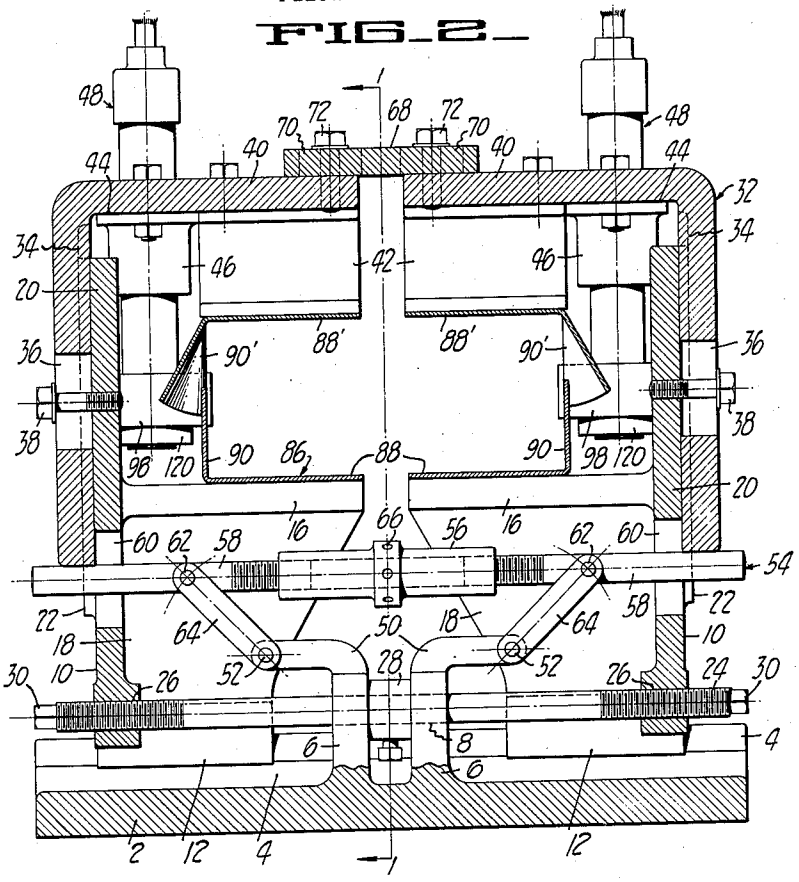


FIG. 3.

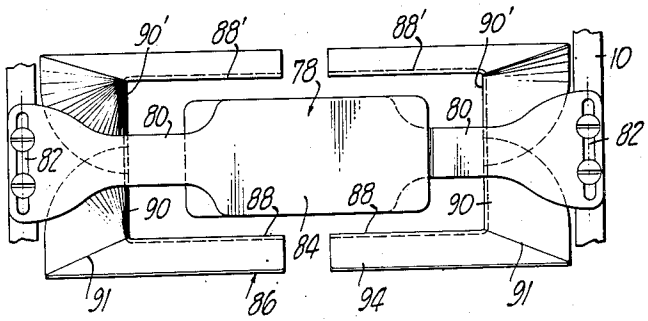
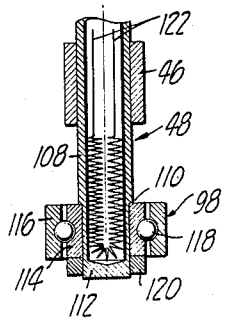


FIG. 4.



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2,166,473

WRAPPING MACHINE

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7 Claims. (Cl. 93—2)

This invention relates to wrapping machines and in particular to a machine for covering rectangular packages with a secondary cover such as a transparent film wrapper.

The principal object of the invention is to provide a machine of the character referred to which is simple in construction, economical in manufacture and suitable for use where a modicum of monetary expenditure is desired in constructing the same. Other and more specific objects will be apparent on consideration of the following specification and appended drawings.

In the drawings,

Fig. 1 represents a machine according to the invention, showing in section principle portion of the machine as viewed from line 1—1 of Fig. 2;

Fig. 2 is a corresponding sectional elevation on line 2—2 of Fig. 1;

Fig. 3 is an end view taken at the entrance of the package pathway and at line 3—3, Fig. 1;

Fig. 4 is a sectional view through the rotary ironing element at line 4—4 of Fig. 1;

Fig. 5 is a representation of the wrapper element; and Fig. 6 represents a package partially wrapped by said wrapper.

Referring to Figs. 1 and 2, the machine comprises a horizontally disposed base 2 provided with laterally disposed parallel V-shaped guideways 4 and a centrally located pair of upwardly extending lugs 6 through which lugs are provided horizontal bearing holes 8. Positioned on and slidable longitudinally of the V-guides 4 are a pair of symmetrically constructed carriage members 10. The carriage members 10 are provided with inwardly disposed footings 12 provided with V-grooves 14, which rest upon the V-guideways 4 of the base member. Also inwardly disposed of the carriage member 10 are a plurality of brackets 16. Brackets 16 and footings 12 may be formed integrally with the upstanding portion 10 and for purposes of rigidity may be joined thereto by webs 18.

Carriage 10 extends upwardly as at 20 and its outer surface is provided with a plurality of V-guideways 22 similar to V-guides 4 on the base member. Means are provided for concurrently adjusting the carriage members 10 toward or away from each other and such means as here disclosed also provide for holding the carriage members down upon the guideways 4. Such means may comprise an adjusting shaft 24 journaled in the bearings 8 and extending laterally as shown in Fig. 2 through threaded openings 26 in carriage member 10. The opposite end portions of adjusting shaft 24 are of right and left-hand threading, respectively, and the threaded openings 26 are threaded to correspond therewith as illustrated.

A collar 28 is set upon shaft 24 intermediate lugs 6 to prevent longitudinal movement of the shaft. The shaft is provided with crank or wrench engaging portions 30. It will be apparent that by rotating shaft 24 the carriage members 10 may be caused to move toward and away from each other, assuming positions equidistant from the center section 1—1.

Each of the carriage members 10 carries a vertically slidable frame member 32 provided with vertical V-grooves 34 for reception of V-guides 22 and is also provided with vertical slots 36. Anchor bolts 38 tapped into members 10 are provided for rigidly securing the frame members 32 to the carriage members 10. Frame members 32 are further provided with inward extensions 40 to which are secured I brackets 42, extending downwardly and providing upper guideway supports.

Secured to the members 32 as at 44 are eye brackets 46. The axis of the eye of brackets 46 are disposed vertically to receive therewithin the cylindrical portion 108 of the ironing element 48, more fully described hereinafter.

Means are provided for simultaneously and equally moving or adjusting the assembly members 32 along the vertical guides 22 regardless of the lateral position of the carriage members 10.

Suitably secured to the lugs 6 and extending upwardly therefrom are brackets 50 provided with pivot pins 52 equidistant from the center section 1—1.

Carried by pins 52 is an adjustable support 54 comprising an internally threaded sleeve nut 56, said internal threading being of right and left-hand character at opposite ends thereof, respectively. Cylindrical members 58 are threaded into nut 56 and extend through vertical slots 60 to underlie and contact with the bottom of members 32. Members 58 are provided with pivot pins 62 equidistantly placed from the center section. Pins 62 and 52 are joined by equilength links 64. The nut 56 may at its center section be provided with radial recesses 66 for engagement by a suitable arcuate wrench.

Adjustment of the assembly members 32 upwardly or downwardly in equal amounts is effected by loosening anchor bolts 38 and rotating sleeve nut 56. After adjustment of assembly members 32, anchor bolts 38 are again tightened. Further rigidity of the assembly is provided by means of a stay link 68 which is provided with

slots 70 through which are disposed anchor bolts 72 tapped into extensions 40. It will be understood that prior to attempting to adjust members 10 the anchor bolts 72 will be released and that after such adjustment is effected said anchor bolts may be again tightened. Means are provided to form a path through which a package 74 with a wrapper 76 are forced in effecting the wrapping of the package, and further means are provided for sequentially folding portions of the wrapper against the package and sealing the overlapped portions of the wrapper together in the relation illustrated in Fig. 6.

Prior to describing the structures which effect such operations, it is deemed desirable to explain by reference to Figs. 5 and 6, the nomenclature used in describing the functions of the elements of the machine. Referring to Fig. 5, the peripheral limits of the wrapper 76 represent the actual appearance thereof, the remaining lines being imaginary insofar as the actual wrapper appearance is concerned, but are here used for the purpose of indicating the portions of the wrapper considered from the standpoint of the folding operations of the machine thereon.

Portion *a* represents the portion covering the flat forward end of the package 74 as viewed in Fig. 1; portions *b* are denominated laterally extending end portions; portions *c* are termed side portions; portions *d* are termed laterally extending side portions and portions *e* are denominated trailing portions. The wrapper when finally placed on the package 74 has its various portions distributed as indicated in Fig. 6.

Referring generally to the operations performed by the machine prior to describing the construction of the machine, the forward surface of package 74 engages portion *a*. Portions *c* are then folded along the side surfaces *c'* of the package and concurrently laterally extending end portions *b* are folded over onto the remaining side surfaces *c''*. Thereafter the lower laterally extending side portions *d* are guided to lie against side surfaces *c''*. Shortly after a forward portion of the said lower laterally extending side portions has assumed the position referred to, the forward portion of the upper laterally extending side portions are guided into overlapping relation with the lower laterally extending side portions of the wrapper.

The material used is preferably a transparent film which is capable of vulcanization when heat is applied to two or more surfaces pressed into engagement. Such material used and preferred in this instance is known by the trade name of "Cellophane."

After the wrapping operations above described and prior to releasing the package from a rectangular pathway defined by the machine, the overlapped portions of the wrapper are pressed against a heated surface to vulcanize such portions together.

Referring to Figs. 1 and 3, the means providing for guiding and overlapping the portions referred to in Fig. 5 comprise initially the flat spring members 78, which are necked down as at 80 and respectively secured for vertical adjustment as at 82 and overlapping as at 84. Members 78 are engaged by portion *a* of the wrapper, the wrapper being pressed against the forward end portion *a'* of the package to flatten the same thereagainst. The package is then forced forward and the spring members 78 are deflected into parallelism with the sides *c''* of the package at the same time bending laterally extending end portions *b* so as to flatten the same against said sides when the package has entered the pathway a substantial distance inwardly of the line 3—3, Fig. 1. The spring members 78 bend so as to extend well along the path of movement to insure that portions *b* remain flattened against sides *c''* until the forward elements of the upper and lower laterally extending side portions have been brought into overlapping engagement with each other and portions *b*, so as to hold said portions *b* into desired position.

Means forming a pathway through the machine and means for successively deflecting and folding the lower and upper laterally extending side portions may take the form of pressed members 86, which comprise flat guideway portions 88, which may be fastened to members 16 as by counter-sink screws extending from the entry to the exit of the machine as shown in Fig. 1 and deflector portions 90 extending laterally of said flat portions. The entry element 91 of portion 90 lies in a common plane with the flat portion 88 so that the laterally extending portions *d* of the wrapper engage the entry element in a horizontal plane common with the portions *c* of the wrapper. As illustrated, the deflecting means 90 progressively increases the angular displacement of its elements from the horizontal as the surface progresses forwardly until, as at the point *p*, the deflecting surface is vertical. It will be apparent therefore that the forward element of the lower laterally extending side portions will be gradually deflected into a vertical position and flattened against the side of the package in which position the same is held by the vertical continuing portion 92.

Referring to Fig. 1, it will be noted that the element 86 extends forwardly as at 94 to provide an apron to facilitate the entry of the package and wrapper. The upper laterally extending side portions of the wrapper are caused to assume a position against the sides of the package by an arrangement similar to the lower deflecting arrangement. However, it is to be noted that the folding of opposed elements of the lower and upper laterally extending side portions *d* is effected in sequence rather than simultaneously. For that reason the deflecting elements of the upper deflectors 90' are displaced forwardly of the corresponding elements of the lower deflecting portions. The outer overlapping of the upper laterally extending side portion of the wrapper being brought into overlying relation with lower corresponding portion of the wrapper is held there by the vertical continuing portion 96 of the deflector 90'. In other respects the upper guide members 88' are similar to the lower heretofore described and may be similarly secured to the I members 42.

As the package issues from the pathway formed by the guide members, at point *p''*, the overlapped portions of the wrapper engage a hot roller 98, which is free to rotate about its vertical axis and which is maintained at a temperature sufficient to vulcanize the overlapping portions referred to. As will be observed by reference to Fig. 2, the rolls 98 are placed at opposite sides of the exit formed by the guide means, and preferably project slightly into the path of the package, passing therethrough so that the overlapping portions *d* are firmly pressed together with the package as a backing while heat is applied by the roll.

It will be understood that the trailing portions *e*, Fig. 5, of the wrapper are not necessarily vul-

canized together by the machine as these portions pass the rolls. It is found expedient to manually fold these portions *e* against the trailing end of the package and simply apply these overlapped ends to the surface of roller 98 to complete the sealing of the package if desired.

Means are preferably provided to force the package 74 with the wrapper 76 through the path of the machine, and such means may consist, as shown in Fig. 1, of a plunger 100 mounted upon a guide surface 102 for rectilinear motion in the direction of the path through the machine and along the axis of said path. Brackets 104 may be provided to provide a channel path for plunger 100 and lips 106 provided to overlie the plunger to retain the same in said channel.

The preferred construction of the heating units 48 is best illustrated in Fig. 4 and may comprise a cylindrical body 108 turned down to provide a shoulder 110 and a reduced body section 112. We have found that a conventional roller bearing construction comprising an inner race 114 and an outer race 116 enclosing rollers 118 is effective for transmitting heat from the body portion to the wrapper portions to be vulcanized. This roller assembly may be held against shoulder 110 by means of a suitable collar and set screw 120. Heat is applied to the member 108 through a conventional resister unit 122 carried therewithin.

It will be noted that members 86 and members 88' form, respectively, lower and upper channels and, as positioned, these upper and lower channels form a rectangular pathway which is, through the agency of the described structure, independently adjustable in both of its dimensions. This is a desirable feature since the range of carton sizes which may be wrapped by the machine is thereby extended, and the pathway may be adjusted to exactly accommodate the size package to be wrapped.

Having described and explained the manner of operation of our invention, what we claim is:

1. In a machine of the character described, folding means for folding a flat wrapper of sheet material against one end and two opposite sides of a package during movement of such package in one general direction along a path of travel, means for supporting such package during said movement, said folding means comprising a pair of spring arms extending across said path from points at opposite sides thereof whereby the arms will engage one side of a wrapper interposed between the arms and the leading end of said package to force the wrapper against said leading end upon said movement of the package, means securing one of the ends of said arms at said points and the opposite ends of the arms being free and said arms respectively being yieldable between said points and said free ends for movement of the free ends apart to positions at opposite sides of said package upon continual movement of the package along said path whereby the wrapper projecting outwardly of said leading end will be forced by said arms against opposite sides of the package as said leading end moves along said path to past the free ends of the arms.

2. In a construction as defined in claim 1, said arms overlapping each other at their free ends when in position extending across said path.

3. In a construction as defined in claim 1, said arms being of relatively thin, resilient sheet metal disposed with their free ends in overlapping relation and extending substantially perpendicularly across said path.

4. In a machine of the character described, means forming an open-ended passageway for passing a package into one open end for passage therethrough, a pair of spring arms extending across said open end, said arms respectively being secured at one of their ends at points adjacent opposite sides of said open end and the portions of the arms extending away from said point and across said open end being free for yielding apart to permit a package and wrapper to pass into said passageway upon forceable engagement by a package moving toward said open end, whereby a flat wrapper extending across said open end and outwardly of said arms will be forced by said arms to against the leading end of such package and against the opposite sides of the package as the package moves past the arms into said passageway, and means adapted for forcing a package into said open end and past said arms.

5. In a machine for wrapping packaged goods with a second cover comprising, a base member, means including a pair of members movably mounted on said base member and forming a channel-like pathway, means including a pair of members respectively mounted on said first named movably mounted members and together forming, with said channel-like pathway, a rectangular pathway, means for adjusting the width of said channels, and means for adjusting the thickness of said rectangular pathway.

6. In a machine for wrapping packaged goods with a second cover comprising, a base member, means including a pair of members movably mounted on said base member and forming a channel-like pathway, means including a pair of members respectively mounted on said first named movably mounted members and together forming, with said channel-like pathway, a rectangular pathway, means for concurrently adjusting each of the first named pair of members to increase or decrease the width of said rectangular pathway, and means for concurrently adjusting each of the second pair of members with respect to the first pair to vary the thickness of said rectangular pathway.

7. In a machine for wrapping packaged goods with a second cover comprising, a base member, means including a pair of members movably mounted on said base member and forming a channel-like pathway, means including a pair of members respectively mounted on said first named movably mounted members and together forming, with said channel-like pathway, a rectangular pathway, a heat applying element, and means for adjusting said element to compensate for variations in the thickness of said pathway.

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