

June 11, 1940.

E. L. SMITH ET AL

2,204,162

ARTICLE FORWARDING DEVICE FOR WRAPPING MACHINES

Filed Aug. 18, 1938

3 Sheets-Sheet 1

Fig. 1.

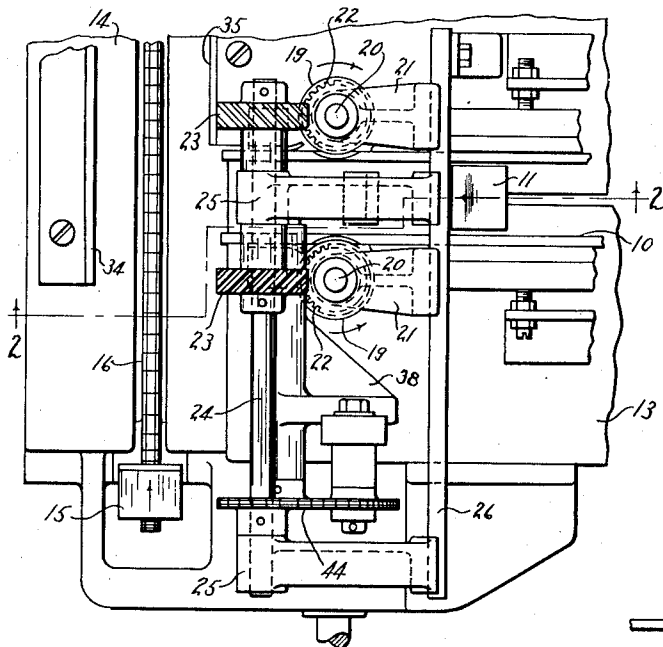


Fig. 3.

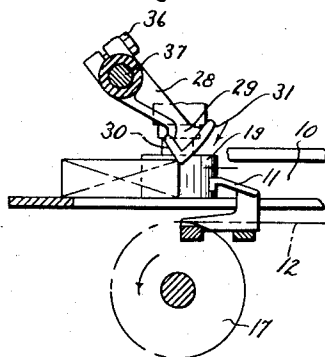


Fig. 4.

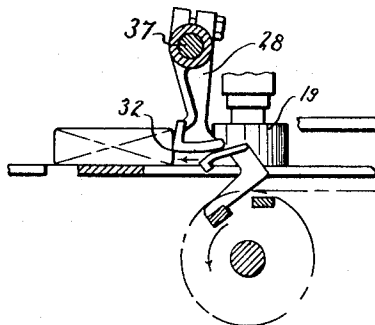


Fig. 2.

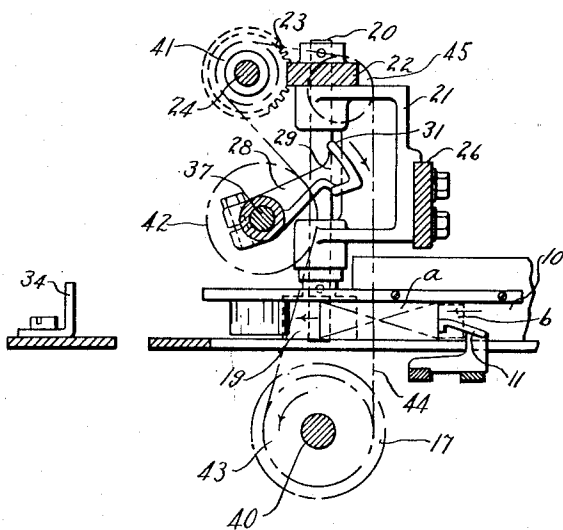
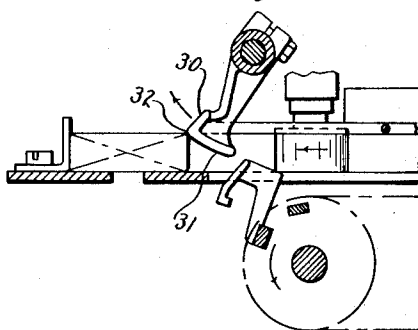


Fig. 5.



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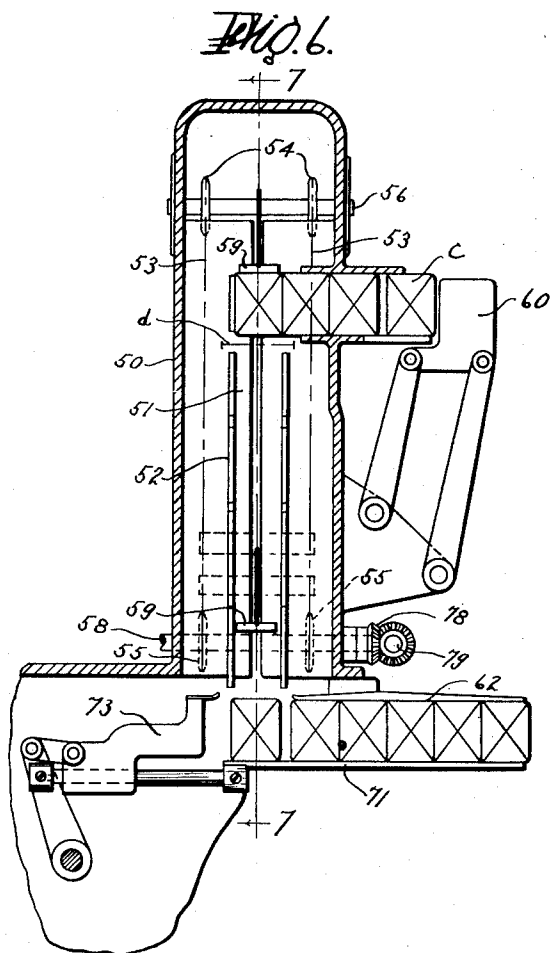
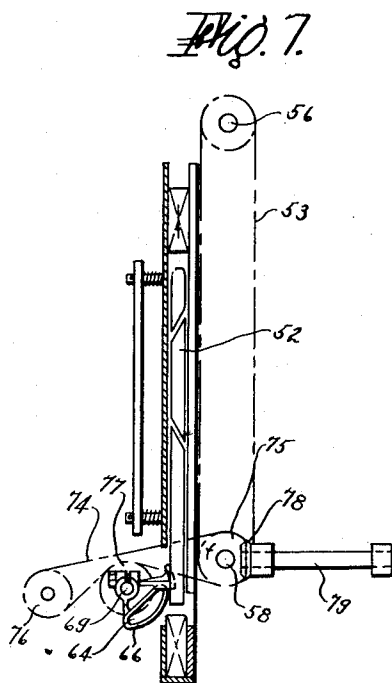
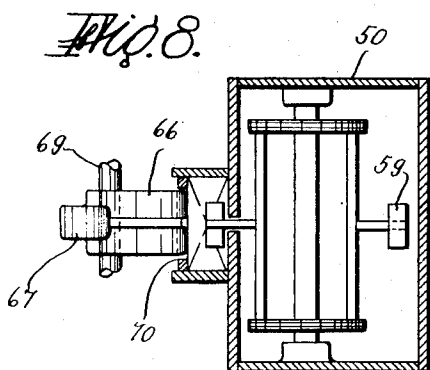
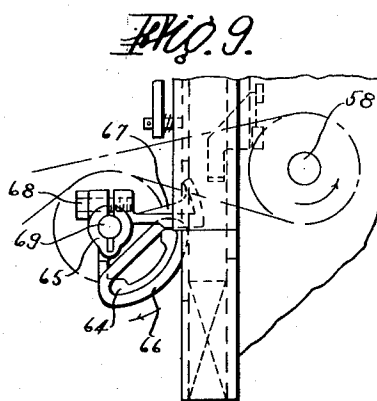
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FIG. 10.

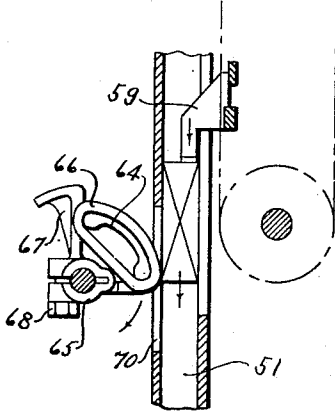


FIG. 11.

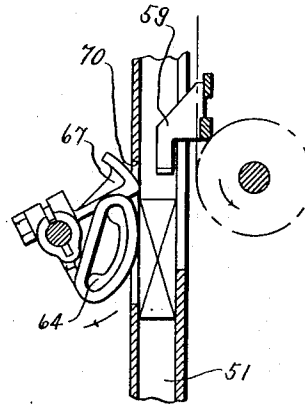


FIG. 12.

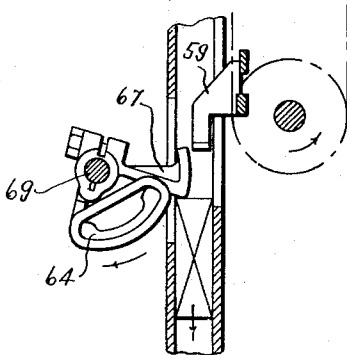
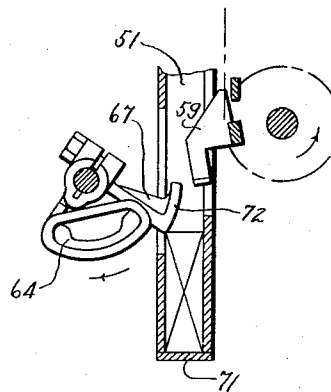


FIG. 13.



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ARTICLE FORWARDING DEVICE FOR WRAPPING MACHINES

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Application August 18, 1938, Serial No. 225,496

7 Claims. (Cl. 198—20)

This invention relates to machines for wrapping articles, and more particularly to the mechanisms by which articles are forwarded through such machines.

In some types of wrapping machines a portion at least of the wrapping is accomplished by passing the articles and wrappers through one or more channels provided with folding instrumentalities positioned along the path of article travel.

The articles are commonly advanced by continuously operating conveyors provided with spaced pusher fingers. In many folding machines it is necessary or desirable to change the direction of travel of the article necessitating the transfer of the control of the article from a set of pushers to another advancing means. When the wrapper has been folded in the first path of travel in a manner to form portions extending rearwardly from the end engaged by the pushers, the withdrawal of the pusher from between the extended wrapper portions presents difficulties which are increased by the fact that in high speed machines the package must be kept under constant and accurate control.

Further difficulties in effecting transfer of the articles are encountered in high speed machines due to the fact that the articles are usually stationary when engaged by the first series of pushers. Because of the speed at which the pushers are traveling their heads must have a sufficiently extensive article engaging surface to assure that the end of the article is not dented or otherwise damaged by the impact of the swiftly moving pusher on the stationary article. The larger pusher heads increase the zone of interference with the trailing wrapper and with whatever means is employed to transfer the article from the pushers. Furthermore, the transfer mechanisms must operate faster in clearing the article from the first conveyor and must act over a larger distance.

In our copending application Serial No. 92,972, filed July 28, 1936, the articles are advanced from the conveyor by an auxiliary pusher carried by a chain. Such a device is capable of providing the necessary length of advance but contacts the end of the article at the same time the conveyor pushers are also in contact.

It is the principal object of our invention to overcome the above difficulties and provide a mechanism capable of high speed operation, which will transfer the packages from the control of a series of continuously moving pushers to an advancing means operating at right angles

thereto while maintaining accurate control of the position of the package.

Other and further objects will be made apparent in the following specification and claims. In the accompanying drawings,

Fig. 1 is a plan view of a portion of the conveying mechanism of a wrapping machine embodying our invention,

Fig. 2 is a sectional view substantially on line 2—2 of Fig. 1;

Figs. 3 to 5 inclusive are sectional detail views showing successive positions of the transfer mechanism;

Fig. 6 is a front elevational view, partly in section showing a different form of package conveying mechanism;

Fig. 7 is a sectional view substantially on line 7—7 of Fig. 6, showing a modified form of our invention applied to the conveying mechanism of Fig. 6;

Fig. 8 is a plan view of the transfer mechanism of Fig. 7;

Fig. 9 is a side elevational view of the transfer mechanism as shown in Fig. 7 on a larger scale; and

Figs. 10 to 13 inclusive are detail views showing successive steps in the transfer of a package by the mechanism of Figs. 7, 8 and 9.

In Fig. 1 is shown the delivery end of a horizontal folding channel 10 through which the packages and wrappers are advanced by pushers 11 secured to a continuously driven chain 12 shown by a broken line. The channel 10 is provided with folding means, not shown, which fold the wrapper about five sides of the article *a* leaving a tubular extension, indicated at *b* in Fig. 2, at the rear of the article. For clearness of disclosure the wrapper extension *b* is omitted from the subsequent figures. To fold the tubular extension *b* against the end face of the article, the latter is advanced along a second folding channel 14, positioned at right angles to channel 10, by a second series of pushers 15 secured to a continuously driven chain 16. The wrapping channels and other parts are supported on a table-like frame member generally indicated at 13.

In order to effect the transfer of the partially wrapped package from pushers 11 to pushers 15 without damage to the traveling wrapper portion *b*, we provide means for speeding up the rate of travel of the article to advance the trailing end of the wrapper beyond the pusher 11 before the latter rounds the sprocket or pulley 17

shown in dotted line, about which the chain 12 is trained.

This transfer means comprises a pair of rubber or rubber-covered rolls 19 positioned to frictionally engage the sides of the package, and mounted on vertical shafts 20 journaled in bearing brackets 21. Shafts 20 are provided with gears 22 meshing with gears 23 secured to a shaft 24, journaled in spaced brackets 25. Gears 22 and 23 may be given an elliptical form if desired to vary the speed of rolls 19. Brackets 21 and 25 are secured to a cross frame member 26. The rolls 19 are driven, by means later described, at a speed to advance the article from the pusher 11 a distance sufficient to free the pushers from the article, as shown in Fig. 3. At this point in the operation the article passes out of contact with rolls 19 and its top rear edge is engaged by a rotating arm 28 which further advances the package into position for entering channel 14.

As will be evident from Fig. 3, the package has been cleared from the conveyor by the rolls at the time arm 28 begins to act on the package and, as shown in Fig. 4, arm 28 can engage that portion of the package previously engaged by the pusher 11 without interference with the latter.

Arm 28 is provided with a package engaging head 29 formed with a substantially flat forward face 30 and a rearwardly extending arcuate face 31, the joining edge 32 of the two faces being slightly rounded. As shown in Fig. 3, face 30 engages the top rear edge of the partially wrapped article, just as the latter is released by the rolls 19, and with the continued movement of the arm advances the article to a position of Fig. 4, the face 30 sliding downwardly over the edge of the package and temporarily bending inwardly the intervening portion of the trailing wrapper. Since the package is free to move forward and since the area of contact is restricted no permanent fold or crease is made in the wrapper by the head 29. In the continued movement of arm 28 the rounded edge 32 moves up the end face of the package, which is then held against rebound by the curved surface 31, and the temporarily folded trailing portion of the wrapper then springs back to substantially its original position.

It is important that the package be accurately positioned at the entrance of channel 14 and in the path of pusher 15. To this end the package is moved by the head 29 against guide 34 which forms one wall of the channel. As shown in Fig. 5 the forward end of the package engages guide 34 just as edge 32 of the head reaches the upper edge of the package, and in the further rotation of arm 28 the arcuate face 31 swings over the edge of the package without exerting any further advancing pressure on the package. The continued contact of the package edge with arcuate face 31 prevents any rebound of the package from the guide 34 and any tendency of the package to tilt. The arcuate surface 31 may be of sufficient extent so that it continues to hold the package against guide 14 until the package is advanced by pusher 15 between guide 34 and an opposed guide 35 at the entrance of channel 14. Surface 31 in effect serves as a temporary extension of guide 35 and the package is thus kept under complete control and in accurate alignment with the channel.

Arm 28 is adjustably mounted as at 36 on a horizontal shaft 37 journaled in a bracket 38 secured on the frame top 13. Shaft 37 and shaft 24, through which rolls 19 are driven, are both driven from shaft 40 which carries sprocket 17 of conveyor chain 12. Shafts 24, 37 and 40 are

provided with respective sprockets 41, 42, and 43, connected by a sprocket chain 44, which also passes around an idle sprocket 45 which serves to guide the chain. Sprocket 45 is preferably adjustably mounted in any conventional manner, not shown, so that it may also serve as a chain tightener.

By our arrangement the advance of the package from the pusher 11 to free the latter from the trailing wrapper is accomplished by rolls 19 and these may be driven at a speed to perform this function very quickly without need to consider the speed at which the package may be properly brought to position for entering the second channel since this positioning of the package is done by the arm 28 which has complete control of the package after it leaves rolls 19. For best results the package should be brought to rest against guide 34 relatively slowly and arm 28 may be driven at a speed to accomplish this in the best manner. Furthermore, it will be evident that from the position shown in Fig. 4 to that shown in Fig. 5 the edge 32 has an increasing component of upward motion with a consequent decrease in the speed of forward motion imparted to the package. As previously pointed out when the edge 32 of the arm passes over the upper edge of the package forward motion of the package ceases.

In Figs. 6 to 13 inclusive our improved transfer mechanism is shown applied in a modified form to a type of wrapping machine in which the initial wrapping channel is vertical.

Referring to Fig. 6, a casing-like frame structure is shown at 50 in which is formed a wrapping channel 51 including conventional folding members 52. A pair of spaced sprocket chains 53 trained around pairs of sprockets 54 and 55 mounted respectively on shafts 56 and 58, carry a series of pushers 59. Articles *c* are fed to the entrance of channel 51 by any suitable feeding means, such as feeding member 60, to be carried by pushers 59 together with a wrapper *d* into the folding channel in the usual manner. At the lower end of channel 51 is positioned a horizontal folding channel 62 in which the wrapping is completed.

As in the structure previously described the wrapper is folded around five sides of the article during the passage of the latter through channel 51, leaving a tubular portion of wrapper extending rearwardly from the article, and our transfer mechanism performs the same service as above described, namely advancing the package from the pushers to permit the latter to round their supporting sprocket without damage to the trailing portion of the wrapper. In the embodiment of Figs. 6 to 13 the rubber-covered rolls of the previously described device are replaced by a curved member 64 formed on a hub 65 and provided with one or more band-like rubber pads 66. Hub 65 also carries an arm 67 similar to arm 28 previously described. Hub 65 is adjustably secured as at 68 to a shaft 69 journaled in suitable bearings not shown.

The operation of the modified structure is substantially the same as that previously described.

As the partially wrapped package approaches the end of channel 51 (Fig. 10) it is frictionally engaged on one face by the rubber pads of member 64 through an opening 70 formed in the front wall of the channel. The surface speed of member 64 is such that the package is cleared from the conveyor pushers 59 as shown in Fig. 11, in which figure the arm 67 is just entering opening 70. In

Fig. 12 the forward face of arm 67 has engaged the rear end of the thus cleared article through the trailing wrapper (not shown) to further advance the package toward the bottom of the channel. As shown in Fig. 13, the package has reached the bottom 71 of horizontal channel 62 and the arcuate surface 72 of the arm is about to pass over the corner of the package serving as before to prevent rebound of the package and position it for entrance into the channel 62. As shown in Fig. 6 the articles are advanced along channel 62 by a reciprocating pusher member 73 of conventional design. Shaft 69 is driven (Fig. 7) from shaft 58 by a sprocket chain 74 trained around a sprocket 75 secured to shaft 58 and around an idle sprocket 76, the lower run of the chain passing over a sprocket 77 secured to shaft 69. Power is supplied to shaft 58 by conventional gearing 78 from a shaft 79.

As is obvious from the drawing the extent of movement of the package by the transfer device as a whole is the sum of the movements imparted by the frictionally acting clearing means, which is limited to the length of the article, and the movement effected by the arm, which depends on the radius of the arm and the position of its axis with respect to the axis of the friction member. In the first form described the movement imparted by the arm is relatively greater than in the second form due to the fact that its radius is greater and because its axis of rotation is positioned beyond the axis of the rolls so that there is no overlapping of the range of action of the two members. In the second form both members are mounted on the same shaft so that the first half of the operating range of movement of the arm overlaps that of the friction member. By changing the radius of the arm and the position of its axis of rotation with respect to that of the friction member, a substantial range of variations in the total length of the transfer movement of the package and variations in its speed may be secured, so that by our invention the particular needs of various types and sizes of articles may be met.

We claim:

1. In a wrapping machine of the type having two wrapping channels at right angles to each other and a continuously moving series of article forwarding pushers passing through the first channel, a device for transferring partially wrapped articles from said pushers to a position for entrance into the second channel which comprises, means positioned adjacent the delivery end of the first channel to successively engage each article as it is presented by the pushers and move it at an increased speed to clear it from the pusher, and means engaging the article after it is cleared from the pusher by the first means to advance the article into alignment with the second channel.

2. In a wrapping machine of the type having two wrapping channels at right angles to each other and a continuously moving series of article forwarding pushers passing through the first channel, a device for transferring partially wrapped articles from said pushers to a position for entrance into the second channel which comprises, means positioned adjacent the delivery end of the first channel to successively engage each article as it is presented by the pushers and move it at an increased speed to clear it from the pusher, and means engaging the article after it is cleared from the pusher by the first means to advance the article at a decreasing speed to

a position of rest in alignment with the second channel.

3. In a wrapping machine of the type having two wrapping channels at right angles to each other and a continuously moving series of article forwarding pushers passing through the first channel, a device for transferring partially wrapped articles from said pushers to a position for entrance into the second channel which comprises means positioned adjacent the delivery end of the first channel to frictionally engage at least one face of each article as it is presented by the pushers and move it at an increased speed to clear it from the pusher, and means engaging the article after it is cleared from the pusher by the friction means to advance the article into alignment with the second channel.

4. In a wrapping machine of the type having two wrapping channels at right angles to each other and a continuously moving series of article forwarding pushers passing through the first channel, a device for transferring partially wrapped articles from said pushers to a position for entrance into the second channel which comprises means positioned adjacent the delivery end of the first channel to successively engage each article as it is presented by the pushers and move it at an increased speed to clear it from the pusher, and a rotating arm engaging the article after it is cleared from the pusher by the first means to advance the article at a decreasing speed to a position of rest in alignment with the second channel, the article engaging portion of the arm including a curved portion engaging a rear edge of the article as the latter is brought to rest to prevent rebound of the article.

5. In a wrapping machine of the type having two wrapping channels at right angles to each other and a continuously moving series of article forwarding pushers passing through the first channel, a device for transferring partially wrapped articles from said pushers to a position for entrance into the second channel which comprises a pair of friction rolls positioned at the sides of the first channel adjacent its delivery end and engaging each article between them as the article is presented by the pushers, means to rotate said rolls at a surface speed greater than the linear speed of the pushers to advance the article engaged between the rolls and clear it from the pusher, an arm rotatably mounted beyond said rolls in the path of article travel and engaging the article after it is cleared from the pusher by the friction rolls to advance the articles to a position of rest in alignment with the second channel, and means to rotate said arm.

6. In a wrapping machine of the type having two wrapping channels at right angles to each other and a continuously moving series of article forwarding pushers passing through the first channel, a device for transferring partially wrapped articles from said pushers to a position for entrance into the second channel which comprises an arcuate member provided with a friction surface and rotatably mounted adjacent the delivery end of the first channel in position to engage the surface of each article as it is presented by the pushers, means to rotate said member at a surface speed greater than the linear speed of the pushers to advance the article engaged by the arcuate member so as to clear it from the pusher, an arm rotatably mounted concentrically with the friction member, and rotatable therewith, to engage the article after it is cleared from the pusher by the friction member and advance it to

a position of rest in alignment with the second channel.

7. In a wrapping machine, means for advancing a package as it emerges from a preceding conveying means to bring the article to rest in a predetermined position which comprises, an arm rotatably mounted above the path of travel of the article, said arm having a package engaging head formed with a flat face on its forward side and having its free end face curved rearwardly, said faces being joined by a rounded

edge, said arm being positioned so that a rear edge of the package is engaged by the flat face of the head as the package passes from the control of the preceding conveyor means, and means to rotate the arm to advance the package, the arcuate end face of the head passing over the upper edge of the package as the latter comes to rest and preventing rearward movement of the package.

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