

[54] **DEVICE FOR FEEDING WRAPPERS IN A PACKAGING MACHINE**

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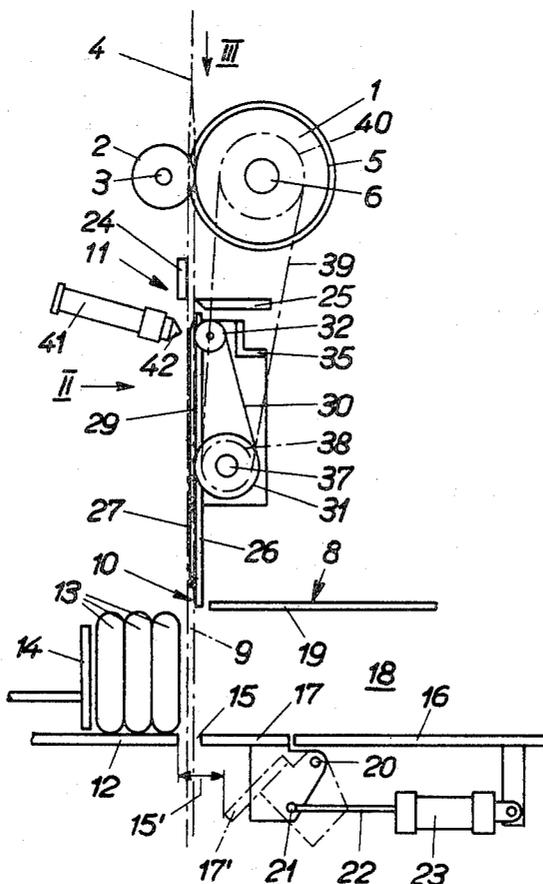
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[57] **ABSTRACT**

In a packaging machine there is provided a feeding device which advances a wrapper sheet of indefinite length transversely through a folding channel and introduces the lower, leading edge of the wrapper sheet into a slot provided in the floor of the folding channel. The feeding device has a complementary feeding assembly which provides the wrapper sheet with provisional longitudinal corrugations for rendering it sufficiently stiff to ensure its easy introduction into the slot. A cutter severs the wrapper portion positioned in the folding channel and a pusher moves an article along the folding channel against the wrapper to fold the latter about the leading face of the article.

5 Claims, 3 Drawing Figures



DEVICE FOR FEEDING WRAPPERS IN A PACKAGING MACHINE

BACKGROUND OF THE INVENTION

This invention relates to a device for feeding wrappers in a packaging machine and is of the type in which each wrapper is severed from a wrapper sheet after the lower, leading end of the wrapper sheet is introduced by a feeding mechanism transversely through a folding channel and through a slot provided in the travelling path of the articles to be packaged. In the folding channel the wrapper is folded in a U-shaped manner about the front (leading) face of the article. If, in known wrapper feeding devices of the aforementioned type, very thin wrappers are used, then, because of the insufficient stiffness of the wrapper and particularly if the folding channel has a substantial width, the introduction of the wrapper into the slot proved to be very difficult, if at all possible. The wrapper sheet, guided only by the folding channel which cannot provide an improved guidance therefor, is likely to be deformed, for example, as a result of an air draft or an electrostatic charge and does not enter the slot. In order to eliminate this disadvantage, it has already been known to provide a movable guide for the lower end of the wrapper sheet, as disclosed, for example, in Swiss Patent No. 483,956.

SUMMARY OF THE INVENTION

It is an object of the invention to provide a device for feeding wrappers in a packaging machine in which the desired result is achieved in a simpler and more economical manner to permit the use of even thinner and more easily deformable wrappers than heretofore possible.

This object and others to become apparent as the specification progresses, are accomplished by the invention according to which, briefly stated, complementary wrapper feeding means are provided which, in addition to advancing the wrapper sheet, provide it with provisional longitudinal corrugations which disappear from the individual wrapper upon its severance from the wrapper sheet.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic side elevational view of the wrapper feeding device according to the invention.

FIG. 2 is a partial front elevational view taken in the direction of arrow II of FIG. 1.

FIG. 3 is a plan view of a detail taken in the direction of arrow III of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Turning now to FIG. 1, the wrapper feeding device shown therein includes a feeding drum 1 and a series of feeding rollers 2 (only one shown) which are mounted on a shaft 3 extending parallel to the axis of the drum 1. The cylindrically curved surface of the drum 1 cooperates with the cylindrically curved surface of the rollers 2. Between the drum 1 on the one hand and the rollers 2 on the other hand there is introduced a wrapper sheet 4 of indefinite length which is pinched and advanced by the feeding assembly 1, 2 which draws the wrapper sheet 4 from a storage reel (not shown). The drum 1 is provided with a plurality of axially spaced peripheral ribs 5 (only one shown)

which may be formed, for example, of rings force-fitted on the drum surface. As best illustrated in FIGS. 2 and 3, with each rib 5 there is associated a pair of rollers 2 so that at either side of a rib 5 one roller 2 presses the wrapper sheet 4 against the drum 1. The drum 1 is at each end (only one shown) mounted in a bearing 7 by a stub shaft 6, one of which is driven synchronously with the operational cycle of a packaging machine 8. By means of the cooperation between any rib 5 and the associated pair of rollers 2, a longitudinally extending corrugation 9 is formed in the wrapper sheet 4, as it may be best observed from FIG. 3.

It is noted that the plurality of rollers 2 may be replaced by a single-piece feed drum, similar to the feed drum 1. Such a structure would then have, in registry with each circumferential rib 5 on the drum 1, a circumferential groove into which the associated rib 5 would project with a slight clearance.

In principle, instead of the particular, drum-type feeding assembly described, any other complementary feeding devices, such as complementary endless belts may be used which are designed in such a manner that, similarly to the described drums, they provide reinforcing longitudinal corrugations 9 which disappear when the wrapper 10 is folded, as it will be described hereinafter.

The purpose of the longitudinal, parallel-extending corrugations is to temporarily stiffen the wrapper 10 to prevent a significant deformation thereof and thus to prevent it from changing its initial vertical position which it must assume at the beginning of the wrapping operation proper.

The wrapper 10 is severed from the wrapper sheet 4 by means of a cutting device 11 which is disposed downstream of the feeding assembly 1, 2 and which is formed essentially of a stationary blade 24 and a horizontally movable blade 25. FIG. 1 depicts the moment when an end portion of the sufficiently downwardly advanced wrapper sheet 4 has just been severed by means of the cutting device 11 to form an individual wrapper 10. The movable blade 25 has moved immediately thereafter in the rearward direction so as to again free the travelling path of the wrapper sheet 4.

The packaging machine 8 includes an inlet table 12 on which the article 13 to be packaged (in the present example it consists of a group of individual articles) is moved by means of a pusher 14 against the wrapper 10 which is in its initial position. The lower, leading portion of the wrapper 10 is, in this initial position, passing through a slot 15 and is oriented downwardly. It is noted that, as seen in FIG. 1, the wrapper sheet 4 is severed into a wrapper 10 by the cutting mechanism 11 after the lower leading edge of the wrapper sheet 4 is introduced into the slot 15. The slot 15 is provided in the travelling path of the article 13 between the intake table 12 and a trap door 17 which in its closed position is coplanar with the intake table 12 and a discharge table 16. The discharge table 16 and the trap door 17 constitute the floor of a folding channel 18 which has a ceiling 19. As the article 13 is, together with the wrapper 10, moved by the pusher 14 into the folding channel 18, the wrapper 10 is, in a known manner, folded in a U-shaped manner about the front face of the article 13. The wrapping is completed also in a conventional manner.

The trap door 17 is pivotally secured at 20 and is further attached at 21 to a piston rod 22 forming part of

a pneumatic power cylinder 23. Each time a new wrapper is to be advanced into its initial position, the trap door 17 is pivoted downwardly into its dash-dotted position indicated at 17' thus enlarging the width of the slot 15 to 15'. In this manner an abutting of the lower, leading end of the wrapper sheet 4 against the trap door 17 may be avoided even if the wrapper sheet 4 is somewhat bent despite the provision of the corrugations 9. In practice, the slot 15 is very narrow; usually narrower than one half the thickness of the individual articles forming the article group 13.

Below the cutting mechanism 11 there is arranged a stationary vertical guiding plate 26 which, at its face oriented towards the wrapper sheet, is provided with guide ribs 27 which cooperate with the corrugations 9 in the wrapper sheet 4. As the wrapper sheet 4 is advanced, it slides along the guiding plate 26 at which time the grooves 27 prevent a premature disappearance of the corrugations 9 due to the elasticity of the wrapper sheet.

In order to even more securely ensure that the corrugations 9 engaged by the ribs 27 of the guiding plate 26 do not prematurely disappear by a smoothening of the wrapper sheet due to its resiliency, at both sides of each guiding rib 27, at a small distance therefrom and from the guiding plate 26 there may be additionally provided two stationary guiding strips which, in the vicinity of each rib 27 constrain the wrapper sheet 4 to lie flat against the guiding plate 26.

The guiding plate 26 has a rectangular cutout 28 (FIG. 2) in the area of which the advancing wrapper sheet 4 is in engagement with a vertical reach 29 of an endless belt 30. The latter is trained about two reversing rolls 31 and 32 which are supported in two brackets 33 and 34 which in turn are affixed to a machine frame portion 35. The latter also supports a bearing 36 in which there is positioned a drive shaft 37 of the reversing roller 31. In FIG. 1 the components 35 and 36 have been omitted to more clearly illustrate the endless belt 30.

The drive shaft 37 carries a sprocket wheel 38 which is drivingly coupled to the stub shaft 6 by means of a chain 39 and a sprocket wheel 40 affixed to the stub shaft 6 of the feeding drum 1. The complemental feeding mechanism 2, 3 may be driven by separate drive means (not shown) in a direction opposite to the drum 1 or may be driven by the drum 1 by means of friction.

Turning once again to FIG. 1, there is further shown a spraying device 41 by means of which a strip-shaped adhesive layer is applied to the wrapper sheet 4 during its advance. By virtue of the adhesive layer the folded wrapper may be provided with a longitudinal, sealed seam.

The spraying device 41 includes a spray nozzle 42, the discharge opening of which is illustrated by a dot in FIG. 2. As the adhesive impinges on the wrapper sheet 4, the latter (which is not shown in FIG. 2) is urged against the reach 29 of the endless belt 30, the travelling speed of which is identical to the advancing speed of the wrapper sheet 4 which, in turn, is identical to the circumferential speed of the drum 1. By virtue of the components 29, 30, even that portion of the wrapper sheet 4 that passes under the spray nozzle 42 is advanced downwardly without any deformation. In the absence of the components 29, 30, the force of the adhesive jet would press the affected portions of the

wrapper sheet 4 against the guiding plate 26 and, due to the friction generated, the wrapper sheet 4 would adhere to the guiding plate 26 and would be rumpled, preventing a proper feeding operation. It is to be understood that a plurality of spraying devices 41 and a plurality of corresponding endless belts 30 may be used instead of only one as shown and it is also to be understood that the cutout 28 of the guiding plate 26 need not necessarily be positioned in an edge zone of the guiding plate 26. It is also to be understood that the spraying device 41 and the associated cutout 28 and support belt 30 may be omitted if the package is not to be provided with a glued seam which is the case, for example, with cold-sealable wrappers or if the gluing is to be effected by means of subsequently applied adhesive strips.

By means of the feeding device described hereinbefore extremely thin wrappers, even if of large dimensions, can be brought safely in their required initial position.

It will be understood that the above description of the present invention is susceptible to various modifications, changes, and adaptations, and the same are intended to be comprehended within the meaning and range of equivalents of the appended claims.

I claim:

1. In a packaging machine for wrapping articles in a wrapper, said machine being of the type that has a folding channel provided with a floor; a slot provided in the floor of the folding channel and extending thereacross; a feeding device for advancing a wrapper sheet of indefinite length transversely through the folding channel and introducing the leading edge of said wrapper sheet into the slot; a cutting mechanism disposed between said feeding device and said folding channel for severing said wrapper sheet when its leading edge is introduced into the slot; and means for moving an article along the folding channel against the wrapper positioned across the folding channel for folding the wrapper about the leading face of the article; the improvement comprising: complemental feeding means through which said wrapper sheet passes and by which said wrapper sheet is engaged on both of its faces, said complemental feeding means forming part of said feeding device; means on said complemental feeding means for providing at least one corrugation in said wrapper sheet, said corrugation extending longitudinally in the direction of feed of said wrapper sheet, whereby said wrapper sheet is rigidized downstream of said feeding assembly and said corrugation disappears subsequent to the severance of said wrapper sheet; a trap door forming part of the floor of said folding channel, said trap door having an edge bounding said slot; means for pivotally securing said trap door; and means for moving said trap door out of and into the plane of said floor to vary the width of said slot.

2. A packaging machine as defined in claim 1, wherein said complemental feeding means includes two peripherally cooperating curved surfaces.

3. A packaging machine as defined in claim 1, wherein one of said curved surfaces is constituted by the outer face of a drum; said means for providing said corrugation includes a circumferential rib provided on the face of said drum.

4. A packaging machine as defined in claim 3, wherein the other of said curved surfaces is constituted by at least two rollers supported on a common shaft,

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said rollers are arranged on either side of said circumferential rib for urging said wrapper sheet into contact with said face of said drum adjacent either side of said circumferential rib.

5. In a packaging machine for wrapping articles in a wrapper, said machine being of the type that has a folding channel provided with a floor; a slot provided in the floor of the folding channel and extending thereacross; a feeding device for advancing a wrapper sheet of indefinite length transversely through the folding channel and introducing the leading edge of said wrapper sheet into the slot; a cutting mechanism disposed between said feeding device and said folding channel for severing said wrapper sheet when its leading edge is introduced into the slot; and means for moving an article along the folding channel against the wrapper positioned across the folding channel for folding the wrapper about the leading face of the article; the improvement comprising: complemental feeding means through which said wrapper sheet passes and by which said wrapper sheet is engaged on both of its faces, said complemental feeding means forming part of said feeding device; means on said complemental feeding means for providing at least one corrugation in said wrapper sheet, said corrugation extending longitudinally in the direction of feed of said wrapper sheet, whereby said wrapper sheet is rigidized downstream of said feeding assembly and said corrugation disappears subsequent

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to the severance of said wrapper sheet; a guiding plate positioned along the travelling path of said wrapper sheet between said folding channel and said complemental feeding means, said guiding plate being arranged for a face-to-face engagement with said wrapper sheet, said guiding plate having at least one longitudinally extending guide rib so arranged as to project into the corrugation of said wrapper sheet; a spraying device positioned adjacent said guiding plate and oriented towards said wrapper sheet for providing the latter with an adhesive on its face oriented away from said guiding plate; means defining an opening in said guiding plate, said opening being situated opposite said spraying device and being normally covered by said wrapper sheet; an endless conveyor belt disposed adjacent that face of said guiding plate that is oriented away from said spraying device, said conveyor belt having a reach, at least a portion of which is coextensive with said opening, whereby said wrapper sheet engages said conveyor belt through said opening by a force derived from an adhesive jet discharged by said spraying device and impinging on said wrapper sheet; and means for driving said complemental feeding means and said conveyor belt codirectionally and with identical speeds, whereby said conveyor belt travels in the same direction and with the same speed as said wrapper sheet.

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