

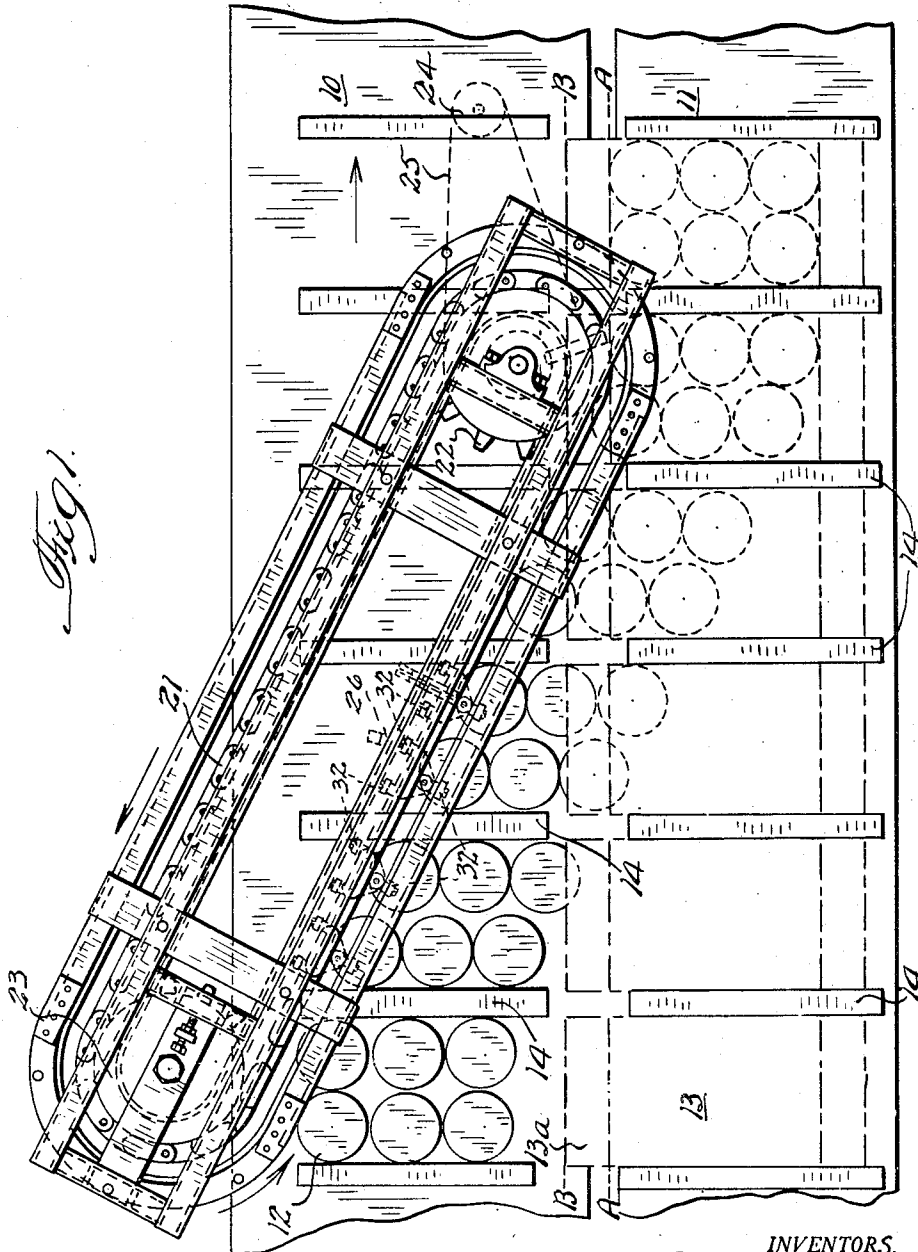
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R. C. TALBOT ET AL
PACKAGE HANDLING APPARATUS

2,828,595

Filed Dec. 6, 1954

2 Sheets-Sheet 1



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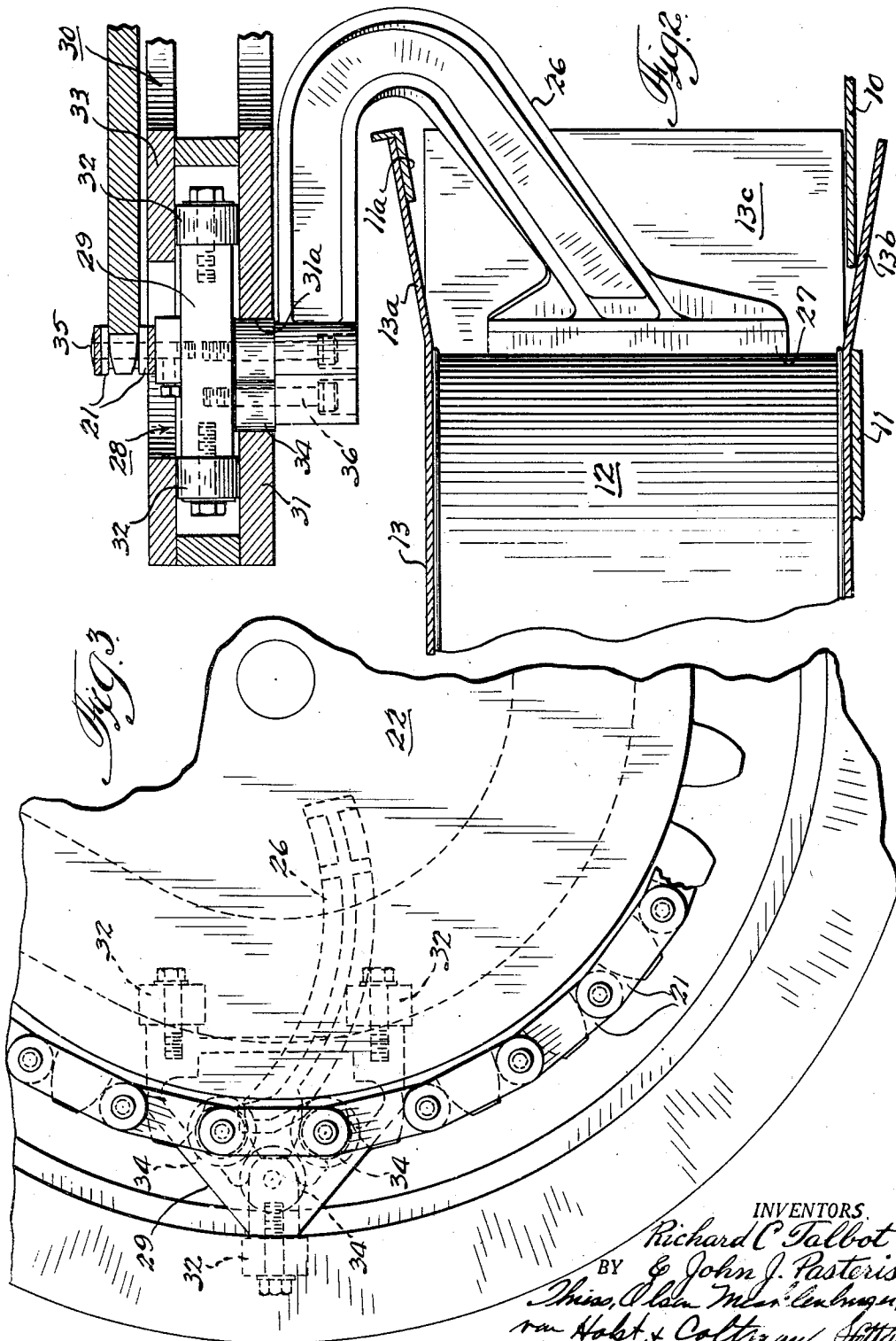
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2,828,595

PACKAGE HANDLING APPARATUS

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Application December 6, 1954, Serial No. 473,151

5 Claims. (Cl. 53—251)

This invention relates to package handling apparatus, and it is an object of the invention to provide improved apparatus of that character.

The apparatus disclosed in the present application is an improvement over that disclosed and claimed in application Serial No. 221,288, now Patent No. 2,756,553, entitled Method and Apparatus for Handling Packages, filed April 16, 1951, by John L. Ferguson and Richard C. Talbot, and assigned to the same assignee as the present invention. In application Serial No. 221,288 a multiple file of packages moving parallel to a single file of empty cases is thrust laterally of the package-conveying means and into the cases by two separate pieces of apparatus, namely, a stationary guide rail, and pusher wheels rotating within the plane of movement of the packages and cases. Since the case flaps at the open side of the cases extend outwardly toward the packages to be received therein, the guide rail cannot extend to the open side of the cases but only to the outer edges of the open case flaps. Pusher wheels are therefore shown in that application for pushing the packages the rest of the way into the cases, the wheels having recesses for receiving the vertical case flaps while the actual pusher elements extend inwardly to the open side of the case.

According to one embodiment of the present invention a single piece of apparatus may be employed to accomplish the same result as the two pieces of apparatus in application Serial No. 221,288. At the same time the pusher means advance in synchronism with the moving file of packages whereby there is no frictional movement between the pushers and the packages. Preferably, the pusher means are in the form of an endless belt or chain carrying pusher elements which bear against the advancing packages to force them laterally into the cases. The pusher elements are spaced apart such that the outwardly extending vertical case flaps may be received therebetween, and the means which support the pusher elements on the endless belt are so formed as to receive the upper horizontal case flap.

Accordingly, it is another object of the invention to provide improved apparatus for driving an advancing file of packages laterally of package-conveying means into an advancing file of empty cases. It is another object of the invention to provide improved apparatus of that character in which a single piece of apparatus moves the packages across the package conveyor past outwardly projecting case flaps and fully into the empty cases. It is another object of the invention to provide apparatus of that character which eliminates frictional movement between the packages and the pusher elements which contact the packages.

This invention, together with further objects and advantages thereof, will best be understood by reference to the following description taken in connection with the accompanying drawings, and its scope will be pointed out in the appended claims.

In the drawings, in which like parts are designated by like reference numerals,

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Fig. 1 is a plan view of apparatus constructed in accordance with one embodiment of the invention;

Fig. 2 is an enlarged elevational view of one portion of the apparatus illustrated in Fig. 1; and

Fig. 3 is a plan view of the apparatus shown in Fig. 2. The apparatus shown in the drawings is particularly adapted for inserting canned goods into empty cases. It will be understood, however, that the invention is readily adapted to handling any form of uniformly shaped packages, whether or not such packages include containers or are wrapped in any way. The "packages" referred to herein may therefore be any form of uniformly shaped articles with or without any form of container or wrapping.

In Fig. 1 there may be seen a conveyor belt 10 for conveying cans 12 from left to right. The same conveyor 10 or an independent but synchronized conveyor belt 11 may be employed for conveying empty cases 13. Cleats 14 are preferably provided for maintaining the empty cases and the cans in definite spaced apart relationship. Apparatus for arranging the cans and for opening and arranging the cases on the conveyor belts 10 and 11 do not constitute a feature of the present invention and, accordingly, are not described herein. Such apparatus may be of any suitable form and may, for example, be like that disclosed and claimed in application Serial No. 221,288, referred to above.

The purpose of apparatus constructed in accordance with the present invention is to drive the packages or articles 12 laterally of the conveyor belt 10 and into the open ends of the cases 13. Complications arise in accomplishing this result because of the fact that the case flaps on the open side of the case extend substantially straight out toward the articles which are being thrust into the cases. This means that there can be no fixed object extending toward the cases beyond the edges of the outwardly extending case flaps. Theoretically the case flaps could be folded back away from any possible contact with the apparatus employed to thrust the articles into the cases. As a practical matter, however, this is undesirable since it involves extra operations both to fold the case flaps back, and subsequently, to fold them forward again. Furthermore, if the case flaps are to be folded back out of the way the empty cases must at some time be spaced sufficiently far apart to permit such folding of the closing flaps, and the filled cases must at a later time be spaced apart a sufficient distance to permit folding the flaps forward again. Apparatus constructed in accordance with the present invention is capable of thrusting the articles completely into the empty cases in spite of the outwardly extending case flaps. Furthermore, a single piece of apparatus is employed to this effect. Still further, the apparatus travels in synchronism with the articles whereby there is no frictional movement between the apparatus and the articles.

A runner or elongated bracket 11a is shown in Fig. 2 for maintaining the upper case flaps 13a out of the way of the cans 12. The lower case flaps 13b may be arranged below the can conveyor 10, as shown. The side flaps 13c may be permitted to extend forward without guidance as they will not normally interfere with the insertion of cylindrical cans.

In accordance with the preferred embodiment of the invention an endless chain 21 is provided which meshes with a pair of sprockets 22 and 23. In Fig. 1 there is suggested a driving shaft 24 and a belt or chain 25 for driving the sprocket 22 and, hence, the endless chain 21. Since the means for driving the chain 21 does not, in itself, constitute a feature of the invention it is not shown or described in detail herein. It is believed sufficient for the purpose of the present disclosure to point out that

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the sprocket 22 and the chain 21 must be driven in synchronism with the conveyor belts 10 and 11.

Secured to the chain 21 is a plurality of pusher arms 26 having pusher faces 27 arranged to engage the sides of the cans 12 to push the cans laterally of the conveyor belt 10 and into the cases 13. The pusher faces 27 may be of a relatively soft material, such as a plastic, in order to avoid damage to labels on the cans 12.

Each of the arms 26 is secured to the chain 21 through a carriage generally designated 28 in Fig. 2, which carriage serves to guide the arm 26 and to maintain it in proper alignment while being driven by the chain 21.

The carriage 28 includes a body or frame member 29 to which the arm 26 is rigidly attached. Various rollers are rotatably secured to the frame 29 for guiding and aligning the frame 29 and, hence, the arm 26, these rollers cooperating with a fixed base 30 which is arranged immediately below the chain 21 and the sprockets 22 and 23. The base 30 includes a lower platform 31 upon which three rollers 32 may ride. The rollers 32 are rotatably mounted on the frame member 29 of the carriage 28, as may readily be seen in Figs. 2 and 3. The base 30 also includes a top plate 33 which restrains any tendency of any of the rollers 32 to rise off the bottom plate 31. The carriage 28 is thereby firmly maintained in a given horizontal plane.

Three additional rollers 34 are rotatably secured to the bottom of the frame member 29 of the carriage 28, these rollers having vertical axes. The bottom plate 31 of the base 30 is cut away to form a continuous slot 31a for receiving the three rollers 34. Two of these rollers engage the inner wall of the slot 31a while the centrally located roller engages the outer wall of the slot. This construction prevents pivoting of the carriage 28 and restricts sliding movement to a direction along the length of the slot 31a.

The carriage 28 may be secured to the link chain 21 by any suitable means. In Figs. 2 and 3 it will be seen that two of the pins 35 which connect adjoining links of the chain 21 extend downwardly through the links and into openings in the carriage 28. Accordingly, as the link chain 21 travels its course it drives the carriage 28 with it. It will be understood, of course, that the slot 31a extends along the path of the chain 21.

The arm 26 may be secured to the carriage 28 in any suitable manner. In the illustrated embodiment of the invention the arm 26 spreads at its upper end and three bolts 36 secure the arm to the frame member 29 of the carriage 28. The pins or bolts 36 also constitute the axles for the rollers 34.

It will now be apparent that as the chain 21 travels around its course it carries a plurality of carriages 28 and arms 26 with it, the carriages and the arms being guided along a fixed path determined by the cooperation of the rollers 32 and 34 with the fixed base 30. It will also be apparent by reference to Fig. 1 that as the arms 26 are carried along they may engage successive rows of cans 12 in the multiple file and sweep these rows of cans toward the empty cases 13.

The pusher face 27 of each successive arm 26 must travel toward the cases 13 until it reaches the line A—A of Fig. 1, this line representing the plane of the open sides of the cases. This means that the pusher faces must travel inwardly beyond the line B—B which represents the plane of the ends of the outwardly extending case flaps. Preferably, the pusher faces 27 lie substantially directly below the chain 21 in order that the pusher faces may travel at a constant speed, whether traveling along a straight line or around a curve. It will be apparent that if the arms 26 were so formed that the pusher faces extended substantially outward beyond the chain 21, the pusher faces would travel at the same speed as the chain when traveling along a straight line but would accelerate substantially instantaneously to an appreciably higher speed when traveling around curves, since

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the pusher face would swing in a wider arc than the chain.

In view of this the chain is arranged above the line A—A of Fig. 1 and, therefore, must be arranged above the open case flaps in order to permit the passage of the case flaps in their open positions. The fixed base 30 must similarly be arranged above the open case flaps. As may be seen best in Fig. 2 the arms 26 extend directly inwardly of the loop formed by the chain from their points of attachment to the corresponding carriages 28. Each arm then bends downwardly and outwardly such that the pusher face 27 is brought back substantially directly under the chain 21. The bent or re-entrant form of the arm 26 receives the upper case flap 13a without interference therewith. This novel construction permits the thrusting of cans 12 across the width of the conveyor belt 10 and completely into the cases 13 without interference with the outwardly extending upper case flaps 13a.

In the particular embodiment of the invention illustrated, two successive rows of cans are thrust into each successive case 13. The two successive rows of cans which are to be thrust into a single case 13 are in intimate contact with each other on the conveyor belt 10, as may be seen in Fig. 1. On the other hand, successive rows which pass into different cases are spaced apart by the width of the cleats 14. Accordingly, successive carriages 28 and arms 26 are spaced apart corresponding distances. It should be noted here that where cylindrical articles such as conventional cans are being thrust into the cases, the staggered arrangement of the two successive rows of cans entering a single case permits ready reception by the case, in spite of the case providing a snug fit when the cans reach their final positions.

The arm 26 which operates on the forwardmost row of cans to be inserted in any given case has no tendency to interfere with the open vertical flaps of the cases 13. However, the trailing arm 26, which operates on the rearwardmost row of cans entering a given case, may offer some interference with the trailing vertical flap of the case into which it thrusts a row of cans. Such interference arises from the fact that the forward velocity of the arm diminishes after it breaks contact with the cans on account of the curvature of its path, whereby the trailing vertical flap of the case into which the pusher arm 26 has thrust a row of cans tends to overtake and strike the arm. For this reason the trailing arm 26, that is, the arm 26 which thrusts the rearwardmost row of cans into a given case, is preferably bowed horizontally, as shown in Figs. 1 and 3.

Attention is directed to the fact that the forward or left to right component of velocity of the package-engaging faces 27 should be the same as that of the packages 12 on the conveyor 10. In this case the package-engaging faces 27 may travel along with the packages as they force the packages laterally of the conveyor. Additionally, and as suggested above, the entire moving apparatus which forces the packages into the cases should be synchronized with the conveyor 10 in order that the package-engaging faces 27 may engage the successive rows of packages rather than being inserted between successive rows of packages.

It will now be seen that in accordance with the present invention a single piece of equipment is provided for moving packages a substantial distance laterally of the conveyor upon which they travel, past the outwardly extending closing flaps of open-ended cases and entirely into such cases.

Furthermore, the elements which actually contact the packages travel with the same forward velocity as the packages whereby there is substantially no frictional movement between these elements and the packages.

It will be apparent that the invention may be varied in its physical embodiment without departing from the

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spirit of the invention, and it is desired, therefore, that the invention be limited only by the prior art and the scope of the appended claims.

The invention having thus been described, what is claimed and desired to be secured by Letters Patent is:

1. In a machine for moving packages of uniform size into cases, means for continuously conveying empty cases along a fixed path with one side open and with closing flaps extending outwardly substantially parallel to the corresponding case sides, means for continuously conveying packages substantially parallel to and in the same direction as the movement of said cases and alongside the open sides of said cases, means for moving said packages laterally across the surface of said package conveying means past said outwardly extending case flaps and into said cases, said last mentioned means including an endless belt supported for movement above the plane of the upper sides of said cases, means for continuously driving said endless belt, a portion of said belt moving in a substantially straight line diagonally across said package conveying means and having a component of velocity toward said case conveying means and a component of velocity in the direction of and substantially equal to the velocity of said packages as carried by said package conveyor, and a plurality of arms secured to said belt and engageable with successive packages on said conveyor to drive said packages into said cases, the package-engaging ends of said arms lying substantially directly below said endless belt at least where said belt and said arms are traveling in a straight line, whereby said package-engaging ends of said arms travel at the same speed as said endless belt even when traveling around a curve, the central portions of said arms being offset inwardly of said endless belt to receive the outwardly extending upper case flaps when said package-engaging ends of said arms near said open ends of said cases.

2. In a machine for moving packages of uniform size into cases, means for continuously conveying empty cases along a fixed path with one side open and with closing flaps extending outwardly substantially parallel to the corresponding case sides, means for continuously conveying packages substantially parallel to and in the same direction as the movement of said cases and alongside the open sides of said cases, means for moving said packages laterally across the surface of said package conveying means past said outwardly extending case flaps and into said cases, said last mentioned means including a fixed base arranged above said package conveying means, a plurality of carriages movable along said base in a determined closed path, an endless belt forming a closed loop and connected to said carriages, means for continuously driving said endless belt, a portion of said belt being guided by said carriages along a substantially straight line diagonally across said package conveying means and having a component of velocity toward said case conveying means and a component of velocity in the direction of and substantially equal to the velocity of said packages as carried by said package conveyor, and a plurality of arms extending on each from said carriages and engageable with successive packages on said conveyor to drive said packages into said cases, the package-engaging ends of said arms lying substantially directly below said endless belt at least where said belt and said arms are traveling in a straight line, whereby said package-engaging ends of said arms travel at the same speed as said endless belt even when traveling around a curve, the central portions of said arms being offset inwardly of said endless belt to receive the outwardly extending upper case flaps when said package-engaging ends of said arms near said open ends of said cases.

3. In a machine for moving packages of uniform size into cases, means for continuously conveying empty cases along a fixed path with one side open and with closing flaps extending outwardly substantially parallel to the

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corresponding case sides, means for continuously conveying packages substantially parallel to and in the same direction as the movement of said cases and alongside the open sides of said cases, means for moving said packages laterally across the surface of said package conveying means past said outwardly extending case flaps and into said cases, said last mentioned means including a fixed base arranged above said package conveying means, said base having a plurality of endless tracks thereon, a plurality of carriages movable along said base in a determined closed path, said carriages having a plurality of rollers for rolling along said tracks, an endless belt forming a closed loop and connected to said carriages, means for continuously driving said endless belt, a portion of said belt being guided by said carriages along a substantially straight line diagonally across said package conveying means and having a component of velocity toward said case conveying means and a component of velocity in the direction of and substantially equal to the velocity of said packages as carried by said package conveyor, and a plurality of arms extending one each from said carriages and engageable with successive packages on said conveyor to drive said packages into said cases, the package-engaging end portion of each of said arms having a horizontal displacement whereby the package-engaging extremity thereof may travel to the open sides of said cases between said case flaps.

4. In a machine for moving packages of uniform size into cases, means for continuously conveying empty cases along a fixed path with one side open and with closing flaps extending outwardly substantially parallel to the corresponding case sides, means for continuously conveying packages substantially parallel to and in the same direction as the movement of said cases and alongside the open sides of said cases, means for moving said packages laterally across the surface of said package conveying means past said outwardly extending case flaps and into said cases, said last mentioned means including a fixed base arranged above said package conveying means, a plurality of carriages movable along said base in a determined closed path, an endless belt forming a closed loop and connected to said carriages, said belt and said carriages being arranged above the plane of the upper sides of said cases, means for continuously driving said endless belt, a portion of said belt moving in a substantially straight line diagonally across said package conveying means and having a component of velocity toward said case conveying means and a component of velocity in the direction of and substantially equal to the velocity of said packages as carried by said package conveyor, and a plurality of arms extending one each from said carriages and engageable with successive packages on said conveyor to drive said packages into said cases, the package-engaging ends of said arms lying substantially directly below said endless belt at least where said belt and said arms are traveling in a straight line, whereby said package-engaging ends of said arms travel at the same speed as said endless belt even when traveling around a curve, the central portions of said arms being offset inwardly of said endless belt to receive the outwardly extending upper case flaps when said package-engaging ends of said arms near said open ends of said cases.

5. In a machine for moving packages of uniform size into cases, means for continuously conveying empty cases along a fixed path with one side open and with closing flaps extending outwardly substantially parallel to the corresponding case sides, means for continuously conveying packages substantially parallel to and in the same direction as the movement of said cases and alongside the open sides of said cases, means for moving said packages laterally across the surface of said package conveying means past said outwardly extending case flaps and into said cases, said last mentioned means includ-

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ing a fixed base arranged above said package conveying means, said base having a plurality of endless tracks thereon, a plurality of carriages movable along said base in a determined closed path, said carriages having a plurality of rollers for rolling along said tracks, an endless belt forming a closed loop and connected to said carriages, said belt and said carriages being arranged above the plane of the upper sides of said cases, means for continuously driving said endless belt, a portion of said belt moving in a substantially straight line diagonally across said package conveying means and having a component of velocity toward said case conveying means and a component of velocity in the direction of and substantially equal to the velocity of said packages as carried by said package conveyor, and a plurality of arms extending one each from said carriages and engageable with successive packages on said conveyor to drive said

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packages into said cases, the package-engaging ends of said arms lying substantially directly below said endless belt at least where said belt and said arms are traveling in a straight line, whereby said package-engaging ends of said arms travel at the same speed as said endless belt even when traveling around a curve, the central portions of said arms being offset inwardly of said endless belt to receive the outwardly extending upper case flaps when said package-engaging ends of said arms near said open ends of said cases.

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U. S. DEPARTMENT OF COMMERCE

PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,828,595

Richard C. Talbot et al.

April 1, 1958

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 3, for "above the" read -- to travel to the --; column 5, line 59, for "pacackages" read -- packages --; line 60, for "on each" read -- one each --.

Signed and sealed this 27th day of May 1958.

(SEAL)

Attest:

KARL H. AXLINE

Attesting Officer

ROBERT C. WATSON
Commissioner of Patents