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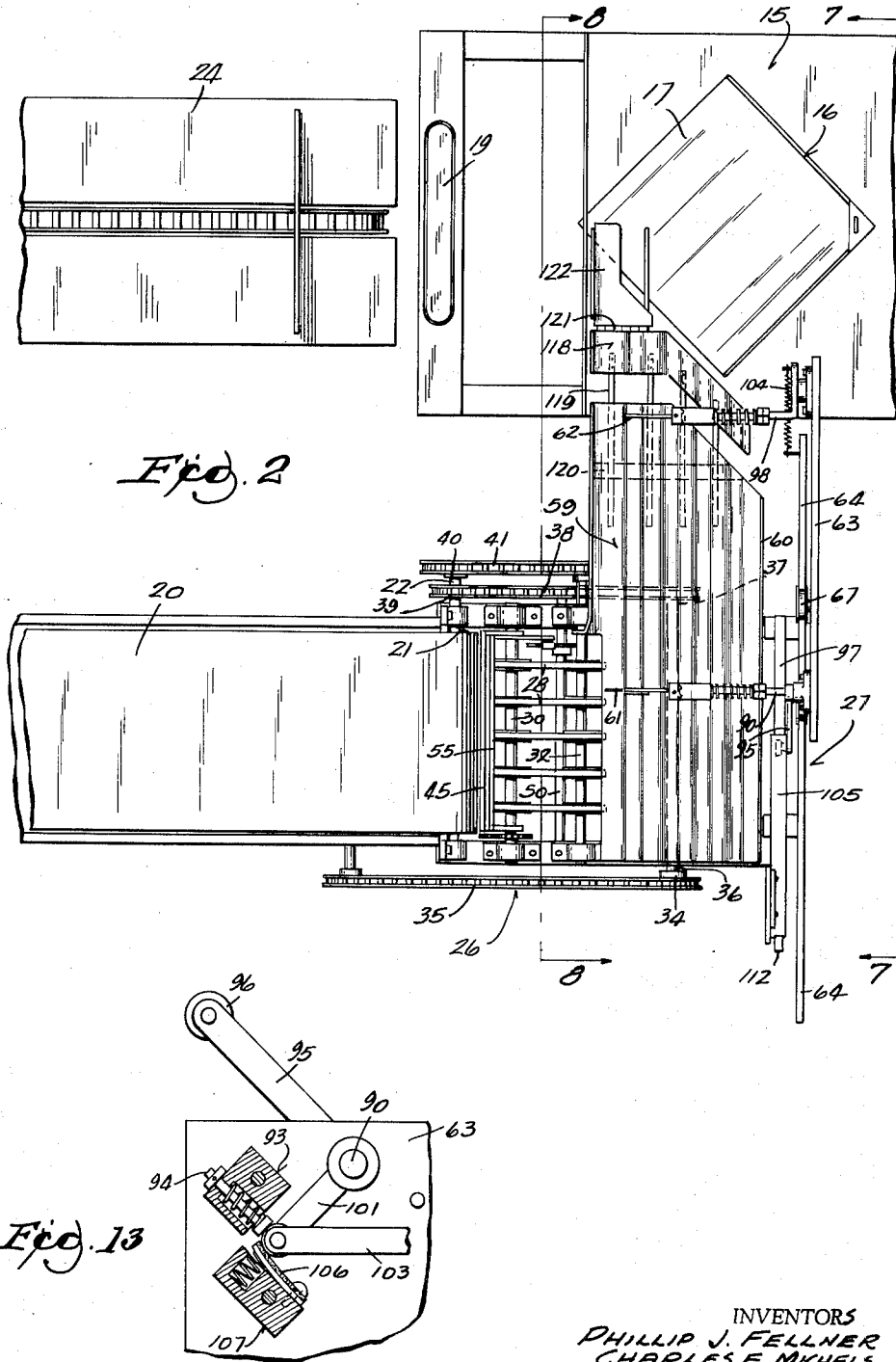
P. J. FELLNER ETAL

3,217,858

PACKAGE TRANSPORTING AND WRAPPING APPARATUS

Filed June 22, 1962

5 Sheets-Sheet 2



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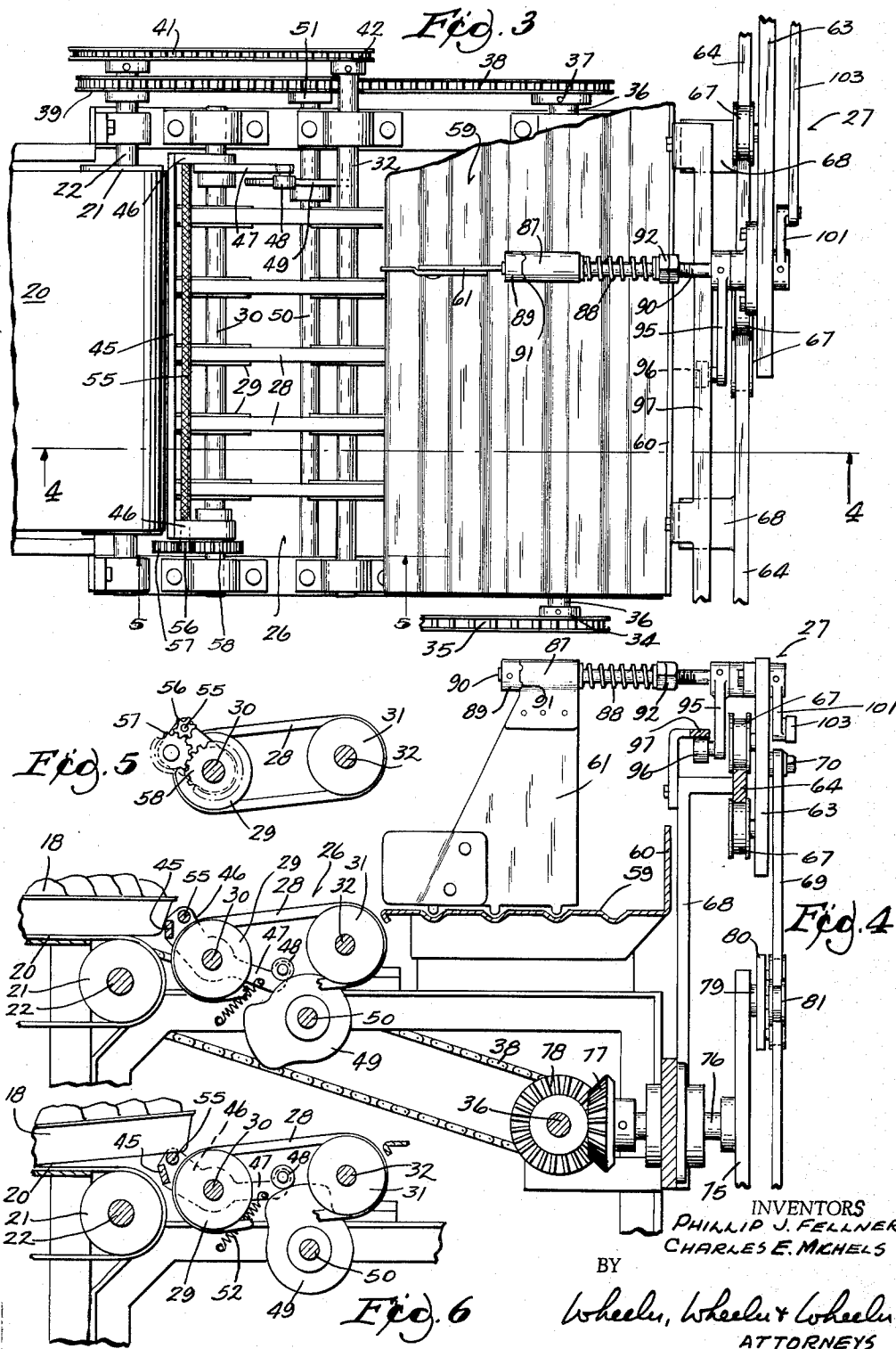
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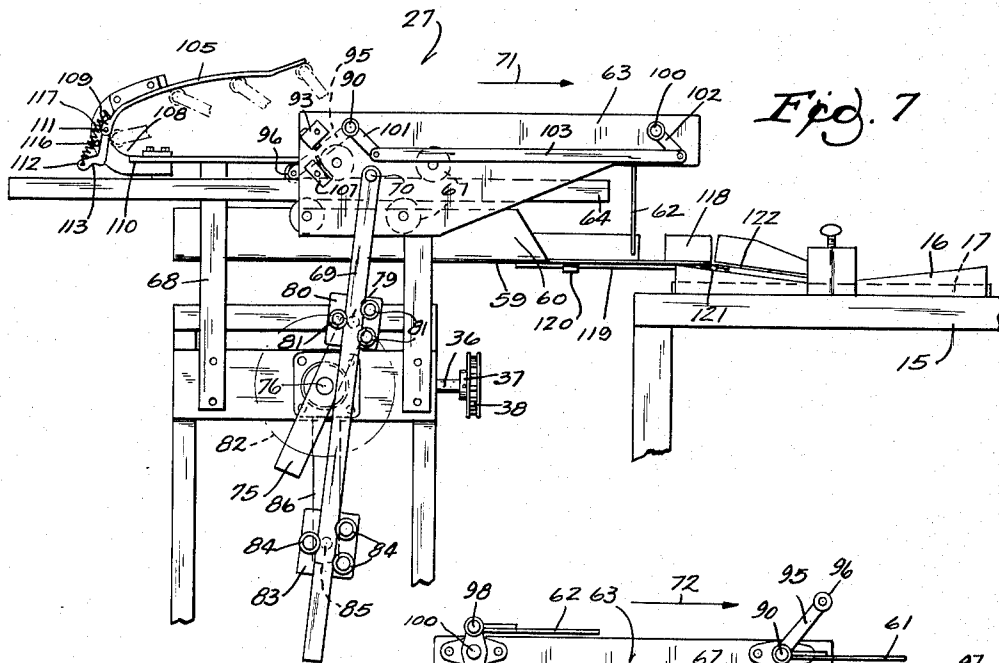


Fig. 7

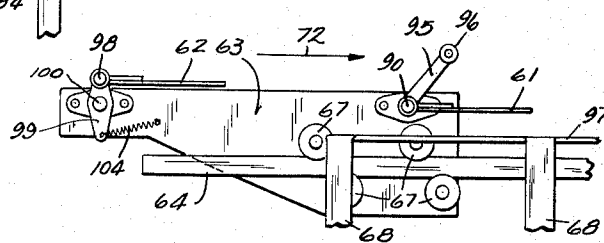


Fig. 9

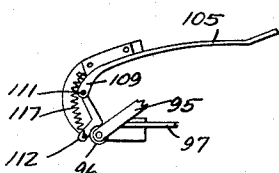


Fig. 12

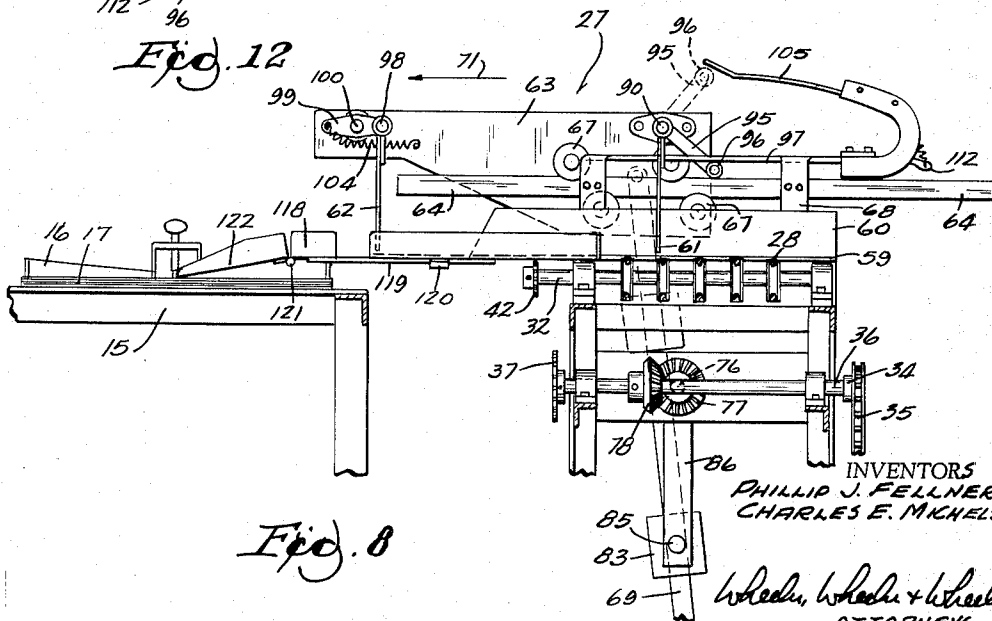


Fig. 8

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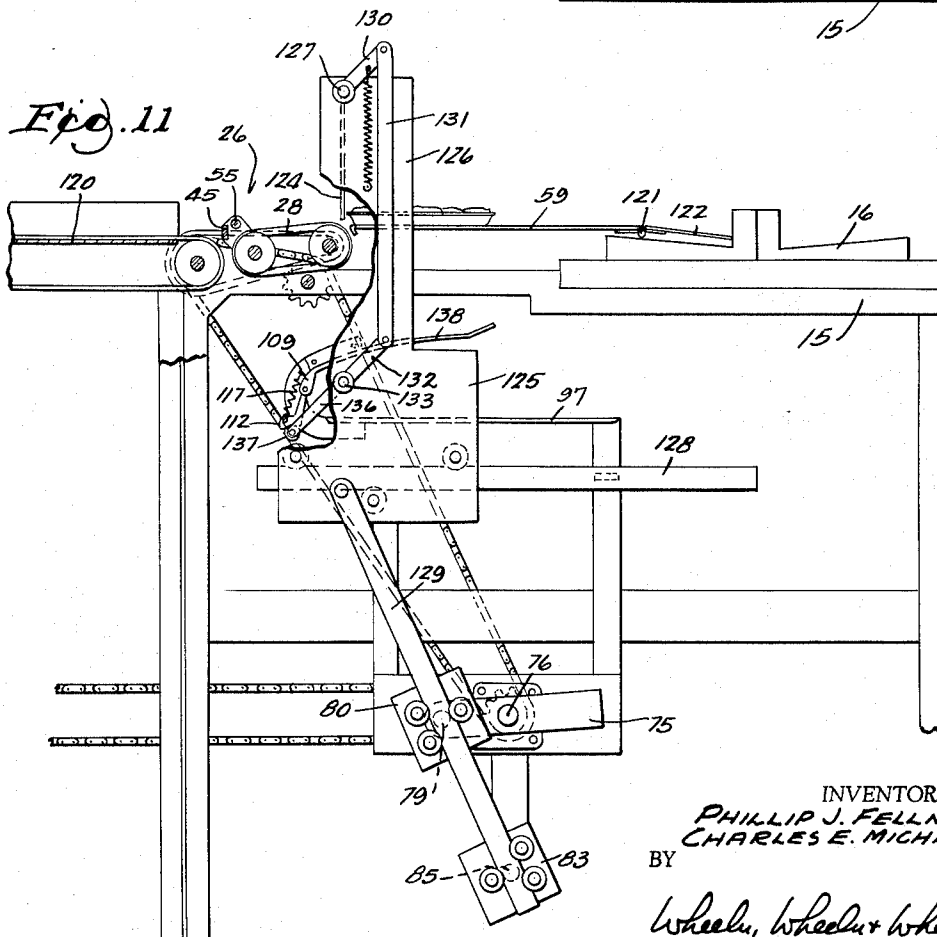
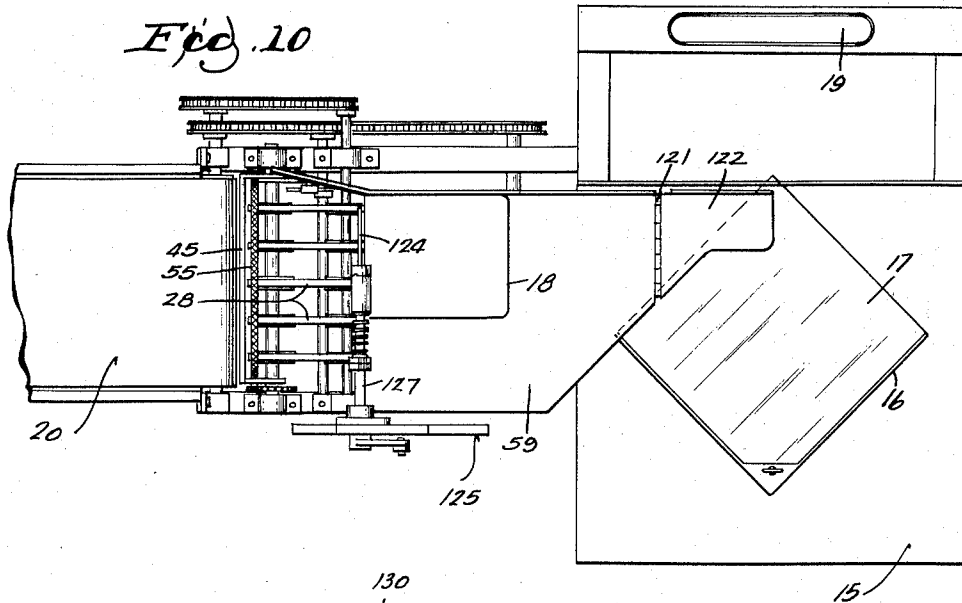
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PACKAGE TRANSPORTING AND WRAPPING APPARATUS

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5 Sheets-Sheet 5



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3,217,858 PACKAGE TRANSPORTING AND WRAPPING APPARATUS

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9 Claims. (Cl. 198—34)

This invention relates to package transporting and wrap-
ing apparatus and particularly to mechanism to transport
packages from an infeed conveyor to an operating station.

The present invention is illustrated herein in connection
with feeding packages to the prewrap table of a wrapping
machine. Such a prewrap table is shown in United States
Patents 2,840,962 and 2,917,886. The wrapping machine
to which packages are fed from the prewrap table is typi-
fied by the wrapping machine shown in said United States
Patent 2,917,886.

In the use of the apparatus shown in the prior patents
aforesaid, an operator manually performs certain pre-
liminary wrapping operations on the package, before the
package is processed in a wrapping machine which com-
pletes the wrapping operation. The operator first manual-
ly places an unwrapped package on the corner of a stack
of diamond-shaped sheets of wrapping film. The operator
then folds the top sheet of the stack over the package, as
described in United States Patent 2,840,962 aforesaid and
seals the partially wrapped sheet on a hot plate. The
wrapping is completed automatically in a wrapping ma-
chine, to which the operator transfers the partially
wrapped package.

Heretofore, the operator draws upon a quantity of un-
wrapped packages in a bin or on a table adjacent the pre-
wrap table and from which the packages are transferred
manually to the prewrap table.

According to the present invention, package feeding
means are provided to feed unwrapped packages auto-
matically in spaced sequence toward the prewrap table
and deposit the packages successively on the sheet stack.
The package feeding conveyor functions substantially in
timed relation with the operator's manual manipulation
of the package in the prewrapping step. Accordingly, the
operator is free to concentrate on prewrap manipulations
and need not be concerned with flow of packages to the
prewrap table.

The package feeding or transporting conveyor of the
present invention is characterized by flip-type paddles,
which are mounted on a side carriage which reciprocates
in a direction toward and away from the prewrap table.
Substantially all of the mechanical apparatus by which
the paddles are operated is disposed at the side of the table
over which the packages are pushed. Accordingly, there
is no conveyor chain, or the like, which overhangs the
packages and from which grease or dirt might fall onto
the packages.

The present invention also incorporates a package sepa-
rating escapement mechanism for feeding packages from
an input conveyor into the package feeding conveyor and
substantially in timed relation with its operations. Ac-
cordingly, packages may accumulate on the infeed con-
veyor in random order, the same being separated and fed
to the package feeding conveyor in timed sequence with
its operations, as aforesaid.

A package feeding conveyor according to the present
invention is, moreover, useful in transporting packages
through an automatic or semi-automatic weighing op-
eration, wherein each package must be brought to a halt
in a position where a scale can rapidly determine its
weight. Where weighing is completely automatic, a com-
puter connected to the scale computes the weight, price,

and other suitable data, and automatically prints it on a
label which is then applied to the package. The positioner
moves the package off the pan of the scale onto a station
where labelling takes place. The package is then subse-
quently moved completely out of the labeller to an ap-
propriate storage or stacking device.

Other objects, features and advantages of the invention
will appear from the following disclosure, in which:

FIG. 1 is a perspective view of one embodiment of the
invention and in which the package feeding conveyor is
transverse to an input conveyor.

FIG. 2 is a plan view of the apparatus shown in
FIG. 1.

FIG. 3 is an enlarged fragmentary plan view of the
package separating escapement mechanism.

FIG. 4 is a cross section taken along the line 4—4 of
FIG. 3.

FIG. 5 is a fragmentary cross section taken along the
line 5—5 of FIG. 3.

FIG. 6 is a fragmentary elevation showing the stop
bar of the package separating escapement mechanism in
a position different from which it is shown in FIG. 4.

FIG. 7 is a fragmentary end elevation of the apparatus
looking in the direction of arrows 7—7 of FIG. 2.

FIG. 8 is a fragmentary cross section taken substan-
tially along the line 8—8 of FIG. 2.

FIG. 9 is a fragmentary detail showing parts of FIG. 8
in a different position of the push arms.

FIG. 10 is a plan view of a modified embodiment of
the invention in which the package feeding conveyor
feeds packages in the same longitudinal direction as the
input conveyor. This view also illustrates a modified
embodiment of the package feeding mechanism.

FIG. 11 is a side elevation of the apparatus shown in
FIG. 10.

FIG. 12 is a fragmentary detail of a part of the cam
track on the package feeding conveyor.

FIG. 13 is a fragmentary detail of a cushion stop for
the paddle arm linkage on the package feeding conveyor.

Although the disclosure hereof is detailed and exact to
enable those skilled in the art to practice the invention,
the physical embodiments herein disclosed merely exem-
plify the invention which may be embodied in other
specific structure. The scope of the invention is defined
in the claims appended hereto.

The prewrap table 15 is substantially the same as the
one shown in United States Patent 2,840,962 and carries
thereon a diamond-shaped sheet dispensing tray 16 in
which is confined a stack 17 of wrapping film sheets.
Packages 18 are placed on the corner of the stack 17 and
are partially wrapped, as is described in Patent 2,840,962.
The partial wrap is sealed on the hot plate 19 and is
placed on conveyor 24 to be fed into a wrapping machine,
such as shown in United States Patent 2,917,886, which
completes the wrapping operation.

The unwrapped packages 18 typically arrive on a belt
conveyor 20. Belt 20 is typically trained over a roller
21 having a shaft 22 by which the conveyor belt 20 is
powered from a motor 23 or the like.

The packages 18 typically arrive on the infeed conveyor
20 in random order and may collect in unspaced or
bunched relationship at the end of conveyor 20, as is illus-
trated in FIG. 1.

According to the present invention, the packages 18 are
separated and delivered to the prewrap table or station
15 in spaced relationship and in time with the sequence
of the manual wrapping operation formed at table 15.
Accordingly, the operator can concentrate on the prewrap
operations and need not be concerned about coordinating
flow of packages to the prewrap table.

According to the present invention, there are two inter-
related mechanisms which function in timed relationship

for the purpose aforesaid. One of these consists of a package separating escapement mechanism indicated generally by reference character 26 and which functions to separate and feed packages 18 in spaced sequence from the infeed conveyor 20 to the second mechanism which comprises a package transporting or feeding conveyor 27 which receives the packages in spaced sequence and conveys the packages in such spaced sequence to the prewrap table 15 and desirably onto the corner of the wrapping sheet stack 17 in dispenser 16 on the prewrap table 15.

Details of the package separating escapement mechanism are best shown in FIGS. 3-6. Beyond the end of the infeed conveyor 20, there is a series of laterally spaced transfer conveyor belts 28 respectively trained over a series of pulleys 29 on jack-shaft 30 and a series of pulleys 31 on drive shaft 32. Belts 28 are desirably continuously driven at a somewhat higher rate than conveyor belt 20, thus to accelerate separation of the packages.

Belt drive power is derived from the motor 23, which drives the main power chain 35 which is trained around sprocket 34 on the drive shaft 36. The opposite end of shaft 36 is provided with a sprocket 37 for chain 38 which drives sprocket 39 on shaft 22 for the roller 21 of belt conveyor 20. Shaft 22 is also provided with a second sprocket 40, which drives chain 41 trained about sprocket 42 on shaft 32. Sprocket 42 is smaller than sprocket 40. Accordingly, the belts 28 are driven at a somewhat higher lineal speed than the belt 20.

Between infeed conveyor 20 and the transfer conveyor belts 28 of the escapement 26 there is a package stop bar 45. Bar 45 moves in an escapement cycle between an elevated position, as shown in FIG. 4, in which it blocks passages of packages 18 from conveyor 20 onto conveyor 26, and a retracted position, as shown in FIG. 6, in which it permits package passage.

Bar 45 is mounted on paired arms 46 pivotally mounted at substantially their midpoints near the ends of pulley shaft 30, as shown in FIG. 4. One arm 46 has a cam follower extension 47 which carries cam follower roller 48 which follows the cam 49 on cam shaft 50. Cam shaft 50 is actuated by chain 38 which is trained over a sprocket 51 on the end of the cam shaft 50.

Spring 52 biases roller 48 against the cam 49. In its position shown in FIG. 4, the roller bears on a low portion of the cam 49 and spring 52 thus elevates the stop bar 45 to package blocking position. In FIG. 6, roller 48 is shown on the high portion of the cam 49, thus lowering the stop bar 45 against the bias of spring 52 to permit package 18 to pass under pressure of the belt 20 onto the belts 28 and thence into the package feeding conveyor 27 and into the path of its pusher arm 61.

To assist movement of the package as shown in FIG. 6, the arms 46 which carry the stop bar 45 may also support a driven roller 55 which may have its periphery knurled for better drive engagement with the bottom of packages 18. Roller 55 is provided on one end with a pinion 56 which meshes with direction changing gears 57 journaled for rotation on the arm 46 and which is in mesh with a drive gear 58 mounted on the end of shaft 30. Accordingly, both gears 56, 57 are concentric with the shaft 30 and swinging of the arm 46 does not disturb the meshing relationship of the respective gears 56, 57, 58.

Cam 49 is rotated in timed relationship to the operation of the package feeding conveyor 27 so that the packages 18 arrive on the conveyor 27 in timed relationship with its feed cycle with respect to the prewrap table 15.

The package transporting or feeding conveyor 27 consists of a bed or table 59, which may be corrugated as shown in the drawings. The table has an upwardly turned side margin 60, against which the packages 18 may abut on delivery from the package separating escapement conveyor 26.

The package conveyor 27 further comprises one or more push arms or paddles 61, 62, which are pivotally

mounted on a travelling carriage 63 which moves rectilinearly on a track 64 on a path of reciprocation longitudinally of table 59 and toward and away from the prewrap table 15. Track 64 is mounted from the frame of the machine on a bracket 68.

Carriage 63 may consist simply of a board or panel having a series of grooved wheels 67 embracing the track 64. The carriage 63 is reciprocated under power of motor 23 by a sweep arm 69 which has a pivotal connection on pin 70 with the carriage 63. Arm 69 is swept periodically in the direction of arrows 71, 72 (FIGS. 7, 8 and 9) by the rotating crank arm 75 (FIG. 7) which is fixed on one end of shaft 76 and which has a miter gear 77 meshing with miter gear 78 on shaft 36 (FIG. 8). The sweep arm 69 has both a shifting fulcrum and a shifting pressure point. The mechanism converts the circular motion of the crank 75 into the reciprocating motion of the carriage.

Crank 75 pivotally carries on pin 79 a thrust transmitting slide block 80 having grooved rollers 81 which embrace the sweep arm 69 and which permits the sweep arm 69 to slide with respect to the block 80 in the course of orbital movement of the pivot 79 on the orbit indicated by broken line 82 in FIG. 7.

The end of the sweep arm 69 opposite its end which is connected to the carriage 63 is guided in another slide block 83 having grooved rollers 84 which embrace the sweep arm 69. Block 83 is pivotally connected on the pin 85 to a fixed bracket arm 86.

Accordingly, rotation of shaft 36 will rotate crank 75 which will sweep arm 69 back and forth to reciprocate the carriage 63 along the table 59, the carriage movement being rectilinear along the track 64.

The geometry of the sweep arm mechanism is such that the velocity of carriage movement is slower in the forward stroke than in the return stroke. This promotes quick return of the carriage and paddles. The geometry of the sweep arm mechanism is also such that the paddles 61, 62 will dwell at the beginning and end of each stroke.

As many paddles or push arms 61, 62 as are needed to convey the packages 18 in shuttle stroke fashion from the receiving end of table 59 to the prewrap table 15 will be provided on the carriage 63. In the embodiment of the invention shown in FIGS. 1-9, the carriage has two paddles 61, 62. In the embodiment of the invention shown in FIGS. 10 and 11, a single paddle suffices.

In any case, and using paddle 61 as an example, the paddle is provided with a mounting sleeve 87 connected to a shaft 90 by which the paddle may be rotated or "flipped" between one position of package engagement and another position in which the paddle is retracted out of range of the package. Sleeve 87 is otherwise loose on the shaft 90, but is pressed under bias of a spring 88 against a clutch shoe 89 fixed on the shaft 90. The sleeve 87 and clutch shoe 89 are provided with bevelled clutch teeth indicated by reference character 91. These will be cammed out of engagement against pressure of spring 88 if the operator's hand is caught by the paddle 61 or if the paddle is otherwise jammed, thus to release the paddle and permit it to swing out of harm's way. Shaft 90 is provided with adjustable nut sets 92, against which the spring 88 bears for adjustment of the pressure of the spring 88.

Shaft 90 is provided with a crank arm 95 having a cam follower roller 96, which, in the conveying stroke of the paddle 61 in the direction of arrow 71, will ride beneath the cam track 97 to bear the reaction thrust of the load. As the sweep arm 69 moves the carriage 63 in the conveying direction of arrow 71, paddle 61 will be held in its depending position shown in FIGS. 1 through 8 to convey the package 18 along the table 59. At the end of the conveying stroke, cam roller 96 runs off the end of track 97 and paddle 61 is swung up to retracted position by spring 104, as will hereinafter appear.

Where a second paddle 62 is also mounted on the carriage 63, it has a similar releasable spring-biased clutch

connection to a shaft 98. Shaft 98 is not mounted directly to the carriage 63, as is shaft 90, but is carried on a crank 99, which is in turn pivotally connected on the pin 100 to the carriage 63. Shaft 90 and pin 100 extend from the rear side of the carriage 63 and are respectively provided with crank arms 101, 102, interconnected by motion-transmitting link 103.

Crank 99 is biased by tension spring 104 toward its position shown in FIG. 9 in which the paddles 61, 62 are elevated. While the paddles are moving forwardly in the direction of arrow 71 during the forward stroke of the conveyor, the cam roller 96 bearing against the undersurface of cam track 97 opposes the bias of spring 104 to keep the paddles vertical. However, at the end of the forward stroke of the carriage, roller 96 moves beyond the terminal end of the track 97 and the spring 104 is released to turn crank 99 and the respective paddles 61, 62 to their elevated position, as shown in FIG. 9. At this point in the cycle, swing arm 69 moves carriage 63 in the return direction of arrow 72 shown in FIG. 9 and the paddles return to starting position. In the course of return movement they are elevated to pass over packages dwelling on the table 59.

The elevated position of paddles 61, 62 is defined by abutment of crank arm 101 with cushion stop 93 having a spring biased cushion plunger 94. The end of arm 101 also engages spring pressed brake shoe 106 on brake stop 107, thus to reduce impact shock and reduce wear on the mechanism.

Near the end of the return stroke of the carriage 63, the cam roller 96, which is then elevated as shown in FIG. 9, comes into contact with cam track 105, which is downwardly inclined toward the package receiving end of table 59. Continued movement of carriage 63 in the direction of arrow 72 will gradually swing the paddles 61, 62 about the axis of their shafts 90, 100, and restore them to depending position, as shown in FIG. 1. Successive positions of the roller 96 in the course of this movement are shown in dotted lines in FIG. 7.

Note from FIG. 7 that there is a gap 108 between the end 109 of track 105 and the end 110 of track 97. Pivotally connected to track end 109 on the pivot 111 is a swing guide 112 having a notch 113 into which the roller 96 is received in the rearmost position of carriage 63. The rearmost position of swing guide 112 is defined by abutment pin 116.

As the carriage 63 again moves forward in the direction of arrow 71, the guide 112 will swing about pivot 111 against the slight bias of return spring 117 to guide the roller 96 to a position beneath the terminal end 110 of cam track 97. At this point, as shown in FIG. 12, the angle of the guide arm 112 is such that roller 96 will leave recess 113 and will be beneath the track 97 where it will remain during continued movement of the carriage 63 in the direction of arrow 71 and until it runs out the other end of track 97, as aforesaid.

The foregoing structure results in the cycling of the paddles 61, 62 between a package propelling position in which they downwardly depend from their pivot shafts to push the packages 18 over table 59 and toward the table 15, and a second position during the return stroke of the carriage in which the paddles 61, 62 are elevated to pass over previously advanced packages now dwelling on table 59. At the end of the return stroke, the paddles are restored by means of the cam track 105 to depending package propelling position.

The mounting of the shaft 98 for paddle 62 on crank arm 99 has the advantage of increasing the throw of the paddle 62 as it pivots from its depending paddle propelling position to its raised retracted position shown in FIG. 9. Note in this figure that paddle 62 is carried at a higher level than paddle 61 by an amount equal to the spacing between pivot pin 100 and shaft 98. This facilitates paddle 62 clearing large packages in the course of its upward swing at the end of the forward stroke of carriage 63.

As best shown in FIG. 2, the table 59 is desirably provided with an extensible apron 118, adjustably related to the table 59 on the extension rods 119 slidable in a bearing bracket 120 beneath the table 59. At its terminal end, the apron 118 is pivotally provided on hinge 121 with ramp 122 which guides each package 18 onto the corner of the stacked sheets 17. Apron 118 is adjusted according to the size of the package to guide the package for deposit on said corner.

FIGS. 10 and 11 show a modified embodiment of the invention in which the incoming conveyor 20 is longitudinally aligned with the table 59 of the package feeding conveyor. The package feeding conveyor has a somewhat different specific construction from that previously described, in that there is but a single push arm or paddle 61. Moreover, the carriage 125, which is otherwise similar to carriage 63 of the previously described embodiment, is provided with an upwardly extending mast portion 126, on which the shaft 127 for paddle 124 is mounted. This construction facilitates disposing of most of the moving parts of the apparatus below the level of the table 59. As in the previously described embodiment, the carriage 125 is guided for reciprocating movement on a track 128, the carriage being propelled by a sweep arm 129 powered by apparatus similar to that shown in the previous figures and which have been given the same reference characters where applicable. In this embodiment of the invention, the paddle 124 is raised and lowered by a crank arm 130, which is fast to the paddle shaft 127. Crank arm 130 is actuated by a link 131 connected to crank arm 132, which is fast to a shaft 133 which extends laterally through the carriage 125 and is provided at its opposite end with a cam arm 136 having a cam follower roller 137, which follows a cam track 138 having components which are substantially identical with those of track 105 shown in FIG. 7 and which are given the same reference characters where appropriate in FIG. 11.

The package separating escapement mechanisms is substantially identical with that shown at 26 in the previously described figures of the drawing and to which the same reference characters are applied where appropriate.

In this embodiment, the travel of the carriage 125 is sufficient to convey package 18 completely from the package separating escapement mechanism 26 onto the stack of wrapping sheets 17 in the dispenser 16 on the table 15. As in the previously described embodiment, the table 59 may have a hinged ramp 122 to guide the package onto the corner of the sheet stack 17.

What is claimed is:

1. In package handling apparatus including an in-feed conveyor for unwrapped packages and a wrapping station, mechanism for feeding the unwrapped packages from the infeed conveyor to the station in time with wrapping operations performed at said station, said mechanism comprising a package separating escapement means for removing unwrapped packages from the in-feed conveyor in spaced intervals and a package feeding means for feeding in spaced sequence to said station packages delivered thereto by the package separating escapement means said package feeding means comprising means to convey packages in a direction which is transverse to said infeed conveyor, said package feeding means having two spaced package propelling push arms, the packages being transferred from one arm to the next in the course of the feeding thereof, a carriage for said push arms, means for reciprocating said carriage in one direction toward the wrapping station and in the opposite direction away from the wrapping stations, mechanism interconnecting said push arms for concurrently cycling said push arms from a package feed position behind said packages during movement of the carriage in said one direction and a retracted position clear of said packages during movement of the carriage in said opposite direction, said package separating escapement means comprising means to advance said packages transversely into

the path of one of said push arms from which said package is advanced by said push arm longitudinally into the path of movement of the next push arm.

2. In package handling apparatus including an infeed conveyor for unwrapped packages and a wrapping station, mechanism for feeding the unwrapped packages from the infeed conveyor to the station in time with wrapping operations performed at said station, said mechanism comprising a package separating escapement means for removing unwrapped packages from the infeed conveyor in spaced intervals and a package feeding means for feeding in spaced sequence to said station packages delivered thereto by the package separating escapement means, said package feeding means comprising a pair of interconnected push arms, a carriage having a path of reciprocation on which the push arms move in a forward stroke toward and a return stroke away from said wrapping station, means to reciprocate the carriage on said path, said push arms having pivotal connections to said carriage on which said push arms are pivotally movable between one position of push arm engagement with packages and another position in which said push arms are elevated out of the range of engagement with said packages and means for concurrently pivoting said push arms on their pivotal connections between their said positions in time with the movements of said carriage whereby said push arms will advance packages toward said wrapping station in the forward stroke of the carriage and will return above the path of said packages in the return stroke of the carriage.

3. The device of claim 6 in which said push arms are further provided with a cam follower, a cam having a relatively fixed position near the end of the return stroke of the carriage, said cam follower interacting with said cam to pivotally move said push arms from their said other position to their said one position in the course of final retraction of the carriage.

4. A package conveyor comprising a table along which packages are fed, a carriage and means for reciprocating said carriage longitudinally of said table, at least one push arm and means pivotally connecting said push arm to said carriage, means for pivotally moving said push arm between a package conveying position in which said push arm is proximate said table to convey packages therealong and another position in which the push arm is elevated above said table for retraction over packages on the table to an initial position behind said packages and means for pivotally moving said arm between said positions in time with the desired advance of packages, said carriage having a second push arm and a pivotal connection thereof to said carriage, and means interconnecting said push arms for concurrent pivotal movement thereof between said package engaging position and retracted position.

5. The device of claim 4 in which the means for pivoting said push arms to their package engaging position comprises a cam having a relatively fixed position, said push arms having a cam follower which follows said cam to pivot said push arms to their package engaging position.

6. The device of claim 4 in which the carriage is above the level of the table.

7. A package conveyor comprising a table along which packages are fed, a carriage and means for reciprocating said carriage longitudinally of said table, at least one push arm and means pivotally connecting said push arm to said carriage, means for pivotally moving said push arm

between a package conveying position in which said push arm is proximate said table to convey packages therealong and another position in which the push arm is elevated above said table for retraction over packages on the table to an initial position behind said packages and means for pivotally moving said arm between said positions in time with the desired advance of packages, said means for pivoting said push arm to its package engaging position comprising a cam having a relatively fixed position, the pivotal connection of the push arm to the carriage including a cam follower which follows said cam to pivot said push arm to its package engaging position, and a second cam to hold said push arm in package engaging position, said second cam being spaced by a gap from the cam first mentioned, and means to guide said cam follower across said gap.

8. A package conveyor comprising a table along which packages are fed, a carriage and means for reciprocating said carriage longitudinally of said table, at least one push arm and means pivotally connecting said push arm to said carriage, means for pivotally moving said push arm between a package conveying position in which said push arm is proximate said table to convey packages therealong and another position in which the push arm is elevated above said table for retraction over packages on the table to an initial position behind said packages and means for pivotally moving said arm between said positions in time with the desired advance of packages, the means pivotally connecting the push arm to the carriage including a yieldable coupling on which the push arm is displaceable.

9. A package conveyor comprising a table along which packages are fed, a carriage and means for reciprocating said carriage longitudinally of said table, at least one push arm and means pivotally connecting said push arm to said carriage, means for pivotally moving said push arm between a package conveying position in which said push arm is proximate said table to convey packages therealong and another position in which the push arm is elevated above said table for retraction over packages on the table to an initial position behind said packages and means for pivotally moving said arm between said positions in time with the desired advance of packages, the means for reciprocating the carriage comprising means for moving it at a higher velocity in its return stroke than in its forward stroke.

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