Nov. 22, 1960 M. ZWARYCZ 2,960,809

EJECTOR FOR FOOD SUPPORTING ELEMENTS

Filed May 27, 1959

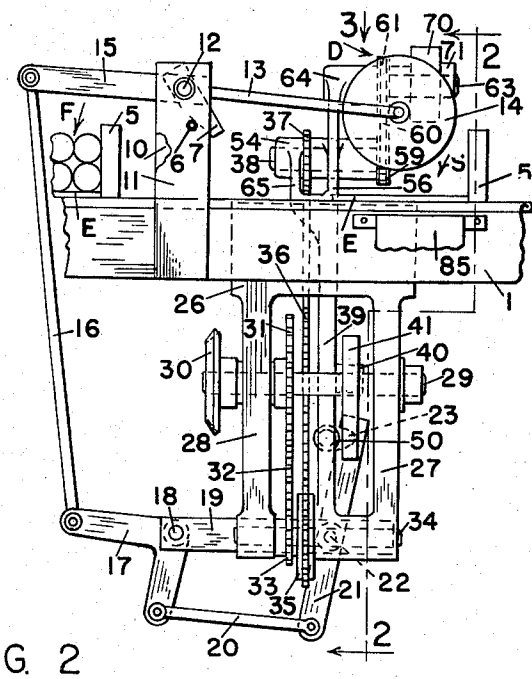

FIG. 1

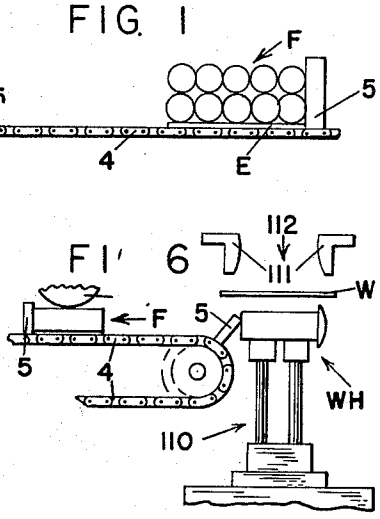

FIG. 6

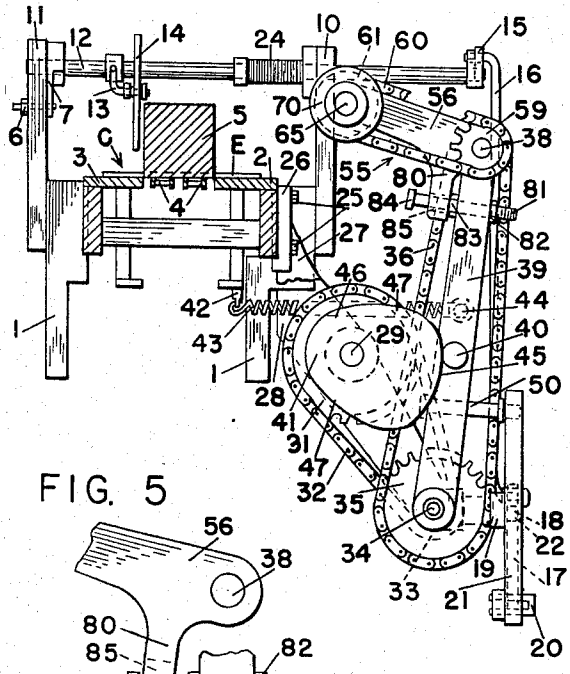

FIG. 2

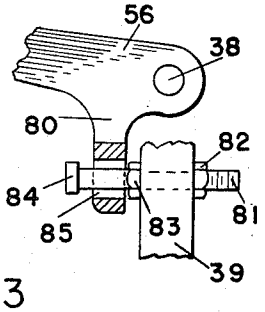

FIG. 4

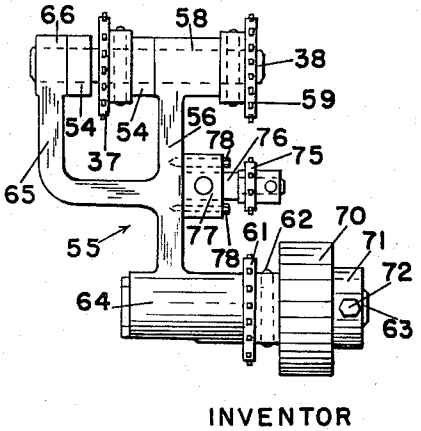

FIG. 3

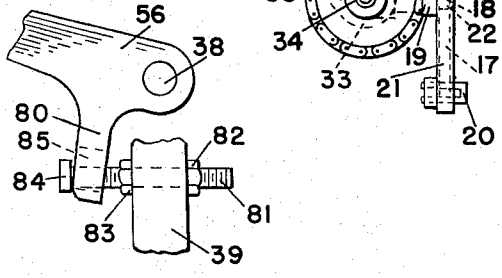

FIG. 5

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EJECTOR FOR FOOD SUPPORTING ELEMENTS

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7 Claims. (Cl. 53—53)

This invention relates to improvements in package wrapping machinery and it is the general object of the invention to prevent the wrapping head of such machinery from being damaged by delivery to it of empty or unloaded food supporting elements, such as heavy cardboard.

In a known form of wrapping machinery articles to be wrapped, such for instance as a group of frankfurters, are deposited on comparatively heavy cardboards which are located along a conveyor which moves each cardboard and its article to the wrapping head of the machine. The cards may be delivered to the conveyor either manually or by machine, and the articles of food are generally placed by hand on the cardboards as they pass one or more loading points. Occasionally a card will pass the loading point or points without having an article placed on it, and unless such a card is removed from the conveyor it is likely to be delivered to the elevator mechanism of the wrapping machine and in one way or another become entangled with the mechanism of the wrapping head and cause damage.

It is an important object of the present invention to provide means for removing an unloaded cardboard or food supporting element from the conveyor to prevent damage to the wrapping head of the machine.

As the cardboards and their articles move toward the wrapping head they pass through a sensing and ejector station and it is a further object of the invention to provide sensing means located at the station effective to permit a loaded element to pass along to the wrapping head but also effective to remove an unloaded element while it is still at the ejecting station.

It is a more particular object of the invention to provide a rotating removal or ejector wheel mounted in such manner that it tends to move toward ejecting position and is permitted to do so if the cardboard element is unloaded but is prevented from doing so if the sensing means detects the presence of an article on the element. The sensing means controls a lock which in turn controls the tendency of the rotating wheel to move to card ejecting position.

It is another object of the invention to mount the aforesaid rotating ejector wheel on a lever operated by a cam in such manner that the wheel is moved positively away from ejecting position but is urged toward ejecting position by a spring which can yield in the event that the ejector wheel should engage two or more cardboards deposited by mistake one over the other on the conveyor.

It is a further object of the invention to mount the aforesaid ejector wheel on the upper end of a lever which swings about a pivot located below but to one side of the conveyor so that as the ejector wheel moves toward the sensing station it will have a downward motion due to the location of the pivot of the lever and be brought into engagement with the top of an unloaded cardboard element to remove it.

In order that the invention may be clearly understood

reference is made to the accompanying drawings which illustrate by way of example the embodiments of the invention and in which:

Fig. 1 is a side elevation of a portion of the conveyor of a wrapping machine showing the invention applied thereto and in such position as to eject an unloaded cardboard element,

Fig. 2 is a vertical section on line 2—2, Fig. 1,

Fig. 3 is a detail plan view looking in the direction of arrow 3, Fig. 2,

Figs. 4 and 5 are detail operating views having the ejector wheel mounted in two positions relative to the carrier lever, and

Fig. 6 is a diagrammatic view showing the wrapping head of the wrapping machine on which the invention is used.

Referring more particularly to Fig. 1, the frame of the conveyor system of the machine supported in any approved manner is indicated at 1 and has supporting upwardly facing flat runs 2 and 3 between which move conveyor chains 4. The chains are joined by upwardly extending pushers 5 which are equally spaced along the length of the chains 4. In normal operation the conveyor coacting with runs 2 and 3 will move an article F of food, shown herein as a group of frankfurters resting on a thin flat cardboard supporting element E, along the runs 2 and 3 and within the outer edges thereof toward the wrapping head WH, Fig. 6, of the machine. As the articles and elements move along the runs and the conveyor designated generally at C they pass through a sensing and ejecting station designated generally at S where the presence or absence of an article F can be detected by a sensing means designated at D. In Fig. 1 three elements E are shown, the ones at the right and left-hand ends of the conveyor are shown as being properly loaded with articles F, but the center element is shown as unloaded and must be ejected.

The sensing means D includes two uprights 10 and 11 secured to the frame 1 and having rockably mounted in their upper ends a sensing shaft 12. Secured to the shaft between the uprights is an arm 13 which as shown in Fig. 1 extends to the right and has mounted thereon for free rotation a sensing or detecting circular disc 14. The right-hand end of the shaft 12, Fig. 2, has secured thereto an arm 15 which is pivotally connected to a descending link 16 the lower end of which is pivotally connected to one arm of a bell crank lever 17 pivoted at 18 to fixed bar 19 mounted as will be described hereinafter. Another link 20 pivotally connects the other arm of the bell crank lever to a lock lever 21 pivoted at 22 to bar 19 and having a locking detent 23 formed in the upper end thereof.

The operation of the sensing mechanism D is such that the disc 14 is normally in low position in the path of travel of an article as shown in Fig. 1 and when an article is absent from the station the disc remains down on the cardboard element E at the sensing station. The lift link 16 is therefore raised and the lock lever 21 will be in the position shown in Fig. 1, which is its nonlocking position. It is this position of the lock lever, as will be described hereinafter, which effects ejection of the element E from the sensing and ejecting station. A torsion spring 24 surrounding part of shaft 12 urges the disc 14 downwardly and tends to hold lock 21 normally in unlocking position. Downward motion of the disc is limited by engagement of a pin 6 on upright 11 with a short lever rockable with sensing shaft 12.

Bolted at 25 to one of the vertical sides of the frame 1 is the foot 26 of a support or stand having right and left depending arms 27 and 28 respectively as viewed in Fig. 1. Bar 19 is secured to the lower ends of these

arms 27 and 28. Journaled in these arms is a driving shaft 29 which has secured to the left end thereof as viewed in Fig. 1 a bevel gear 30 which is driven in any approved manner from a source of power (not shown) to rotate the shaft once for each operating cycle of the machine. The shaft 29 has secured thereto a sprocket wheel 31 which by means of a chain 32 drives lower sprocket 33 fastened to a driven shaft 34 journaled in the lower ends of arms 27 and 28.

The shaft 34 has secured thereto a sprocket wheel 35 which by means of a chain 36 has driving relation with a sprocket wheel 37 secured to a stub shaft 38 rotatable in bearings 54 on the forked upper end of a carrier lever 39. The latter lever swings about the shaft 34 as a center and has rotatable thereon a roll 40 which engages a cam 41 secured to the driving shaft 29 and which normally controls lever 39. A pull spring 42 having its left-hand end as viewed in Fig. 2 fastened to a depending stud 43 fixed to the conveyor frame has its right-hand end fastened to a stud or the like 44 on the lever 39 and tends to move lever 39 toward the conveyor and also tends to hold the roll against the cam.

The cam has a high dwell 45 and a low dwell 46 connected to it by inclines 47. When the previously mentioned lock lever 21 is in its unlocking position the roll 40 can move from the high dwell 45 down one of the inclines 47 to the low dwell 46 to permit the spring 42 to move the lever from its nonejecting position shown in Fig. 2 to the left to its ejecting position. If, on the other hand, the lock lever 21 is in its locked position so that the detent 23 engages a lock lug 50 secured to the lever the lock will hold the roll 40 away from the cam as an incline arrives under it and the lever will remain in its nonejecting position during an interval of stoppage of the conveyor chain.

Mounted on the upper end of the lever 39 is a bodily movable ejector mechanism shown in Fig. 3 and designated generally at 55. This mechanism comprises a lever 56 mounted for slight rockable motion about the previously mentioned shaft 38 which is rotatable on the upper end of lever 39. Lever 56 has a hub 58 in which the shaft 38 turns and the latter shaft has secured thereto a sprocket wheel 59 which by a chain 60 drives a sprocket wheel 61 pinned as at 62 to an ejector shaft 63 rotatable in another hub bearing 64 formed on the lever 56. A side bearing arm 65 of lever 56 provides additional support for lever 56 on shaft 38.

The ejector which actively discharges an unloaded element E from the conveyor comprises a wheel 70 made preferably of rubber and bonded to a hub 71 which is held by set screw 72 on the ejector shaft 63. An idler sprocket 75 rotatable on a stud 76 held by a small stand 77 fastened at 78 to the lever 56 keeps the chain 60 taut. As long as the shaft 38 is turned by power derived from the shaft 29 and transmitted through the chains and the sprockets already described the ejector wheel 70 will rotate without regard to the position of the lever 39.

The lever 56 has a depending arm 80 which cooperates with a limiting screw 81 to permit a slight angular motion of the lever 56 with respect to the lever 39. The limiting screw 81 has thereon nuts 82 and 83 engaging opposite sides of the lever 39 for adjustment relative to the latter and the screw has a head 84 normally spaced from the arm 80, the latter being held against the nut 83 by the weight of the lever 56 and the parts mounted thereon. Arm 80 has a hole 85 therein for screw 81 large enough to allow free motion of lever 56. The reason for the angular motion of lever 56 is to permit it to move from the position of Fig. 4 to the position of Fig. 5 to take care of any excess motion of lever 39 which might occur after roll 70 engages an element E.

It will be noted from Fig. 2 that the horizontal shaft 34 around which lever 39, lever 56 and roll 70 turn is below and spaced considerably to one side of the conveyor chains and the runways 2 and 3. It is because of the location of the shaft 34 that rocking motion of the lever 39 to the left from the position shown in Fig. 2 causes the roll 70 to descend toward the path of travel of the elements along the conveyor onto the top of an unloaded element E at station S and remove it in a direction to the right as viewed in Fig. 2.

When a cardboard element E is ejected it moves in a direction at right angles to the travel of the conveyor and slides down a chute 86 to a receiver (not shown). The ejected elements are not damaged by the ejector wheel 70 and can be reused.

It is believed that the operation of the mechanism will be understood from the previous description but it may be stated that when an article F on a cardboard element E arrives at the sensing station the disc 14 will be raised to move the locking lever 21 to its locking position so that the detent 23 will engage the locking stud 50 and prevent angular motion of the lever 39 to the left as viewed in Fig. 2 when a decline of the cam arrives under the roll 40. At this time the conveyor chain is at rest for an interval of time and the article F will hold disc 14 up while the declines and low dwell of the cam pass by roll 40 and spring 24 will not be able to unseat the lock lever 21 from the stud 50. If, on the other hand, an article F should be absent from the element E upon arrival of the latter at the station S the disc 14 will remain down by action of the torsion spring 24 to hold the lock lever 21 in its unlocking position, whereupon the roll 40 can travel along a decline of the cam and the ejector roll 70 will descend against the top surface of the unloaded element E and eject it. Further turning of the cam will restore the lever 39 to the position shown in Fig. 2.

The conveyor chain 4 is operated intermittently by means not shown to stop the pushers one at a time in position to locate the elements E and articles F at the sensing or ejecting station S. After the ejector wheel 70 has had time to move to ejecting position and return to normal position in transverse alignment with the ejecting station and above and to one side of the conveyor, if that is necessary, the chain will move again to place the next article F at the station and then stop. The high dwell 45 of cam 41 holds the lever 39 and roll 70 in nonejecting position while the conveyor is moving, and the inclines 47 and low dwell 46 permit roll 70 to move to and back from ejecting position, if necessary, while the conveyor is momentarily at rest.

At one end of the conveyor there is located the wrapping head WH of the wrapping machine. The head has a plunger system 110 and a guide former 111 having an opening 112 for the article to be wrapped. A sheet wrapper W is supplied in usual manner over the system 110 and the article to be wrapped. The plunger system rises to push the article and sheet up through the opening 112 and then descends for the next operation, all in known manner. The conveyor chain and pushers 5 move an article and its cardboard element to the wrapping head and if the element is empty it may damage the head. The latter and the parts associated with it are shown diagrammatically in Fig. 6, much of the detail being omitted since the head is of well known construction.

From the foregoing it will be seen that the invention provides element ejecting means located at a station along the conveyor and has placing means, such as cam 41 and spring 42, tending at periodic intervals when the conveyor is at rest to move the ejecting means to ejecting position, but is prevented from doing so by control means, such as sensing disc 14 and lock 21, if an article is on the element at the station. If an article is absent the control means permits the ejecting means to follow its normal tendency and move against the element and remove it, thereby preventing the element from reaching

and possibly damaging the wrapping head WH. The ejecting means includes the constantly rotating wheel **70** which, because of the location of shaft **34** with respect to the conveyor, moves down to engage the top of the article and move the latter toward the chute **85**. The ejector operating shaft **38** has operative connections, such as chain **60**, with the ejector **70** to cause the latter to be rotated by power derived from shaft **29**. The low position of the sensing disc **14** is determined by a stop **6**, Figs. 1 and 2, which engages a stop arm **7** secured to shaft **12**. This stop also determines the position of lock lever **21**.

Having now particularly described and ascertained the nature of the invention and in what manner the same is to be performed, what is claimed is:

1. In protector mechanism for the wrapping head of a wrapping machine, a conveyor coacting with a run on each side thereof operative to support and transport thin flat article support elements within the outer edges of the runs to an ejecting station and toward said head, each element normally provided with an article thereon to be wrapped therewith at said head but being capable of damaging the head if delivered thereto by the conveyor without an article thereon, a bodily movable element ejector wheel continuously rotating during operation of the machine and normally above and to one side of the conveyor and in transverse alignment with said station, periodically acting placing cam means tending to move the ejector into ejecting relation with respect to an element on the conveyor at the ejecting station, vertically movable sensing means at said station and normally down and in the path of travel of an article to determine whether or not an article is on an element at the ejecting station, and locking means for the placing means and normally in unlocked relationship with the placing means and operated by the sensing means when the latter moves upwardly to establish locking relationship between the locking and placing means, the sensing means when sensing the presence of an article on an element at the ejecting station effective by upward movement to prevent the placing means from moving the ejector into ejecting relation with the element but when in down position enabling the placing means because of said unlocked relationship to move the ejector into ejecting relation with the element to remove the latter from the conveyor in the event of absence of an article on the element.

2. The protector mechanism set forth in claim 1 wherein the ejector wheel is above the conveyor and runs in transverse relationship thereto and is mounted on a vertical carrier lever movable by the placing means about a pivot below and out of vertical alignment with the conveyor, whereby arcuate movement of the lever moves the ejector down on an element at the station to eject it when an article is absent at the station.

3. The protector mechanism set forth in claim 1 wherein the conveyor moves the element along a path while lying flat on the conveyor and the placing cam means moves the ejector wheel about a horizontal axis and causes the ejector wheel to move in a vertical plane down toward the path to engage the top of an element at the station to remove the element by a motion transverse of the conveyor, provided there is no article on the element.

4. The protector mechanism set forth in claim 1 wherein the carrier lever is moved by a spring to be normally against the cam and a part on the lever is locked by the locking means to prevent the spring from moving the ejector against an element at said station when an article is present on the element.

5. The protector mechanism set forth in claim 4 wherein the bodily movable ejector is mounted for limited free motion with respect to said carrier lever enabling the ejector to have motion relative to the lever should the latter have excess motion subsequent to engagement of the ejector with an element.

6. In protector mechanism for the wrapping head of a wrapping machine, a conveyor including a run on each side thereof operative to support and transport thin flat article supporting elements within the outer edges of the runs to an ejecting station and toward said head, each element normally provided with an article thereon to be wrapped therewith at said head but being capable of damaging the head if delivered thereto by the conveyor without an article thereon, a shaft below and to one side of the conveyor and which rotates when the machine is in operation, a vertical lever pivoted about the axis of said shaft and capable of moving to ejecting and nonejecting positions, an element ejector wheel rotatably mounted on the lever for constant rotation during machine operation, a rotatable cam having high and low dwells driven from said shaft effective at periodic intervals to normally move the lever to nonejecting position by reason of said high dwell, a spring normally holding the lever against the cam and moving the lever to ejecting position between said intervals by reason of said low dwell, means to rotate the ejector wheel from said shaft, and a lock normally in unlocking position for the lever capable of being in locking or unlocking position relative to the lever and effective if an article is present on an element at the station to be moved to locking position and prevent the spring from moving the ejector wheel into element ejecting position but being in unlocking position if an article is absent from the station and enabling the spring to move the lever to place the ejector wheel in element ejecting position.

7. The mechanism set forth in claim 6 wherein the lever has an ejector operating shaft constantly rotating thereon during machine operation and driven from the first named shaft and the ejector operating shaft has chain and sprocket operative connections with the ejector wheel to constantly rotate the latter by power derived from the first named shaft and transmitted to the shaft on the lever.

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CERTIFICATION OF CORRECTION

Patent No. 2,960,809 November 22, 1960

Michael Zwarycz

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

In the grant, lines 2 and 12, and in the heading to the printed specification, lines 3 and 4, name of assignee, for "Crompton & Knowles Packing Corporation", each occurrence, read -- Crompton & Knowles Packaging Corporation --.

Signed and sealed this 13th day of June 1961.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents