Oct. 15, 1968 R. H. MARSHALL ETAL 3,405,504

TRANSFERRING SYSTEM

Filed Oct. 21, 1965 4 Sheets-Sheet 1

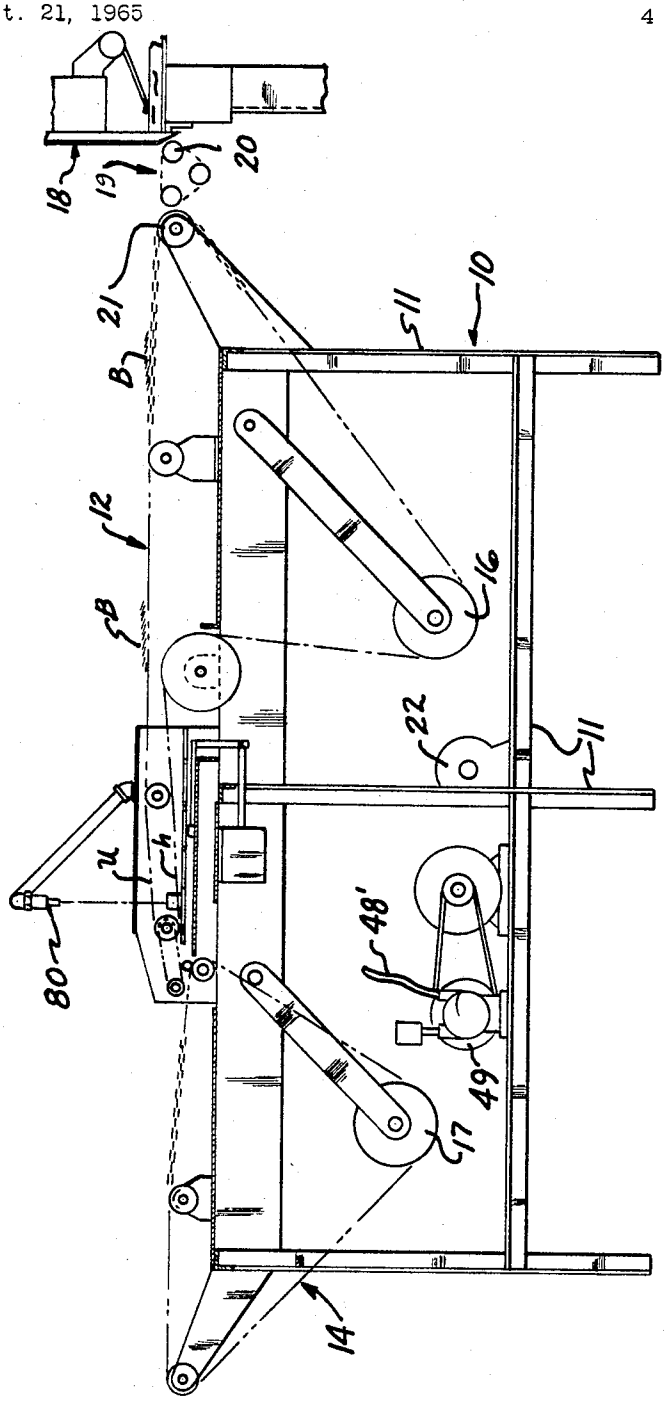


FIG. 1

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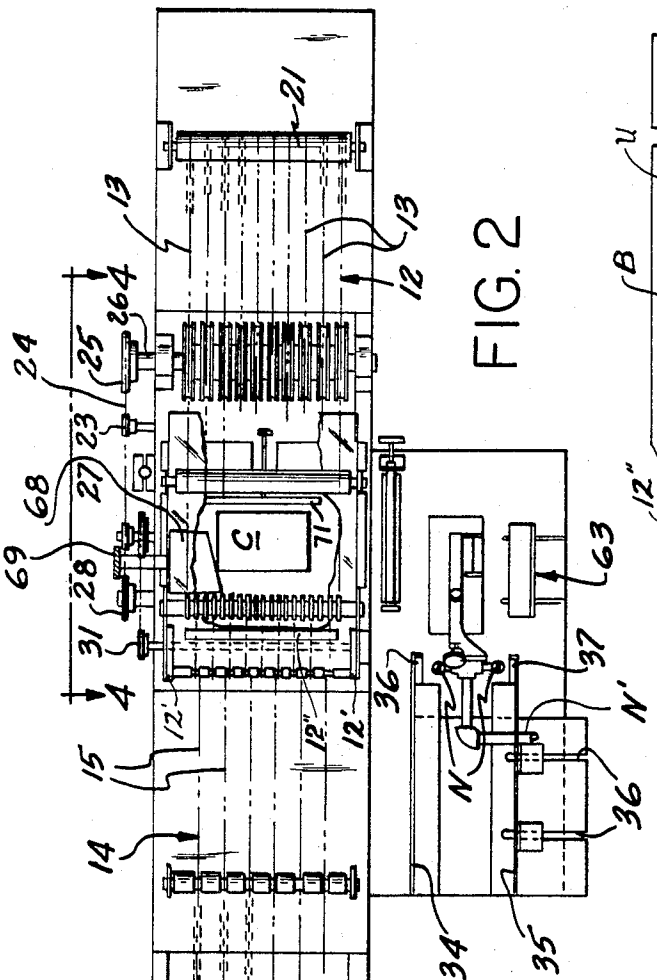


FIG. 2

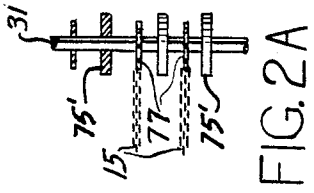


FIG. 2A

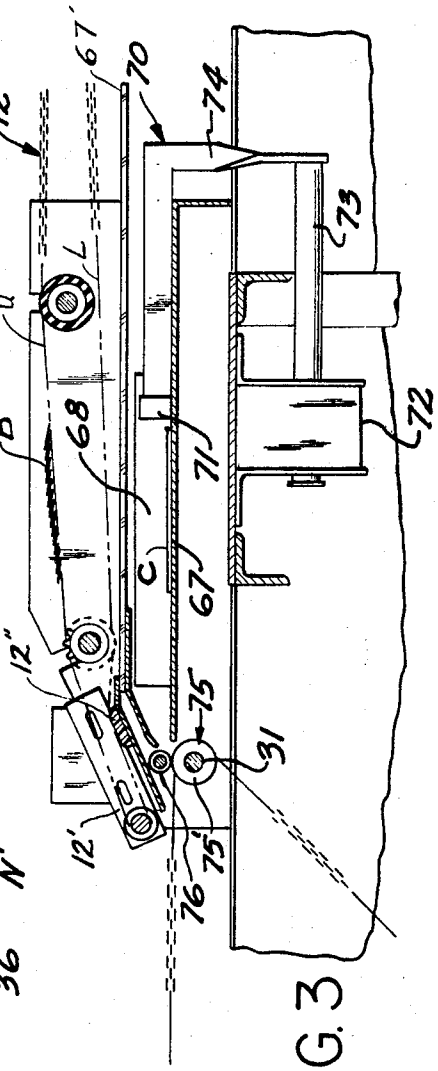


FIG. 3

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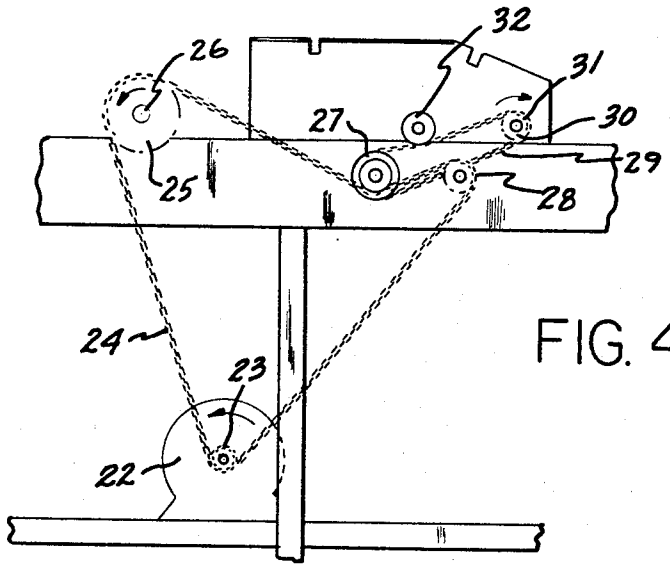


FIG. 4

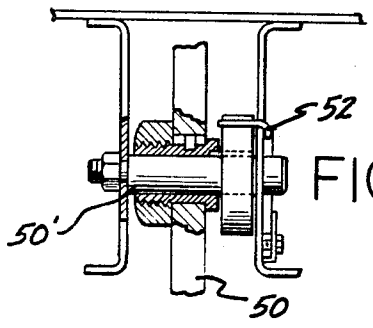


FIG. 7

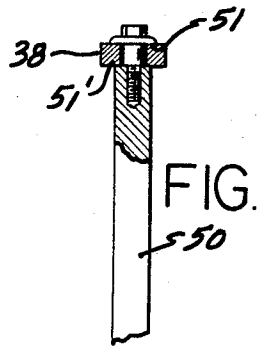


FIG. 8

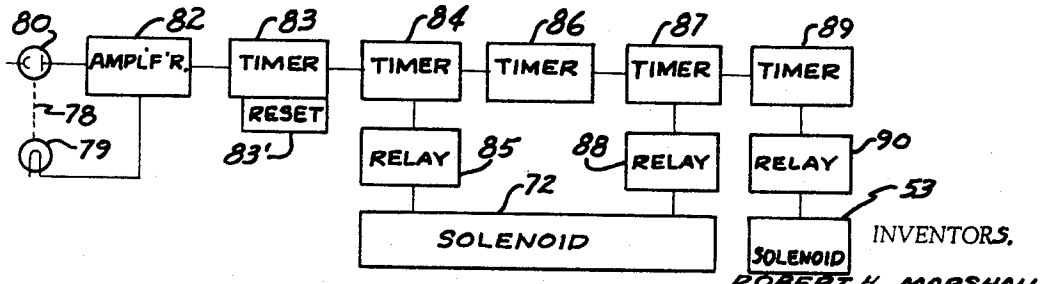


FIG. 9

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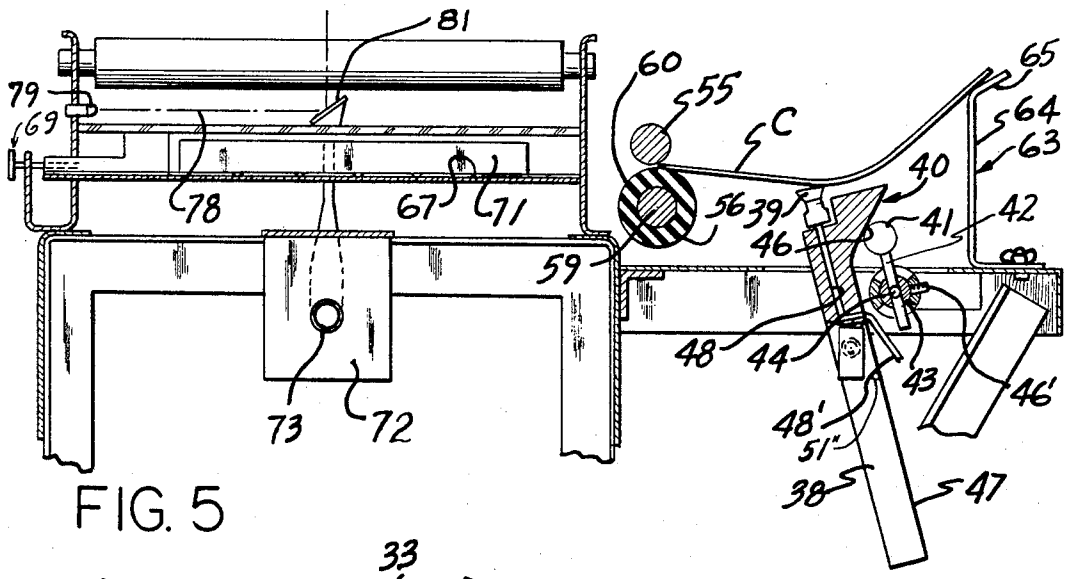


FIG. 5

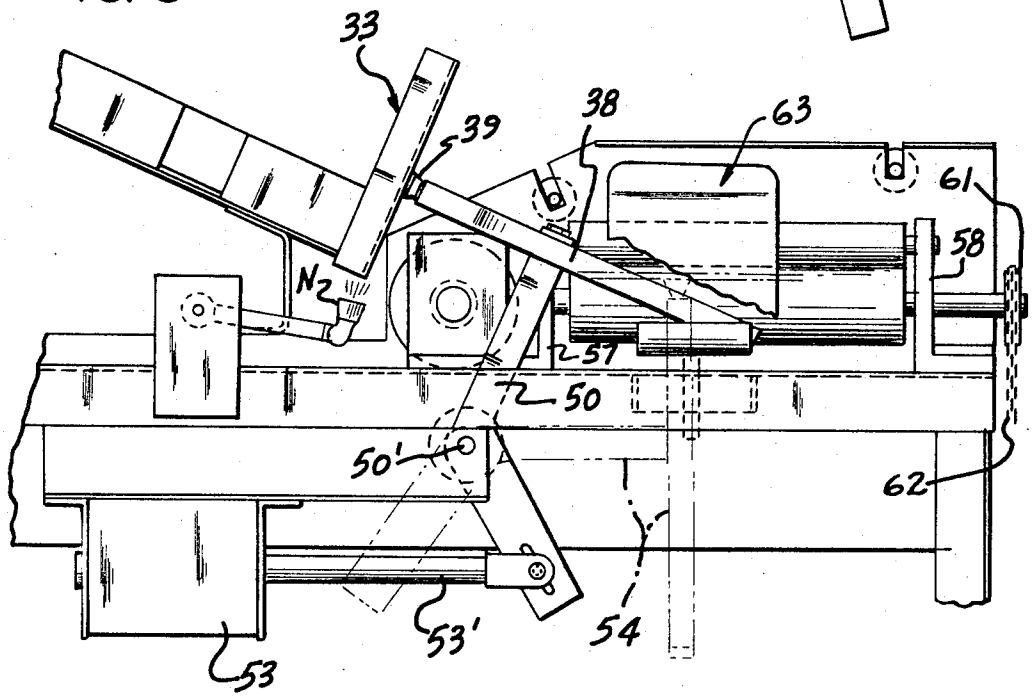


FIG. 6

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3,405,504

TRANSFERRING SYSTEM

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Filed Oct. 21, 1965, Ser. No. 499,966
13 Claims. (Cl. 53—74)

ABSTRACT OF THE DISCLOSURE

Apparatus having adjacent conveyors for moving individual units of product, a magazine for containing a supply of cards, and a card feeder positioned to move a card below each unit of product being transferred between conveyors.

This invention relates to a system for transferring material onto a card.

In accordance with the invention, there is provided a system by which material, for example a group of bacon slices, is automatically deposited onto a card when a group of bacon slices is sensed travelling on a first endless conveyor of the system, a card is pushed over a support into the pinch point of feed rolls following a time delay; the feed rolls feed the card onto a second endless conveyor where the bacon slices are discharged onto the card by the first conveyor; and thereafter another card is fed from a magazine and tucked into the pinch point of another set of feed rolls which feed the card onto the support.

In the drawings:

FIGURE 1 is a side elevational view of a transferring system in accordance with the invention;

FIGURE 2 is a top plan view of the system illustrated in FIGURE 1;

FIGURE 2A is a fragmentary view showing a feed roll;

FIGURE 3 is a vertical sectional view showing in particular a mechanism for transferring a card over the support into the pinch point of feed rolls;

FIGURE 4 is a side elevational view taken along line 4—4 of FIGURE 2;

FIGURE 5 is a sectional view illustrating the manner in which a card is positioned in the pinch point of feed rolls which feed the card onto a support;

FIGURE 6 is a side elevational view showing the mechanism by which a card is transferred from a stack of cards and positioned at the pinch point of feed rolls;

FIGURE 7 is a partly cutaway view showing structure by which a bell crank shown in its entirety in FIGURE 5 is pivotally mounted;

FIGURE 8 is a fragmentary view showing the connection of the bell crank and an arm; and

FIGURE 9 is a schematic view showing control elements for the system illustrated in FIGURES 1 through 8 of the drawings.

Referring more particularly to the drawings there is shown a transferring system generally indicated at **10**. The system **10** has an elongated frame **11**. A first endless conveyor **12** constructed of spaced apart side-by-side chains **13** and a second endless conveyor **14** constructed of spaced apart side-by-side chains **15** are mounted by the frame **11**. Idler rolls **16** and **17** serve to maintain individual chains **13** and **15**, respectively, under the proper tension. A bacon slicer generally indicated at **18** deposits bacon slices onto a weighing conveyor **19** having a porcupine roll **20** and the conveyor **12** having a porcupine roll **21**.

The conveyors **12** and **14** are driven by mechanism best illustrated in FIGURE 4. An electric motor **22** drives a sprocket **23** which in turn drives a chain **24**. The chain **24** drives a sprocket **25** and its shaft **26**. The chain **24** also drives idler sprockets **27** and **28**. The sprocket **27** drives

a chain **29** which in turn drives a sprocket **30** and its shaft **31** and an idler sprocket **32**. The idler sprocket **32** exerts force against the chain **29** to maintain the chain **29** under the proper tension. Thus, it is seen that the conveyors **12** and **14** are continuously driven.

Mounted at one side of the frame **11** is a magazine generally indicated at **33**. The magazine **33** has side guides **34** and **35**, the latter being adjustable by means of slots **36** to accommodate cards C of different widths. The side guides **34** and **35** terminate at stops **36** and **37** which engage the sides of the endmost card C of the stack.

Fan-shaped nozzles N connected to a source of continuous air pressure by conduit means N′ direct jets of air against the bottom edges of the last several cards C at the end of the stack of cards in the magazine **33**. The last one and perhaps several of the endmost cards are bowed outwardly beyond the stops **36** and **37** so that a vacuum cup **39** removes only one card at a time from the stack.

An arm **38** carries the vacuum cup **39** at one end. The arm **38** has a cam surface **40** engageable with a guide **41** in the form of a rod of circular cross-section. The guide **41** is mounted by a stem **42** in a rod **43** of circular cross-section and held at a selected position by a set screw **44**. The rod **43** can be swung in an arc to position the guide **41** at a selected position and held in place by a set screw **45′**. The cam surface **40** has a first cam surface portion **46** and a second cam surface portion **47** inclined with respect to the first cam surface portion **46**. When the arm **38** is in the position shown in FIGURE 6, the cam surface portion **47** engages the guide **41**. While when the arm **38** is in the position shown in FIGURE 5, the cam surface portion **46** engages the guide **41**. The arm **38** has a passage **48** which communicates with the vacuum cup **39** and flexible plastic tubing **48′** connected to a vacuum pump **49**.

The arm **38** is pivotally connected to a bell crank **50** by a pivot screw **51**. A bushing **51′**, received by the arm **38**, receives a portion of the pivot screw **51**, as best shown in FIGURE 8. A pin **51″** serves as a stop to hold the arm **38** in engagement with the guide **41**.

The bell crank **50** is normally biased into the position shown by solid lines in FIGURE 6 by a spiral spring **52**. When a solenoid **53** is energized its core **53′** pivots the bell crank **50** into the position shown by phantom lines **54** in FIGURE 6. When the solenoid **53** is deenergized, the bell crank **50** is returned by the spring **52** to the position shown by solid lines in FIGURE 6 of the drawings. When the arm **38** is actuated from the solid line position to the position represented by phantom lines **54**, the cam surface portion **47** prevents the arm **38** from pivoting until the guide **41** engages the cam surface portion **46**, at which time the arm **38** pivots about the pivot screw **51**. This pivotal movement causes a card C carried by the vacuum cup **39** to be tucked into the pinch point of feed rolls **55** and **56**. The roll **55** is a circular cylindrical roll having a polished outer surface and is mounted in blocks **57** and **58**. The roll **56** has a shaft **59** covered by resilient, rubbery material **60** such as polyurethane. The shaft **59** carries a sprocket **61** driven by a chain **62** which in turn is driven by an electric motor (not shown). The axis of the roll **55** is vertically above the axis of the shaft **59**. The outside diameter of the roll **55** is considerably less than the outside diameter of the roll **56** at their engaging surfaces.

As best illustrated in FIGURE 5, a deflector **63** has an upstanding plate **64** and an upwardly and outwardly inclined flange **65**. The side of the card C strikes the flange **65** and serves to facilitate feeding of the edge of the opposite side of the card C into the pinch point of the rolls **55** and **56**. The deflector **63** is movable in directions toward and away from the rolls **55** and **56**. The rolls **55** and **56** cooperate to feed the card C onto a platform or support **67**.

A side guide 68 is movable transversely of the frame 11 by an adjusting mechanism 69. The side guide 68 determines the location at which the card C is fed onto the conveyor 14. A pair of slotted plates 12' permit adjustment of the tension of chains 13 by adjusting the force they exert on transverse bar 12''.

A transferring mechanism 70 includes a pusher bar 71, a solenoid 72 having a movable core 73, and a link 74 connecting the core 73 and the pusher bar 71. When the solenoid 72 is energized, the pusher bar 71 moves the card C over and across the support 67 into the pinch point of feed rolls 75 and 76. The feed roll 75 includes resilient spaced apart feed roll sections 75' secured to its shaft 31 and composed for example of polyurethane. A sprocket 77 for each chain 15 is disposed between each roll section 75' and is secured to the shaft 31. The roll 75 cooperates with the roll 76 which may be an idler roll as shown. As soon as the leading end of the card C is in the pinch point of rolls 75 and 76, the card C is conveyed onto the conveyor 14. A group of bacon slices, indicated at B, is deposited onto the card C by the conveyor 12 as the card C moves forward on the conveyor 14.

When a light beam 78 from a lamp 79 to the phtoo cell 80 is broken by a group of bacon slices B travelling on the conveyor 12, a cycle of operation is started. A mirror 81 placed beneath the upper flight U and above the lower flight L of conveyor 12, deflects the light beam 78 by 90° so that it passes upwardly through the upper flight U in the path of approximately the center line of a group of bacon slices B.

As best shown in FIGURE 9, when the light beam 78 between the light 79 and the photo cell 80 is broken, a signal, as amplified by an amplifier 82, starts a timer 83 in operation. After the timer 83 has run for a preselected period of time, it energizes a timer 84. Whenever the timer 84 is operating a relay 85 is energized to energize the solenoid 72, thus causing a card C resting on the support 67 to be pushed into the pinch point of the feed rolls 75 and 76. After a preselected period of time of operation of the timer 84, a timer 86 is energized. At the end of a preselected period of time, the timer 86 energizes a timer 87. Whenever the timer 87 is operating, a relay 88 is energized to cause return of the solenoid 72, that is, its core 73, to the position shown in FIGURE 3, after a preselected period of time of operation of the timer 87, the timer 87 energizes the timer 89 and also energizes the timer 83 for return to its starting position. Whenever the timer 89 is operating, it energizes a relay 90 which causes energization of the solenoid 53. Actuation of the solenoid 53 causes a card C to be withdrawn from the magazine 33 by the vacuum cup 39 at the end of the arm 38 which is swung about pin 50'. As the cam surface portion 46 bears against the guide 41, the card C is tucked into the pinch point of rotating feed rolls 55 and 56. The card C is thus fed onto the support 67 where it rests until the next cycle of operation is ready to be started when the light beam 78 is broken by a group of bacon slices B travelling on the conveyor 12. A transparent plastic plate 67' above the support 67 and pusher 71 permits visual observation of the card C.

Should it happen that the light beam 78 is broken for only a very short period of time, as for example by a scrap of bacon adhering to the upper flight U of the conveyor 12, a commercially available reset means 83' automatically resets the timer 83. The cycle described above is not started unless the light beam 78 is broken for a preselected period of time.

Other embodiments and modifications of this invention will suggest themselves to those skilled in the art, and all such of these as come within the spirit of this invention are included within its scope as best defined by the appended claims, wherein there is claimed:

1. Transferring system, comprising: a frame, a driven feed roll mounted to said frame and extending in one direction relative to said frame, a card feeder mounted by said frame and having means for positioning a card for gripping and feeding by said feed roll, a support positioned to receive a card from said feed roll, means disposed above said support for conveying articles in said one direction, conveying means including a feed roll disposed forwardly of said support and extending transversely to said one direction, a pusher for moving a card over said support and into position to be gripped by said transverse feed roll, means for sensing the presence of an article at a preselected location on said conveying means, and means responsive to said sensing means for sequentially actuating said pusher to push the card so that an article is deposited on the card on said conveying means and for actuating said card feeder.

2. A transferring system, comprising: a conveyor to convey discrete units of product in one direction and having a discharge end, a continuously driven feed roll disposed below said conveyor adjacent the discharge end and extending transversely of said one direction, means for supporting a card below said conveyor upstream of said feed roll, means for moving a card from said supporting means to said feed roll, said feed roll being adapted to move the card in said one direction under an associated unit of product as the unit is being discharged from the conveyor, means for successively feeding separate cards to said supporting means, and means engageable with an edge of the card for placing the card in alignment with the associated unit of product on said conveyor so that the unit is positioned in overlying relationship on the card.

3. A transferring system for separate units of a material, comprising: a frame, first and second continuously operating conveying means, a driven feed roll mounted to said frame and composed of material capable of gripping cards, said feed roll being adapted to insert a card under a unit of the material being discharged from the first conveying means and position the loaded card on the second conveyor and means for feeding a card into gripping position with respect to said feed roll, said feeding means including a magazine, a pivotally mounted arm, a vacuum cup mounted on said arm engageable with a card in said magazine and connected to a source of vacuum, means for pivoting said arm and its vacuum cup to move a card into the gripping position.

4. Transferring system as claimed in claim 3, wherein said pivoting means includes a cam surface on said arm, and a guide mounted on said frame and engageable with said cam surface.

5. Transferring system, comprising: first and second continuously moving means for conveying units of a material, a magazine for cards, means for feeding separate ones of the cards below each unit being discharged from the first conveyor and for depositing the loaded card on the second conveyor, said feeding means including an arm, and a vacuum cup mounted on said arm, said cup being engageable with the exposed surface of the outermost card in said magazine and connected to a source of vacuum, and said arm being pivotable for movement in a first plane to draw the outermost card from said magazine and being simultaneously movable during a portion of its travel in a second plane which is at an angle to said first plane, and means for sensing the presence of each unit of the material at a predetermined position on said first conveying means and for actuating said feeding means.

6. Transferring system, comprising: first and second means for continuously conveying spaced portions of a product, first means for successively feeding separate cards, one card at a time into position beneath said first conveying means, second means for simultaneously feeding said one card beneath one of the spaced product portions being discharged from said first conveying means in the direction of travel of said first conveying means and onto said second conveying means, means for sensing

the presence of each spaced portion at a position adjacent the discharge end of said first conveying means, and actuating means responsive to said sensing means for actuating said first and second feeding means, said actuating means including time delay means so that each portion is deposited onto a separate card.

7. Transferring system, comprising: first conveying means having a discharge end, second conveying means for receiving articles from the discharge end of said first conveying means, said first and second conveying means being continuously driven, means for supporting a card below the discharge end of said first conveying means and rearwardly of second conveying means, means for sensing the presence of an article at a predetermined position on said first conveying means, and means responsive to said sensing means for moving the card across said support and onto said second conveying means at the same speed as said second conveying means, said card being positioned below the article as it is being discharged from the first conveying means so that the article is deposited onto the card as it is being moved by said second conveying means.

8. Transferring system for spaced units of product, comprising: a first endless conveyor having a discharge end, a second endless conveyor having pulley means disposed adjacent said discharge end of said first conveyor, said first and second conveyors being continuously driven to continuously transfer the spaced units of product, card feeding means including said pulley means, and a cooperating platen for supporting one card at a time, means for supplying cards to said platen one at a time, means sensing the presence of the spaced units of product at a predetermined location on said first conveyor, and means responsive to said sensing means for moving said one card to feeding position of the pulley means to be fed forwardly continuously by said feeding means below one of the spaced units of product as it is being continuously discharged by said first conveyor.

9. Transferring system comprising: a first endless conveyor having a discharge end, a second endless conveyor having pulley means disposed below said discharge end of said first conveyor, card feeding means including said pulley means, and a cooperating platen, means sensing the presence of an article on said first conveyor, means responsive to said sensing means for moving a card to feeding position to be fed forwardly by said feeding means, and means for rendering said sensing means ineffective to actuate said card moving means when the presence of an article is not sensed for a preselected period of time.

10. Transferring system as claimed in claim 8 wherein said card feeding means further includes a magazine adapted to contain a stack of cards, a pivotally mounted arm, a vacuum cup mounted on the arm and engageable with the exposed surface of the endmost card in the stack, said arm having a first camming surface for moving the endmost card in a direction parallel to the movement of the first conveyor and a second camming surface for moving the card transversely of the first conveyor and toward the platen, and a nozzle for directing high velocity air at the edges of at least two cards at one end of the stack to facilitate withdrawal of the endmost card from the stack by said vacuum cup.

11. Transferring system as claimed in claim 10 wherein said card feeding means further includes stop means for said magazines engageable with the side marginal edges of the exposed surface of the endmost card of the stack of cards, said stop means and air nozzle bowing at least the endmost card outwardly.

12. Transferring system, comprising: a first endless conveyor having an upper flight and a discharge end, a second endless conveyor for receiving groups of product from the discharge end of said first conveyor, said first and second conveyors being in continuous motion and means for feeding a card onto the second conveyor and at the same speed as said second conveyor in synchronism with each group of product being discharged from said first conveyor, the discharging product being deposited on an associated one of the cards being fed onto the second conveyor, said feeding means including a light source, a photocell and a mirror disposed immediately below and approximately centrally of said flight for reflecting light from said source through said flight and to said photocell to detect the leading edge of each group as it moves on said flight between the mirror and the photocell.

13. Transferring system, comprising: a first endless conveyor having a discharge end, a second endless conveyor adapted to receive a group of bacon slices from the discharge end of said first conveyor, means for driving said first and second conveyors, a magazine adapted to contain a stack of cards, an arm mounted for pivotal movement in one plane, a vacuum cap mounted on said arm, means for connecting said vacuum cup to a source of vacuum supply, a support disposed below said first conveyor, a pair of feed rolls for feeding a card onto said support, means for driving said pair of feed rolls, said arm being pivotal between one position in which said vacuum cup contacts an endmost card of the stack and another position in which an edge of the card can be passed into the pinch point of said pair of feed rolls, means for pivoting said arm in a direction perpendicular to said plane into said other position, said second conveyor having a feed roll, a platen roll cooperating with said feed roll, means for sensing the presence of a group of bacon slices on said first conveyor, and means responsive to said sensing means for moving a card from said support into the pinch point of said cooperating feed roll and platen in synchronism with the speed of said first conveyor to effect deposition of the group of bacon slices onto the card as it moves on said second conveyor.

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