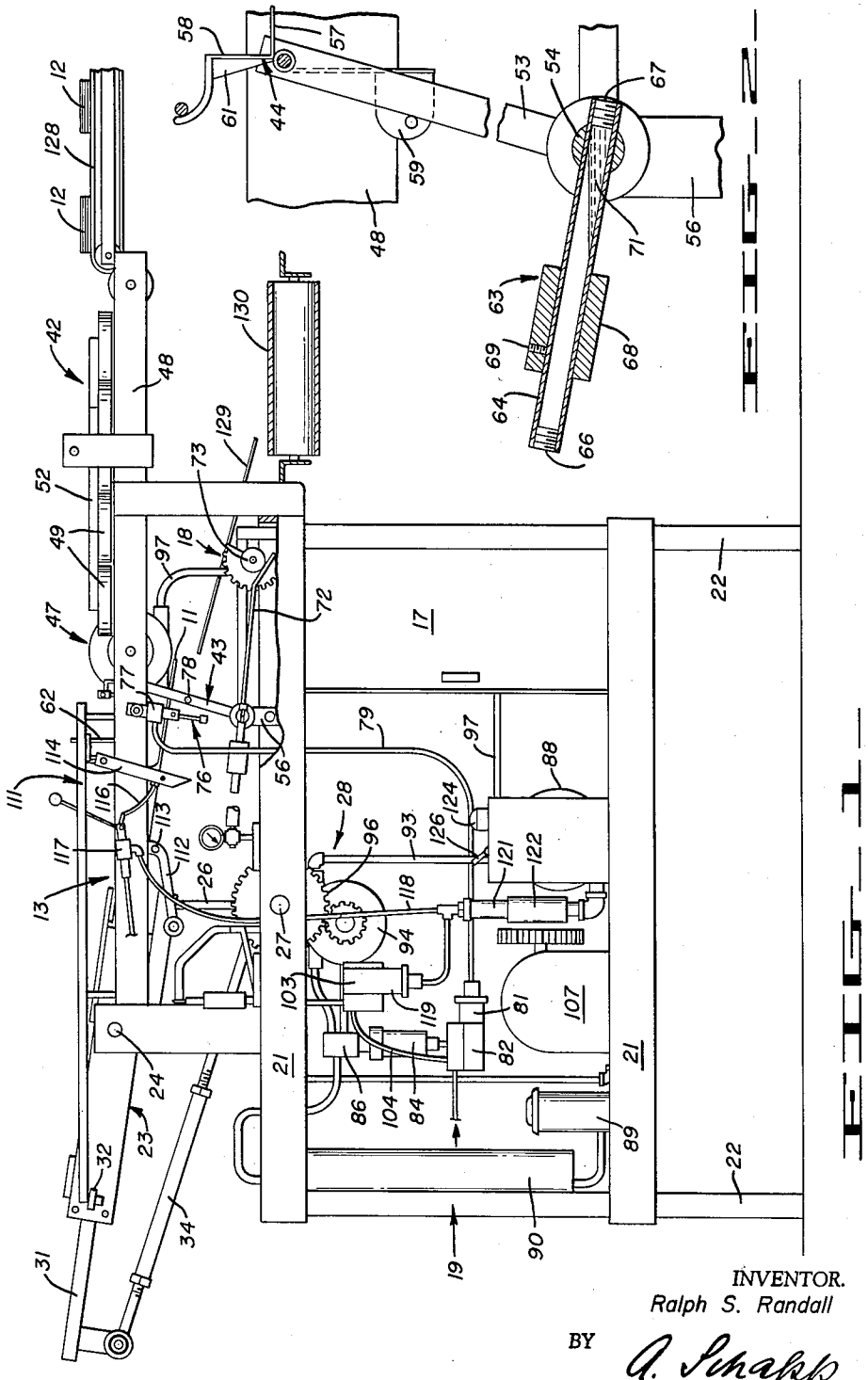
June 6, 1961 R. S. RANDALL 2,986,858

BAGGING AND PACKAGING MACHINE

Filed Sept. 2, 1958 3 Sheets-Sheet 1

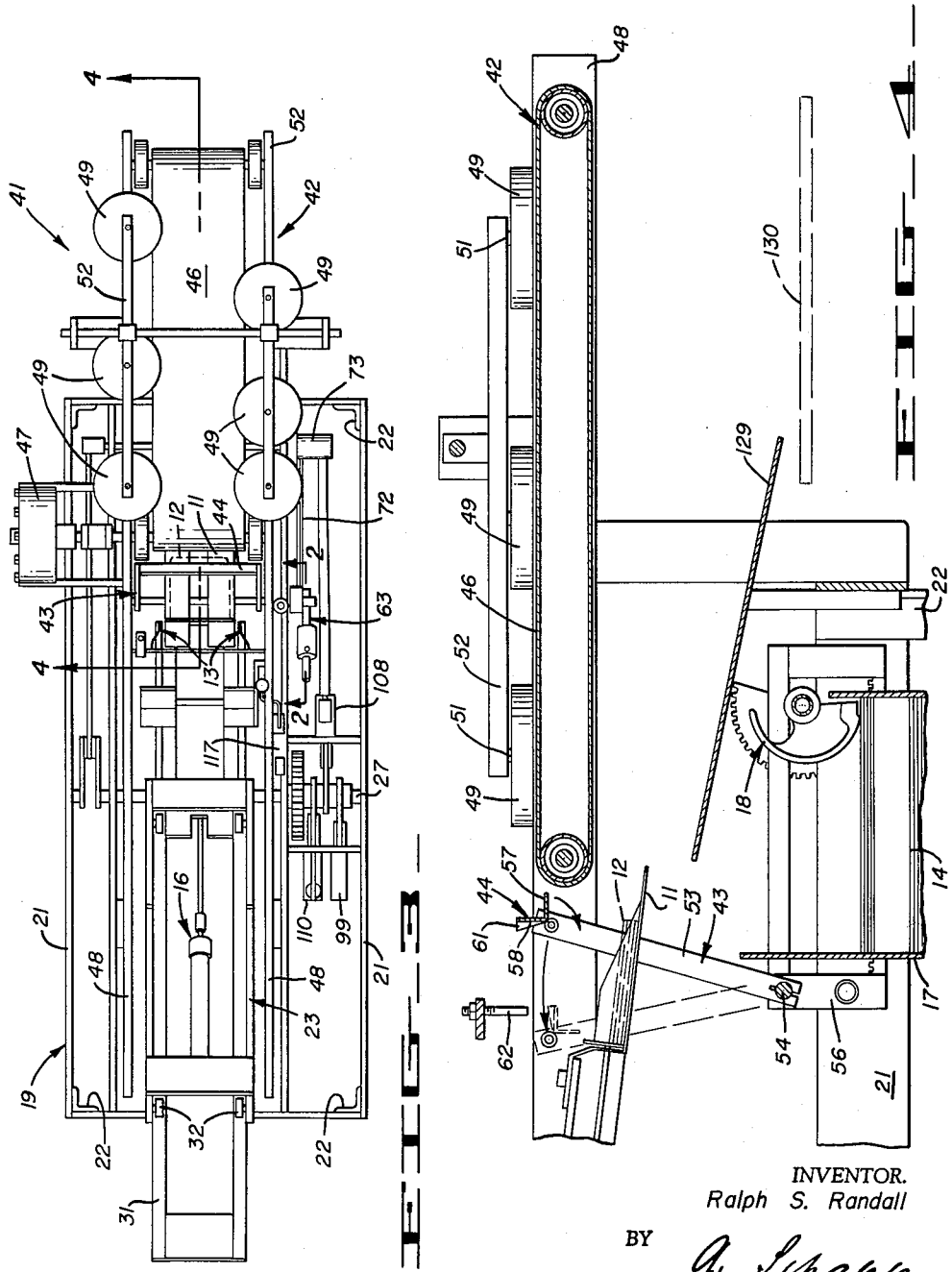


INVENTOR.
Ralph S. Randall
BY A. Schaffp
Attorney

June 6, 1961 R. S. RANDALL 2,986,858

BAGGING AND PACKAGING MACHINE

Filed Sept. 2, 1958 3 Sheets-Sheet 2



INVENTOR.
Ralph S. Randall

BY A. Schapp

Attorney

June 6, 1961 R. S. RANDALL 2,986,858

BAGGING AND PACKAGING MACHINE

Filed Sept. 2, 1958 3 Sheets-Sheet 3

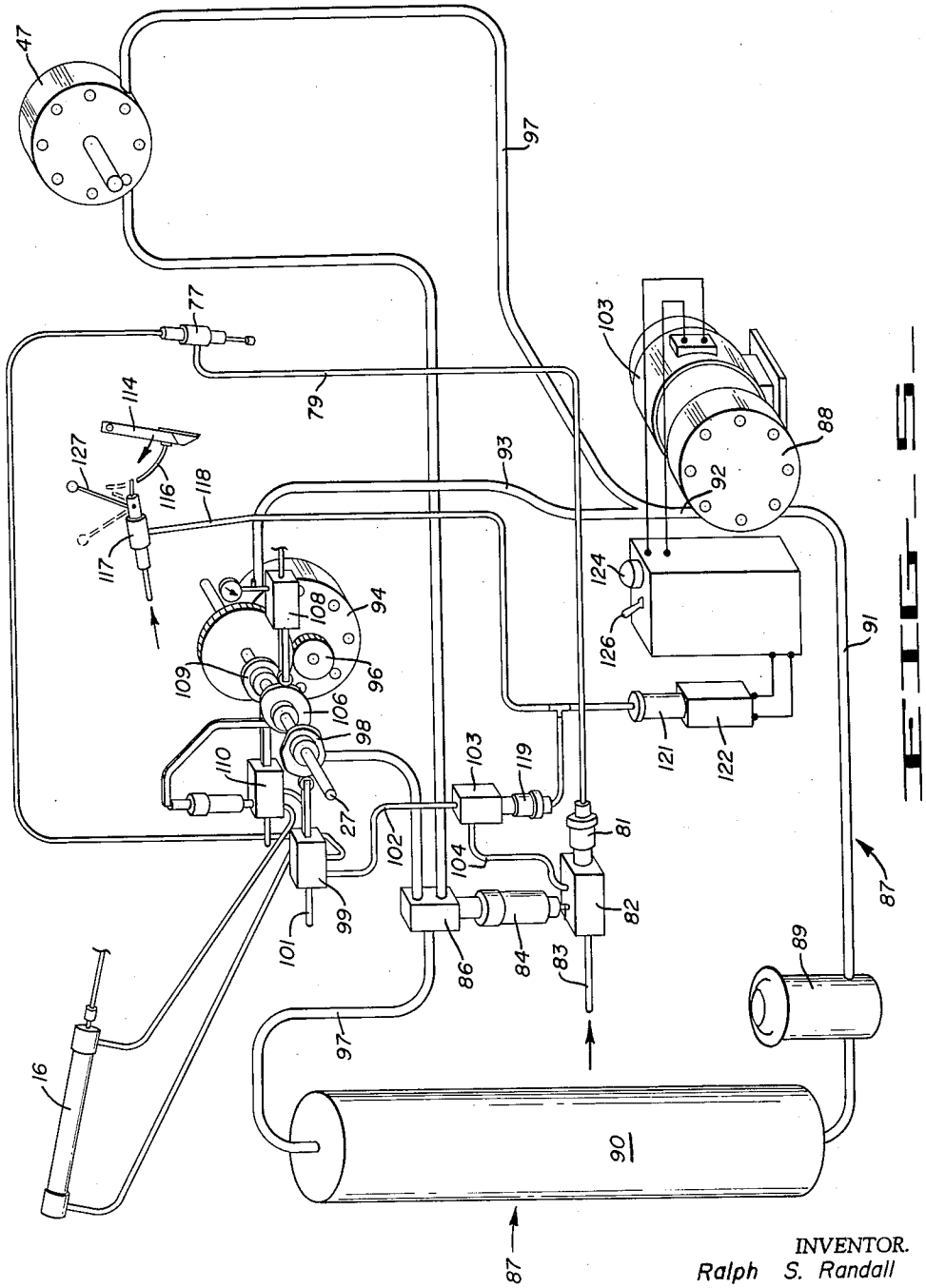


FIG. 5

INVENTOR.
Ralph S. Randall

BY A. Schapp

Attorney

United States Patent Office 2,986,858 Patented June 6, 1961

2,986,858

BAGGING AND PACKAGING MACHINE

Ralph S. Randall, 3380 20th St., San Francisco, Calif.

Filed Sept. 2, 1958, Ser. No. 758,399
13 Claims. (Cl. 53—67)

This invention relates to bagging and packaging machinery, and more particularly to machines of the type disclosed and described in my co-pending application, Serial Number 744,975, for Bag Filling Machine.

The bagging machine of my co-pending application may be fed by hand, or automatically. The present invention is concerned with automatic feeding devices designed to keep up with the high speed at which the bagging machine may be operated.

It is therefore, an object of the present invention to provide a mechanism for automatically feeding articles to be bagged onto the article receiving platform of a bagging machine in a rapid and fool-proof manner.

Another object of my invention is to provide a highly efficient automatic loading device for a bagging machine which will re-orient and straighten out articles placed thereon in a haphazard manner and transfer them onto the bagging machine platform at the desired time and in the correct position.

A further object of my invention is to provide in an automatic feed device of the character described, a swinging guide means which is actuated by the forward momentum of the article and which guides the leading edge thereof across the receiving platform so as to insure that the article lands in the desired position.

A still further object of my invention is to provide a control device actuated by the transfer mechanism and functioning to operate the bagging machine through one cycle whenever an article to be bagged is transferred onto the receiving platform.

Yet another object of my invention is to provide a safety device which will function in cooperation with the described mechanism to halt the bagging should, for any reason, the bagging machine fail to enclose the article in a bag.

Additionally, it is proposed to provide a safety device of the character described which will prevent operation of the bagging machine until the latter is manually advanced a small distance, thus preventing accidental operation of the machine and consequent danger of injury to the operator.

Other objects and advantages of my invention will become apparent from the accompanying description and accompanying drawings, and accordingly it is not desired to limit the scope of the invention, except as defined in attached claims.

In the drawings:

FIGURE 1 is a side elevational view of a bagging machine and associated feeding device constructed in accordance with the present invention.

FIGURE 2 is an enlarged fragmentary cross-sectional view of the machine taken substantially on the plane of line 2—2 of FIGURE 3.

FIGURE 3 is a plan view of the machine of FIGURE 1.

FIGURE 4 is an enlarged longitudinal sectional view of the device taken substantially on the plane of line 4—4 of FIGURE 3.

FIGURE 5 is a schematic view of a hydraulic drive system for the bagging and automatic feeding device together with a pneumatically actuated valving system for automatically controlling the action of the various components.

The bagging machine proper, as illustrated in the accompanying drawing, includes a platform 11 for supporting the article 12 to be bagged and finger means 13 at

the opposite sides of the platform formed for gripping the unsealed end of a bag 14 adjacent to a side and spreading it open, the finger means being mounted for reciprocation along the side of the platform 11, so as to draw the bag 14 into enveloping relation around the platform and the product 12 thereon.

Pneumatic cylinder means 16 is also provided for displacing the bagged product from the platform as soon as the product is inserted in the bag and the bag is released by the finger means 13.

Bags 14 are maintained in a stack in a bag magazine 17 and are removed from the stack by a transfer device 18 and presented open end foremost to the finger means 13.

As here shown the bagging means includes a frame 19 supporting the various components and formed of elongated plates 21 supported on vertical legs 22. The finger means 13 and the platform 11 are carried on a sub-frame 23, for vertical movement toward and away from frame 19.

The platform 11 is affixed to the sub-frame and reciprocates therewith between the up position illustrated in FIGURE 1 and the down position wherein the end of the platform is aligned with the open end of the bag presented by the transfer device 18.

The sub-frame is pivoted on a pin 24 carried in an upward extension of the frame 19, and rocking motion of the sub-frame about the pin is provided by an eccentric 26 connecting the sub-frame to a drive shaft 27, which forms a part of a drive means 28.

The finger means 13 are supported on the forward end of the carriage 31, which is mounted for endwise reciprocation upon rollers 32 journaled on the sub-frame 23. The carriage 31 is reciprocated by a link 34 connected to a crank mounted on the drive shaft 27 (not shown).

In accordance with the present invention, means 41 is provided on the bagging machine for feeding articles, such as units of the product to be bagged in one at a time order to the receiving platform 11.

The means 41 consist essentially of linear conveyor means 42 for receiving and transporting the articles to be bagged in a continuous row and for discharging them from an end of the conveyor means adjacent to the platform 11. Also included in the feeding means 41 is a transfer means 43, which is pivotally supported on the bagging machine frame 19 and which provides a bar 44 which can swing across the platform 11 from an article receiving position at the discharge end of the conveyor means.

The bar 44 is formed to support and guide the leading edge of the article discharge from the conveyor means 42 in a manner causing the article to land in the desired position on the platform 11. The position of the article on the platform is shown in FIGURE 4 in phantom lines.

As here shown, the conveyor means 42 consists of an endless belt conveyor 46 driven by a suitable drive means 47. The head and tail pulleys of the belt conveyor are supported upon plate members 48 secured to the bagging machine frame 19.

A valuable feature of the conveyor means 42 is its ability to receive the articles to be bagged in a haphazard manner and to rapidly orient them into a single aligned file on the conveyor belt. This orienting of the articles is accomplished by a number of flat circular discs 49 arranged in two converging rows along the edges of the conveyor belt.

The discs are unevenly spaced along the belt and are journaled for rotation in a plane parallel to, and slightly above the upper course of the conveyor belt. Preferably the discs 49 are journaled on vertical pins 51 supported by bars 52, which are in turn, supported by the plates 48.

The rows of discs 49 are spaced apart by a distance

slightly greater than the width of the article passing along the conveyor belt 46. For example, when bagging stacked sliced luncheon meats, which is approximately four inches wide by four inches long, the confronting edges of the discs will be spaced apart approximately four and one-quarter inches at the point of entry.

As the stacks of luncheon meats pass the rollers, and by reason of the uneven spacing of the discs, the stacks will automatically be aligned in the direction of movement.

The construction of the transfer means 43 may best be seen in FIGURE 4 of the drawings. The bar 44 is supported for swinging movement across the platform 11 upon a pair of parallel arms 53 which are secured at their lower ends to a shaft 54 journaled in the bag transfer sub-frame 56.

The bar 44 is of right-angular cross-section, that is, of L-shape, providing a horizontal flange 57 for supporting the leading edge of the article discharged from the conveyor end during its passage across the platform 11. The vertical flange 58 acts as a back-stop against which the leading edge of the article will press. Flange 58, being perpendicular to the path of the product straightens any misalinement of the stack of slices.

The bar 44 is moved by the impetus afforded by the article's momentum as it is forcibly discharged from the conveyor 46. Accordingly, the conveyor is regulated to move at a comparitively high rate of speed sufficient to impart enough momentum for the intended purpose.

As shown in FIGURE 2, the depending counter-balance 59 is attached to the bar 44 and tends to maintain it in the position shown. As the bar moves to its left-most position, as illustrated in phantom lines in FIGURE 4, the boss 61 on the vertical flange 58 strikes the pin 62 supportetd on the conveyor frame causing the bar to rotate ninety degrees.

Thus, as the bar nears the end of its stroke, it is rotated so that the flange 57 hangs down and no longer supports the leading edge of the article being transferred. This action causes the article to land on the platform 11 in the optimum position for bagging.

Once the arms 53 have moved to their left-most position, as viewed in the drawing, they are held in such position until the bagging machine goes through its bagging cycle.

The arms 53 and bar 44 are held in the left-most position by a counter-weight 63 secured to the shaft 54. This counter-weight is best seen in FIGURE 2 of the drawings and includes a hollow tube 64 secured to the shaft and closed at its ends by plugs 66 and 67.

A metal sleeve 68 is slidable along the tube 64 and is held in position by a set screw 69. As may be seen from FIGURE 2, when the arms 53 are in their right-most, or article receiving position, the tube 64 is inclined so that its distal end is raised somewhat above the end secured to the shaft 54. The tube contains a quantity of liquid mercury 71. As the distal end of the tube swings downwardly past level position, the mercury will run outwardly into such end and hold the parts in their left-most position until forcibly returned.

The return of the arms 53 to their right-most position is effected by a rod 72 secured to the shaft 54 and extending in the direction of the bag transfer means 18. As the means 18 moves to the left as viewed in the drawing, the hub 73 engages and presses down on the rod 72 to move the bar 44 back to its receiving position.

Associated with the bagging machine and the feed means 41 is a control means 76 which is actuated by the transfer means 43 to halt conveyor 46 and start the drive means 28 of the bagging machine so as to bag the units of products which has been deposited on the platform 11.

As here shown, the control means 76 includes a pneumatic valve 77. A pin 78 on one of the arms 53 engages and actuates the valve 77 during the swinging movement of the arms.

Actuation of the valve 77 supplies air under pressure through a conduit 79 to an air cylinder 81 connected to a valve 82.

The valve 82 is connected by means of conduits 83 to a source of air under pressure and, when actuated by cylinder 81, supplies air to an air cylinder 84, which actuates the valve 86 controlling the hydraulic drive system, shown best in FIGURE 5.

The hydraulic drive system 87 of the present invention is similar to the system in my aforesaid co-pending application. Included in the system 87 is a positive displacement hydraulic pump 88 connected through a filter 89 to a fluid reservoir 90 by supply and return conduits 91 and 92. The conduit 92 is split and one branch 93 communicates with a positive displacement hydraulic motor 94 which drives the main shaft 27 through gearing 96.

The other branch 97 of the conduit 92 leads to a second positive displacement hydraulic motor constituting the conveyor drive means 47. Conduits from the motors 47 and 94 lead to the valve 86 and a discharge conduit 97 is connected between the valve 86 and the reservoir 90. The valve 86 is of any suitable lineal operating three-way type, and in one position, will connect the motor 47 to the reservoir through conduits 97 and in the other terminal position, will connect the motor 94 to the reservoir 90.

The unit must stop positively and start quickly and should not be subject to undue wear during operation. Moreover, it is desirable to be able to control the speed of the motors in order to control the speed at which the bagging machine and feed conveyor operate.

It is desirable to eleminate the electrical components as far as possible in order to reduce possibility of malfunction and to provide positive mechanical action. To this end, the hydraulic drive system 87 incorporates novel mechanical controlled means for starting and stopping the motors 47 and 94.

Both of these motors are of the type disclosed in my co-pending application, and are of the vane-type which will lock up against turning when the conduit from the particular motor is closed by the valve 86.

As long as air pressure is present in the air cylinder 84, the valve 86 will halt the conveyor motor 47, and cause the bagging machine motor 94 to rotate the bagging machine drive 27. The starting valve 77 will offer a supply of air to the cylinder 84 for only a short period of the bagging machine cycle. Other means must, therefore, be provided to continue the operation of the bagging machine through a full cycle.

FIGURE 5 illustrates schematically the method by which the various operations are accomplished. As shown therein, the cam 98 is secured to the shaft 27 and serves, during the major portion of the cycle, to keep open the valve 99 which furnishes compressed air from a conduit 101 through a conduit 102 to a valve 103, and which vents valve 77 to atmosphere. During the rest of the cycle valve 99 suppleis air to valve 77.

When in one terminal position, the valve 103 connects the conduit 102 to a tube 104 leading to the valve 82. Valve 82 is so constructed that air under pressure in tube 104 will pass into the air cylinder 84.

The action of valve 99, therefore, is to keep the motor 94 running until the drive shaft 27 has made one complete revolution and the lobe of cam 98 has again shut off valve 99.

As soon as the valve 99 stops supplying air to cylinder 84, the valve 86 will move to its other position, shutting off motor 94 and starting the conveyor motor 47. The conveyor belt 46 will then advance until the next article swings the transfer-means 43 and the foregoing cycle is then repeated.

A second cam 106 is mounted on drive shaft 27 and operates a valve 108 which connects the bag transfer

means 18 to a vacuum pump 107 mounted on the bagging machine frame 19.

A third cam 109 operates a valve 110 which supplies air to the means 16 for displacing the filled bags from the platform 11.

As an important feature of the present invention, safety means 111 is provided for halting the bagging machine operation when no bag is present in the finger means 13.

An arm 112 forming a part of the finger means 13 has affixed thereto a pin 113. A lever arm 114 is pivoted to its upper end to the conveyor frame 48 and depends therefrom. This arm is positioned in the path of the pin 113 when no bag is gripped in the finger means. It is noted in this connection that the finger means will spread further apart when no bag is present and the arm 112 will be somewhat higher in relation to the carriage 31.

Thus, the pin will engage and move arm 114 to the left only when no bag is present in the finger means 13.

A curved rod 116 on the lever arm 114 will engage and actuate a pneumatic valve 117 when the arm 114 is swung to the left. Actuation of this valve will supply air under pressure through conduit 118 to an air cylinder 119 which will close valve 103 shutting off the supply of air to cylinder 84 and hence causing valve 86 to halt the bagging machine drive motor 94. Thus, if no bag is present, the bagging machine will come to a quick stop.

The valve 117 also supplies air to an air cylinder 121 which actuates a relay 122 to cut off power to the hydraulic pump motor 103, also halting the conveyor 46.

It should be noted that the bagging machine stops before the vacuum transfer means 18 can roll over and be fouled up by any product which might have fallen onto the top bag in the bag magazine.

As a safety measure, in order to start the bagging machine, the drive shaft 27 must be manually rotated a few degrees. This may be accomplished by a wrench or other suitable means (not shown). The parts are arranged so that the shaft 27 stops before the lobe of the cam 98 has come around to close valve 99. The shaft 27 must accordingly be rotated until arm 116 drops clear and permits 117 to be manually reset.

As an additional safety measure, a red light 124 mounted on the relay housing remains lit so long as the power supply switch 126 is closed. Thus, the operator, seeing the red light on, would snap the switch 126 to off position before attempting to clear and re-start the machine.

It is noted that the curved rod 116 will prevent closing of the valve 117 until the shaft 27 has been manually rotated to reset position. Once, the shaft 27 has reached such position, the pin 113 will have passed beyond the arm 114 permitting it to drop back to its original position. At this point, the control handle 127 may be moved back to the right, as viewed in the drawings, to close the valve 117.

A small orifice is provided in the valve 117 to let the air under pressure pass from the air cylinders 119 and 121. Preferably, the cylinder 121 is provided with a stronger return spring than is the cylinder 119. This will insure that the hydraulic pump motor is turned on before the valve 86 starts the motor 94.

In operation, the automatic bagging machine goes through the following steps:

(1) An article to be bagged, such as a stack of sliced luncheon meat, or cheese, is placed on the conveyor 46. This may be done by hand, or by transfer from some other device, such as the conveyor indicated at 128 of FIGURE 1.

(2) As the product is carried along the conveyor belt 46, it is aligned by the discs 49 with the directional movement of the belt.

(3) The product is discharged from the end of the conveyor and its leading edge strikes and swings the bar 44 to the left.

(4) As the bar 44 moves to the left, it supports and guides the leading edge of the product across the platform 11.

(5) As the bar 44 reaches the opposite edge of the platform, it is rotated ninety degrees by the pin 62, displacing the leading edge of the product downwardly and causing it to land in the desired position on the platform 11.

(6) As the arms 53, which carry the bar 44, move to the left, the mercury 71 in the counter-weight 63, shifts its position and holds the arms 53 in their leftmost position.

(7) During the movement of the arms 53, to the left, the pin actuates the valve 77 to supply air to the cylinder 81. This operates the valve 82 to supply air to the cylinder 84, which in turn actuates the valve 86 to start the bagging machine drive motor 94 and stop the conveyor motor 47.

(8) As the air drains from the cylinder 81, compressed air is supplied by valve 99 through valve 103 and conduit 104 to the cylinder 84 to keep the motor 94 running until the bagging machine completes its cycle, that is until the lobe on cam 98 comes around and turns off the valve 99.

(9) As the bagging transfer means 18 moves to the left during the bagging machine cycle, the hub 73 engages and pushes down on the rod 72 to cock the arms 53 and bar 54 back to their original position.

(10) As the bagging machine nears the end of its cycle, the means 16 will push the bagged product from the platform 11 where it may slide over chute 129 into a box or onto a suitable conveyor 130.

(11) Should the transfer means 18 start to the left without a bag, no bag will be presented to the finger means. As the finger means 13 move to the left, the pin 113 of the arm 112 will engage and swing arm 114 to the left, causing the curved rod 116 to flip the valve 117 to open position. This will supply air to reverse the valve 103, dumping the air from the cylinder 84 and causing the valve 86 to halt the bagging machine motor 94. At the same time, the cylinder 121 will shut off the power to the pump motor 123.

(12) To re-start the bagging machine, the shaft 27 is manually rotated until arm 116 drops and allows valve 117 to be re-set.

(13) The handle 127 of valve 117 is then moved to the right to shut off the valve and bleed the air from the conduit 118. This permits the relay 122 to again furnish power to the pump motor 123, and reconnects valve 99 to cylinder 84 through conduit 104. The machine is then ready for operation by another article to be bagged passing from the conveyor means 42 and against the bar 44.

From the foregoing, it will be apparent that I have provided a new and improved bagging machine having a novel automatic feed means associated therewith, the whole being interconnected to provide fool-proof automatic operation.

I claim:

1. In combination with a bagging machine having a product receiving platform and drive means reciprocating the platform for bagging the product thereon, a conveyor adapted for discharging units of the product toward said platform, transfer means formed to support and guide said product to a predetermined position on said platform, and control means actuated by said transfer means to halt said conveyor and start said drive means of said bagging machine so as to bag the unit of product on said platform.

2. The combination as described in claim 1 and wherein said transfer means includes a pair of arms pivoted on said bagging machine and supporting a bar formed for supporting the leading edge of a unit of product discharge from said conveyor, said arms and bar being

formed to swing across said platform under the impetus of the momentum of said product.

3. The combination as described in claim 2 and wherein said control means includes a pneumatic valve formed for actuation by one of said arms as they swing across said platform so as to provide air under pressure, and an air cylinder connected to said pneumatic valve and adapted for starting said drive means of said bagging machine.

4. An article bagging machine comprising a platform supporting the article to be bagged, finger means at opposite sides of said platform formed for gripping the unsealed end of a bag adjacent to its sides and spreading it open, said means being reciprocable along the sides of said platform so as to draw said bag into enveloping relation around said platform and the article thereon, means for displacing the bagged article from said platform, a belt conveyor adapted for receiving and transporting a single file of articles and for discharging them forcibly from one end confronting said platform, transfer means pivotally supported beneath said platform and having a bar swingable across said platform from an article receiving position at one end of said conveyor means, said bar being formed to support and guide the leading edge of said article while swinging across said platform so as to cause said article to land in a desired position on said platform.

5. An article bagging machine as described in claim 4 wherein hydraulic drive means is provided for operating the component parts of said machine.

6. An article bagging machine as described in claim 5 wherein pneumatic control means is provided, said control means being formed for actuation by the movement of said transfer means to halt said conveyor and start said drive means so as to effect bagging of the article on said platform.

7. An article bagging machine as described in claim 5 wherein means are provided for halting said machine when no bag is present in said finger means.

8. In combination with a bagging machine having a reciprocating product receiving platform, linear conveyor means having a delivery end spaced from said platform and operable at a speed sufficient to propel articles therefrom onto said platform, control means responsive to the reciprocation of said platform for actuating said conveyor means when said platform is at a desired position for receiving said article, and transfer means actuated by momentum of said article and formed to support and guide the leading edge of article from said conveyor means to said platform.

9. The combination as described in claim 8 and wherein said linear conveyor means consists of an endless belt conveyor and a drive means therefor synchronized with the reciprocating movement of said platform whereby said belt conveyor will be halted when said platform is not in position for receiving said product.

10. A mechanism for feeding flattened articles in one at a time order to a receiving platform, comprising a belt conveyor adapted for receiving and transporting a single file of articles and for discharging them forcibly from an end confronting said platform, transfer means pivotally supported beneath said platform and having a bar swingable across said platform from an article receiving position at an end of said conveyor means under the impetus of momentum of the article, said bar being formed to support and guide the leading edge of said article while swinging across said platform so as to cause said article to land in a desired position on said platform.

11. A mechanism for feeding flattened articles in one at a time order to a receiving platform, comprising a belt conveyor adapted for receiving and transporting a single file of articles and for discharging them forcibly from an end confronting said platform, rows of unevenly spaced discs journalled for rotation in a plane parallel to and slightly above the opposite side of the upper flight of said conveyor, said rows of discs being spaced apart by a distance slightly greater than the width of said articles for orienting the latter into an alined file on said conveyor, transfer means pivotally supported beneath said platform and having a bar swingable across said platform from an article receiving position at one end of said conveyor means under the impetus of momentum of said article, said bar being formed to support and guide the leading edge of said article while swinging across said platform so as to cause said article to land in a desired position on said platform.

12. A mechanism for feeding flattened articles in one at a time order to a receiving platform, comprising a belt conveyor adapted for receiving and transporting a single file of articles and for discharging them forcibly from an end confronting said platform, transfer means pivotally supported beneath said platform and having a bar swingable across said platform from an article receiving position at one end of said conveyor means, said transfer means including a pair of upstanding parallel arms pivoted at their lower ends to a structure supporting the platform, said bar extending between the upper ends of said arms and being of right angular cross section and providing a horizontal flange for supporting the leading edge of an article discharged from said conveyor end, said arms and bar being formed to swing across said platform under the impetus of the momentum of said article, a pivotal connection between said arms and said bar, and means for swinging said horizontal flange down to a depending position when said bar approaches the side of said platform remote from the conveyor.

13. In combination with a bagging machine having a reciprocating product receiving platform, linear conveyor means for forcibly discharging units of the product in one at a time order toward said platform in response to the reciprocation thereof, transfer means actuated by the momentum of the product and formed to support and guide said product to a predetermined position on said platform, said transfer means including a bar mounted for swinging movement across said platform from a product receiving position at said conveyor means to a side of said platform remote from said conveyor means, said bar being formed to support and guide the leading edge of said product while swinging across said platform so as to cause said product to land in a desired position on said platform.

References Cited in the file of this patent

UNITED STATES PATENTS

772,855	Winton	Oct. 18, 1904
2,017,390	Barse	Oct. 15, 1935
2,021,696	Miller	Nov. 19, 1935
2,850,855	Offutt	Sept. 9, 1958
2,870,921	Winkel	Jan. 27, 1959