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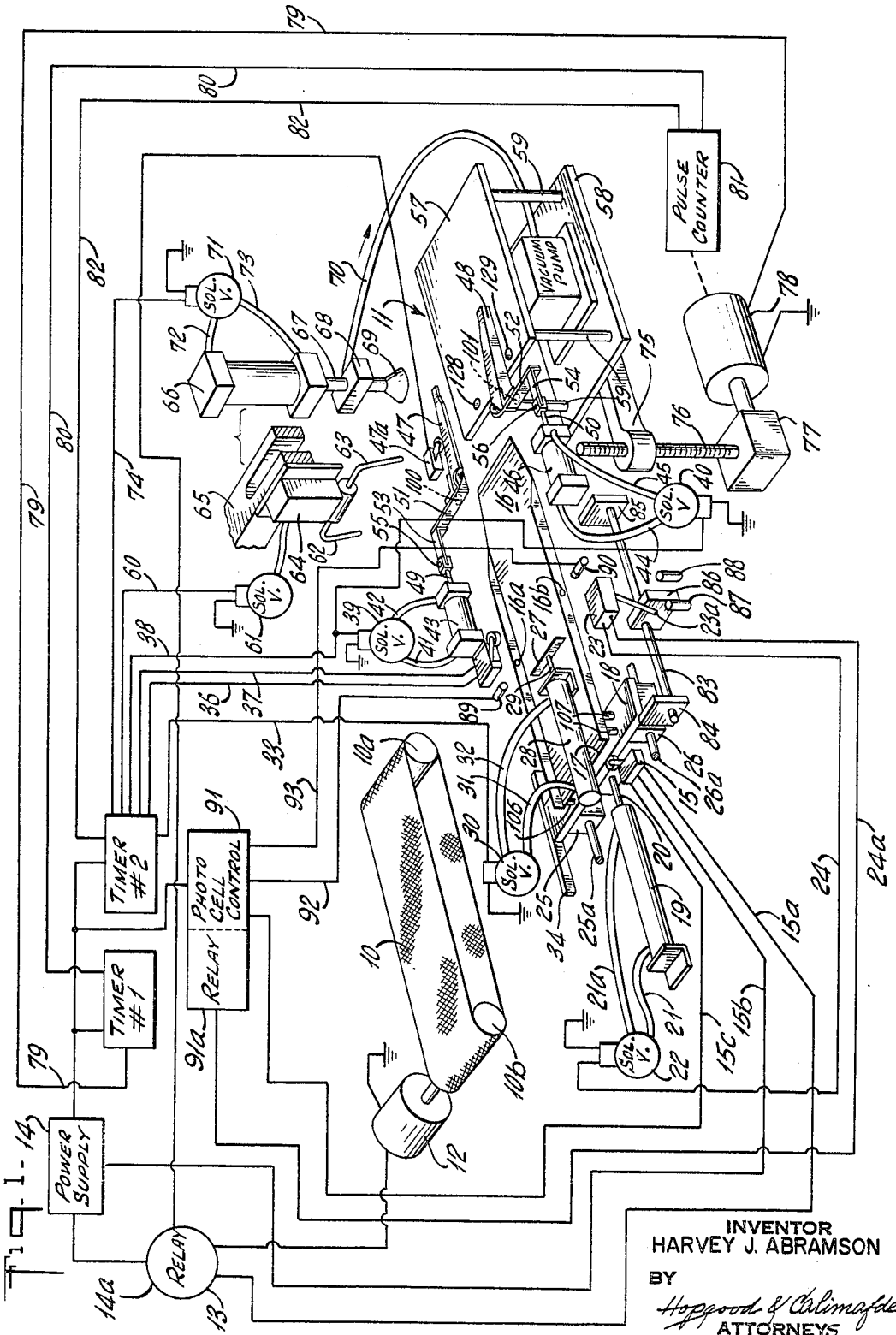
H. J. ABRAMSON

3,490,195

PACKAGING MACHINE AND METHOD

Filed June 2, 1967

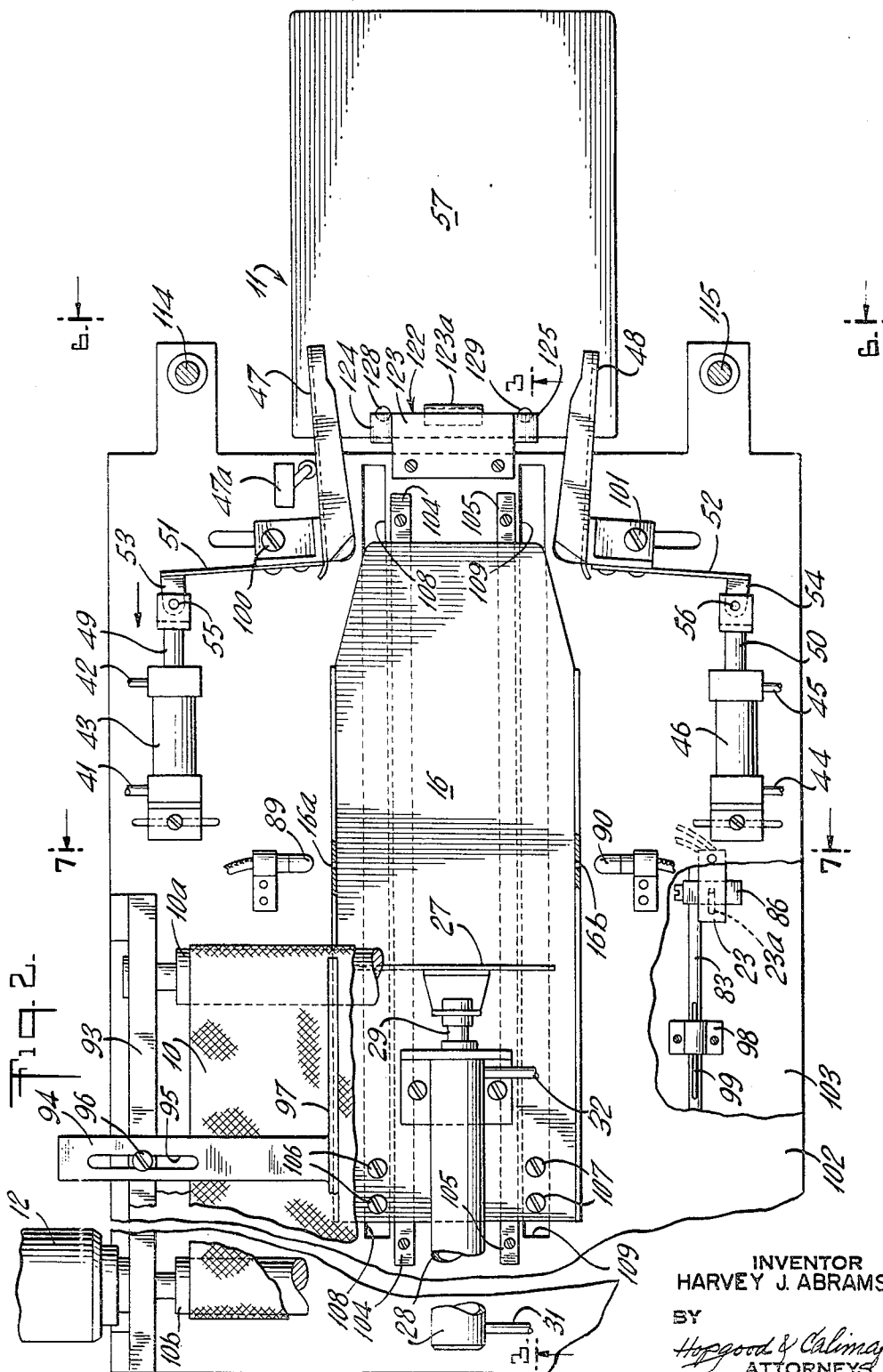
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PACKAGING MACHINE AND METHOD

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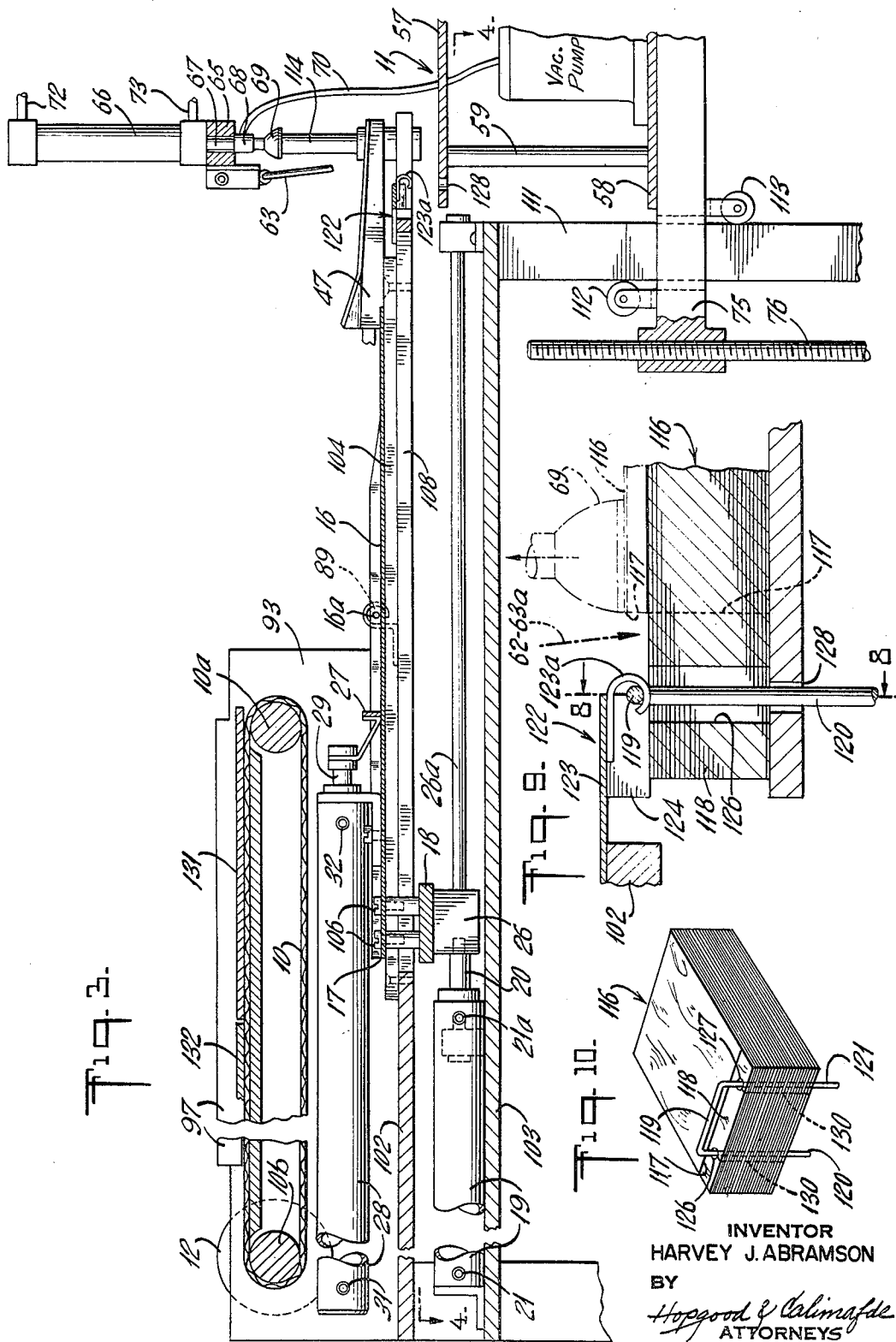
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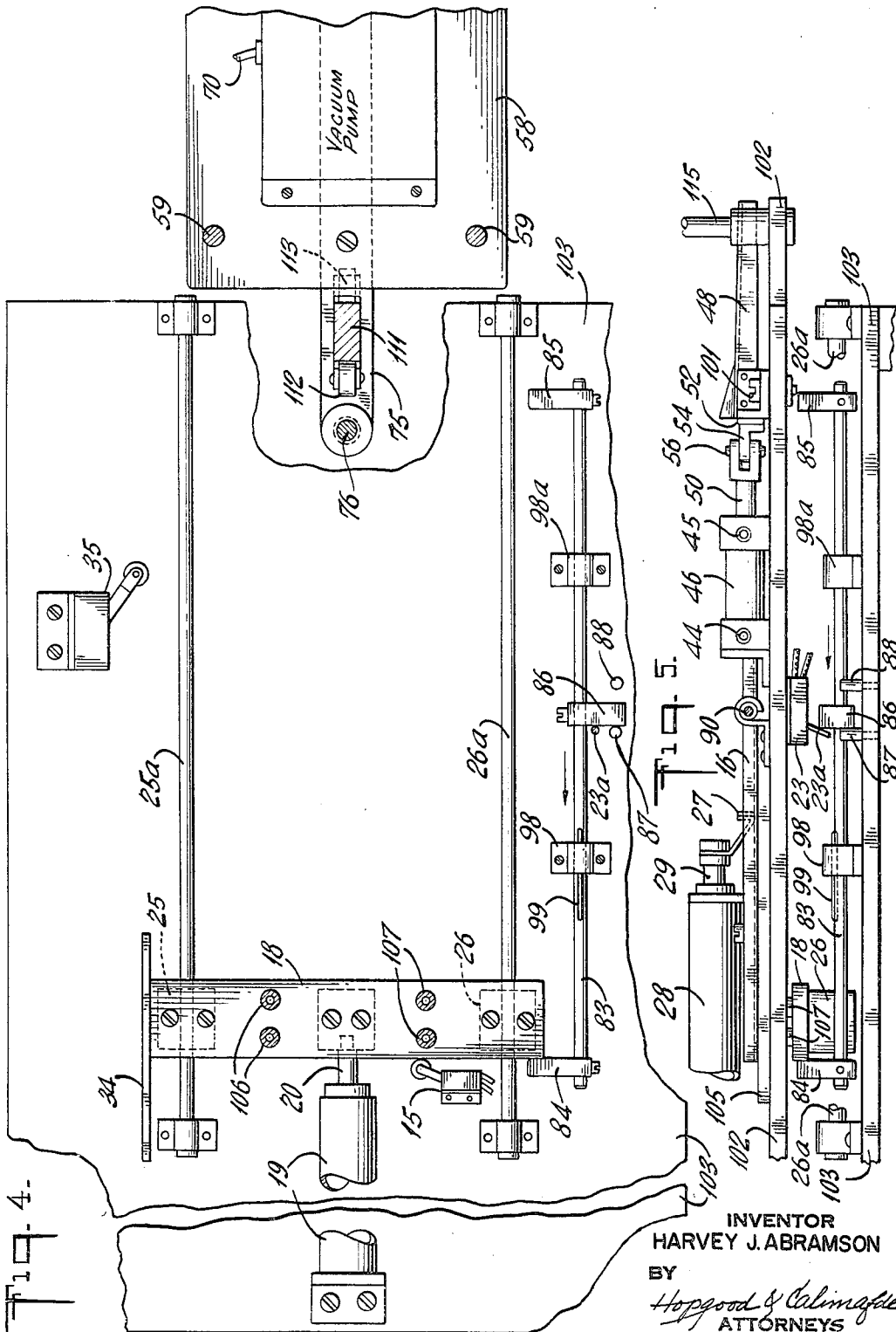
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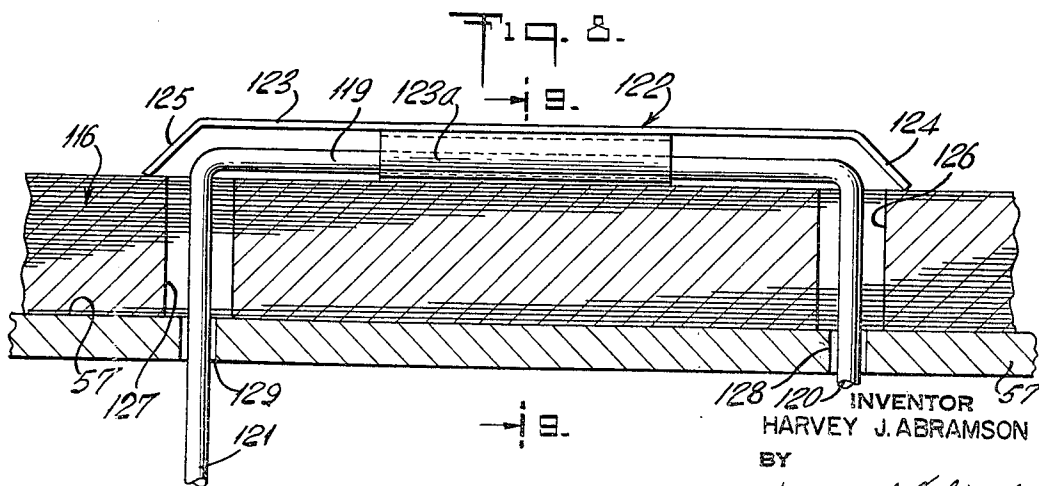
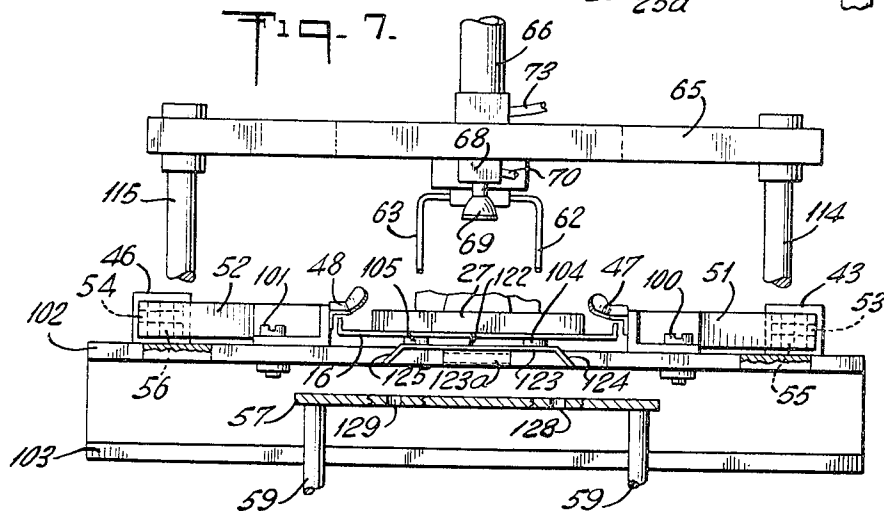
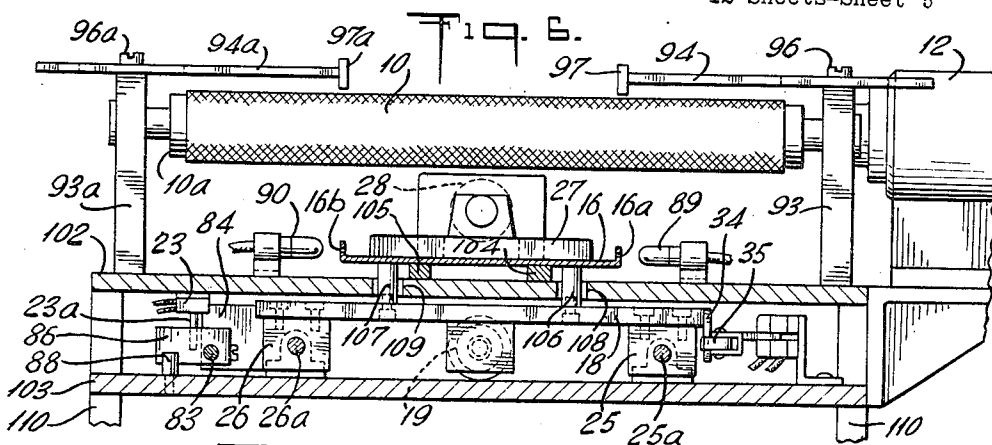
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12 Sheets-Sheet 5



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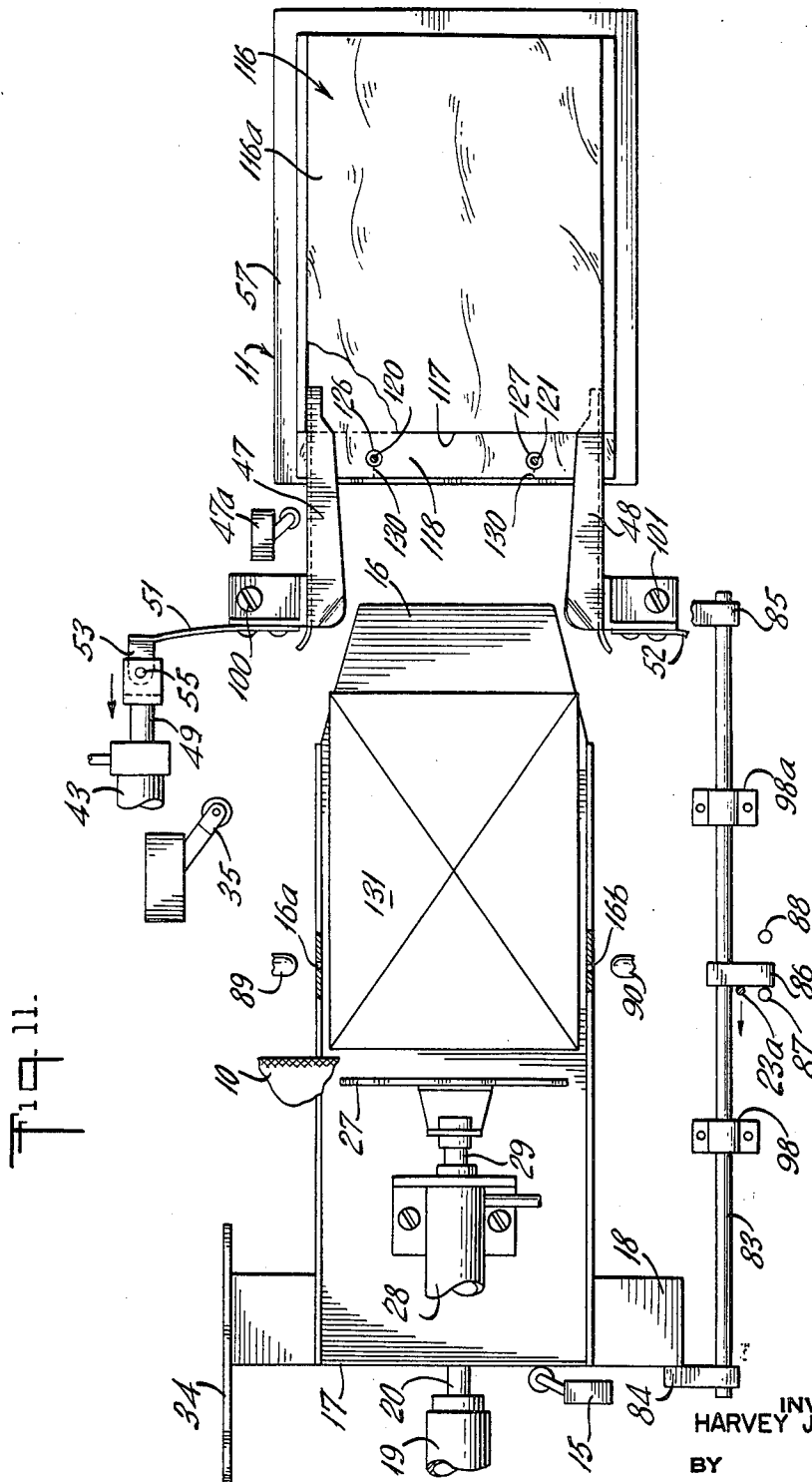
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12 Sheets-Sheet 6



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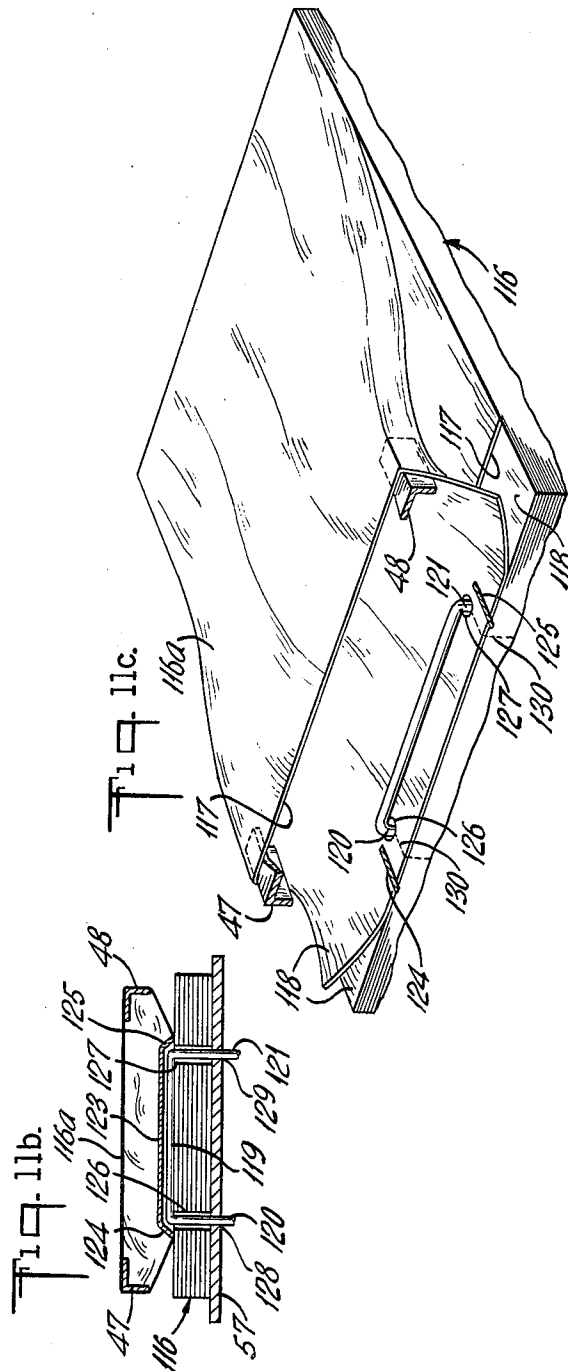
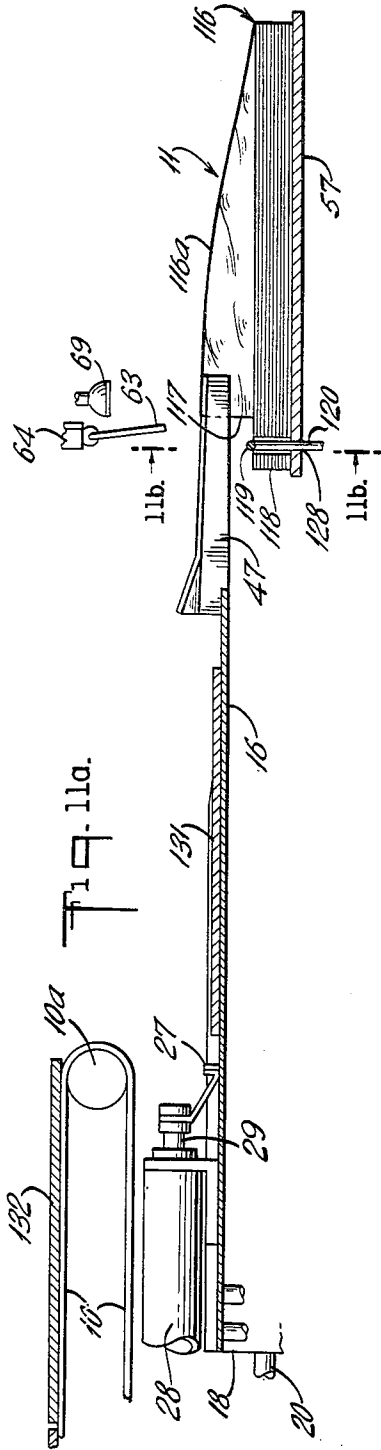
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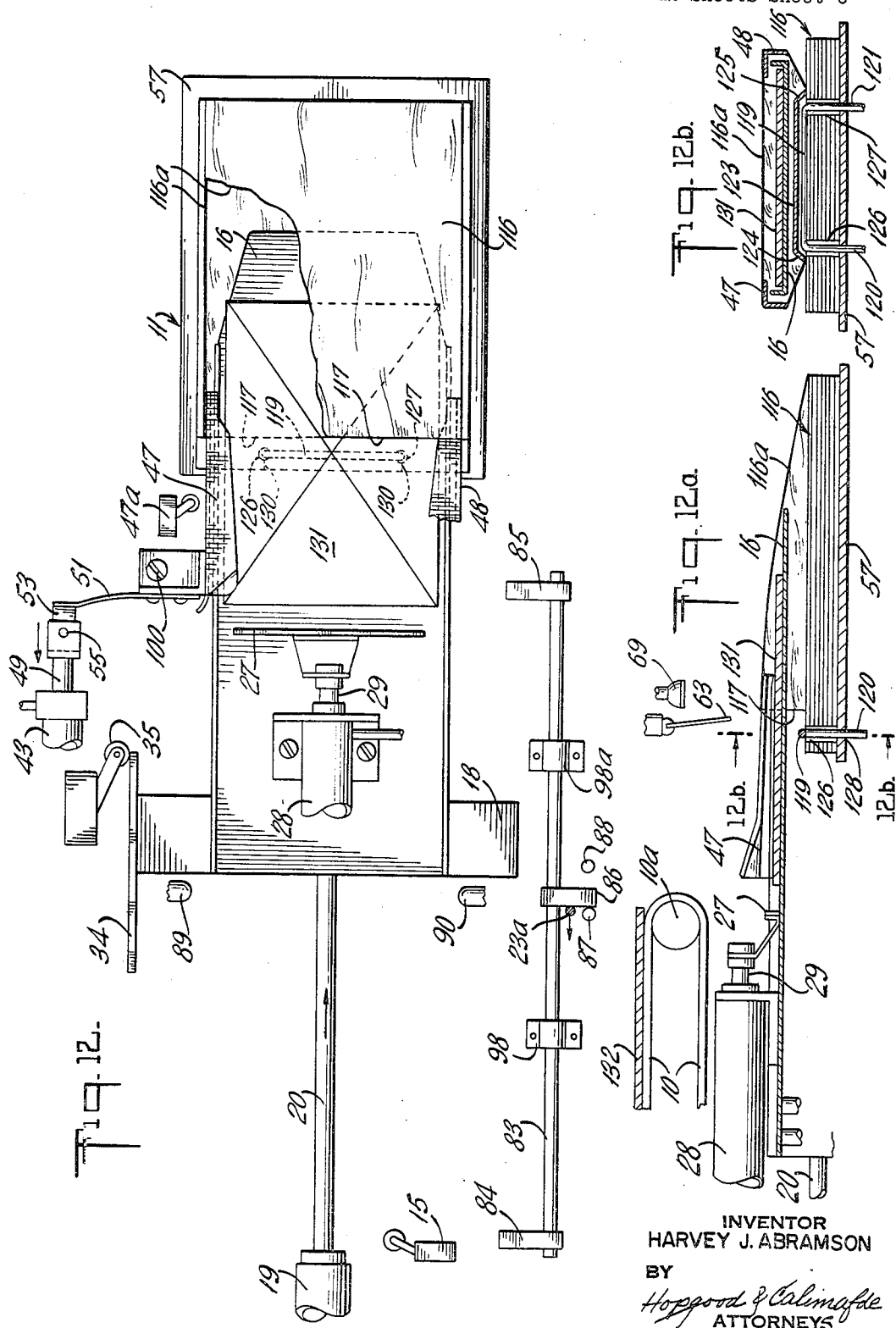
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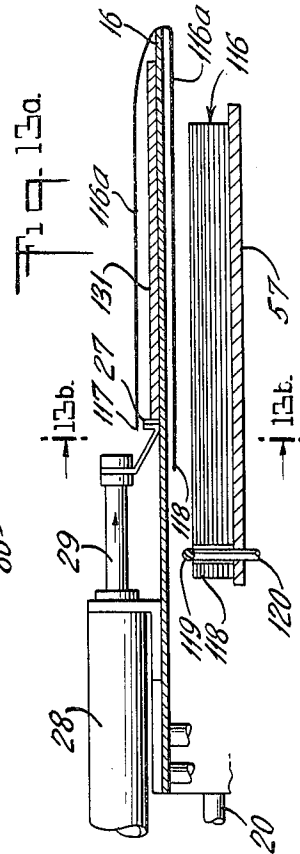
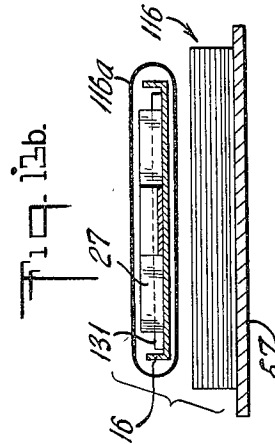
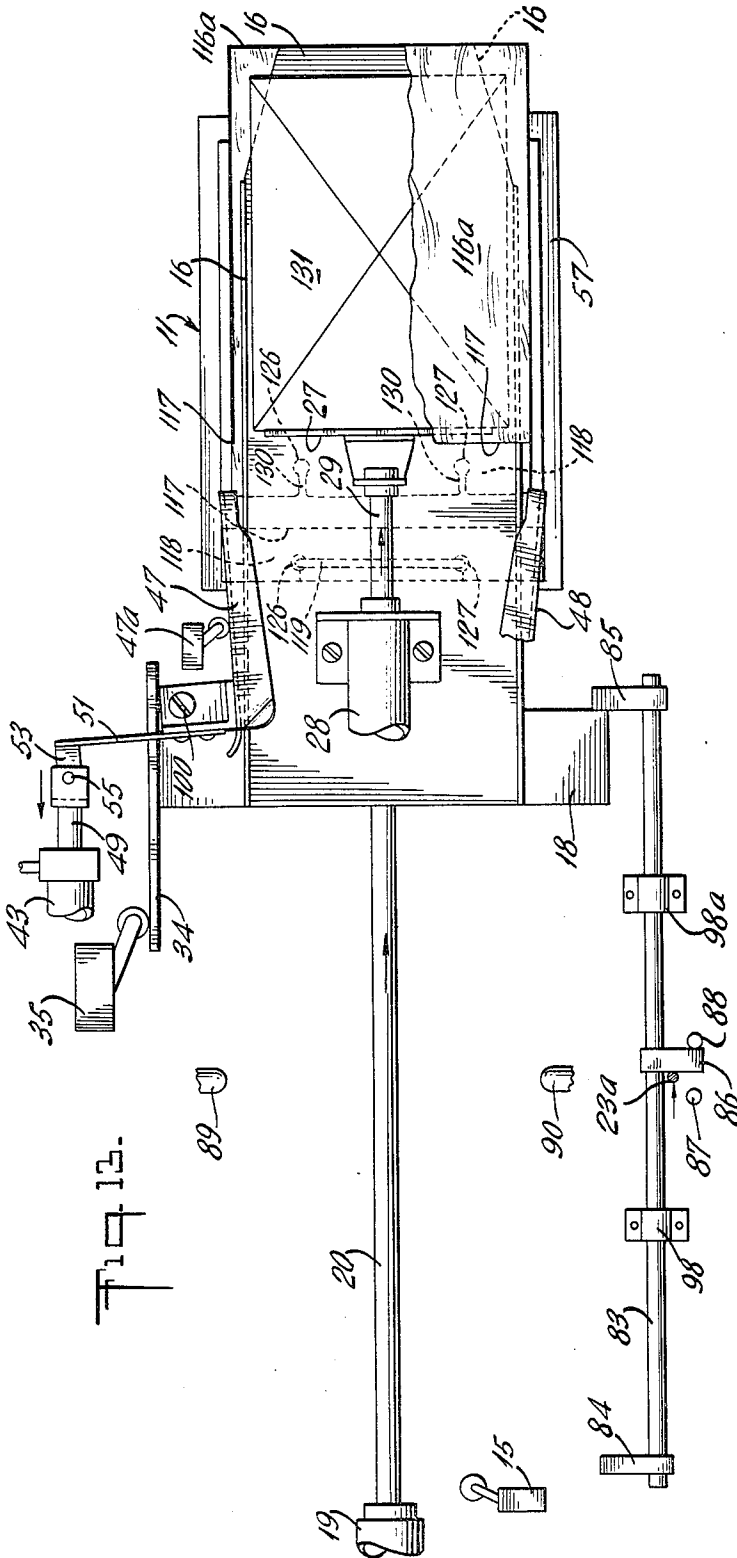
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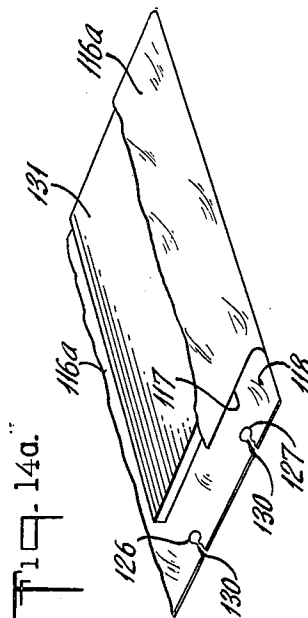
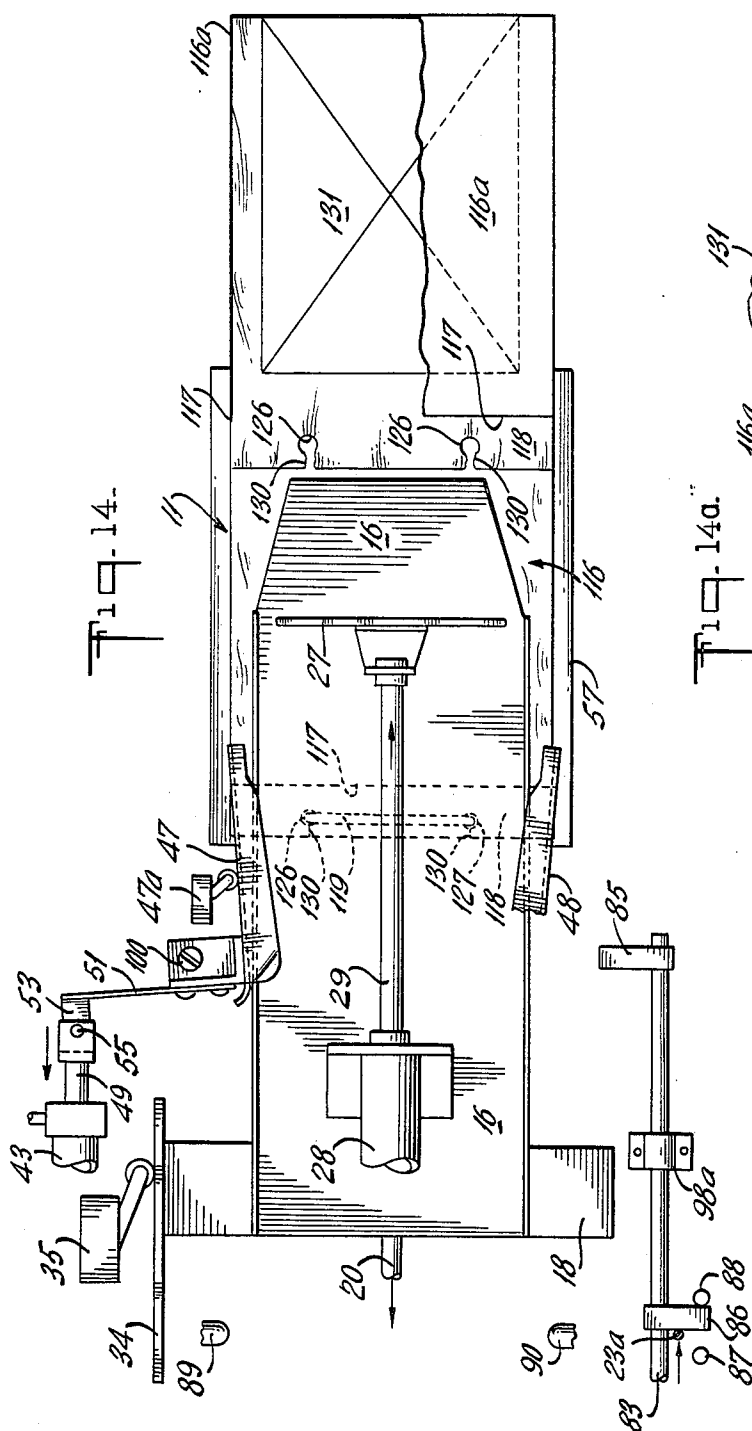
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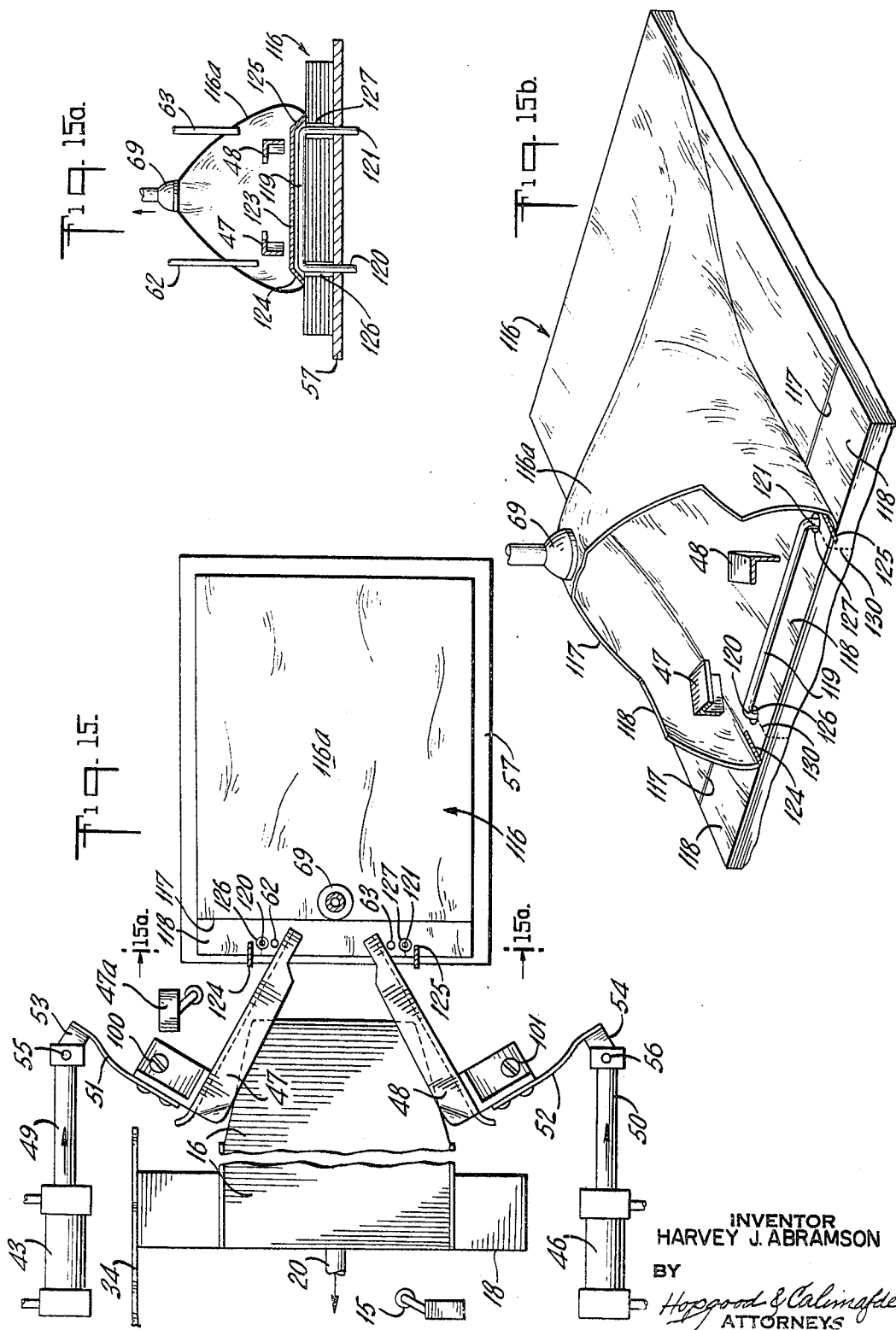
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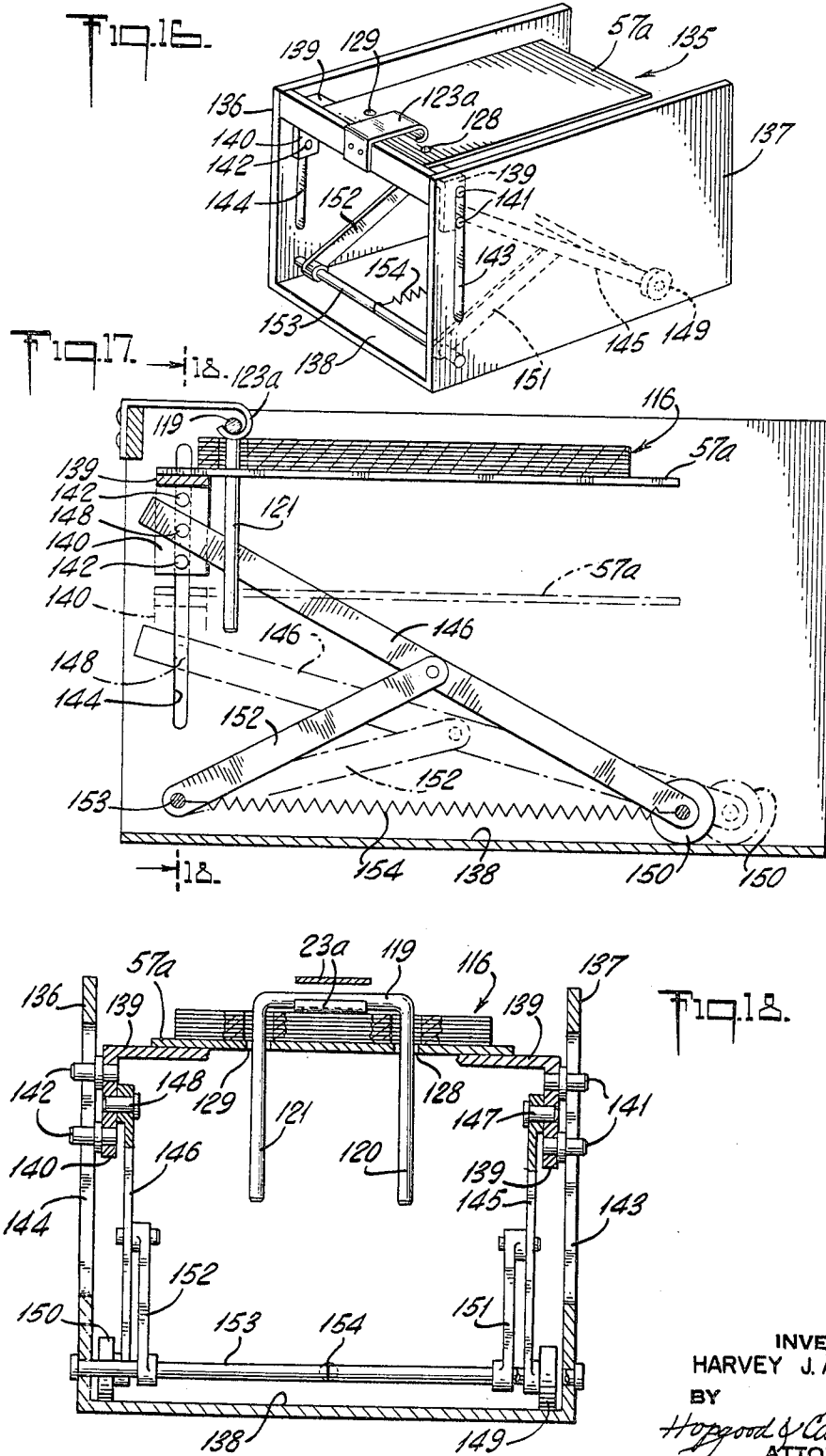
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12 Sheets-Sheet 12



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PACKAGING MACHINE AND METHOD

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U.S. Cl. 53—29

11 Claims

ABSTRACT OF THE DISCLOSURE

A packaging machine and method are provided for packaging articles in containers, particularly in flexible containers, such as polyethylene bags. The machine has means for feeding articles to a packaging station, wherein a tray intermediate the feeding means and the packaging station is provided for receiving the article and for delivering it to the packaging station, the tray being adapted to move from home position to the packaging station and back to home position. Containers, such as polyethylene bags, are provided at the packaging station for receiving the article, the tray being actuated to deposit the article within the container, the tray having associated with it pusher means for assuring that the article is retained in the container as the tray returns to home position. Actuating means controlled by a circuit are provided for carrying out the operation in a sequential arrangement of steps.

This invention relates to a packaging machine, and in particular, to an automatically operable packaging machine for continuously depositing articles into flexible containers, such as polyethylene bags.

In recent years, polyethylene and similar plastic bags have come into widespread use as a packaging material, particularly in the form of bags for packaging food, wearing apparel (such as shirts), books, magazines, and a variety of other items too numerous to mention. Plastic bags are employed because they can be sealed simply by heat sealing the mouth of the bag shut. Generally speaking, the packaging operation heretofore employed included a certain amount of manual labor, such as hand placing the article or item within the plastic bag and depositing the thus-filled bag on a conveyor for transport to a sealing station.

It would be desirable to have an automatically operable device capable of carrying out the packaging step on a continuous production line basis.

It is thus the object of this invention to provide an automatically operable packaging machine.

Another object is to provide a machine capable of depositing articles within flexible containers, such as polyethylene bags.

These and other objects will more clearly appear when taken in conjunction with the following disclosure and the accompanying drawings, wherein:

FIG. 1 is an exploded diagrammatic perspective of the essential parts of the apparatus together with associated circuitry;

FIG. 2 is a plan view of the apparatus partially broken away;

FIG. 3 shows in elevation a longitudinal section of the apparatus taken along line 3—3 of FIG. 2;

FIG. 4 is a plan view of the apparatus taken along the section determined by line 4—4 of FIG. 3;

FIG. 5 depicts in side elevation that portion of the apparatus shown in FIG. 4;

FIG. 6 is a transverse section taken along line 6—6 of FIG. 2;

FIG. 7 is another transverse section taken along line 7—7 of FIG. 2;

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FIG. 8 is an enlarged fragment taken along line 8—8 of FIG. 9;

FIG. 9 is an enlarged fragment taken along line 9—9 of FIG. 8;

FIG. 10 depicts in perspective a stack of polyethylene or similar plastic bags held together with a wicket;

FIGS. 11, 11a, 11b and 11c are illustrative of the first step in the operation of the apparatus provided by the invention;

FIGS. 12, 12a and 12b illustrate the second step in the operation of the apparatus;

FIGS. 13, 13a and 13b depict the third step in the operation of the apparatus;

FIGS. 14 and 14a are illustrative of the fourth step in the operation of the apparatus;

FIGS. 15, 15a and 15b show the fifth step in the operation of the apparatus; while.

FIGS. 16 to 18 are illustrative of a device for supporting bags.

Stating it broadly, the invention is directed to a packaging machine which includes means for feeding articles to a packaging station, a tray for receiving an article fed to it located intermediate the feeding means and the packaging station, the tray being mounted to move in a forwardly and backwardly direction, and pusher means associated with the tray to aid in delivering the article to the container. Means for moving the tray and the pusher means into loading and unloading position is provided, controlled by a circuit having at least one timer set to carry out a predetermined arrangement of operational steps.

Referring first to FIG. 1, which is an exploded view showing the essential elements making up the apparatus, and also FIGS. 2 to 10, a continuous belt or conveyor 10 is shown for delivering an article, e.g. a book, to a packaging station referred to generally by the numeral 11. The belt 10 is actuated via a motor 12 coupled to relay 13 via line 13a, which relay in turn is coupled to a power supply 14 via line 14a shown as a block diagram. Relay 13 is adopted to be controlled by a switch 15 to be explained later.

Intermediate belt 10 and packaging station 11 is a tray 16 connected transversely near its rear end 17 to a cross bar 18 coupled to a solenoid operated pneumatic cylinder 19 via piston rod 20. The cylinder is pneumatically coupled via tubes 21, 21a to solenoid operated air valve 22 which in turn is coupled to ground and to switch 23 via lines 24 and 24a. Cross bar 18 has a pair of depending lugs 25, 26 through which rods 25a, 26a pass in sliding contact, the rods serving as tracks along which the cross bar is caused to move via the actuation of pneumatic cylinder 19. The solenoid operated air valves mentioned herein are connected to a source of compressed air not shown.

Mounted on tray 16 is a pusher means 27 coupled to a pneumatic cylinder 28 via piston rod 29, the cylinder being in turn pneumatically coupled to solenoid operated air valve 30 via tubes 31 and 32. The solenoid valve is electrically coupled to timer #2 via line 33 and to ground. Pusher means 27 is adapted to move relative to the tray as well as move with the tray, since it is fixed to the tray. Coupled at one side of cross bar 18 is a cam bar 34 which is adapted to actuate switch 35 near tray 16 when the tray moves in a forwardly direction towards packaging station 11. The switch is coupled to timer #2 via lines 36, 37. The timer is a conventional device containing cams on a single shaft programmed to control a sequential arrangement of operational steps to be described later in more detail. Thus, timer #2 is coupled via line 38 to a pair of simultaneously operable solenoid valves 39 and 40, solenoid valve 39 being coupled via tubes 41, 42 to pneumatic cylinder 43, and solenoid valve

40 being coupled via tubes 44, 45 to pneumatic cylinder 46.

The pneumatic cylinders actuate a pair of bag-contacting fingers 47, 48 which are adapted pivotally to move towards each other and to spread apart when piston rods 49, 50 are caused to move forward and return. The fingers are coupled to a pair of transverse resilient metal members 51, 52 of, for example, spring steel, and to links 53, 54 which are pivotally mounted at 55, 56 to piston rods 49, 50 respectively. As piston rods 49 and 50 move forward, the fingers close to enter a bag, and as pistons 49 and 50 return to home position, the fingers are caused to open within the bag and support it at its sides. In this manner, the bag is supported while the tray is inserting the article in it.

It will be noted that packaging station 11 has two levels, surface 57 supported above shelf 58 via support members 59, the shelf having a vacuum pump as shown.

Timer #2 is also coupled via line 60 to solenoid valve 61 which controls an air blast fed to two spaced outlets 62, 63 which are used to help separate the mouth of the bag to be described later. The air blast means is coupled to a housing 64 which is mounted to a cross member 65 shown fragmentarily in FIG. 1. Cross member 65 also has mounted on it (note FIGS. 3 and 7) a bag-suction assembly comprising pneumatic cylinder 66 coupled via piston rod 67 and suction chamber 68 to suction cup 69. Suction chamber 68 is coupled to the vacuum pump via line 70. Pneumatic cylinder 66 is actuated by a solenoid valve 71 via pneumatic tubes 72, 73, the solenoid being in turn coupled to timer #2 via line 74.

Packaging station 11 is supported on a screw operated elevator comprising a transverse support member 75 in threading engagement with a screw 76 actuated via transmission means within enclosure 77 coupled to a motor 78. The motor is coupled to ground and to a timer #1 via line 79, the timer being in turn coupled via line 80 to a pulse counter 81, the pulse counter being also coupled to timer #2 via line 82 and to motor 78. The purpose of the pulse counter is to assure proper level of surface 57 with the bag-contacting fingers 47, 48. Since a stack of bags will be placed on surface 57 and since the stack of bags will diminish in height as they are used, then the surface of packaging station 11 must be intermittently raised. If it is decided that after twenty bags have been removed from the surface that the surface must be raised, a pulse for each bag removed is sent to the pulse counter from timer #1 which stores the counts until twenty counts are accumulated. At the twentieth count, a pulse is sent to the timer which actuates the motor for a predetermined time which actuates the screw to raise the packaging station up one unit and then stops the motor.

Other control means are shown in the exploded view including a cam bar 83 having lugs 84, 85 fixed at each end so as to be contacted by cross bar 18 as it moves forwardly and backwardly. A cam lug 86 is fixed to the bar intermediate the ends, the cam bar 83 being limited in travel via stops 87 and 88 which intercept cam lug 86. As cam lug 86 moves between stops 87 and 88, it actuates switch 23 by contacting switch lever 23a. Straddling the tray transversely is a (pair of) photocell 89, and light source 90 coupled to photocell control circuit 91 via lines 92, 93. When the photocell has a clear line of vision through openings 16a and 16b in the side walls of tray 16 and when the tray is in home position, belt 10 will move to deposit an article on the tray. When the article lands on the tray and intercepts the line of sight of the photocells, the belt stops until the deposited article is delivered to the packaging station. The purpose of switch 15, which is released when cross bar 18 moves forward, is to keep the belt from moving during the time that the tray moves into packaging position. Switch 15 is coupled to relay 13 and the power supply via lines 15a, 15b. The switch is also coupled to the photocell control circuit via line 15c.

FIG. 2 shows in plan view the apparatus provided by the invention with portions of the elements broken away. Thus, belt 10 is shown supported by rollers 10a, 10b, the rollers in turn being axially supported by member 93, and a similar member 93a on the other side of tray 16 (note FIG. 6).

A bar 94 is adjustably positioned via slot 95 and screw 96 to member 93, bar 94 being in turn connected to a side guide 97 along one side of tray 16. A similar guide 97a coupled to bar 94 (FIG. 6) is disposed along the other side of the tray, the guides being employed to insure that the article is correctly positioned on the belt while it is being delivered to the packaging station. In the breakaway portion of the top view of FIG. 2, cam bar 83 is shown supported by mount 98 and 98a (FIG. 4), the bar having a key 99. Bag-supporting fingers 47, 48 are shown pivotally mounted at 100 and 101 and similarly pivotally supported at 55 and 56, the spring members and links being designated with the same numerals as in FIG. 1.

The relation of the parts are shown more clearly in the elevation side view shown in FIG. 3. The device is shown as having an upper surface 102 and an underlying shelf 103. The upper surface has a pair of tracks 104 and 105 (FIG. 2) fastened thereto by screws to provide runners over which tray 16 slides as it moves forwardly and backwardly. The tray is coupled to cross member 18 via posts 106, 107 (note also FIG. 2) which pass through slots 108, 109 in the upper surface 102 of the device. As pneumatic cylinder 19 acts upon cross member 18 via piston rod 20, lugs 25 and 26 fixed to the cross member are caused to move slidingly along rods 25a and 26a, with posts 106 and 107 moving along slots 108 and 109 as tray 16 is carried forward to the packaging station. Legs 110 and 111 are provided for supporting the apparatus above the floor. The elevator supporting packing station 11 is guided via rollers 112, 113 along leg 111, the elevator being raised via screw 76 as shown in FIG. 1. Cross member 65 (FIG. 3), which supports pneumatic cylinder 66, is fixed above the top surface of the apparatus via legs 114 and 115 (FIG. 7).

FIG. 4 taken along line 4—4 of FIG. 3 shows the arrangement of parts supported on lower shelf 103, the parts being designated by the same numerals as in FIGS. 1, 2 and 3. FIG. 5, which is a side view in elevation of FIG. 4, shows the relationship of the elements as they appear on top surface 102 and shelf 103.

FIG. 6 which is viewed transversely in elevation along line 6—6 of FIG. 2, shows in more detail the relationship between tray 16 and its supporting structure as described with relation to FIGS. 1 to 5.

FIG. 7 is an end view in elevation as viewed along line 7—7 of FIG. 2, the parts being designated with the same numerals.

FIGS. 8 and 9, each of which is enlarged cross sectional fragment of the other, show in detail the parts involved in supporting a stack of polyethylene bags. The stack of bags 116 is shown in perspective in FIG. 10, the mouth 117 of the bags having a marginal portion or extension 118 on one face with a pair of indexed holes through which a wicket 119 having legs 120, 121 passes in order to keep the bags correctly stacked. The bags are fixed in a region 122 (FIG. 3) shown in more detail in FIGS. 8 and 9. A plate 123 having a pair of bent wings 124, 125 is provided having fastened to its underside a curved plate shaped as a hook 123a in which wicket 119 is cradled, the legs of the wicket passing through the indexed holes 126, 127 of the bags and through holes 128, 129 of support surface 57 (note also FIG. 2). Suction cup 69 is shown positioned on the uppermost bag of the stack in FIG. 9. The purpose of bent wings 124, 125 is to provide spring pressure on the bags so that when bag-supporting fingers 47, 48 enter the top bag followed by tray 16, the bag can be easily ripped from the wicket

through perforations 130 extending from the holes to the marginal edge of the bag opening (note FIG. 10).

The air blast tubes 62, 63 (FIGS. 3 and 7) are disposed near the edge of the bag opening so that the flow of air impinging at the mouth of the bag will cause the two faces of the bag to separate so that the top face towards the suction cup can easily be picked up when the suction cup is lowered so as to enable bag-supporting fingers 47, 48 to enter the bag.

The operation of the device can be easily understood by following the steps illustrated by FIGS. 11 to 11c; FIGS. 12 to 12b; FIGS. 13 to 13b; FIGS. 14 to 14a; and FIGS. 15, 15a and 15b as follows:

Step 1: Referring to the plan view of FIG. 11, and to the corresponding views in elevation of FIGS. 11a, 11b and 11c, the operation of the device begins by throwing a power switch (not shown) which starts belt 10 moving. So long as tray 16 is in home position and there is a line of sight between photoelectric cells 89, 90, the belt will move. The moment article 131, for example, a small book (FIGS. 11 and 11a) drops upon tray 16 and intercepts the line of sight of the photoelectric cells, the belt will stop before another article 132 (note FIG. 11a) is discharged on the tray. As soon as the article intercepts the line of sight of the photocells, piston rod 20 of pneumatic cylinder 19 is actuated via photocell relay 91a through lines 24, 24a of switch element 23a shown in contact with cam lug 86 when tray 16 is in home position. It will be noted that fingers 47 and 48 are already positioned within the mouth of bag 116a on top of stack 116. This position of the bag-supporting fingers has already been determined as a result of the last operational step which will be apparent after the complete operation has been described. In this connection, it will be noted by referring to FIGS. 11a, 11b and 11c that when the fingers have entered the bag as a result of the previously completed cycle, the bag is maintained in the open condition under tension so that tray 16 with article 131 can enter freely in its. The tension is provided via resilient metal members 51, 52 which are shown slightly bowed in FIG. 11.

Step 2: As tray 16 moves forward (note FIGS. 12, 12a and 12b), cam bar 34 contacts and closes switch 35 which actuates timer #2. At the same time switch 15 is released so that belt 10 cannot move, since the photocells have now a clear line of sight as shown in FIG. 12. Timer #2 controls the forward and rearward movement of pusher means 27 via pneumatic cylinder 28 and piston rod 29. As will be noted from FIGS. 12, 12a and 12b, tray 16 with article 131 has already entered approximately halfway through bag 116a.

Step 3: As tray 16 reaches its full forward stroke as shown in FIGS. 13, 13a and 13b, pneumatic cylinder 28 has in the meantime been actuated by means of the timer #2, whereby pusher means 27 is caused to move against the back-end of the article (note FIG. 13) just as bag 116a is being ripped from the wicket by the contact of tray 16 with the end of the bag. This occurs before the leading edge of the article has reached the closed end of the bag. Coincidentally with the foregoing, cross bar 18 has contacted cam lug 85 whereby cam bar 83 is caused to move forwardly a short distance from stop 87 to stop 86. When this occurs, switch element 23a moves to the right with cam lug 86 and causes pneumatic cylinder 19 to actuate in the reverse direction so as to bring tray 16 back to home position. As bag 116a is being sheared along perforation 130 (note perforations shown in FIG. 10), pusher means 27 is still pushing the article to the end of the bag before the packaged article leaves surface 57 by its own momentum.

Step 4: Referring to FIGS. 14 and 14a, the packaged article is shown leaving packaging station 11 under its own momentum on its way to a sealing station not shown. It will be noted that piston rod 29 has reached its full stroke as tray 16 is returning to its home position. At this point, piston rod 29 begins to return to pneumatic

cylinder 28 in accordance with the cycle programmed in timer #2.

Step 5: As tray 16 is returning to home position (note FIGS. 15, 15a and 15b), pneumatic cylinders 43 and 46 are actuated by timer #2 whereby bag-supporting fingers are caused to assume the position shown in FIG. 15 in preparation for insertion into another bag. Simultaneously with the movement of the fingers, solenoid 61 is actuated by timer #2 to cause compressed air to flow through tubes 62 and 63 which are positioned above the marginal end 118 of the bag as shown in FIG. 15. As the compressed air flows against the marginal edge, the two faces of the bag are caused to separate. Simultaneously with this operation, suction cup 69 is also actuated by the timer via solenoid valve 71 (FIG. 1) which causes pneumatic cylinder 66 to lower suction cup 69 to the proximity of the bag, whereby the top surface of the bag is grabbed by the suction cup and raised as shown in FIGS. 15a and 15b. At this point, bag-supporting fingers 47 and 48 are sufficiently within the bag so that before the tray reaches home position to complete the cycle, the fingers are caused to spread apart to support the bag under transverse tension as shown in FIG. 11. As tray 16 reaches home position, switch 15 is contacted by cross bar 18 to release the relay coupled to motor 12 of belt 10, whereby belt 10 starts to move and deposit another article on the tray in preparation for Step 1 previously discussed.

Referring to the pivotally mounted bag supporting fingers, it will be noted that the fingers are coupled to pneumatic cylinders 43 and 46 by means of leaf springs 51 and 52, respectively. The leaf springs are advantageous in that they provide spring tension to each of the fingers and in turn provide transverse tension on the bag when the fingers are inserted into the bag. As will be noted in FIG. 2, fingers 47 and 48 are spread widely apart at an angle such that there is a slight bow on each of the leaf springs. In this position, the fingers are spread apart beyond the normal width of the bag. For example, this will be apparent by comparing the position of the fingers of FIG. 2 to the position of the fingers of FIG. 11 which shows the fingers biased against the sides of bag 116a.

It would be desirable where there is a defective bag to provide a safety switch that will prevent the device from operating where the bag is so badly torn that the fingers are unable to support the bag. In order to avoid the problem that arises when such a situation occurs, a safety switch 47a is provided located next to finger 47 (note FIG. 2) which is coupled to relay 13 that controls motor 12 of belt 10. Thus, in the position shown in FIG. 2, fingers 47 and 48 are spread out in their extreme position since there is no bag, whereby switch 47a is closed by finger 47 which actuates relay 13 to keep the belt from moving, regardless of whether switch 15 is open or closed. However, in the situation where the fingers are within the bag as shown in FIG. 11, switch 47a does not contact finger 47 and, therefore does not actuate relay 13. In the event that there is a defective tear in the bag so that the fingers are unable to support the bag, they will then tend to assume the extreme spread-out position because of the tension applied thereto through the leaf spring. When this occurs, finger 47 bears on switch 47a to close it so as to prevent motor 12 from operating belt 10. Thereafter, the defective bag is removed by the operator and the fingers positioned correctly relative to the next bag.

Another advantage of having leaf springs 51 and 52 on fingers 47 and 48, is that the tension in the springs provide sufficient give or yield to the fingers so that they can operate to support bags having slightly different dimensions.

As will be apparent from the foregoing description, an apparatus is provided for packaging articles comprising broadly means 10 and 16 for feeding an article to a packaging station 11 located forward of the article feeding means, container-supporting means 47 and 48 lo-

cated relative to the packaging station, and means 69 cooperably associated with the packaging station for presenting the container to the container-supporting means 47 and 48, whereby to position the container to receive the article within it when the article is fed to the packaging station.

In its more preferred aspect, the apparatus provided by the invention as applied to the packaging of articles within pliable plastic bags comprises a tray for receiving an article to be packaged, means for slidably supporting the tray, and means for feeding the article to the tray. A packaging station is located forward of and in article-receiving relationship with the tray. The tray has coupled to it means for moving it in a forwardly and backwardly direction, and pusher means cooperably associated with the tray mounted to move in a forwardly and backwardly direction relative to the tray. Located adjacent the packaging station is a bag-supporting means for insertion into a bag to support it in an article-receiving position, the packaging station having means for holding a stack of bags. Suction means is provided above the stack of bags for opening the topmost bag in preparation for receiving an article.

An advantage of the preferred embodiment of the invention is that pliable plastic bags, e.g. polyethylene bags, can be easily handled, even when they are electrostatically charged. As is well known, charged bags tend to stick together and are normally difficult to deal with. However, this is overcome by directing a flow of air upon the topmost bag of a stack in the region of the mouth portion of the bag as shown by the dot-dash arrow 62-63a in FIG. 9 representing airflow emanating from elements 62, 63 shown in FIGS. 1 and 3. The bags are generally stacked one on top of the other, each bag having a mouth portion and upper and lower faces in faying relationship with each other, the bags being releasably anchored to the platform of the packaging station. As air is being directed to the topmost bag to ripple the upper face and separate it from the lower face, a suction cup is brought down in proximity of the bag, whereby to lift up and retain the upper face against the cup, so that when the cup is raised to a predetermined height, the mouth of the bag is opened in preparation for receiving an article. This technique overcomes the disadvantages which normally prevail in handling electrostatically charged bags.

However, in some situations, a suction cup may not be necessary for opening the mouth of the bag. For example, a flow of air of sufficient force from air tubes 62, 63 may be satisfactory, so long as the air flow is directed inwardly of the mouth of the bag as shown by dot-dash arrow 62-63a in FIG. 9.

As will be appreciated by those skilled in the art, the packaging station 11 for supporting the bags may take various forms. For example, the platform may be part of a cartridge device of the type 135 shown in FIG. 16. There the platform is indicated by the numeral 57 supported within the cartridge having side walls 136, 137 and a base 138. The platform is in a substantially horizontal position by being fixed at one end to a cross member 139 having ears 140, 141 at both ends, each of said ears (FIG. 18) having a pair of protruding bosses 141, 142 which ride in slots 143, 144, respectively, in the side walls of the cartridge.

Cross member 139 is supported by and pivotally coupled to drag arms 145, 146 (FIGS. 16-18) at pivots 147, 148, the ends of the arms being in rolling engagement via rollers 149, 150 with base 138 of the cartridge. The rollers are coupled to stub shafts at each end of the arms. A pair of links 151, 152 is provided pivoted along shaft 153, the shaft being pivotally fixed to the sidewalls as shown. A biasing spring 154 is provided adapted to keep platform 57 in the elevated position. In placing the stack of bags on the platform, the platform is urged downward by firmly pressing down on it against the action of spring 154 (note FIG. 17) and the legs 120, 121 of the wicket then inserted

into holes 128, 129 (FIG. 18) the same as shown for FIG. 8. The top of the wicket is inserted into the cradle of hook 123a which also serves as a stop (FIG. 17). As bags are removed from the stack, the platform will continue to urge itself upward against the stop, thereby maintaining the top most bag in the desired position.

After each of the bags has been filled with an article, they are generally delivered to a heat sealing device. The heat sealing device may be an automatically operable type disclosed in my copending application Ser. No. 626,800, filed Mar. 29, 1967.

Although the present invention has been described in conjunction with preferred embodiments, it is to be understood that modifications and variations may be resorted to without departing from the spirit and scope of the invention as those skilled in the art will readily understand. Such modifications and variations are considered to be within the purview and scope of the invention and the appended claims.

What is claimed is:

1. An apparatus for packaging articles in pliable plastic bags which comprises a tray for receiving an article to be packaged, means for slidably supporting said tray, means for feeding said article to said tray, a packaging station located forward of and in article-receiving relationship with said tray, means coupled to said tray for moving said tray in a forwardly and backwardly direction, pusher means coupled to said tray and movably mounted so as to move in a forwardly and backwardly direction relative to said tray and in timed sequence to the movement thereof, bag-supporting means located relative to said packaging station for insertion into a bag as a support therefor, means for holding a stack of bags at said packaging station, and means located relative to said packaging station for opening the topmost bag so that said bag-supporting means can be inserted into the open bag and support it for receiving the article to be packaged when the tray with an article is moved in the forwardly direction into said bag and said pusher means on said tray is caused to push the article to the end of said bag at the end stroke of said tray.

2. The apparatus of claim 1, wherein said bag-supporting means comprises a pair of spaced-apart pivotally mounted fingers, and wherein the means for opening a bag to enable the fingers to be inserted into it comprises means for directing a flow of air into the bag.

3. The apparatus of claim 2, wherein suction means is provided to aid in opening the bag to a height sufficient to allow entrance therein of the bag-supporting means.

4. The apparatus of claim 2, wherein each of the pivotally mounted fingers has an element in the form of a leaf spring coupled to the finger, whereby to apply a biasing stress to a bag supported by said fingers when the fingers are pivoted to an open position within the bag against the biasing action of said leaf springs.

5. The apparatus of claim 1, wherein the packaging station has means for supporting a stack of bags, including means for elevating the stack to a correct position as bags are removed from the stack.

6. The apparatus of claim 1, wherein the means for feeding the article to said tray is a conveyor, wherein the means for moving said tray is a pneumatic cylinder and piston actuated by a solenoid-operated air valve, and wherein the means for moving the pusher means is a pneumatic cylinder and piston actuated by a solenoid-operated air valve.

7. An apparatus for packaging articles in bags which comprises, a tray for receiving an article to be packaged, means for slidably supporting said tray, a solenoid-operated pneumatic cylinder and piston coupled to said tray for moving said tray in a forwardly and backwardly direction, pusher means mounted on said tray, said pusher means having coupled thereto a solenoid-operated pneumatic cylinder and piston for moving said pusher means in a forwardly and backwardly direction relative to said tray, an intermittently operable conveyor means for feed-

ing said article to said tray, a packaging station located forward of and in article-receiving relationship with said tray, said packaging station having a platform with means for holding a stack of bags, means for raising the stack as bags are removed, a pair of pivotally mounted bag-supported fingers located relative to said packaging station, said fingers being simultaneously pivotally operable via a pair of solenoid-operated pneumatic cylinders and pistons, and air flow means located relative to the packaging station for applying a blast of air to the mouth of a bag, whereby to open said bag in preparation for receiving an article.

8. The apparatus of claim 7 including a control circuit and a timer coupled thereto, said timer being programmed for carrying out a sequence of operational steps via subsidiary circuits actuated by said timer.

9. The apparatus of claim 8, wherein said control circuit includes a plurality of subsidiary circuits comprising, a photoelectric circuit for determining when an article has been deposited on said tray, said circuit being adapted to stop said conveyor means when said article has been deposited on said tray, a first circuit responsive to the movement of said tray for actuating said timer when said tray moves to said packaging station, a second circuit responsive to the movement of said tray for actuating the solenoid valve coupled to the pneumatic cylinder of the tray for returning said tray to home position, and a third circuit operable when said tray moves towards the packaging station for keeping said conveyor stationary.

10. In a method of feeding articles to pliable plastic containers characterized by a tendency to retain static electrical charges which comprises, providing a plastic bag lying on a surface of a packaging station, said bag having a mouth portion and upper and lower faces in facing relationship with each other, said bag being releasably anchored to said surface at a marginal edge of its mouth portion, directing a flow of air to the region of the mouth portion of said bag, and lifting the upper face of bag by suction, whereby to open said bag in preparation for receiving an article.

11. The method of claim 10 wherein after the bag has been opened, a support is removably inserted into the bag to support it in a predetermined position, an article is then inserted in the bag, following which the bag is released from its support, and the bag with the confined article discharge from the packaging station.

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