

Jan. 14, 1969

T. M. SHEETS

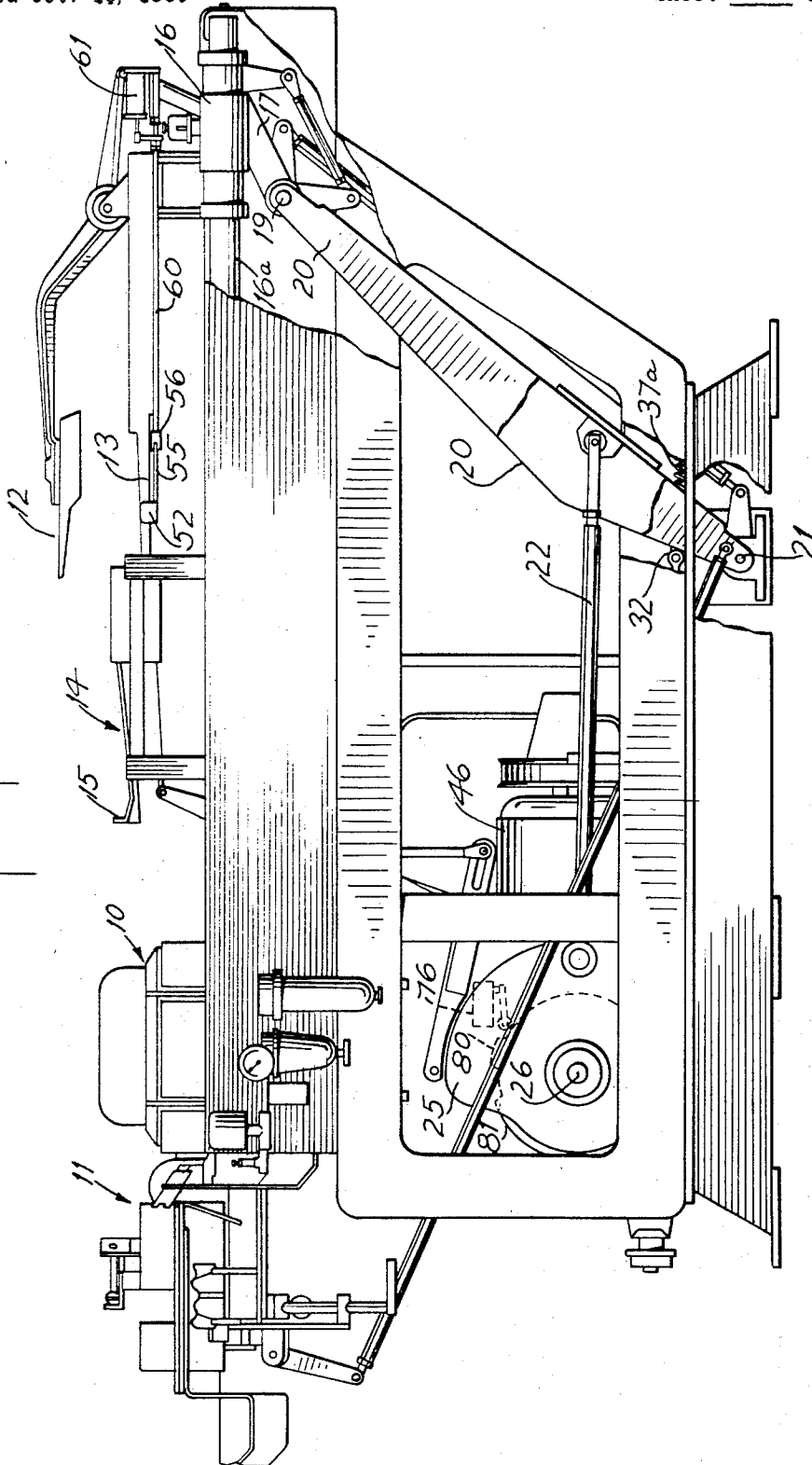
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AUTOMATIC BAGGING MACHINES

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Fig. 1.



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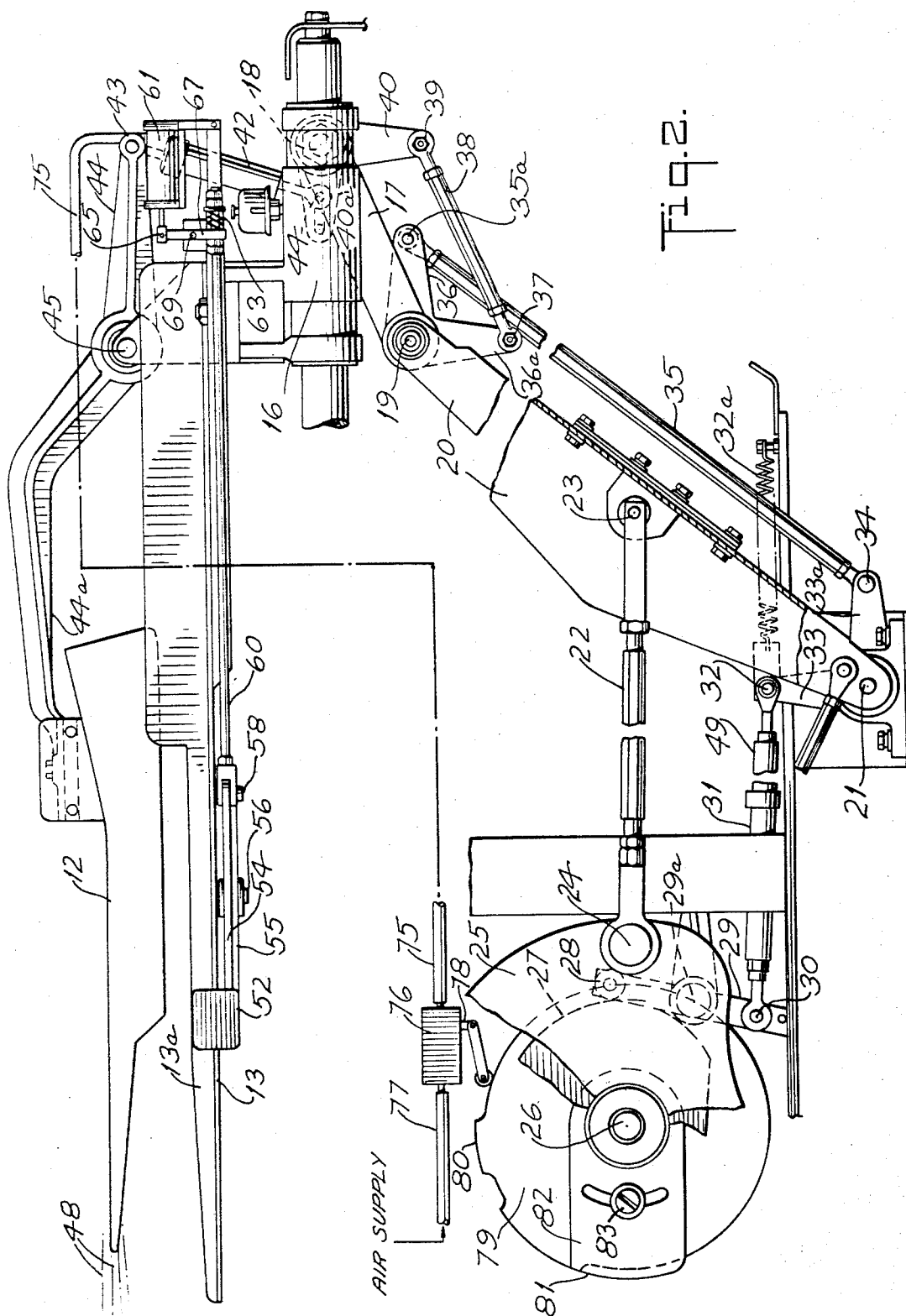
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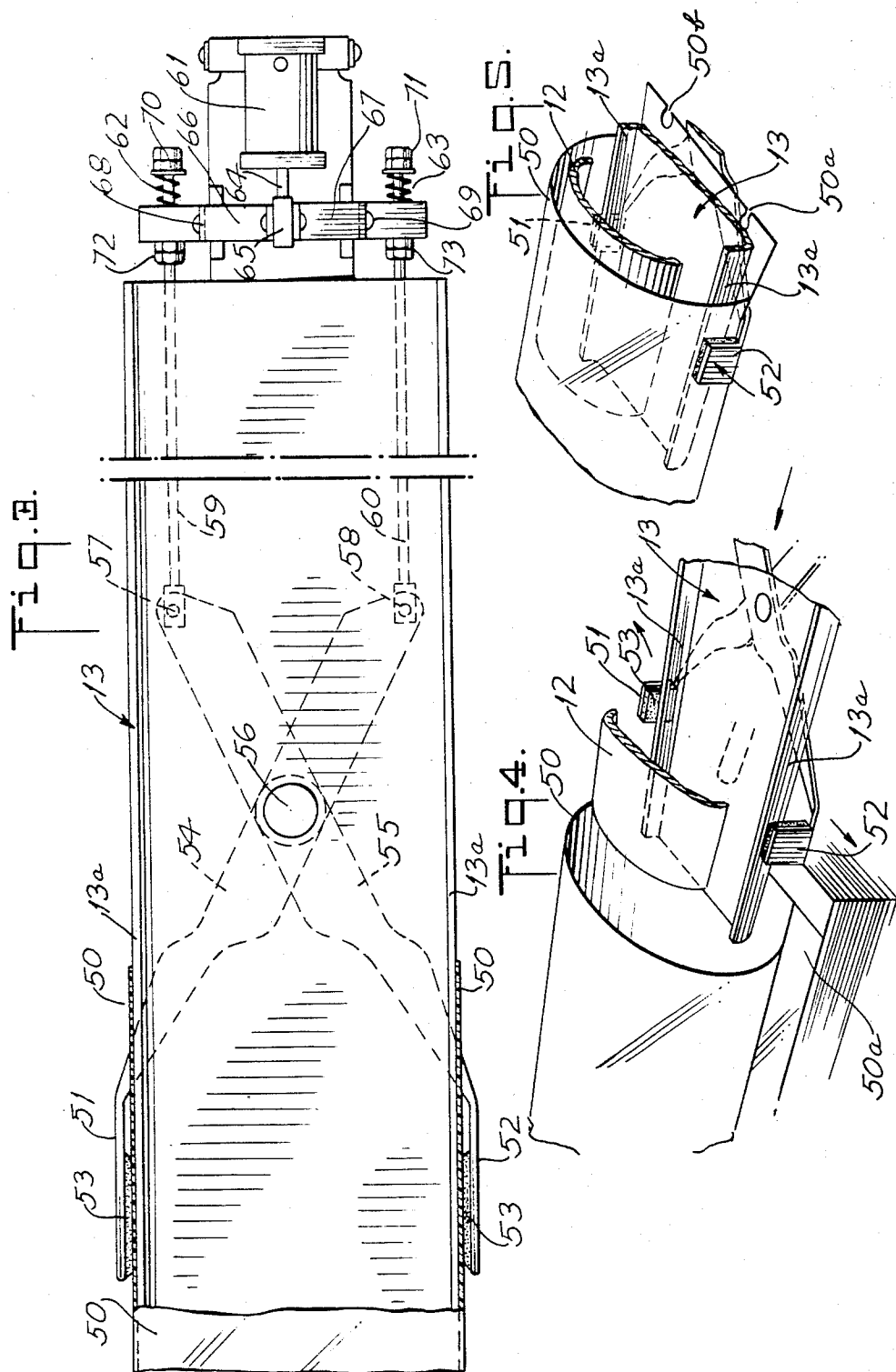
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AUTOMATIC BAGGING MACHINES

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U.S. Cl. 53—190

Int. Cl. B65b 5/00; B65b 9/00

5 Claims

ABSTRACT OF THE DISCLOSURE

This invention relates to automatic bagging machines which include clamping apparatus for clamping portions of the bag wall adjacent its mouth, and means for operating the clamping apparatus in timed relation to the other components of the machine.

This invention relates to automatic bagging machines and more particularly to machines of that class adapted for applying bags such as polyethylene or other plastic film material to loaves of bread, other comestibles or objects.

By way of example, the invention will be herein described and illustrated as applied to a so-called Mark "50" machine, now well known on the market and as described and illustrated in the drawings of a manual published in March 1965 for that machine by Commodity Packaging Co., Inc. of Yakima, Wash. (now Bakery Machinery Division, American Machine & Foundry Company, 2115 W. Laburnum Avenue, Richmond, Va. 23277). Features of the invention may be applied to other automatic bread packaging machines of that class adapted for like or similar purposes.

In machines of that type, opposed spaced-apart scoop elements are reciprocatably mounted to travel endwise past an object such as a loaf of bread and enter into the open mouth of a plastic film bag and become spread apart to somewhat frictionally grip the bag internally, the scoop elements being then retracted for drawing the bag into the desired position surrounding the loaf. In order that the scoop element will thus adequately grip frictionally the interior of the bag mouth, it is necessary in the existing machines of this class, that the scoop elements when spreading apart subject the film material of the bag to considerable tension. Also, if such frictional gripping is relied on, problems sometimes arise because of the varying slip characteristics of the film material which sometimes may become somewhat sticky or bear dust-like material. Also the coefficient of friction of the film against the scoop elements which may be of highly polished aluminum or stainless steel, will be such that the film is not properly frictionally engaged or released. The same difficulty may arise when any foreign material becomes lodged on the scoop elements.

The present invention provides for certain improvements in the form of releasable clamping means mounted on at least one of the scoop elements for clamping the film material of the bag mouth securely in place on the scoop element at the proper times, thus providing positive means for holding the bag in place on the scoops and avoiding the problems of the above-noted variables. Also the present improvements make it possible to ease the tension heretofore required on the film of the bag mouth. Either one, or preferably a pair of such clamping means may be provided on opposite sides of one of the scoop elements, for example the lower scoop as herein-after disclosed, and if desired, the other or upper scoop may also be similarly equipped with such clamping means.

It may be mentioned that such plastic film bags, although intended to be manufactured to predetermined

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sizes, nevertheless are necessarily produced very rapidly and inexpensively with the film being heat-sealed with a so-called weld along one, or usually two longitudinal lines. In some cases such welds may be insecure and under these circumstances the circumference of the bag, although intended to be of a certain predetermined size, may vary somewhat from bag to bag due to variations in the character and position of the lines of heat-sealing or due to variations in the stretchability of the film material under varying conditions. As a result the scoop elements which enter the bag mouth and shape same to receive the load, may from bag to bag tend to exert different amounts of pressure against the interior surfaces of the bag walls. Thus even though the operating supports for the two scoop elements may be carefully adjusted so that they will expand in the bag to accurately predetermined spaced-apart positions for accommodating a predetermined size of bag, yet, because of the variations in the successive bags, the scoop elements may in some cases overstretch the mouths of the bags or disrupt the welds, or in other cases fit in place too loosely, and cause disruption of the film of the bag or allow it to slip out of proper control. Even if this occurs only infrequently or if the bags slip out of place only infrequently, it will be necessary to stop the machine for a considerable period to clean away disrupted bags and possibly mangled bread loaves or other commodities, and also this will interrupt the regular normal automatic flow through the plant of the commodity being made and bagged.

In accordance with the present invention, the clamping means grips the film at the bag mouth and clamps same against one of the scoop elements, such as the bottom scoop on its forward stroke after it has entered the bag sufficiently to hold the bag mouth open. Usually with the above-mentioned class of machines, the plastic film bags are positioned as a stack of same in flattened condition and held on suitable wicket means. Air pressure is used to blow open the mouth of the top bag of the stack to enable the scoops to enter. The clamping means provided by the present invention in effect supplements the frictional engagement of the scoops within the bag mouth, to the extent required more easily to strip the bag off the wicket means. As the scoops separate to maximum spacing therebetween inside the bag mouth, preferably the clamping means is arranged to release the film momentarily to permit any slack film which may be trapped under the bottom scoop between the clamping means to be straightened out, whereupon the scoops as they separate are permitted to open the bag mouth to the maximum desired extent for a given size of bag. Then the clamping means is arranged again to become closed to clamp the film against the scoop means, this occurring just as or shortly after the scoop means has begun to travel on its working stroke to retract the bag and draw it over the object being packaged.

The clamping means further in accordance with the invention, serves to clamp each bag in position on the scoops until they have been retracted to a predetermined position so that the bag may be released by the clamps at an adjustable predetermined time after the object being bagged has been fully enclosed by the bag.

In such machines a blockade device is provided against which the object, such as a bread loaf, is adapted to come into engagement to prevent its longitudinal movement as the bag surrounding same is drawn firmly into place thereon. Since the clamping means of the present invention can be adjusted to become released at an accurately predetermined time, the pressure between the loaf or other object and the blockade will be reduced when the clamping means releases and so that the frictional resistance of the scoops upon finally sliding out of the bag

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mouth, does not have to be great enough to draw the object or loaf with any undue pressure against the blockade, or to cause any troublesome impact thereon, or between the end of the object or loaf and the gusset formation usually provided at the bottom end of such plastic film bags. Thus in short the clamping means provides a positive expedient for holding the bag on the scoop elements without relying on frictional resistance or any excessive tensioning of the film by the scoops.

In a co-pending U.S. patent application of Edward J. Chambless, Jr., Ser. No. 570,584, filed Aug. 5, 1966, another expedient is disclosed and claimed for minimizing certain of the problems occurring with the class of machine here involved. That is, as disclosed in said application, one of said scoop elements, for example the upper one, is associated through suitable linkage with means in the form of an air operated cylinder and piston device for so applying pressure to the linkage as to urge such upper scoop element with a uniform pressure against the upper inner wall of the mouth of the bag. The pressure which the scoop element is thus caused to exert will be uniform, even though the upward movement of the scoop element in coming into engagement within the inner wall of the mouth of the bag, will be stopped at varying levels depending on inaccuracies in the dimensions or character of successive bags. For best results the expedient disclosed in said Chambless application may conveniently be used in combination with the present invention, although the present invention, has been found to give strikingly successful results without such expedient, and particularly in the case of film bags which may have weak side seams so that it is difficult to pull such bags from the retaining wicket without undue strain on the side seams.

Various further and more specific objects, features and advantages of the invention will appear from the description given below, taken in connection with the accompanying drawings, illustrating by way of example a preferred form of the invention.

In the drawings:

FIG. 1 is a side elevational view of the machine of the particular type above referred to and embodying the improvements of the present invention;

FIG. 2 is an enlarged elevational view of the parts of such a machine;

FIG. 3 is a plan view of the arrangement of certain of the parts more particularly concerned with the improvement of the present invention; and

FIGS. 4 and 5 are perspective views showing the operation of the scoop elements and clamping means in accordance with the invention respectively just as same are about to enter the open mouth of a bag and just as same are about to retract to draw the bag onto the object being packed.

The essential parts of the above-mentioned type of machine will first be referred to and including also the improvement of said Chambless application, although the latter forms no part of the present invention except to the extent that same may optionally be used in cooperative combination with the present invention to achieve best results. Suitable conveyor means, although not shown in FIG. 1, may extend generally horizontally from the position of the viewer transversely across the top of the machine as shown in FIG. 1, to convey loaves of bread or other objects to a packaging station at the position indicated at 10. Equipment indicated generally at 11, of any suitable known type, may be provided for holding a stack of the initially flat plastic film bags which are brought into a position so that as by the use of air jets, the mouth portion of each successive bag is blown to an open condition ready to receive spaced-apart upper and lower scoop elements as at 12, 13 which are reciprocated endwise past the loaf of bread, for example, located at 10, to enter into the open mouth of a plastic bag which has been made ready to receive same by the

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equipment at 11. Meanwhile a so-called blockade arrangement indicated generally at 14 is operated to thrust a blocking element 15 into contact with the end of the loaf to retain same again endwise movement at the packaging station 10 while the scoop elements 12 and 13 have entered into and engaged within the mouth of the plastic bag. Then the scoop elements are retracted to pull the bag over the loaf at station 10, while the loaf is prevented from moving by the blockade device until the plastic bag is drawn into position fully to contain the loaf, and the scoop elements are retracted to the position shown in FIG. 1.

The scoop elements are carried by a shuttle element indicated at 16 which reciprocates along a shaft 16a to move the scoop elements to and fro in the process of their reaching for a plastic film bag and drawing same over the loaf. The shuttle element 16, as better shown in FIG. 2, may be operated by a link 17 pivotally connected at its upper end about an axis 18. The other end of this link is pivotally connected about an axis 19 to a lever 20, which in turn is pivotally mounted about an axis as at 21 at the base of the machine. The lever 20 is swung back and forth as by link means 22 which is of adjustable length, this link being pivotally connected at 23 to the lever 20 and at its other end at 24 to a member 25 which may incidentally be a cam member rotated about an axis 26 for operating the above-mentioned blockade arrangement.

During the reciprocating movement of the scoop elements 12 and 13, the vertical spacing therebetween is alternately increased and decreased by linkage means so that the scoop elements enter the bag mouth while they are closer together, and will then expand apart or become more separated to engage the interior surfaces within the mouth of the bag and continue such engagement until the bag is pulled over the loaf of bread, whereupon their vertical spacing may be reduced again. With machines of the type above referred to, this is accomplished by a cam 27 rotatable on axis 26 and engaging a cam follower 28 mounted on an upstanding lever 29 which is pivotally mounted at 29a.

Lever 29 is pivotally connected at 30 to a link member generally indicated at 31, the other end of which is pivotally connected at 32 to a bell crank 33 having its central pivot at 21 and having an arm 33a pivotally connected at 34 to a link 35. A spring 32a normally pulls against link means 31 and thereby acts to maintain cam follower 28 in contact with cam 27. Link 35 is pivotally connected at 35a to a bell crank 36 pivotally mounted on an axis at 19. Another arm 36a of this bell crank is pivotally connected at 37 to a link 38, the latter in turn being pivotally connected at 39 to another bell crank 40 having its central pivot at 18 and having another arm 40a which is slotted to provide an adjustable pivotal connection 41 to a further link 42, the latter in turn being pivotally connected at 43 to a rocker arm 44. The rocker arm 44 is pivotally mounted at 45 and carries at its left-hand end 44a the upper scoop element 12.

It will be apparent that the linkage by which the upper scoop element is tilted by rotation of cam 27, is such that the tilting movement can be imparted during reciprocation of the shuttle member 16 without interfering with the reciprocating movements of the scoop elements.

The parts of the machine as thus far described, with the exception of the construction of the link means 31 as hereinafter explained, may all be constructed and operated in accordance with the known machines of the above-mentioned type. Of course, the various parts are power driven by suitable mechanical connections as from a motor 46 (FIG. 1) so that each portion of the machine will operate in proper synchronous relation to the other portions and the accompanying conveying means.

Referring further to the link 31, in former examples of this machine, this link was simply adjustable in length by reason of its threaded ends, and upon such adjustment

and possible adjustment of various others of the links, the scoop element 12 would be tilted up and down as required during each stroke and as above explained. Once the linkages were thus adjusted, although the scoop 12 and its rocker arm support 44a might have some resiliency, yet the limits of the up and down movements thereof would be substantially fixed and not variable without stopping the machine and readjusting the linkage or other parts. However, as explained in said Chambless application, the desirable upward swinging movement of this scoop element may vary from bag to bag, so that it should stop at the level of one or another of the dotted lines, as indicated at 48 (see upper left corner of FIG. 2), and in doing so, apply substantially a predetermined upward pressure against the inner surface of the mouths of bags even if of inaccurately-formed dimensions. To make this possible in accordance with the present invention, the link 31 has interposed therein a suitable cylinder and piston means, indicated at 49 with the piston operated by air pressure in a direction tending to pull against the bell crank arm 33. By following through the linkage shown in FIG. 2, it will be apparent that this pulling effect acts to apply an upward tilting pressure to the scoop rocker arm 44a, but at no time a greater pressure than that corresponding to the air pressure in the device 49, as more fully explained in said Chambless application.

Referring now more particularly to FIG. 3, the upper surface of the lower scoop element is here shown just after it has entered the mouth portions 50 of a bag. A pair of clamping members 51 and 52 are here shown as clamping such mouth portions of the bag against the side portions 13a of the scoop element. The clamping members 51 and 52 respectively are carried on lever members 54 and 55 which cross each other and are pivotally mounted at 56 on the underside of the scoop element 13. Extended portions of these levers are pivotally attached as at 57 and 58 to push-pull rods 59 and 60 which are arranged to be pulled to bring the clamps into clamping position by a suitable pressure fluid containing cylinder and piston device 61 suitably connected to act against springs as at 62, 63, which springs normally tend to push the rods 59 and 60 in a direction to open the clamps. The connections between the device 61 and the rods 59 and 60 may for example comprise a piston rod 64 pivotally connected as at 65 to suitable bracket members 66 and 67. These in turn have downwardly extending portions pivotally mounted about horizontal axes at 68 and 69. The lower end portions of the bracket members 66, 67 are apertured to receive the rods 59 and 60 respectively and said springs act between such bracket members and nuts as at 70, 71. Stop nuts as at 72, 73 may be mounted on the rods respectively to limit the movement of the bracket means toward the left as tends to be caused by the springs. Thus when fluid under pressure such as air or other fluid is admitted to the device 61 to force a plunger therein toward the left, the pivotal connection at 65 will be pushed to the left thus pushing the lower end portions of the brackets 66, 67 against the springs thereby pulling the clamps to their closed positions, as shown in FIG. 3. When the pressure in the device 61 is released, it will be apparent that the springs will tend to push the lower end portions of the brackets 66, 67 to the left, thus pushing the clamps to open position where they will be spaced somewhat from the sides 13a of the scoop element 13. Various other suitable connections may, of course, be devised to permit the clamps to be actuated by the pressure device or even by any other suitable types of devices arranged and connected to operate in synchronism with the other parts of the machine.

In the example shown, as shown more particularly in FIG. 2, the device 61 is connected by an air supply line 75 running to a suitable air valve means at 76 which controls the admission and release of air pressure to such line from a supply conduit 77. The air valve 76 may be

controlled by a suitable cam follower 78 positioned to engage a cam 79. This cam preferably has two formations for operating the valve 76, viz. one relatively short elevated portion 80 and a considerably longer elevated portion 81 the length of which may be adjusted by moving a swingable cam portion 82 about the axis 26, the portion 82 being held at the desired position of adjustment as by screw and slot means shown at 83.

The clamps 51, 52 may preferably be faced by layers of rubber, rubber-like material or possibly foam plastic material, as indicated at 53, to facilitate gripping the film of the bag without danger of rupturing same.

As shown in FIG. 4, the ends of the scoops 12 and 13 are about to enter the mouth of a bag 50 which has been opened up as by known air jet means, this bag coming from the top of a stack thereof indicated at 50a. At this point, as shown in FIG. 4, the clamps 51, 52 are shown in their open or retracted positions. Also the upper scoop 12 has not as yet moved up to engage the upper interior surface of the bag.

As shown in FIG. 5, however, the forward ends of the scoop elements 12 and 13 have entered into the mouth of the bag 50, and the upper scoop element 12 has been raised up into frictional engagement with the upper interior surface of the bag mouth. Here also the clamps 51, 52 have been moved to engage the outer surfaces of the bag mouth and to clamp same against the sides 13a of the scoop 13. This actuation of the clamps is caused by operation of the air valve 76 through the medium of the cam formation 80. The clamps are preferably caused to be closed when the scoops are at positions about one and one-half inches from the end of their forward stroke. This closing of the clamps against the bag causes pulling of the bag off a conventional wicket therefor without any undue strain on the side walls of the bag. In FIG. 5 torn apertures are indicated at 50b where the end portion of the bag has been pulled from the conventional wicket means.

The clamps 51, 52 upon engaging the sides of the bag mouth may, however, do so at a time when there is some slack in the film of the bag mouth at points between the clamps particularly in under the scoop 13. Thus to enable the upper scoop element 51 upon rising into contact with the upper interior surface of the bag mouth to apply tension for straightening out such slack, the cam formation permits the air valve to operate and to release the clamps momentarily. After opportunity has been had for thus removing said slack, the cam formation 81 again operates the air valve to in turn cause reclosing of the clamps. This should occur immediately after the scoops begin their travel on their retracting stroke. The clamps will then remain closed until the scoop elements draw the bag over the object to be packaged and until the object contacts with or is about to come into contact with the blocking element 15, whereupon the clamps release at a predetermined adjustable time depending upon the angular position of adjustment of the cam portion 82 shown in FIG. 2.

The parts are preferably adjusted so that the clamps will open when a bag has been pulled completely over an object such as a loaf of bread to the extent that the heel of the loaf meets the usual bottom gusset portions within the bag. Thus any possibility is eliminated that the bag may slip off from the scoops when the loaf is only partially in the bag, as well as eliminating the possibility of the loaf being collapsed against the blockade due to any excessive drag against the scoops. In this way also the problem is avoided which sometimes has occurred heretofore of rupturing the gusset within the bag where in the usual case there are four thicknesses of the film which come together with the consequence that sometimes the gusset is not of the desired predetermined dimensions.

In view of the operation of the bag clamps, the scoops may be so arranged and operated that the tension which they apply within the bag mouth to the film may be

considerably lessened, yet since the clamps permit the bag to be forcefully drawn onto the loaf or other object accurately to the desired predetermined extent without slippage from the scoops, it becomes possible to use bags which will more tightly fit the object being packed without necessarily subsequently subjecting the package to any process for shrinking the film of the bag more closely about the object.

Although a certain particular embodiment of the invention is herein disclosed for purposes of explanation, further modifications thereof, after study of this specification, will be apparent to those skilled in the art to which the invention pertains. Reference should accordingly be had to the appended claims in determining the scope of the invention.

What is claimed and desired to be secured by Letters Patent is:

In the claims:

1. In a machine for automatically applying bags of sheet material to an object to be bagged therein, the machine having a pair of opposed scoop-like elements, means for reciprocally mounting same to travel past the object to be bagged and to enter into the open mouth of a bag, mechanism being provided to then spread apart said elements and into engagement with the interior surfaces of the mouth of the bag, said reciprocable mounting means then acting to retract said elements with the bag thereon and to pull the bag into surrounding relationship to the object being bagged, the improvement which comprises providing a pair of clamping members on at least one of said scoop-like elements for clamping portions of the bag wall adjacent its mouth against said element, said clamping members crossing each other and being pivotally mounted together in a scissor-like manner to clamp against opposite sides of said one of the scoop-like elements, and mechanism for operating said pair of clamping members in timed relation with the reciprocation of said element to actuate said clamping members to clamping position after the scoop elements have entered the bag mouth and for releasing said clamping members after the scoop elements have been retracted to pull the bag about said object, said mechanism for operating the pair of clamping members being connected to act simultaneously to operate both of said pair in opposite directions with respect to each other but in directions toward and from the scoop element on which same are mounted.

2. A machine in accordance with the foregoing claim 1 and in which the mechanism for operating the clamping means includes pressure-operated cylinder and piston means, cam means driven to operate in synchronism with the operation of the machine, and valve means actuable by said cam means to control said cylinder and piston means.

3. A machine in accordance with the foregoing claim 1 and in which additional mechanism is provided including air pressure operated means for applying a predetermined force acting to cause said scoop elements to exert a predetermined spreading pressure against the interior surfaces of the bag mouths notwithstanding variations of the latter from normal size when spread open.

4. In a machine for automatically applying bags of sheet material to an object to be bagged therein, the machine having a pair of opposed scoop-like elements, means for reciprocally mounting same to travel past the object to be bagged and to enter into the open mouth of a bag, mechanism being provided to then spread apart said elements and into engagement with the interior sur-

faces of the mouth of the bag, said reciprocable mounting means then acting to retract said elements with the bag thereon and to pull the bag into surrounding relationship to the object being bagged, the improvement which comprises providing a pair of clamping means in spaced apart positions on a least one of said scoop-like elements for clamping portions of the bag wall adjacent its mouth against said element, and mechanism for operating said clamping means in timed relation with the reciprocation of said element to actuate said clamping means to clamping position after the scoop elements have entered the bag mouth and for releasing said clamping means after the scoop elements have been retracted to pull the bag about said object, said clamping means includes pressure-operated cylinder and piston means, cam means driven to operate in synchronism with the operation of the machine, valve means actuable by said cam means to control said cylinder and piston means, said cam means being provided with at least two valve-operating formations, one for causing actuation of the cylinder and piston means to close the clamping means momentarily and then open same to allow the scoop elements while being spread apart to tension any slack bag wall portions which are between the clamping means, and the other valve-operating formation then acting to again close the clamping means and retain same closed until the bag is drawn over said object.

5. In a machine for automatically applying bags of sheet material to an object to be bagged therein, the machine having a pair of opposed scoop-like elements, means for reciprocally mounting same to travel past the object to be bagged and to enter into the open mouth of a bag, mechanism being provided to then spread apart said elements and into engagement with the interior surfaces of the mouth of the bag, said reciprocable mounting means then acting to retract said elements with the bag thereon and to pull the bag into surrounding relationship to the object being bagged, the improvement which comprises providing clamping means on at least one of said scoop-like elements for clamping portions of the bag wall adjacent its mouth against said element, and mechanism for operating said clamping means in timed relation with the reciprocation of said element to actuate said clamping means to clamping position after the scoop elements have entered the bag mouth and to close the clamping means while the bag is being pulled from retaining means therefor, then to open said clamping means to permit the scoop elements as they spread apart to straighten out any slack between the clamping means, then to close the clamping means again, and finally to again release the clamping means after the scoop elements have been retracted to pull the bag about said object.

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