

Dec. 5, 1944.

R. T. MOORE

2,364,543

METHOD OF FORMING SIFTPROOF BAG CLOSURES

Filed Oct. 31, 1941

2 Sheets-Sheet 1

Fig. 1.

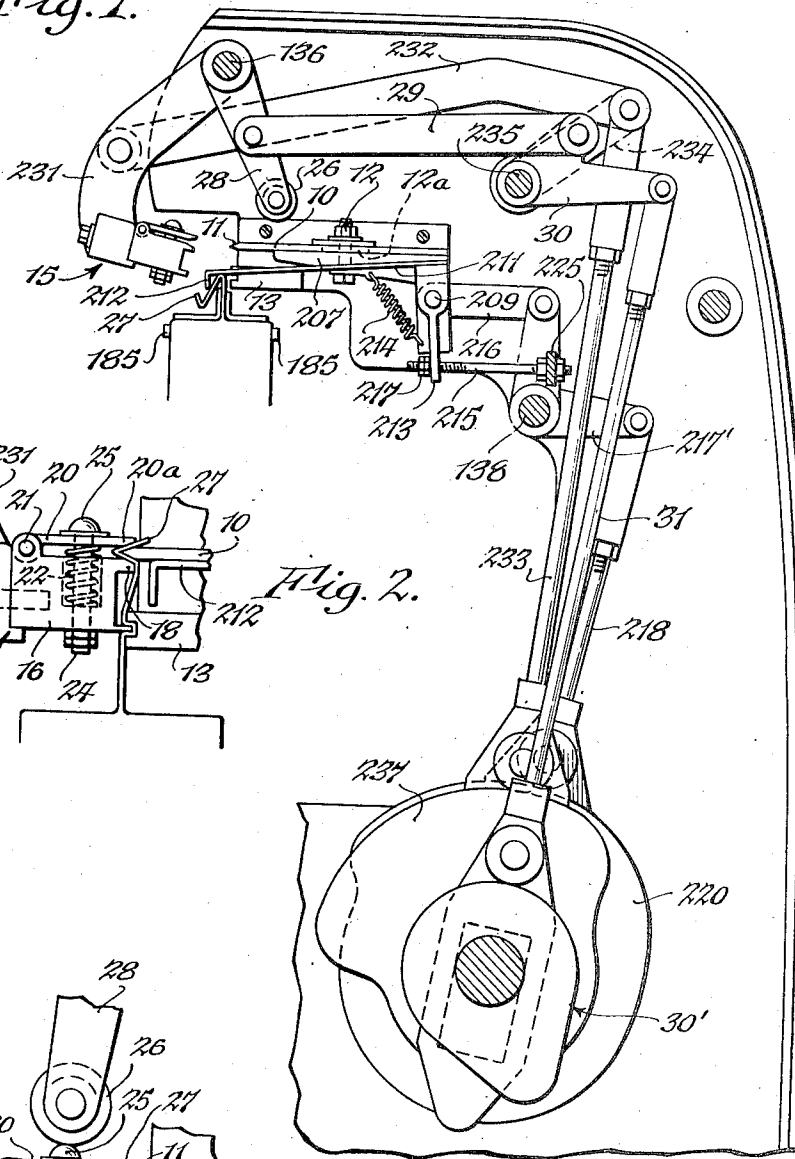


Fig. 2.

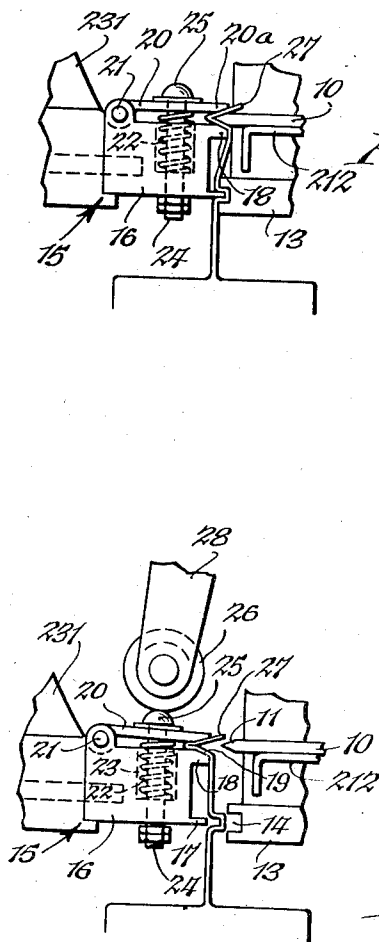


Fig. 3.

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Fig. 4.

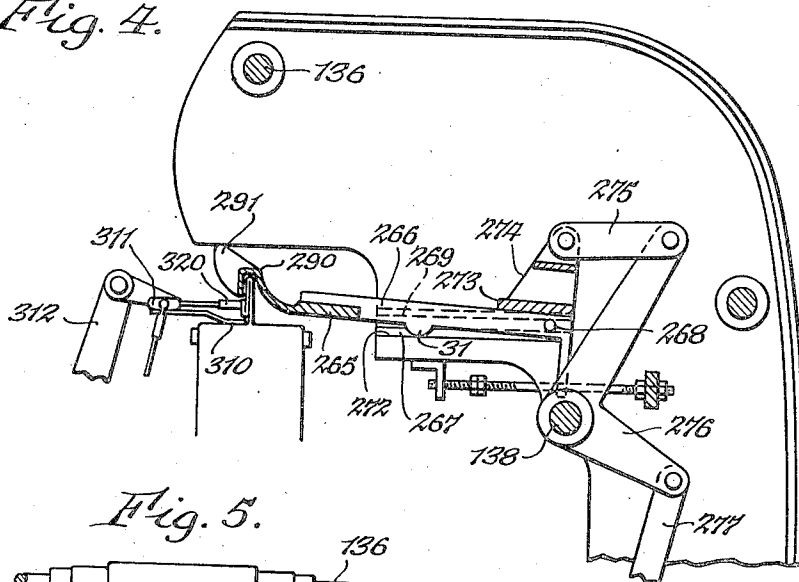


Fig. 5.

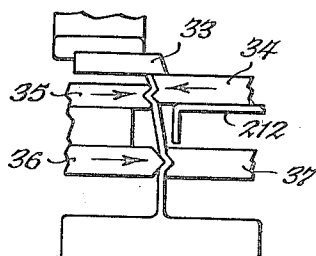
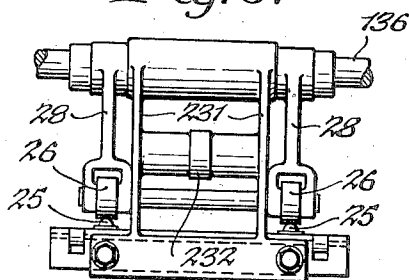


Fig. 9.

Fig. 6.

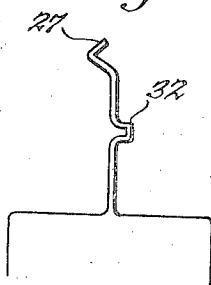


Fig. 7.

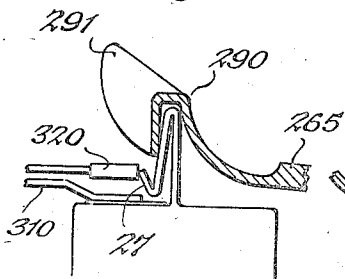
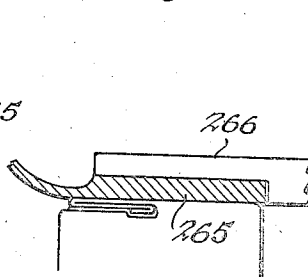


Fig. 8.



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2,364,543

METHOD OF FORMING SIFTPROOF
BAG CLOSURES

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Application October 31, 1941, Serial No. 417,218

4 Claims. (Cl. 93—6)

This invention relates to new and useful improvements in bag closing mechanisms generally, and particularly seeks to provide novel sealing means for forming and sealing bag tops of the single panel fold type.

Paper bags having top closures of the single panel fold type are apt to permit a certain degree of sifting since the line of fold of the top panel may not be closely formed, thereby providing passageway for sifting of material contained within the bags from the mouths thereof.

It has been found that such sifting tendencies can be virtually eliminated by more sharply defining the line of fold of the top panel and by providing a short sharply creased marginal return fold at the bag mouth which is covered by the top flap and sealed by the adhesive.

Therefore it is an object of this invention to provide a bag closing machine with means to form a single panel fold bag closure having a pre-formed sharply creased marginal return fold adjacent the bag mouth and underlying the top panel in the sealed position.

Another object of the invention is to provide a device of the character stated which can be used in conjunction with either trimmed or untrimmed bags.

Another object of the invention is to provide a device of the character stated in which the creasing means includes a pair of opposed relatively moveable elements comprising a creasing blade and a gripper element adapted to receive and pinch the crease formed by the creasing blade to thereby sharply define a marginal return fold.

Another object of the invention is to provide a device of the character stated in which the marginal return fold of the bag closure is first positively formed by the creasing means and then positively tucked into closure-forming position by a tucker blade.

Another object of the invention is to provide a device of the character stated which will form an adhesively sealed single panel fold closure for paper bags.

Another object of the invention is to provide a device of the character stated which is simple in design, rugged in construction, and economical to manufacture.

With these and other objects in view, the nature of which will become more apparent, the invention will be more fully understood by reference to the drawings, the accompanying detailed description, and the appended claims.

In the drawings:

Fig. 1 is a fragmentary vertical transverse section showing the crease forming and initial folding mechanism;

Fig. 2 is an enlarged fragmentary detail view showing the first step of crease forming;

Fig. 3 is a view similar to Fig. 2, but showing the parts in disengaged relation and the gripper firmly holding the marginal return fold;

Fig. 4 is a fragmentary vertical transverse section showing the gluing and shaping mechanism together with the final folding and pressing mechanism;

Fig. 5 is an enlarged detail elevation of a portion of the creasing mechanism shown in Fig. 1;

Figs. 6, 7 and 8 diagrammatically illustrate the formation of a closure by the machine; and

Fig. 9 is an enlarged fragmentary detail view showing the manner in which the crease forming and initial folding mechanism may be combined with end trimming mechanism.

The present invention is directed specifically to improvements in mechanism for creasing, folding and sealing a single panel fold bag closure of the kind formed through the use of a bag closing machine such as is disclosed in the United States Letters Patent No. 2,175,557, issued to R. N. Cundall on October 10, 1939. Since the subject matter of this invention employs driving mechanism similar to those disclosed in the above referred to patent, it is believed unnecessary to herein illustrate the entire machine, and reference may be made to the patent referred to for a clear and complete disclosure of such driving mechanisms.

For convenience in reference, the machine parts of this structure that are identical with the machine parts of the patented structure are given the same reference characters as appear in the patent drawings, and the machine parts included in this invention are designated by reference characters extending from 10 to 37 inclusive.

The creasing and folding means which are constructed in accordance with the present invention are applied to the first operating station as illustrated in Fig. 1 of the drawings. A creasing blade 10 having a V-shaped leading edge 11 is rigidly secured to the machine frame. A plate 207 which is mounted for sliding movement between suitable bearing blocks (not shown) is provided with a depending bearing portion carrying a pivot 209 and is maintained in horizontal position through the medium of bolt fastening means 12 extending through a slot 12a formed in the creasing blade 10. The plate 207 is recessed along its edges to receive the spaced extensions 211 of a folding member 212 normally maintained in contact with the lower surface of the creasing blade 10. The extensions 211 are fixed to the upper ends of a yoke 213 pivotally carried at the ends of the pivot 209.

A spring 214 extends from the yoke to the lower surface of the plate 207 and tends to maintain the yoke at right angles to the plate and thereby holds the folding member 212 against

the lower surface of the creasing blade. A bolt 215, carried by a rigidly mounted bar 225, extends through an opening in the yoke 213 and carries adjustable lock nuts 217 forming an abutment against which the yoke strikes near the end of the forward movement of the plate 207. Continued movement of the plate 207 causes the yoke to rock against the tension of the spring 214 and thereby causes the folding member 212 to drop downward into its position shown in full line in Fig. 1.

The plate 207 is reciprocated through the medium of a link 216, one end of which is pivotally attached to the rod 209 and the other end of which is pivotally attached to one arm of a bell crank 217' journaled on a shaft 138. The other arm of the bell crank is attached to a pitman 218 adapted to be reciprocated in opposite directions by cam and follower connections generally indicated at 220.

A crease anvil 13 having a crease-receiving groove 14 formed across the face thereof is rigidly secured to the machine frame and is located with the groove 14 thereof disposed substantially in the vertical plane of the upper crease-forming blade edge 11.

A creasing assembly 15 which cooperates with the blade 10 and anvil 13 to form spaced parallel oppositely directed creases, is carried by one end of a swinging arm 231, the other end of which is pivotally mounted on a cross rod 136. The arm 231 is oscillated through the medium of link, pitman and toggle connections 232, 233 and 234, respectively, and which are in turn driven by cam and follower connections generally indicated at 237.

The creasing assembly 15 includes a block 16 having a relatively thin rearwardly extending tongue 17 formed integral therewith and adapted to be received by the groove 14 of the anvil in crease-forming relation. A rearwardly projecting and transversely extending bar 18, formed integral with the block 16, is disposed in spaced relation to the tongue 17 and is provided with a beveled upper face 19 substantially parallel to the opposing face of the creasing blade 10. It should be noted that the upper face of the block 16 and the lower face of the crease blade 10 are disposed in substantially coplanar relation in the creasing position.

A plate 20 having a beveled rear edge portion 20a overlies the upper face of the mounting block and is pivotally connected thereto adjacent the arm 231 as indicated at 21. The plate 20 is constantly urged away from the mounting block by a compression spring 22 carried in a well 23 formed in the block, and is limited in its outward movement by a bolt 24 having a rounded head 25 extending through the plate 20, the spring 22, and the block.

After the creasing assembly 15 and the complementary creasing elements 10 and 13 have been brought into the crease forming position (see Fig. 2) by the cam and follower connections 237, and as the respective creasing assemblies are being separated as the result of continued movement of the cam and follower connections (see Fig. 3), the plate 20 is forced downwardly by the action of a pressure roller 26 riding over the rounded head 25 of the bolt 24 to thereby forcibly bend the lip of the bag closure as the flap is folded over and provide the closure with a relatively narrow marginal return fold 27.

The roller 26 is carried by one end of an arm 28 pivotally mounted on the rod 136 and which

is adapted to be oscillated through the medium of a link 29, a bell crank 30, and pitman 31. The pitman is given a movement of reciprocation by cam and follower connections generally indicated at 30'. Continued movement of the cam and follower connections 30', causes the roller 26 to become disengaged from the bolt head 25, and consequently the plate 20 is permitted to rise under the influence of the spring 22 and release the fold.

The bag is then moved by feed means (not shown) to the gluing, final folding, and pressing station as indicated in Fig. 4.

At this station it will be seen that there is a folding and pressing member 265 mounted across the ends of spaced arms 266 movable in guide-ways 267. A rod 268 passing through the arms 266 at the rear thereof, extends into slots 269 (indicated in dotted lines) in the guides. The arms 266 are provided with depending cam portions 31 which are engageable with surfaces 272 of the guides 267 and control the vertical movement of the free end of the member 265. A bar 273, extending across the arms 266, provides support for a ball 274 to which is attached a link 275 extending from a bell crank 276 mounted on the cross rod 138. The other arm of the bell crank is connected to a pitman 277 which partakes of rectilinear motion through the medium of cam and follower connections (not shown). It will be readily apparent that vertical movement of the pitman 277 is translated into horizontal movement of the member 265, the depending cam portions 31 thereof causing the member to fold the bag mouth upon the top of the bag before a rearmost portion of the member comes down to press against the closure.

The member 265 is provided with a channel-shaped upper end 290 corresponding to the hooked fingers of a person's hand and slopes downwardly from the end somewhat after the fashion of the palm of a hand and then horizontally to correspond to the heel of a hand. The channel-shaped portion 290 is preferably provided with a flaring mouth to insure guidance of the previously folded bag mouth into the channel. As the member 265 moves forward its action in folding and pressing the mouth of the bag against the shoulders of the bag is almost exactly the action of a person's hand performing the same function.

A glue blade 310, receiving adhesive through the medium of devices not shown, is mounted on a pivoted bail 311 and carried at the ends of spaced levers 312. The glue blade is resilient and extends angularly forward and downward so as to exert a yielding wiping pressure against the shoulder of the bag as it applies adhesive thereto.

A tucking blade 320 (Fig. 4) carried by resilient fingers mounted on bar 311 extends forward above the glue blade and engages the folded edge of the bag as the glue blade moves inward to insure tucking of the mouth of the bag into the fold. The member 265 is provided with fins 291 which not only depress the tucking blade to insure a tight fold but prevent the blade from snapping upward when released, thereby protecting the resilient fingers. It should be noted that the end of the tucker blade 320 engages the extreme end portion of the prefolded marginal return flap portion 27, and presses it firmly against the top flap portion of the closure so that channel shaped portion 290 of the member 265 and the heel portion thereof may form the flap into a tightly sealed closure as indicated in Fig. 8 of the drawings.

In Figs. 6, 7 and 8 of the drawings there is diagrammatically illustrated the operation of the machine at the gluing, final folding and pressing station. Fig. 6 shows a bag after it has left the creasing station and with the crease 32 and the return marginal fold 27 formed in the closure flap. Fig. 7 shows the bag as it arrives beneath the member 265 with the glue blade 310 applying adhesive to the bag shoulder, and the tucker blade 320 engaging the end portion of the return fold 27. Fig. 8 shows the final position of the member 265 pressing the closure to effect a tight seal. It should be noted that the return fold 27 is tucked tightly into the crease where the closure folds over the bag shoulder and is embedded in adhesive, thereby effecting a well bonded seal.

In Fig. 9 of the drawings there is illustrated a modification of the creasing means which may be employed when the bag ends are to be trimmed. A stationary shear blade 33 is rigidly secured to the machine frame and is disposed in cooperative relation to a movable male creasing member 34, the upper edge of which comprises a movable shear edge. A female creasing member 35 is carried by the movable arm 231 and is adapted to register with the member 34. A male creasing member 36 which is also carried by the arm 231 is disposed below the member 35 and is adapted to register with a stationary female creasing member 37 disposed generally below the movable shear 34. Thus it will be apparent that the elements 33 and 34 function to trim the bag ends, and the element 34 also cooperates with the creasing member 35 to form the sharply defined marginal return fold; and that the members 36 and 37 form the usual intermediate crease.

Thus it will be seen that the herein described invention provides a bag closing machine with means to form a single panel fold bag closure having a sharply creased preformed marginal return fold formed adjacent the bag mouth and underlying the top panel in sealed position, and which is simple in design and rugged in construction.

It is of course to be understood that various details of arrangements and proportions of parts may be modified within the scope of the appended claims.

I claim:

1. In a method of closing a filled bag, the steps of folding and sharply creasing a marginal portion of the collapsed upwardly extending mouth portion upon itself along a line parallel with and closely adjacent to the upper edges thereof to provide a narrow return fold portion, folding said collapsed upwardly extending mouth portion upon itself along a line parallel to the plane of the top of the contents and in a direction opposite to the direction of fold of said return fold portion to thereby bring the line of fold of said return fold portion adjacent the plane of the top of the contents, then applying pressure to said bag along a line defined by the intersection of the upstanding portion of said mouth and the top plane of the contents to define a fold line, restraining that end of said folded portion containing said return fold portion against unfolding, folding the entire upstanding portion of said mouth along said defined fold line and pressing the mouth against the top of the bag while releasing the end containing the return fold from restraint.

2. In a method of closing a filled bag, the steps of folding and sharply creasing a marginal portion of the collapsed upwardly extending mouth

portion upon itself along a line parallel with and closely adjacent to the upper edges thereof to provide a narrow return fold portion, folding said collapsed upwardly extending mouth portion upon itself along a line parallel to the plane of the top of the contents and in a direction opposite to the direction of fold of said return fold portion to thereby bring the line of fold of said return fold portion adjacent the intersection between a shoulder of the bag and said upwardly extending mouth portion applying adhesive to said shoulder of the bag, then applying pressure to said bag along a line defined by the intersection of the upstanding portion of said mouth and the top plane of the contents to define a fold line, restraining that end of said folded portion containing said return fold portion against unfolding, folding the entire upstanding portion of said mouth along said defined fold line, and applying pressure to press the mouth, the adhesive, and said shoulder of the bag together while releasing the end containing the return fold from restraint.

3. In a method of closing a filled bag, the steps of trimming the end of the collapsed mouth portion, folding and sharply creasing a marginal portion of the collapsed upwardly extending mouth portion upon itself along a line parallel with and closely adjacent to the upper edges thereof to provide a narrow return fold portion, folding said collapsed upwardly extending mouth portion upon itself along a line parallel to the plane of the top of the contents and in a direction opposite to the direction of fold of said return fold portion to thereby bring the line of fold of said return fold portion adjacent the plane of the top of the contents, then applying pressure to said bag along a line defined by the intersection of the upstanding portion of said mouth and the top plane of the contents to define a fold line, restraining that end of said folded portion containing said return fold portion against unfolding, folding the entire upstanding portion of said mouth along said defined fold line and pressing the mouth against the top of the bag while releasing the end containing the return fold from restraint.

4. In a method of closing a filled bag, the steps of trimming the end of the collapsed mouth portion, folding and sharply creasing a marginal portion of the collapsed upwardly extending mouth portion upon itself along a line parallel with and closely adjacent to the upper edges thereof to provide a narrow return fold portion, folding said collapsed upwardly extending mouth portion upon itself along a line parallel to the plane of the top of the contents and in a direction opposite to the direction of fold of said return fold portion to thereby bring the line of fold of said return fold portion adjacent the intersection between a shoulder of the bag and said upwardly extending mouth portion, applying adhesive to said shoulder of the bag, then applying pressure to said bag along a line defined by the intersection of the upstanding portion of said mouth and the top plane of the contents to define a fold line, restraining that end of said folded portion containing said return fold portion against unfolding, folding the entire upstanding portion of said mouth along said defined fold line, and applying pressure to press the mouth, the adhesive, and said shoulder of the bag together while releasing the end containing the return fold from restraint.