Feb. 16, 1937. W. W. ROWE 2,070,685

BAG AND PROCESS AND DEVICE FOR EFFECTING CLOSURES THEREIN

Filed Jan. 13, 1933 2 Sheets-Sheet 1

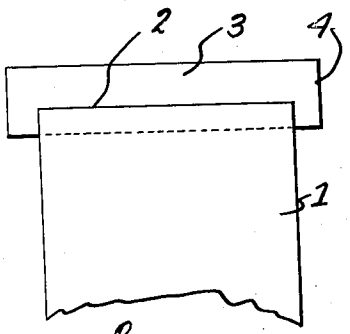


Fig. 1.

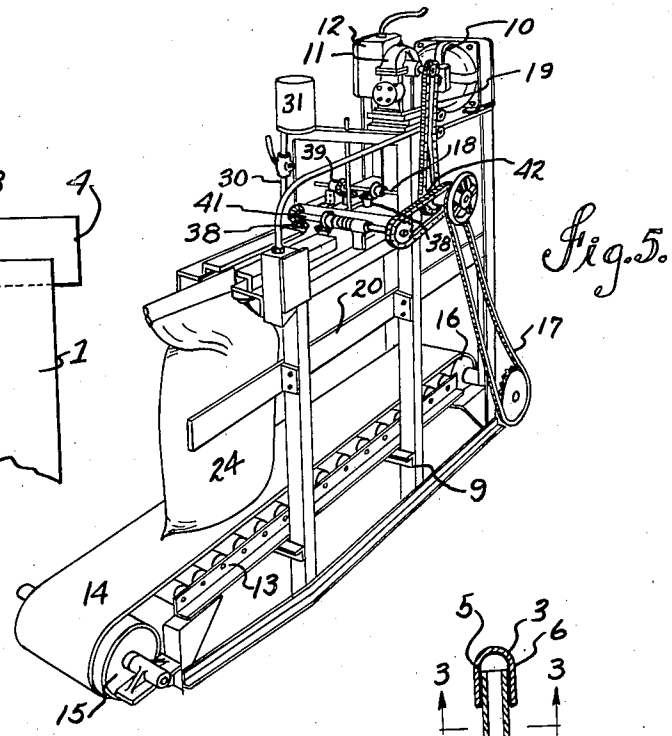


Fig. 5.

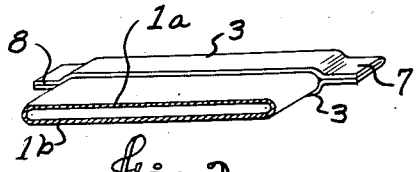


Fig. 3.

Fig. 2.

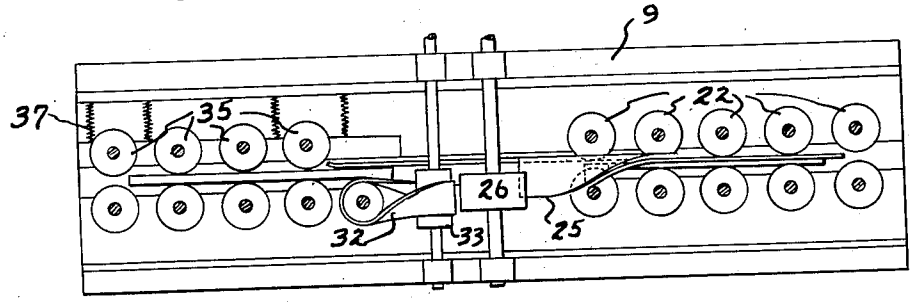


Fig. 7.

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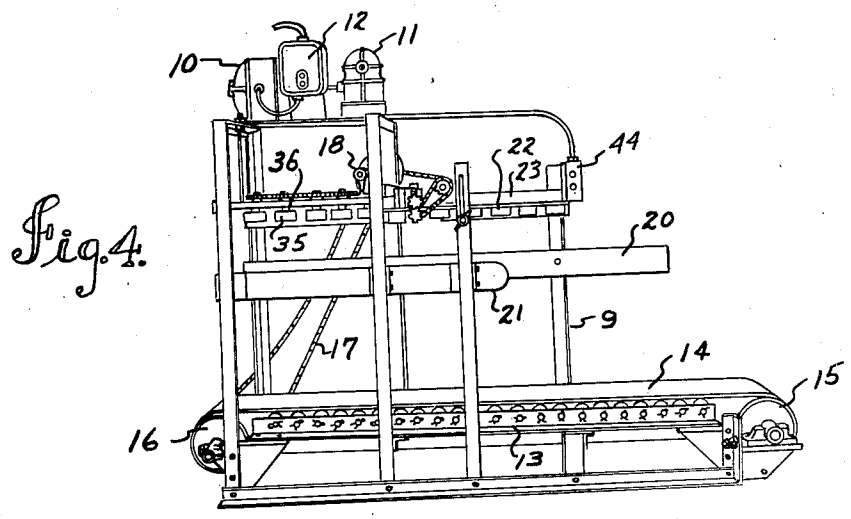


Fig. 4.

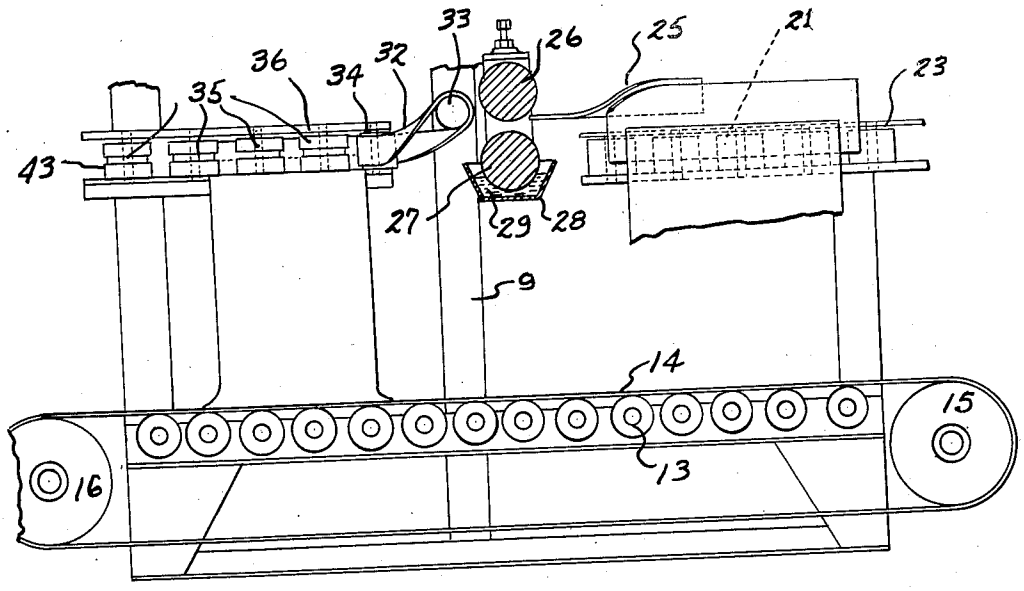


Fig. 6.

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UNITED STATES PATENT OFFICE

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BAG AND PROCESS AND DEVICE FOR EFFECTING CLOSURES THEREIN

William Wallace Rowe, Cincinnati, Ohio, assignor, by mesne assignments, to Bemis Bro. Bag Co., St. Louis, Mo., a corporation of Missouri

Application January 13, 1933, Serial No. 651,577

1 Claim. (Cl. 150—7)

My invention relates primarily to the forming of top closures in bags, preferably after the contents have been placed therein, and more particularly it relates to the formation of top closures of the cemented type, although sewing may additionally be practiced if desired. While my invention is applicable to flexible walled bags of any type, it is of special importance in the making of closures in bags of the cemented seam type. Developments have been made in cemented seam bags, particularly of the class made from composite fabrics in which a textile material is cemented to a paper material, e. g. combinations of burlap and creped paper, giving a bag having certain advantages because the seams therein may be made quite impervious in the cementing operation. Ordinarily such bags have a seam construction such that textile material may be cemented directly to textile material, and the cementing agent used is preferably a rubber latex, or other rubbery substance. Bags of this character have been successfully manufactured with side or center body seams and with adequately cemented body closures; but substantial problems have arisen in the effecting of top closures in such bags after the filling thereof, because the same conditions which surround the manufacture of the bag do not obtain. The closing of the bag is primarily effected by the user after filling. Speed is necessary and it is inconvenient to provide for long and tedious closing operations. The supply of filled bags is usually more or less irregular, and it is highly advantageous to provide means whereby the bags may be closed by machinery rather than by hand. Moreover, the closure of such bags calls for an accurate positioning of the parts, which is complicated by the material with which the bags are filled; and haphazard closing methods do not give adequate results.

The primary objects of my invention are directed to the solution of problems of this character. More particularly my invention has for its object the provision of a bag prepared for closing, such that a closure may readily be effected with an accurate positioning of the parts, and such that separate closing members and the like need not be employed. It is also an object of my invention to provide means and a method for closing bags of the character referred to.

These and other objects of my invention which will be pointed out hereinafter or will be apparent to one skilled in the art upon reading these specifications, I accomplish by that certain construction and arrangement of parts in the bag and in the apparatus for closing the same, and by that certain method of which I shall now describe an exemplary embodiment. With the understanding that my invention is not limited thereto, I shall describe it in connection with the closing of filled cemented seam bags.

Reference is now made to the drawings, wherein

Figure 1 is a partial elevational view of a bag formed in accordance with my invention.

Fig. 2 is a longitudinal sectional view on a somewhat exaggerated scale of a closed bag embodying my invention.

Fig. 3 is a trimetric view showing the top closure of my invention.

Fig. 4 is an elevation of an exemplary closing machine embodying my invention.

Fig. 5 is a perspective view of my machine with a bag entering it.

Fig. 6 is a sectional view of the adhesive applying flap positioning and pressing means of my invention.

Fig. 7 is a plan view of the same mechanism.

Throughout the several figures I have shown the fabric of which the bag is made as unitary in order to simplify the showing. In bags of a composite fabric of textile and paper material it is the usual practice to form the bag body with a textile material outwardly disposed and the paper material inwardly disposed; and in cemented seams in structures of this character a seam construction is preferably chosen such that textile material is cemented directly to textile material. I shall not in this application describe particular types of side or end body form seams, or of bottom forming seams, it being understood that such seams are not a limitation upon my present invention. It has been suggested to form a top closure in bags of this character by applying over the edges of the mouth of a bag a separate strip of material lapped thereabout. Preferably this strip of material will be of the composite fabric heretofore described, and will be applied to the bag with the textile side inwardly disposed so that it lies against the textile side of the bag body, and the two textile surfaces are cemented together with some such substance as rubber latex. In the closing strip the paper layer will be outwardly disposed, thereby preserving the adhesive from atmospheric influences and actinic light. Also it has been suggested to make top or other seam closures in bags or other articles, which comprises coating the portions of adjacent plies intended to be adhesively secured together,

each with a thin coating of an adhesive substance which remains tacky at least to similar bodies of adhesive substance, and then protecting these surfaces with a protective covering strip. When seam formation is desired, this protective covering strip may be removed and the two previously treated surfaces brought together whereby they instantly adhere. The bag and the closure method and device herein described are applicable to all of these types of closures, as well as to others, and in the description which follows it will be understood that these teachings and others may be employed in the resultant bag structure.

With reference to the formation of top closures in bags, it is difficult to employ strips separate from the bag body which are to be folded and led onto the juxtaposed edges of the bag mouth after the filling operation. Such a procedure calls for a careful positioning of the component parts, which is difficult to secure when one of the parts is completely disconnected from the bag body. Secondly since it is inconvenient to handle individual separate strips and to feed them onto the bag by machinery, it would appear that the use of the closure members in the form of a continuous rolled band or strip would be advisable. However, such use involves special problems, since it is necessary to cut the strips apart between the bags. When the supply of filled bags is irregular, problems arise in connection with the use of the adhesive and the application thereof, or "doping" of portions of the strip which are not to be used for the last filled bag, together with problems connected with loss of material between bags when the bags are widely interspaced, and the drying of adhesives before bags have been brought into position to receive the strip. Consequently one aspect of my invention is directed to the provision of a bag with a partially attached closure member. The bags are made in this form by the manufacturer, so that the adhesion of one side of the strip to a bag body wall may be made under optimum conditions, and so that the positioning of the strip with respect to both body walls is predetermined by the attachment thereof to one of the body walls, and so that it is merely necessary to fold the projecting portion of the strip over the other body wall with or without the application of adhesive, as determined by the particular closure method chosen.

In Fig. 1 I have shown a bag having a body **1**, the mouth of the bag being indicated at **2**. Adjacent the mouth I position a strip **3**, adhesively securing it to one of the body walls in the position shown, so that the upper portion of the strip projects beyond the mouth of the bag. Also I prefer to have the strip project as shown at **4** beyond the side edges of the bag, for a purpose which will hereinafter be described.

After such a bag has been filled it is necessary merely to apply adhesive to the projecting portion of the strip **3** and/or to the corresponding portion of the body wall of the bag over which said strip is to be folded, afterward folding the strip over into position and pressing it against the body wall, and holding it in such position long enough to allow the adhesive to set sufficiently to hold it in position. All of these operations may be done by machine. Since in the filling of bags with powdery materials, some of these materials may collect on the surfaces which are to be adhesively secured, such collection will not inhibit the adhesive union when the adhesive is applied after the filling of the bag. It will be clear also that by first securing the strip **3** to one of the body walls of the bag, its position with respect to the finished bag is thereby determined, and there arises no problem similar to that which arises in the attempt to fold and position and adhesively secure a separate strip about the mouth of a bag.

If adhesive has previously been applied to the projecting portion of the strip **3** and the adjacent portion of the body wall, the surfaces will necessarily be protected by a cover strip which will be removed preferably after the filling of the bag, so that the dusting of its contents will not inhibit the adhesive character of the treated surfaces.

Within Fig. 2 I have shown adjacent body walls at *1a* and *1b*. Cover strip **3** is shown as folded over the top of the bag and secured thereto by layers of adhesive **5** and **6**.

In Fig. 3 the body walls of the bag are again indicated at *1a* and *1b*, and the strip portions at **3**. It will be clear that the strip portions extending beyond the side edges of the bag are cemented directly to each other at the points **7** and **8**, whereby siftage at the corners of the bag is prevented, and whereby an impervious seam construction is attained. My general process therefore is one of manufacturing, filling and sealing bags which comprises forming a bag, positioning adjacent the mouth thereof a sealing flap, securing said flap to one of the bag walls adjacent the mouth, filling the bag, and afterward turning over and adhesively securing the remaining portion of said flap to the other wall of said bag. Due to the construction which I have hereinabove described the operation of sealing the bag is one which can be performed by machinery such as I shall now describe.

Turning to Figs. 4 to 7, inclusive, I have shown a machine having a framework indicated generally at **9**. Mounted on or adjacent the framework I provide a source of motive power such as the electric motor **10**, which in this instance drives a gear box **11** from the driven shaft of which power is taken off for the remainder of my device. A starting box for the motor may be provided as at **12**. The framework supports means for carrying bags through the machine, and while other arrangements are possible, I have shown a roller conveyor frame **13** over which a belt **14** passes, said belt also passing over sheaves **15** and **16** at the ends of the conveyor. The sheave **16** may be driven by a chain **17** from a main shaft **18**, which in turn is driven by a chain **19** from the speed reduction gearing **11**. Side guides **20** and **21** may be provided adjacent the main conveyor to engage the sides of the bags and to keep the bags in upright position. Instead of solid side guides I may, of course, employ belts or other conveyor mechanisms which will not inhibit and may be arranged to assist the movement of the bags. Located above the main conveyor I provide a forming and closing mechanism comprising essentially a series of initial pressure rolls, and means for turning over the attached flap into a horizontal position, and a means for applying adhesive to the turned over flap portion, and a means for bringing the flap down against the opposite body wall of the bag, together with means for pressing the adhesively secured parts together. Accordingly I have shown a first series of pressure rolls **22** mounted on a framework **23** above the main conveyor. Reference to Figs. 6 and 7 will show the bag **24** entering the machine and being engaged by this first series of rollers with the attached flap extending upwardly. I next provide a means to turn the flap down into

horizontal position, which in this instance is a form comprising a bent metal plate indicated at 25. This plate bends down the extending portion of the sealing flap to a horizontal position so that it may pass between a pair of rolls indicated at 26 and 27. These rolls constitute an adhesive applying mechanism, the lower of these rolls turning in a pan 28, which contains rubber latex, or the like, 29. A supply of this or other suitable adhesive will be maintained in the pan by means of a supply pipe 30, as shown in Fig. 5 leading from a reservoir 31.

When the now horizontally disposed flap has been treated on its undersurface with adhesive by the mechanism described it is next automatically bent over against the body wall of the bag. To this end it is engaged by a moving belt 32 passing over a roller 33, which is horizontally disposed, but extending therefrom to the first roll 34 of a series of pressure rolls, indicated generally at 35. The belt in its passage turns through an angle of 90 degrees, and in this way bends down the adhesively treated attachment flap against the body of the bag.

While it is adequate to employ a plate former for the first bending operation, I very much prefer to use a belt as shown for the second, not only because the belt does not interpose any frictional resistance to the movement of the bag, but also because the belt may be driven even faster than the bag is moving, whereby to smooth out any wrinkles in the attachment flap and to cause the entering corner of the attachment flap to assume its correct position with respect to the body walls of the bag. It will be obvious that should any resistance be interposed to the movement of the flap with the bag, the entering corner of the flap will tend to trail, whereby the flap becomes unevenly bent over and is adhesively secured in a rumpled or pleated condition. As to the adhesive applying rolls hereinabove described, the upper one is preferably mounted in a movable journal, so that it may be caused to exert pressure against the material fed therethrough, but the movements of the journal are so controlled that the upper roll will be held away from the lower roll when no material is being fed therethrough, so that the upper roll will not become coated with the latex or other adhesive.

When the flap has been bent over and secured to the body wall, as hereinabove described, the bag top is engaged by the second series of pressure rolls 35. These rolls are vertically disposed like the first set, and both sets are preferably driven at a speed somewhat higher than the speed of the conveyor belt 14. Above the sets of pressure rolls I have indicated a plate 36. The mechanism just described coacts to keep the top edge of the bag riding fully within the pressure area of the pressure rolls. Since the lower end of the bag tends to trail somewhat, the rear end of the upper edge will tend to rise. The plate 36 prevents too great an upward movement of the rear end of the upper back portions, and the turned over sealing flap is therefore kept riding well up into the pressure rolls whereby the pressure is evenly and continuously applied.

It will be understood that instead of the pressure rolls which I have illustrated, I may use other pressing means, conveyor belts, or the like, or even under some circumstances nonmoving pressure means; although I prefer to have my pressure means moving with the bag for reasons which will be clear. The pressure rolls may be mounted in opposed plates, and one set of these plates, as shown in Fig. 7, is movable toward and away from the other set, and is controlled by pressure springs 37, whereby the pressure on the bag tops may be controlled. The several rollers may, however, have individual mountings, and this is preferable under some conditions. Where rolls are employed they preferably terminate in sprockets 38, connected by chains so that the several sets of rolls will be simultaneously driven. One of the sets of rolls may be fitted with bevel gears 39, driven from co-operating bevel gears 40 on the main shaft 18. The other set of rolls may be correspondingly driven from a jack shaft 41, connected to the main shaft by a chain 42. In Fig. 6 I have shown grooves 43 in the rolls 35. The purpose of these grooves is to alleviate the pressure along a certain line at which the latex or other adhesive may accumulate to form a relatively thick film or bead. This prevents the extrusion of the adhesive from between the lapped layers, and also prevents the formation of so thin a film at all points over the surface as would fail to give good adhesion.

Since the right hand end of the device as shown in Fig. 4 is the entering end, and since the operator will normally be stationed here, I prefer to mount starting and stopping buttons indicated generally at 44 in a position of convenient access to the operator.

It will be clear that modifications may be made in my invention without departing from the spirit thereof.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

A composite bag of outer textile and inner paper materials prepared for filling and closing, comprising a composite sealing flap of inner textile and outer paper materials attached to one of the bag walls adjacent to and at least the full width of the mouth thereof and projecting thereby beyond in such a position as to permit its being folded over and attached to the other of said bag walls, the inner textile of the flap being attached to the outer textile of the bag.

WILLIAM WALLACE ROWE.