June 15, 1926. 1,588,647

A. M. BATES

METHOD OF AND APPARATUS FOR PACKAGING MATERIAL

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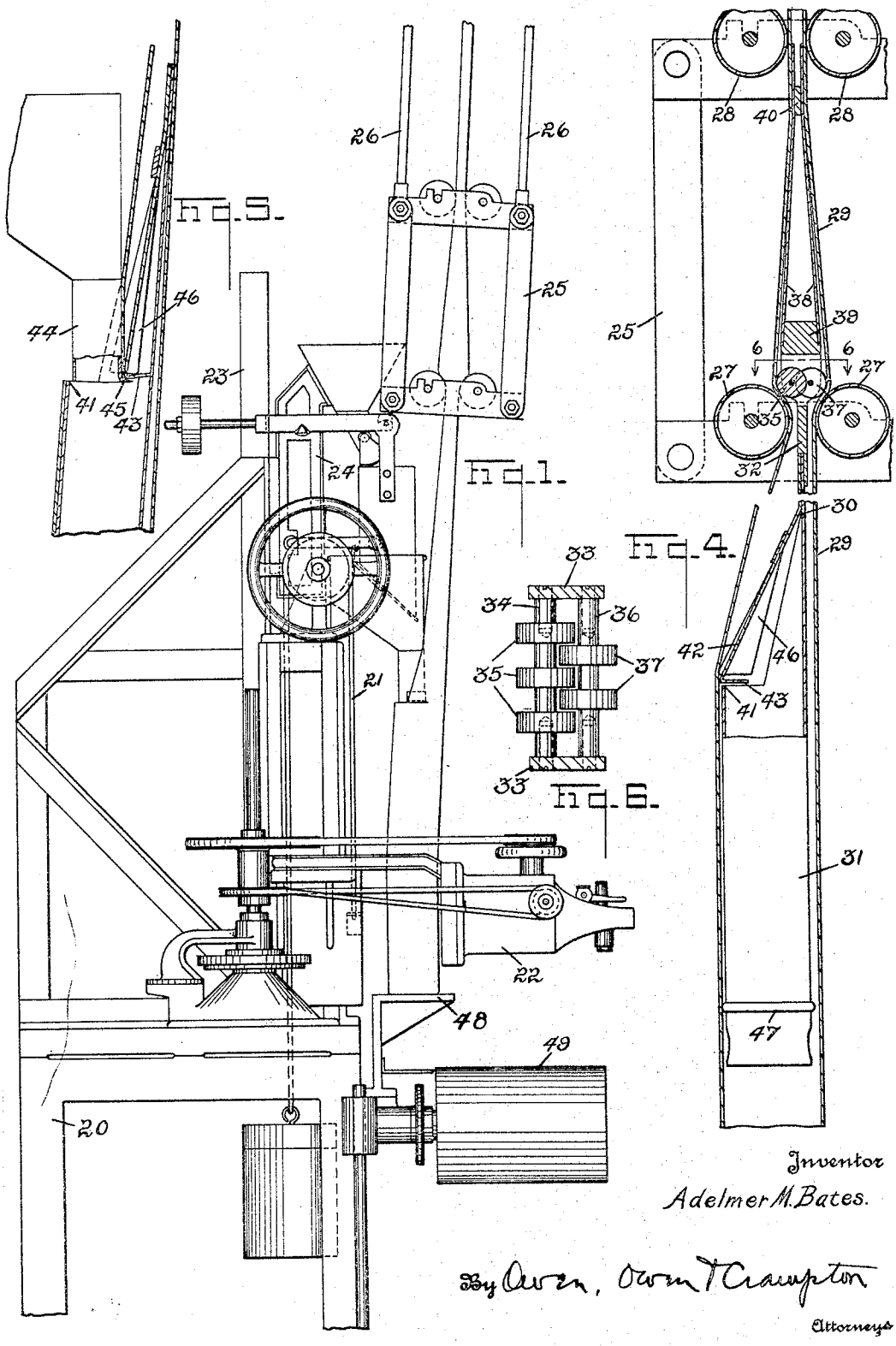


FIG. 5.

FIG. 1.

FIG. 4.

FIG. 6.

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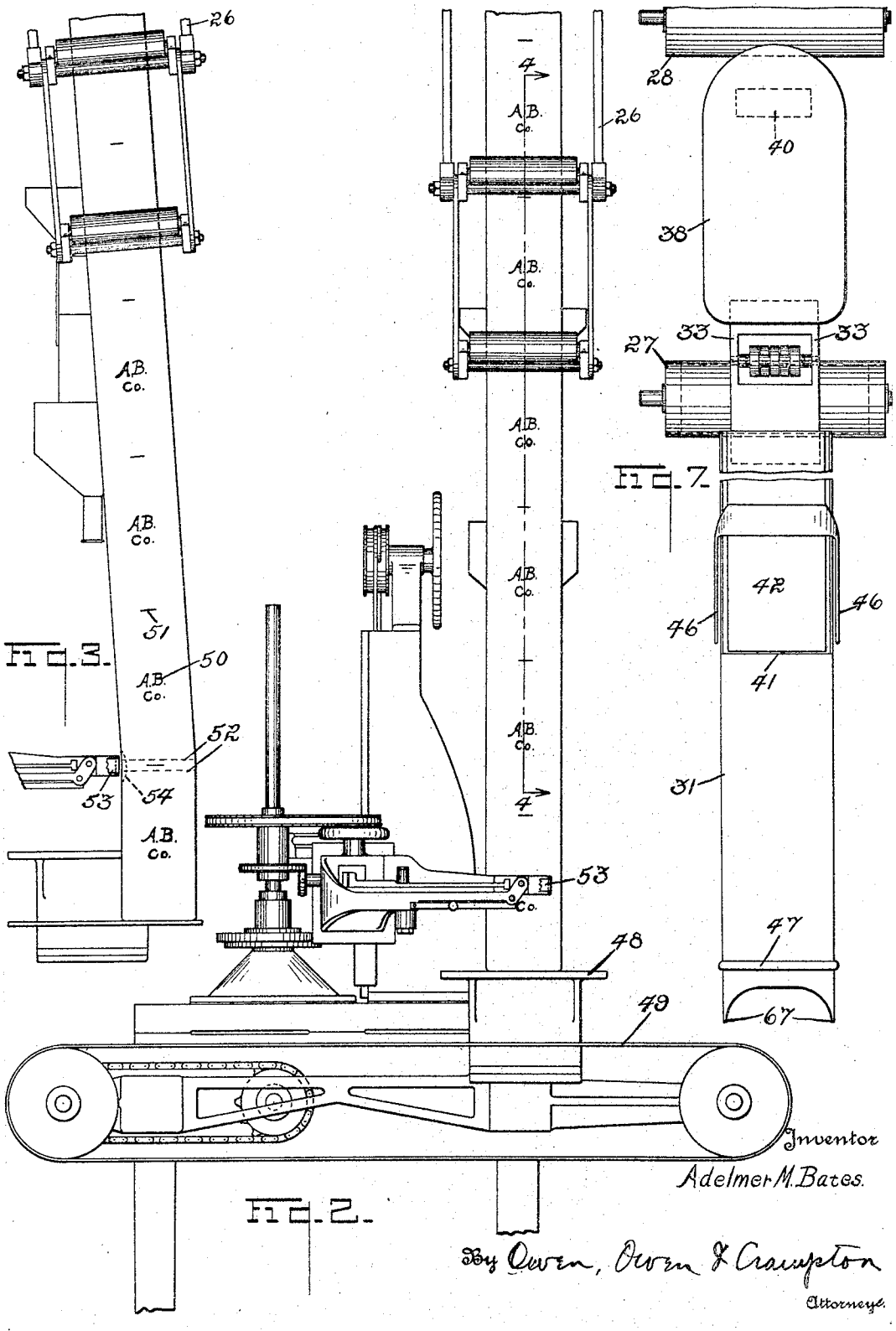
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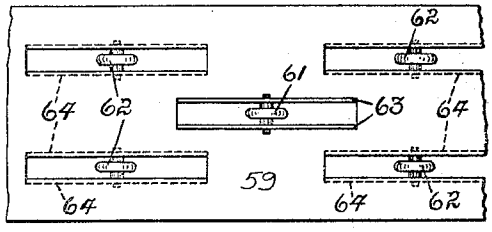


FIG. 10.

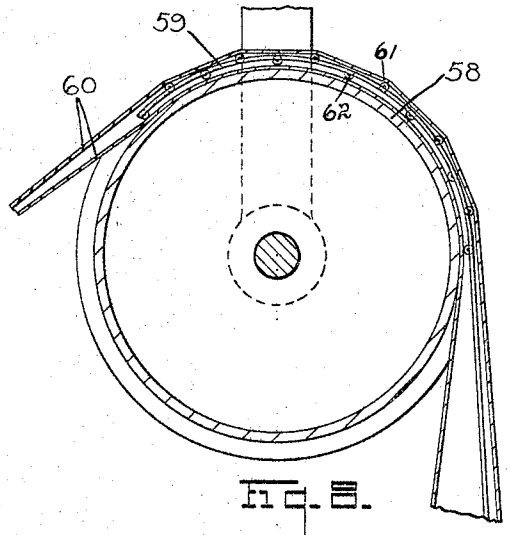


FIG. 8.

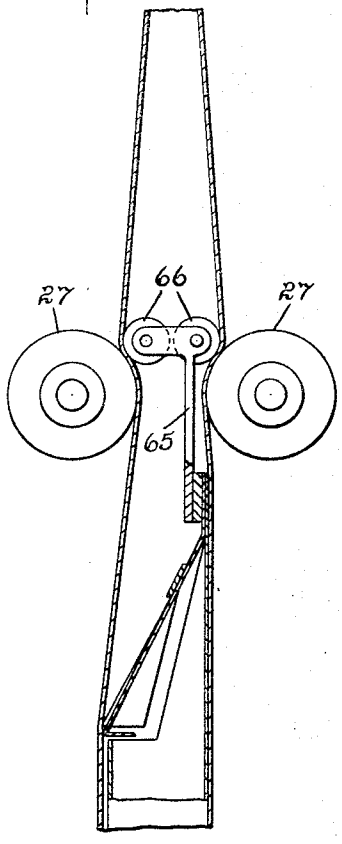


FIG. 11.

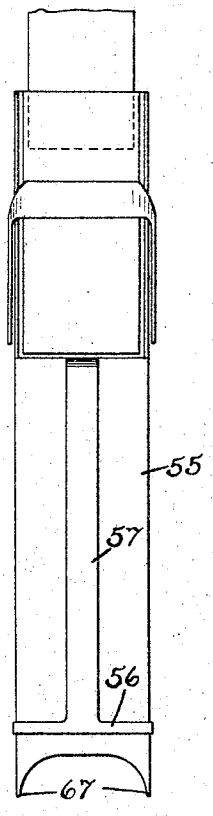
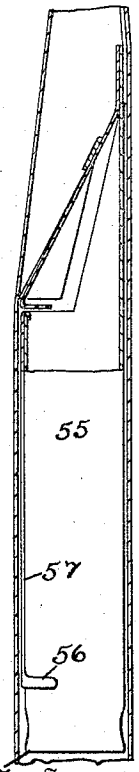


FIG. 9.



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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR PACKAGING MATERIAL.

Application filed May 6, 1925. Serial No. 28,321.

This invention relates to a method of and apparatus for packaging material. The invention has for its object to provide a process and apparatus by which material may be inserted in successive sections of an elongated tube of suitable bag-forming material and the tube closed about the charges to form bags. More specifically, the invention has for its object the provision of a method and apparatus whereby charges may be inserted through openings in the side of a tube of indefinite length. The details and minor objects of the invention will appear as the description proceeds.

In the accompanying drawings forming a part of this specification, Fig. 1 is a side elevation of apparatus appropriate for carrying out my process; Fig. 2 is a front elevation of the apparatus shown in Fig. 1; Fig. 3 is a partial front elevation of parts shown in Fig. 1, showing their positions at a different stage of the process; Fig. 4 is a partial vertical section substantially on the line 4—4, Fig. 2; Fig. 5 is a detail section through the lower end of the feed spout and the cooperating portion of the float; Fig. 6 is a detail section substantially on the line 6—6, Fig. 4; Fig. 7 is a rear elevation of the float; Fig. 8 is a section similar to Fig. 4, showing an alternative form of float and float-anchoring means; Fig. 9 is a rear elevation of the lower portion of the float shown in Fig. 8; Fig. 10 is a plan view of a portion of the float stem shown in Fig. 8; and Fig. 11 is a section detail of another form of float-anchoring arrangement.

The form of apparatus illustrated is mounted upon a framework 20 from which rise guides 21 for a vertically adjustable sewing head 22 and guides 23 for charge forming and discharging apparatus 24.

A roller cage 25 is suspended by rods or cables 26 in operative relation to the charge delivering apparatus. The cage has mounted therein a lower pair of rollers 27 and an upper pair of rollers 28. A tube 29 of suitable bag-forming material is threaded between the pairs of rollers and over a float 30. Tube 29 may be supplied from any suitable source, as from a coil or package of previously formed tubing or from apparatus which forms the tubing progressively as it is used.

The float comprises a tubular body portion 31 and a supporting stem 32. The stem comprises plates 33 between which there is a rod 34 carrying rollers 35 and a rod 36 carrying rollers 37. Preferably the rollers on the two rods are arranged in staggered relation, as shown in Fig. 6, so that fairly large rollers may be used without having their outer sides excessively far apart.

Front and rear plates 38 are attached to a cross-piece 39 above rollers 35 and 37, and at their upper ends are fastened to a block 40. End plates 33 and cross-piece 39 may be integral with the stem below rollers 35 and 37, as indicated on the drawings, or they may be separable, if desired.

The upper end of the rear side of body portion 31 of the float is provided with a shearing edge 41. Above this cutting edge there is a resiliently mounted flapper 42 having a flange or toe 43 at its lower end. The charge-forming apparatus is provided with a downwardly directed discharge spout 44 having a knife 45 on the front side of its lower end.

Rollers 35 and 37 rest upon the walls of bag-tube 29 which in turn rest upon rollers 27, so that the position of the float is determined by the position of the cage-carrying rollers 27. The cage is so adjusted that, when the cage and float are swung to the position in which they are shown in Figs. 1, 2 and 5, knife 45 shears the wall of tube 29 across shearing edge 41 and enters the tube beneath flange or toe 43, which strikes against the front of the float, preventing knife 45 from contacting the wall of the float and determining the distance which the float may be pushed to the rear. When in this position, the bottom of discharge spout 44 registers with the opening formed in the side of tube 29 and with the hollow interior of the float, so that material may be discharged through the spout into the bag-tube.

At the sides of flapper 42 there are ears 46 so mounted that they tend to move to the rear ahead of the flapper. In the construction shown, they are mounted on the upper end of the flapper, and are turned so that they are resilient transversely of the float as viewed in Fig. 2 while being substantially rigid transversely of the float as viewed in Fig. 1. The flapper is resilient transversely of the float as viewed in Fig. 1.

At the distance of a bag-length below shearing edge 41 the float is provided with an irregularity which may be felt through

tube 29. In Figs. 4 and 7 this irregularity is in the form of a bead 47 running around the float.

A bag-length beneath bead 47 there is a platform 48 adapted to support the bottom of the bag while the charge is being deposited. In front of and below platform 48 there is a conveyor 49, and sewing head 22 is so adjusted as to be a bag-length above conveyor 49.

It is generally desirable to have some printed matter, indicated by way of example at 50, on each bag; and in order that this printed matter may be properly positioned on the bags, the bag-ends must come at the proper places along the tube. The tube is shown with indicating marks 51 located thereon so that, if the tube is severed at these marks, the resultant bags will have the printed matter properly positioned thereon.

The sewing machine is provided with two needles, not shown, adapted to sew seams along lines 52; and preferably means is provided for guiding a tape 53 beneath the needles, so that the seams may be reinforced. This is especially desirable where the bag-tube is made of paper. A knife, not shown, is operated in connection with the needles and severs the bag walls and reinforcing tape between the seams.

When the tube is swung to one side, as shown in Fig. 3, there is a tendency for the tube to wrinkle or fold on the side next the sewing machine, as at 54. This may be taken advantage of to assist in making a pleat or bellows fold at the end of the seam, which shortens the seam, strengthens its ends, and aids in making a square-ended bag. As the tube is fed through the machine, it is first straightened, by the filled lower portion coming in line with the upper portion, and then bent in the opposite direction, so that a similar fold may be made easily at the other end of the seam.

A different form of float 55 is shown in Fig. 8. The body of this float is substantially the same as that shown in Figs. 4 and 7 except, that instead of an integral bead 47, there is provided a removable bead member 56 having a suspending shank 57 adapted to hook over the upper edge of the float. As will be seen, this bead member may be easily removed at any time and replaced by another member having a shank of different length.

A float-suspending roller 58 is shown in Fig. 8, and float 55 is provided with a hook-shaped member 59 adapted to fit over roller 58. A bag tube 60 is led from any suitable source and threaded over the hook 59 and float 55. The hook is shown provided with anti-friction rollers 61 and 62, rollers 61 being mounted in flanges 63 on the upper side of the hook and rollers 62 being mounted in flanges 64 on the lower side of the hook. In this way the upper wall of the tube rides over rollers 61 while the float and hook are supported on rollers 62 which ride on the lower wall of the tube. Flanges 63 and 64 may be extended to stiffen the hook longitudinally, and assist in holding it in proper shape.

If desired, the float might be provided with a stem 65 such as shown in Fig. 11, with spaced rollers 66 in place of the nested rollers shown in Figs. 4 and 6; but this requires either a greater spreading of the bag tube or smaller rollers than where they are nested, and therefore the form shown in Figs. 4 and 6 is preferred.

In the form of float shown, the lower corners are flattened and extended outward at 67 so as to form two substantially parallel plates at the opposite sides of the float at its lower end. When desired, these plates may be pressed into the closed end of the tube above the seam to open up squarely the bottom of the tube before the charge is delivered thereto.

The manner of using the invention is fairly apparent from the foregoing description, but may be stated connectedly as follows:

The float is arranged with its stem in the cage, so that rollers 35 and 37 rest upon rollers 27. Then a bag-tube is led from any suitable source and passed between rollers 28, around the float stem, between rollers 27, around the float and downward until its lower end is level with the sewing machine, when its lower end is closed by sewing a seam thereacross.

Then, if desired, the bag-tube is raised until plates 67 press the corners out and open up the end of the bag, whereafter the tube is pulled down until the first mark 51 from the closed end is felt to be in alignment with bead 47. A groove around the float at this point may be felt through the wall of the tube, but it has been discovered that an outwardly projecting bead is felt more readily, and is therefore preferable. Then the float is swung to the rear. As the float is pushed to the rear, knife 45 shears through the tube wall and the discharge spout comes into registry with the slit that is opened in this manner, as seen in Fig. 5. While the parts are in that position, with the closed end of the bag-tube resting on platform 48, a properly weighed or measured charge of material is passed through the discharge spout and float into the bottom end of the tube.

After the lower end of the tube has received its charge in the manner described above, it is swung forward and to one side and dropped onto conveyor 49. A fold is formed in the side of the tube next the sewing machine and the tube is fed through the machine. As it is fed, a fold is formed in

the other side of the tube, a reinforcing tape is applied across the side of the tube, two parallel seams are sewed through the tape and tube-walls, and the tape and tube-walls are severed between the seams.

In this way the filled end of the tube is closed and cut off to form a filled package, and the tube is closed above the line of severance and is ready to have the operation repeated.

It will be readily understood that, when the float and bag-tube are withdrawn from the filling spout, flapper 42 presses the wall of the tube outward beyond the upper edge 41 of the float, and ears 46 spread the sides of the tube at the ends of the slit and press the tube-walls back, so that the tube moves downward without catching and tearing the wall above the slit.

It will be understood that the height of the sewing head above belt 49 is adjusted to equal the length of the desired bag, that the charge-forming apparatus is adjusted so that the end of the discharge spout is two bag-lengths above platform 48, and that cage 25 is adjusted so that edge 41 slips in immediately beneath knife 45 when the float is swung back to filling position. Bead 47 is, of course, one bag-length from edge 41.

Where the length of the bags is to be varied with considerable frequency, it is sometimes desirable to use a removable bead-member, such as shown in Figs. 8 and 9, which may be changed whenever desired, and avoid the necessity of having a float for each different length and also avoid the delay incident to removing and replacing a float.

With some materials and for some purposes it is possible to make the float short, and to have only one bag-length below the filling slit at the time of filling. The objection to this method of procedure as a general practice is that it renders difficult proper filling of the bag, because of the room taken up by the float, and there is danger of the charge not all passing out of the feed pipe before the tube is withdrawn therefrom.

The forms of float-supporting or anchoring devices shown in Figs. 8 and 11 make no material differences in the manner of operating the device.

If desired, filling openings may be formed in the tube when the tube is first formed or at any subsequent time before it reaches the float, but forming the opening at the same time the feed spout is registered therewith prevents any difficulty in obtaining proper registration of the feed spout with the opening.

Different forms of openings and feed spouts may be used, but a straight transverse slit is advantageous as it may be formed at the point where a bag will be divided from the tube, and so require no additional closure. Furthermore, such a slit is best opened by spreading the intermediate portions of the two edges substantially equal distances on the opposite sides of a straight line connecting the two ends of the slit. In this way the maximum opening is formed with a minimum of strain on the walls of the tube at the ends of the slit.

Salt, beans, rice and similar materials require little settling or packing in bags, and fairly satisfactory results are obtained with little more manipulation of the filled tube-end than naturally accompanies its movement from platform 48 to conveyor 49, and the closing of the tube above the charge. Where the nature of the packaged material or other circumstances render more packing or settling desirable, a jigging table may be substituted for platform 48, the feed spout may be so lengthened that the material will drop into the tube with self-packing force, or other settling or packing expedients may be employed without material change in the essential features of the process.

I prefer to make the closures by sewing seams, but other forms of closures could be used while employing some of the elements of this invention. Paper is referred to as a suitable material for the bag-tubes, but other suitable materials may be used. In general, while one form of the method and apparatus has been described in sufficient detail to enable anyone skilled in the art to use the invention, and variations in different elements of the combination have been mentioned and described, no attempt has been made to enumerate all of the possible variations which may be made in the method and apparatus within the scope of the appended claims, which define the invention.

What I claim is:—

1. A process of packaging material, which consists in inserting a charge through an opening in the side of an elongated tube, closing the tube above the charge and severing the tube above the closure.

2. A process of packaging material, which consists in inserting a plurality of charges of material through a plurality of openings in the side of an elongated tube and closing the tube on each side of each of said openings.

3. A process of packaging material, which consists in inserting a charge of material through an opening in the side of an elongated tube having a closed end, positioning the inserted charge against the closed end of the tube, and closing the tube between the charge and the opening.

4. A process of packaging material, which consists in inserting a charge of material through a transverse slit in the side of an elongated tube having a closed end, positioning the charge against the closed end of the tube, closing the tube between the charge

and the slit, and completing the severance of the tube at the slit.

5. A process of packaging material, which consists in inserting a plurality of charges of material through a plurality of transverse slits in the side of an elongated tube, closing the tube on each side of each of said slits and completing the severance of the tube at each slit.

6. A process of packaging material, which consists in simultaneously forming an opening in the side of an elongated tube and placing a feed pipe in position to discharge material into the tube through said opening, inserting a charge of material through said pipe into said tube and closing the tube between the charge and the opening.

7. A process of packaging material, which consists in simultaneously forming a transverse slit in the side of a tube and placing a feed pipe in position to discharge material into the tube through the slit, inserting a charge of material through said pipe into said tube, closing the tube between the charge and slit, and completing the severance of the tube at the slit.

8. The process of inserting material into a tube having an opening in its side, which consists in expanding the tube below the opening, collapsing the tube above the opening, and inserting material through the opening into the expanded portion of the tube.

9. The process of inserting material into a tube having a transverse slit in its side, which consists in separating the edges of the slit by placing the central portions of said edges on opposite sides of a straight line connecting the ends of the slit and inserting a charge of material between the separated edges into the tube.

10. The process of inserting material into a tube having a transverse slit in its side, which consists in separating the edges of the tube material at the slit by holding one edge away from the opposite wall of the tube while pressing the other edge towards said opposite wall, and inserting material between the separated edges and in a direction substantially parallel with the axis of the tube.

11. The process of inserting material into a tube having an opening in its side, which consists in positioning a portion of the tube vertically, maintaining a portion below said opening expanded, collapsing the portion immediately above the opening, and dropping material through the opening into the expanded portion of the tube.

12. The process of inserting material into a tube having a transverse slit in its side, which consists in positioning a portion of the tube vertically, maintaining the tube below the slit in expanded condition, collapsing the tube above the slit and dropping a charge of material through the slit into the expanded portion of the tube.

13. The process of packaging material, which comprises positioning a portion of a tube vertically, simultaneously forming a slit in the side of the tube and separating the edges of the slit to form a downwardly directed opening into the tube, and dropping a charge of material through the opening into the tube.

14. The process of packaging material, which comprises feeding forward a collapsed tube, expanding the end of the tube, feeding successive charges into the expanded end of the tube through longitudinally spaced openings in the side of the tube, and closing the tube on each side of the opening nearest each charge before depositing the next charge.

15. A process in accordance with claim 14, wherein the openings are formed successively as they are needed.

16. A process in accordance with claim 14, in which the closures are formed by sewing.

17. A process in accordance with claim 14, in which the closures are formed by sewing and the tube is severed between the seams as the seams are formed.

18. A process in accordance with claim 14, in which the closures are formed by sewing parallel seams through a reinforcing tape placed across the tube.

19. A process in accordance with claim 14, in which the closures are formed by sewing and the tube is bent before sewing so that it wrinkles on the side where the seam is begun, and a bellows-fold is formed where the tube is thus wrinkled.

20. A process of forming a closure above a charge in an elongated bag-tube, which comprises bending the empty tube above the charge to one side, forming a bellows-fold in the side of the tube towards which it is bent, sewing a seam across the tube, beginning at said bellows-fold, and straightening the tube and forming a bellows-fold in the other side thereof while the sewing is taking place.

21. In apparatus for packaging material, means to support a tube movably, a float adapted to be positioned within the tube, means to maintain the float stationary while the tube is advanced therearound, and means to feed material through an opening in the side of the tube and through the float into the tube beyond the float.

22. In apparatus for packaging material, a float, means to maintain the float stationary while a tube is moved forward therearound, and a feed pipe in position to feed material through an opening in the side of a tube which is positioned around the float and into a portion of the tube held expanded by the float.

23. Apparatus in accordance with claim 22, wherein the float has a tubular portion adapted to register with the feed pipe.

24. Apparatus in accordance with claim 22, wherein the feed pipe has a knife on its lower edge adapted to form a feed opening through the tube.

25. Apparatus in accordance with claim 22, wherein there is a pair of rollers between which the tube passes as it approaches the float, and means anchoring the float to a member inside the tube on the other side of the rollers and too large to pass between the rollers.

26. Apparatus in accordance with claim 22, wherein the float has a tubular portion below the feed pipe and a flapper above the tubular portion normally pressing the walls of the tube outward as far as the tubular portion.

27. In apparatus for packaging material, a float comprising a tubular portion and a flapper, means to maintain the float stationary while a tube is moved forward therearound, and a feed pipe having an end adapted to press back the flapper and register with the tubular portion of the float.

28. Apparatus in accordance with claim 27, in which there is a knife on the feed pipe adapted to form a transverse slit in the tube and to enter between the flapper and the tubular portion of the float.

29. Apparatus in accordance with claim 22, in which the float is longer than the portion of the tube required to enclose one charge of material.

30. Apparatus in accordance with claim 22, in which the tubular portion of the float is longer than one bag length of the tube and has an irregularity thereon one bag length from its upper end easily felt through the wall of the tube.

31. In apparatus for packaging material, means to feed material through an opening in the side of a tube and means to form a closure across the tube on each side of the opening.

32. Apparatus in accordance with claim 31, in which the means to feed material comprises a feed pipe outside of the tube and a float inside of the tube.

33. Apparatus in accordance with claim 31, in which the closure forming means comprises a sewing machine adapted to sew parallel seams.

34. Apparatus in accordance with claim 31 having, associated with the closure forming means, means for completing the severance of the tube walls where the opening occurs.

35. In packaging apparatus, an antifriction device adapted to contact the outside of a bag-tube, and a float adapted to be inserted within a bag-tube and having an anchoring device adapted to cooperate with said anti-friction device to retain the float in place while a bag-tube is moved past said devices and float.

36. In packaging apparatus, means to insert successive charges through a series of longitudinally spaced openings in the side of a tube and a sewing head adapted to sew parallel seams, one on each side of each opening, and having cutting means adapted to complete the severance of the tube walls where the opening occurs.

37. In packaging apparatus, an anti-friction device adapted to contact the outside of a bag-tube, a float adapted to have a bag-tube passed therearound, means to maintain the float a fixed distance from said anti-friction device, a charge-forming and feeding device opposite said float, and closure forming means below said float and feeding means.

38. Apparatus in accordance with claim 37, wherein the anti-friction device is vertically adjustable.

39. Apparatus in accordance with claim 37, wherein the feeding means is vertically adjustable.

40. Apparatus in accordance with claim 37, wherein the closure forming means is vertically adjustable.

41. Apparatus in accordance with claim 37, wherein a knife is attached to the feeding means and is adapted to form a transverse slit in the tube.

42. Apparatus in accordance with claim 35, wherein the anchoring device comprises anti-friction means adapted to contact the interior of the bag-tube wall opposite where the wall is contacted on the exterior by the first said anti-friction device.

43. Apparatus in accordance with claim 35, wherein the anti-friction device comprises a pair of rollers on opposite sides of the tube.

44. Apparatus in accordance with claim 35, wherein the anchoring device comprises two sets of rollers adapted to contact respectively the opposite interior surfaces of a bag-tube.

45. Apparatus in accordance with claim 35, wherein the anchoring device comprises two sets of staggered, overlapping rollers adapted to contact respectively the opposite interior surfaces of a bag-tube.

46. Apparatus in accordance with claim 35, in combination with means outside of said float cooperating with said float to form openings in a bag-tube passed over said float.

47. In apparatus of the character described, a pair of parallel rollers adapted to receive a bag-tube therebetween, a float adapted to be inserted within a bag-tube, and an anchoring device attached to the float and comprising two sets of rollers adapted to contact respectively the opposite interior surfaces of a bag-tube along lines where the exterior of said bag-tube is contacted by the first said rollers.

48. Apparatus in accordance with claim 47, wherein the two sets of rollers of the anchoring device are staggered and overlapping.

49. Apparatus in accordance with claim 22, in which the float has a tubular portion longer than one bag-length of the tube, said portion having an integral bead therearound one bag-length distant from its upper end.

50. Apparatus in accordance with claim 22, in which the float has a tubular portion longer than one bag-length of the tube, said portion having an integral outwardly projecting bead therearound one bag-length from its upper end.

In testimony whereof I hereunto sign my name to this specification.

ADELMER M. BATES.