Feb. 18, 1941. T. E. PIAZZE ET AL 2,232,186

METHOD OF AND APPARATUS FOR PACKAGING MATERIAL

Filed April 24, 1939 4 Sheets-Sheet 1

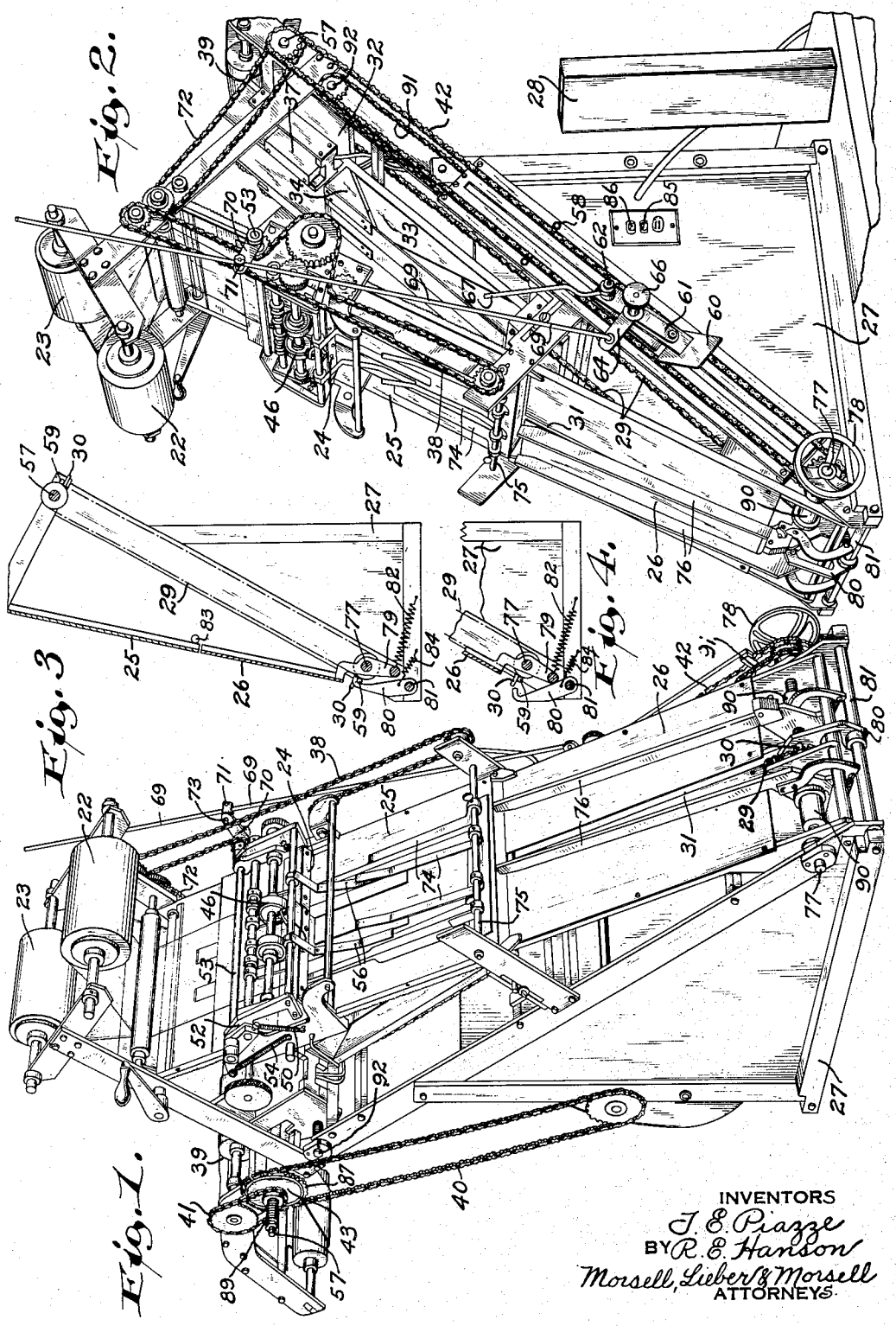


Fig. 2.

Fig. 4.

Fig. 3

Fig. 1.

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METHOD OF AND APPARATUS FOR PACKAGING MATERIAL

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Fig. 5.

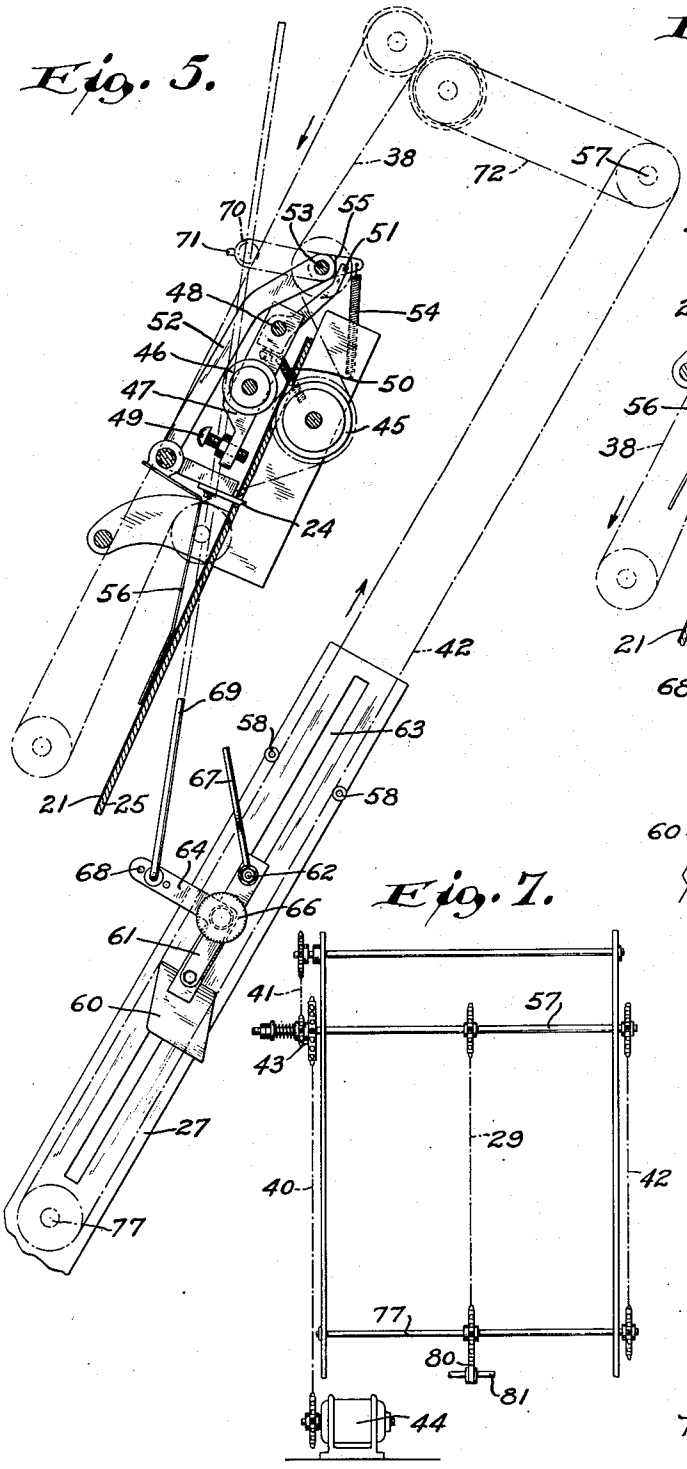


Fig. 6.

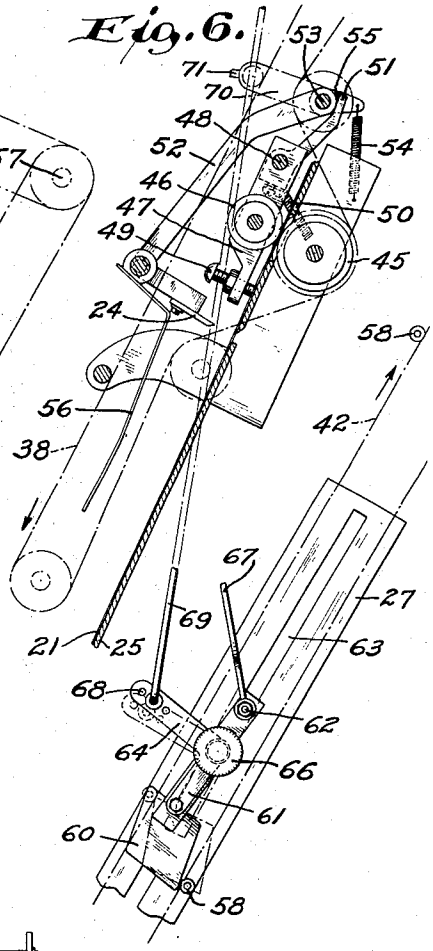


Fig. 7.

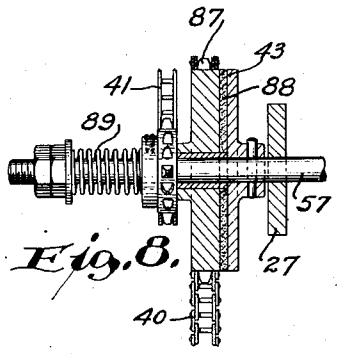


Fig. 8.

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METHOD OF AND APPARATUS FOR PACKAGING MATERIAL

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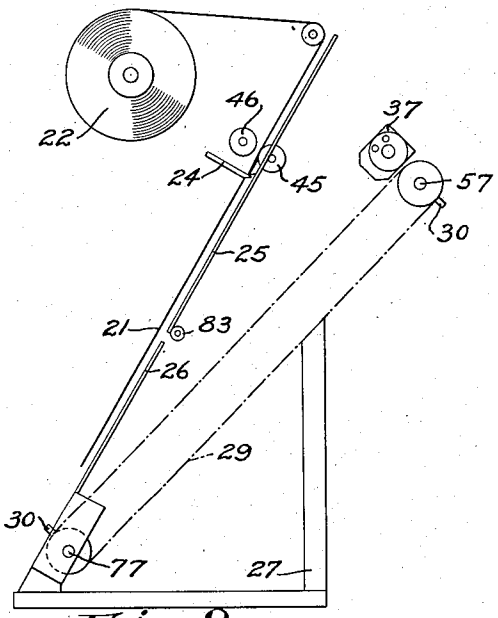


Fig. 9.

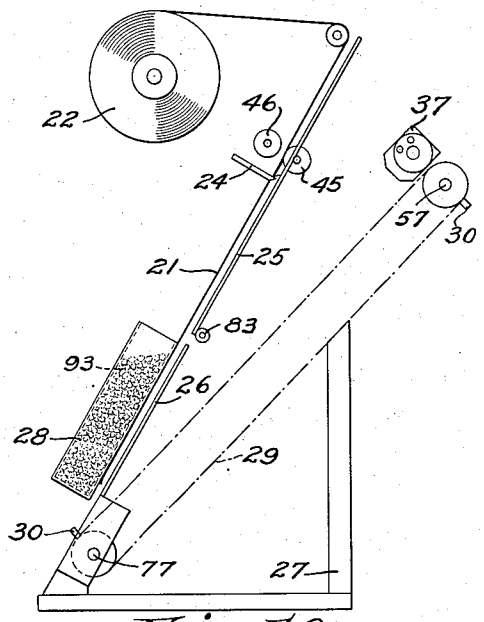


Fig. 10.

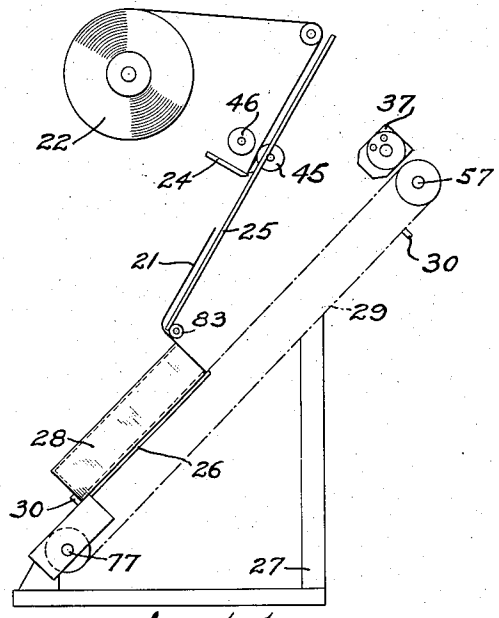


Fig. 11.

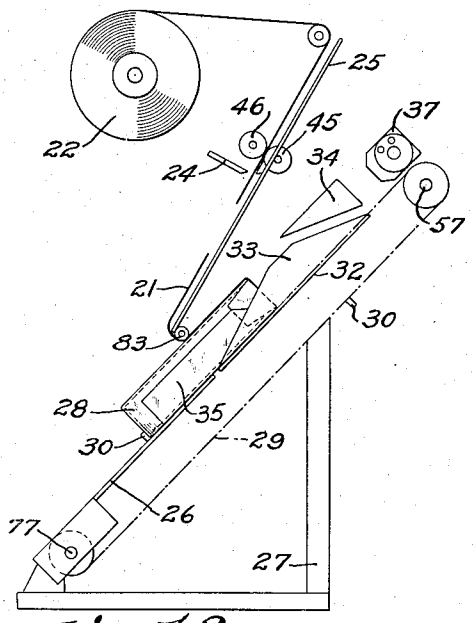


Fig. 12.

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METHOD OF AND APPARATUS FOR PACKAGING MATERIAL

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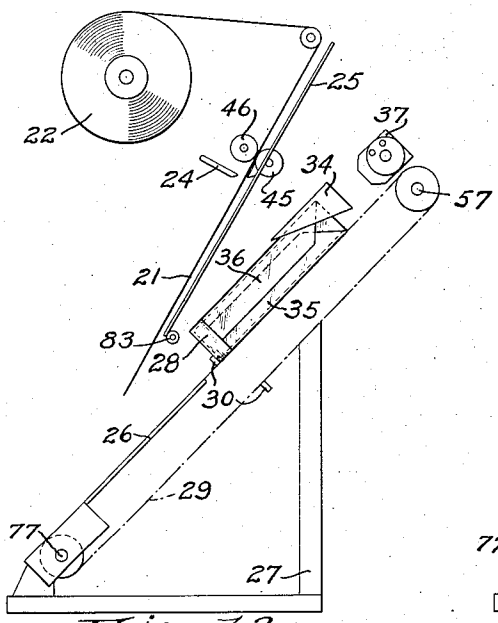


Fig. 13.

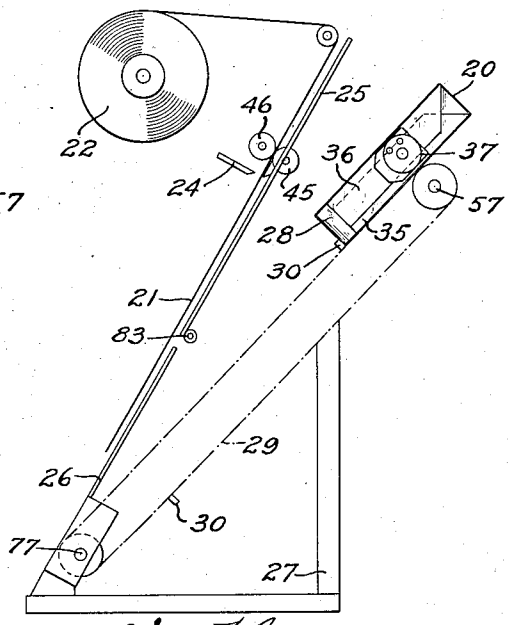


Fig. 14.

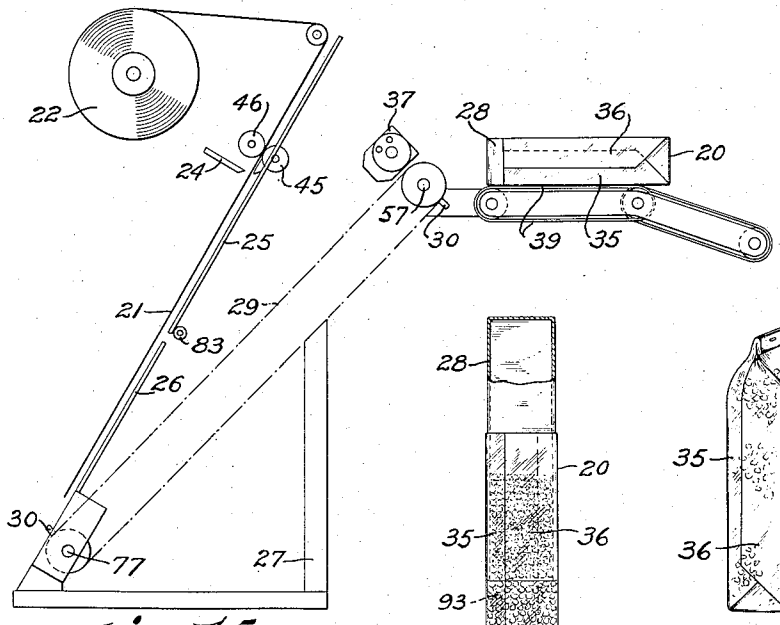


Fig. 15.

Fig. 16.

Fig. 17.

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Patented Feb. 18, 1941 2,232,186

UNITED STATES PATENT OFFICE

2,232,186

METHOD OF AND APPARATUS FOR PACKAGING MATERIAL

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Application April 24, 1939, Serial No. 269,582

19 Claims. (Cl. 93—3)

The present invention relates in general to improvements in the art of packaging sundry materials, and relates more specifically to an improved method of and apparatus for confining batches of bulk material in individual containers.

Generally stated, an object of our present invention is to provide an improved method of and apparatus for packaging material.

It has heretofore been proposed to form bag-like wrappings of definite size and shape about a forming block or mandrel, by utilizing a ribbon of paper stock or the like, which was first folded intermediate its ends about one extreme end of the mandrel and subsequently had its side portions overlapped and united at the opposite sides of the forming block to complete the bag. The mandrel was subsequently removed from the bags to permit the charges to be hereafter inserted within the open ends of these bag-like receptacles; and when such wrappers are formed of thin and highly flexible material such as cellulose film or transparent rubber compound sheets, it is extremely difficult to insert the commodity especially if the containers have been collapsed after formation thereof and must be distended prior to admission of the contents. Because of the delicate nature of some of these wrapper sheets, the bags are frequently torn during the loading operation, thus causing considerable waste and necessarily increasing the packing costs; and because of the fact that the forming mandrel had to be removed before final filling of these prior bags, considerable time was lost.

In accordance with the present invention, we provide a new and useful method of producing such bag-like receptacles and of effecting introduction of the batches of material, without necessitating collapse of the bags after formation thereof and prior to loading; thus not only facilitating filling of the containers but also eliminating waste of material and time.

We also provide simple and highly efficient mechanism for automatically forming and loading these containers, in such manner that waste of bag forming stock is avoided and receptacles of any desired and uniform shape and size may be expeditiously produced.

Another specific object of our invention is to provide an improved mode of quickly forming and of facilitating loading of bags formed of thin and relatively frail transparent sheet material such as cellulose film or rubber composition sheets.

Still another specific object of the invention is to provide relatively simple and highly efficient machinery for facilitating commercial exploitation of our improved method, which may however, be carried on by hand as well as with the aid of said mechanism.

These and other objects and advantages of our invention will be apparent from the following detailed description.

A clear conception of the several steps of our improved packaging method, and of the construction and operation of one type of apparatus for carrying on this method, may be had by referring to the drawings accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a front and side perspective view of the improved packaging machine, looking toward the driving side thereof and operating to form bags with two-ply material;

Fig. 2 is another perspective view of the same machine operating in like manner, but looking toward the opposite side thereof;

Fig. 3 is a rather schematic section through the mechanism, showing the initial sheet feeding and loading mandrel supporting plates in alined position;

Fig. 4 is a similar but more fragmentary section of the mechanism shown in Fig. 3, but showing the mandrel supporting plate swung rearwardly;

Fig. 5 is a diagrammatic side elevation of the cutter and feed roll actuating mechanism, showing the cutting knife in active position and the feed roller in inactive position;

Fig. 6 is a diagrammatic view similar to that of Fig. 5, but showing the knife in inactive position while the feed roller is active;

Fig. 7 is another schematic plan view of the driving mechanism of the machine;

Fig. 8 is an enlarged central vertical section through the friction clutch constituting a part of the drive mechanism;

Fig. 9 is a diagram showing the initial step in the formation of a single ply bag;

Fig. 10 is a similar diagram showing the material laden mandrel initially positioned upon the bag forming sheet;

Fig. 11 is another diagram showing the next step wherein the stock is being folded over the upper open end of the mandrel;

Fig. 12 is another similar diagram showing the stock being initially side folded about the mandrel;

Fig. 13 is a further diagram showing the com-

pletion of the side folding operation, but prior to heat sealing;

Fig. 14 is a further similar diagram showing the completion of the bag-like receptacle by heat sealing;

Fig. 15 is still another diagram showing the completed bag with the loaded mandrel therein, being delivered from the forming machine;

Fig. 16 is a part sectional enlarged side view of a bag and mandrel assemblage inverted, and showing the mandrel being withdrawn from the completed container; and

Fig. 17 is a perspective view of the finally formed, filled and closed bag.

While we have illustrated and described one practical and commercial embodiment of a machine for automatically and continuously producing bags in accordance with our improved method of packaging material, it is not desired to thereby unnecessarily restrict the scope or utility, since the process may be carried on by other types of mechanisms or by hand.

Referring to the drawings, the improved machine for producing successive bags 20 of the type shown in Fig. 17, comprises in general mechanism for facilitating the feeding of successive measured sections or lengths 21 of ribbon-like flexible stock from one or more stock supply rolls 22, 23; a knife or cutter 24 cooperable with the feed mechanism for severing the lengths 21 from the supply ribbons; alinable upper and lower inclined plates 25, 26 respectively, the upper of which is fixedly mounted upon a main frame 27, and the lower of which is swingably suspended at its lower end from said frame; one or more hollow forming elements or mandrels 28 adapted to confine batches of material and to be successively positioned upon said lower tiltable plate 26 over the lower portion of a sheet length 21 disposed thereon; a central conveyor 29 having an upwardly movable stretch provided with conveying lugs 30 which are adapted to be advanced along a central bifurcation 31 in the plate 26 when the latter is swung rearwardly to create a gap between its upper end and the lower end of the fixed plate 25; a third plate 32 fixedly positioned beneath the plate 25 and having thereon side folding formers 33, 34 for folding the side portions 35, 36 of the sheet lengths 21 over the opposite sides of the upwardly advancing mandrels 28 and over each other; heat sealing devices 37 cooperable with the opposite folded sides of the formed bags 20 to permanently unite the overlapping portions 35, 36; a receiving platform conveyor 39 suspended from the upper rear part of the frame 27 and formed to receive the successive bags 20 with the material laden mandrels 28 therein; and a series of chain drives 40, 41, 42 and a clutch 43 for imparting motion from a propelling motor 44 to the several movable elements of the machine.

The mechanism for facilitating the feeding of successive accurately measured lengths 21 of stock, from the supply rolls 22, 23, is best illustrated in Figs. 1, 2, 5 and 6, and while the machine specifically shown is adapted to produce bags 20 of double ply or thickness of either the same or of different materials, it can also be utilized to produce single ply bags 20 by merely omitting either of the stock supply rolls 22, 23, as illustrated in the diagrams of Figs. 9 to 15 inclusive. Journaled in frame 27 beneath the upper fixed plate 25, and with its periphery projecting upwardly through a transverse slot in this plate, is a lower positively driven feed roller 45 which is adapted to be rotated by a chain 38 coacting with a sprocket at one end of this roller; and a set of movable upper feed rollers 46 is cooperable with the lower roller 45 whenever the cutter 24 is elevated, to feed stock from the supply rolls 22, 23. The feed rollers 46 are journaled in a bracket 47 as shown in Figs. 5 and 6, and this bracket 47 is swingably suspended from a cross rod 48 and has an adjustable stop screw 49 which is engageable with the plate 25 to prevent the rollers 46 from contacting the lower roller 45 when no sheet stock is being fed. The rollers 46 are constantly urged toward the roller 45 by a spring 50, and the upper end of the bracket 47 has a projection 51. The knife or cutter 24 which is cooperable with a transverse slot in the plate 25 to sever the stock, is carried by a lever 52 secured to a pivot shaft 53; and this lever 52 is constantly urged to swing in a clockwise direction as viewed in Figs. 5 and 6, by a spring 54, and has a cam portion 55 which coacts with the bracket projection 51 in such manner that when the cutter 24 is active as in Fig. 5, the feed rollers 45, 46 are inactive, and when the rollers 45, 46 are active as in Fig. 6, the cutter 24 is inactive. The cutter suspension lever 52 may also be provided with spring fingers 56 which tend to free the severed lengths 21 from the knife and holds them upon the plate 25, and which also serve as safety guards.

The side driving chain 42 and the intermediate conveyor chain 29 are operable from a common transverse shaft 57 which is driven through the friction clutch 43, and the chain 42 is provided with two spaced projections 58, while the chain 29 has two similarly spaced pins 59 disposed near the lugs 30 thereon. Located in the path of travel of the projections 58, is a shifter plate 60 which is carried by an arm 61 swingably suspended from a pivot pin 62 adjustable along a slot 63 in the frame 27; and a lever 64 is adjustably secured to the medial portion of the arm 61 by means of a clamping nut 66. The pivot pin 62 is provided with a clamping handle 67 for locking it in adjusted position within the slot 63, and the lever 64 has several holes 68 whereby it may be adjustably connected by means of a rod 69, with the swinging end of another lever 70 which is rigidly attached to the knife pivot shaft 53. A clamping screw 71 serves to connect the rod 69 and lever 70, and the assemblage is obviously such that the time of cutting may be varied to produce cut sections or lengths 21 of any desired predetermined length, and with printed matter accurately centered or located on each of the successive lengths 21. The chain 38 which normally drives the lower feed roller 45, is adapted to be driven from the transverse shaft 57, by another chain 72 coacting with gearing and sprockets, as shown in Figs. 2, 5 and 6, and the lever 70 has a lateral projection 73 adapted to coact with the downwardly advancing upper stretch of the chain 38 as indicated in Fig. 1 for the purpose of augmenting the swinging action of the lever 52 when the blade or cutter 24 is brought into action.

The frame 27 may also be provided with guide arms 74 swingably suspended from a cross rod 75 and adapted to rest upon the ribbon stock as it is fed downwardly along the upper plate 25 by the feed rollers 45, 46, see Figs. 1 and 2, and other sheet guiding and mandrel positioning arms 76 which are adjustable along a cross shaft 77 carried by the frame 27, are cooperable with the lower plate 26 on opposite sides of the bifurcation

31. The shaft 77 may be rotated to adjust the arms 76 toward or away from each other by means of a hand wheel 78, and the lower sprockets which coact with the chains 29, 42, are rotatably journaled on this shaft 77 so that the shaft may be rotated without affecting these sprockets. The lower end of the tiltable plate 26 is swingably suspended from the shaft 77 and has a downward projection 79 as shown in Figs. 3 and 4, which is engageable with a hook 80 swingable about a pivot pin 81 carried by the frame 27. The lower plate 26 is constantly urged toward a position of alinement with the upper plate 25 by a spring 82 coacting with the projection 79, but may be swung rearwardly toward the conveyor chain 29, and the lower rear portion of the fixed upper plate 25 is provided with rollers 83 which are cooperable with the front or upper surface of the mandrel 28 to hold the lower plate 26 in proximity to the feed chain 29 while a bag is being formed. The hook 80 is also biased toward the path of travel of the pins 59 by a spring 84 or the like, so that when the plate 26 swings forwardly, the hook will engage the approaching pin 59 and will stop the conveying chain 29.

The electric motor 44 is controllable by means of a switch 85 shown in Fig. 2, and the heat sealing devices 37 may be energized from the power source with the aid of a control switch 86, and when the motor 44 is operating, motion is being constantly transmitted through the driving chain 40 to the sprocket 87 forming one element of the clutch 43, as shown in Fig. 8. The sprocket 87 is journaled on the shaft 57, and is constantly urged toward the friction disk 88 of the clutch 43, by a spring 89, and this sprocket constantly transmits motion to the final discharge conveyor 39 through the driving chain 41. When the lower plate 26 is swung rearwardly so as to cooperate with the central conveyor 29, as in Fig. 4, and the hook 80 is disengaged from the pins 59, the clutch 43 is effective to drive the shaft 57, and motion is transmitted to the conveyor 29 and to the chains 42, 72, 38; but when the hook 80 engages one of the pins 59 upon return of the plate 26 to a position of alinement with the fixed plate 25, then the motion of the conveyor 29 and of the shaft 57 and chain 42, is arrested and the clutch 43 slips. The assemblage is therefore such that the cutter 24 and the stock feed rollers 45, 46 are active only when the mandrel conveyor 29 is active, and when this conveyor 29 is idle, the stock feed mechanism is also idle.

In order to permit operation of the machine on stock of different widths, and with mandrels 28 of different widths, the guide bars 76 and the sealing devices 37 and folding formers 33 must be made laterally adjustable in unison. This desirable result may be accomplished by the hand wheel 78 secured to the transverse lower shaft 77. The mandrel positioning and guide bars 76 are mounted upon internally threaded sleeves 90, having right and left hand threads respectively, coacting with corresponding threads on the shaft 77. The shaft 77 is also connected by sprockets and a chain 91 with an upper transverse shaft 92 which is similarly right and left threaded for coaction with internal threads of the devices 37 and of the folding formers 33. Thus, by rotating the hand wheel 78 in either direction, the bars 76 and the heating devices 37 and folding formers 33, may be simultaneously laterally adjusted to produce any desired lateral spacing.

When utilizing the improved mechanism for the purpose of automatically carrying on the improved process of packing successive batches of material, a hollow mandrel 28 of proper dimensions should first be provided, and this mandrel has a closed bottom so as to be able to receive and retain successive measured batches of granular or other bulk material 93, as indicated in Figs. 10 and 16. Such adjustment, in order to obtain proper lengths 21 of the wrapping stock, and proper width to accommodate the selected mandrel 28, may be obviously effected by properly positioning the lever 64 with the aid of the clamping screw 66 and handle 77, and by also manipulating the hand wheel 78 so as to properly space the guide bars 76 and the heating and folding devices. When the machine has been properly adjusted, either one or both of the stock feed rollers 22, 23 may be utilized, and in order to avoid confusion, the operation of the machine will be described in conjunction with a single stock feed roller 22.

Referring to the diagrams of Figs. 9 to 16 inclusive, in Fig. 9 a length 21 of sheet material has been dlivered from the supply roll 22 by the feed rollers 45, 46 and has been severed from the stock supply by the cutter 24. The lower plate 26 has been swung into alinement with the upper fixed plate 25, and the motion of the conveyor 29 has been arrested by the engagement of the hook 80 with the pin 59 in the manner illustrated in Fig. 3. The propelling motor 44 may be operating, and the heat sealing devices 37 are energized, and the operation of the motor is causing the sprocket 87 to operate the discharge conveyor 39 through the chain 41.

In Fig. 10, the material laden mandrel 28 has been positioned upon the lower end of the section or length 21 of wrapping material and upon the lower plate 26, and upon pushing the mandrel 28 so as to move the plate 26 to the position shown in Fig. 11, the lower projection 30 of the conveyor 29 is brought into engagement with the closed bottom of the mandrel 28 and begins moving this mandrel upwardly, thereby causing the wrapping sheet to close the upper end of the mandrel 28.

As the upward movement of the material laden mandrel 28 proceeds as illustrated in Fig. 12, the cutter 24 is elevated and the feed rollers 45, 46 become active to feed a subsequent length 21 of material downwardly along the fixed plate 25. Simultaneously with this feeding of a subsequent length 21, the opposite lower side portions 35 of the material which has been wrapped around the upper open end of the mandrel 28, are folded upwardly into snug engagement with the mandrel 28 by the side formers 33.

The mandrel is then carried upwardly to cause the side formers 34 to fold the upper side portions of the wrapping sheet downwardly over the previously folded portions 35, as illustrated in Fig. 13, and the feed rollers 45, 46 continue to feed stock from the roller 22 while the cutter 24 remains inactive. It is to be noted that during the upward travel of the mandrel beneath the lower end of the fixed plate 25, the roller 83 is effective to snugly position the wrapping sheet against the upper face of the mandrel.

After the folding operation has been completed, as in Fig. 13, the mandrel 28 is carried between the heat sealing devices 37, as shown in Fig. 14, and these devices then become effective to intimately untie the folded over side portions 35, 36 and to thereby complete the bag 20. It is to be noted that in Fig. 14 the next length 21 of stock

has been fed to mandrel receiving position, and is about to be severed from the supply by the cutter 24; and the lower plate 26 has just been returned for position of alinement with the upper fixed plate 25.

In Fig. 15 the mandrel 28 with the bag 20 completely formed thereabout, has been delivered to the final discharge conveyor 39 and is ready to be removed from the machine. The operator then removes the completed assemblage from the machine and by withdrawing the inverted mandrel 28 from within the completed bag 20, as illustrated in Fig. 16, the charge of material 93 may be deposited by gravity within the bag.

Upon removal of the mandrel 28 from within the bag 20, this mandrel may be positioned upon the machine in the manner shown in Fig. 10 after having received a fresh charge of material 93. The bag which has just been completed can then be closed at its top as shown in Fig. 17, to thereby permanently confine the material 93 therein. Subsequent bags may be formed and loaded in like manner, and the packing operations may be carried on continuously to quickly and effectively confine successive charges or batches of the material 93.

From the foregoing detailed description, it will be apparent that our present invention provides an extremely simple yet highly efficient method of packaging materials without waste of either wrapping material or commodity which is to be packed. The mandrel 28 serves the dual function of providing a form for producing the successive bags 20, and of delivering the charges of material to these bags, and the bags 20 may be produced and filled as needed, thus eliminating necessity of preforming and collapsing the bags before they are actually filled with material. The improved method has been found extremely effective in actual commercial use, and while the method may be more conveniently carried on with the aid of mechanism such as shown and described herein, it can also be carried on by hand.

With respect to the improved mechanism for effecting automatic exploitation of the bag forming and filling method, this mechanism is obviously extremely flexible in its operation. It permits the formation of single or multiple ply bags of any desired width or length, and performs all operations necessary for the production of these bags, automatically. By providing stock feed and cutting mechanism wherein the cutter 24 is inactive when the feed rollers 45, 46 are active, and vice versa, the successive lengths 21 may be produced with extreme accuracy. The adjustable mechanism for controlling the actuation of the cutter 24 and of the feed rollers 45, 46 and which is operable by the chain 42 and pins 58, will permit production of accurately measured successive lengths 21 of wrapping material, and this mechanism may also be adjusted so as to insure proper positioning of printed or decorative matter on the successive completed packages. The mechanism which is operable with the hand wheel 78 to vary the distance between the guide bars 76 and between the folding and sealing devices, also enables convenient adjustment of the machine for cooperation with mandrels of different widths, and the entire assemblage is both easily and safely operable. Units of this type are especially desirable in cases where a manufacturer desires to pack relatively small but variable quantities of material, and the machine will permit such a manufacturer or user to produce the successive bags 20 of any desired size, and as needed for packaging purposes. In producing bags of this type it may be desirable to utilize superimposed layers of transparent material, of opaque material, or to have one sheet formed of transparent material while the other is formed of opaque material. While only one mandrel 28 is absolutely necessary, several of these mandrels may be utilized in order to increase the capacity of the machine, and the extra mandrels may obviously be loaded while one of them is being passed through the machine. The roller 83 carried by the lower end of the fixed plate 25 serves to snugly wrap the lengths 21 about the open upper end of the mandrel, and the side formers 33, 34 which are of relatively well known construction, will effectively fold the opposite overhanging side portions of the successive sheets into intimate contact with the sides of the mandrel 28. The inclined disposition of the sheet feeding plates and of the mandrel guiding plates, is of considerable importance, since the wrapping sheets are thereby folded snugly about the mandrel without wrinkling or creasing; and when the bags have been finally formed, the mandrel is discharged by gravity in horizontal position so as to permit most convenient reversal thereof and delivery of the confined batches into the upright bag by the attendant. By virtue of this inclination, both the wrapping stock and the mandrel are held in position by gravity, thus reducing the assemblage to its simplest form and avoiding necessity of providing special clamps or the like.

It should be understood that it is not desired to limit this invention to the exact steps of the method, or to the exact details of construction of the machine, herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

We claim:

1. The method of packaging, which comprises, confining a charge of material in a cup-shaped mandrel, placing the mandrel with its open end uppermost against the lower half of a flat wrapping sheet, moving the mandrel laterally and then upwardly through a confining gap to stretch the sheet over the open end of the mandrel and about the opposite sides thereof to form a bag, and finally inverting and removing the mandrel from the bag to deposit the charge of material by gravity into the latter.

2. In combination, alineable plates having adjoining ends and one of which is movable relative to the other, means for feeding successive lengths of wrapping stock across said ends, a mandrel positionable upon said movable plate in contact with the stock thereon and with one end near said adjoining plate ends, means for relatively moving said plates to laterally displace said ends and to initially fold said wrapping stock about the mandrel end, and means for advancing said mandrel between said plates to complete the folding operation.

3. In combination, alineable plates having adjoining ends and one of which is movable relative to the other, means for feeding successive lengths of wrapping stock across said ends, a mandrel positionable upon said movable plate in contact with the stock thereon and with one end near said adjoining plate ends, means for relatively moving said plates to laterally displace said ends and to initially fold said wrapping stock about the mandrel end, means for advancing said

mandrel between said plates to complete the folding operation, and means for finally overlapping the side portions of the folded stock length to form successive bags.

4. In combination, an upper inclined plate, a lower inclined plate having its upper end swingable out of alinement with the lower end of said upper plate, means for feeding a sheet of material across the ends of said plates, a mandrel disposable upon said lower plate in contact with the sheet material thereon and with one end near the adjoining ends of said plates, means for relatively moving said plates to move the lower plate out of alinement with said upper plate and to initially fold the sheet over the mandrel end, and means for advancing said mandrel between the off-set ends of said plates to complete the folding of the sheet over the mandrel end.

5. In combination, an upper inclined plate, a lower inclined plate having its upper end swingable out of alinement with the lower end of said upper plate, means for feeding a sheet of material across the ends of said plates, a mandrel disposable upon said lower plate in contact with the sheet material thereon and with its upper end near the adjoining ends of said plates, means for relatively moving said plates to move the lower plate out of alinement with said upper plate and to initially fold the sheet over the mandrel end, means for advancing said mandrel between the off-set ends of said plates to complete the folding of the sheet over the mandrel end, and means for folding the edges of the sheet over the sides of the mandrel to form a bag.

6. In combination, an inclined conveyor, a plate swingable toward and away from said conveyor, a plate fixedly positioned above said conveyor and having a roller spaced therefrom, a mandrel coacting with said swingable plate and being cooperable with said roller to retain said swingable plate in proximity to said conveyor, and means for advancing said mandrel along said swingable plate and laterally of said roller to fold a sheet of material over the leading end of the mandrel.

7. In combination, a conveyor, a fixed plate spaced from said conveyor, a movable plate alineable with said fixed plate and being movable to a position of coaction with said conveyor, means for feeding sheets of wrapping material across the junction between said plates, a mandrel, and means for moving said mandrel along said conveyor between said plates to fold the sheets about the mandrel.

8. In combination, a conveyor, a fixed plate spaced from said conveyor, a movable plate alineable with said fixed plate and being movable to a position of coaction with said conveyor, means for feeding sheets of wrapping material across the junction between said plates, a mandrel, means for moving said mandrel along said conveyor between said plates to fold the sheets about the mandrel, and means for simultaneously stopping said conveyor and said feeding means when said plates are alined.

9. In combination, a fixed inclined upper plate, a lower plate swingable about a lower pivot toward and downwardly away from the lower end of said upper plate, means for feeding sheet stock across the adjoining ends of said plates, a mandrel, and means for advancing said mandrel against the portion of said sheet spanning the gap between said plates when said lower plate has been swung downwardly to fold said sheet over the upper mandrel end.

10. In combination, a fixed inclined upper plate having a transverse lower end, a lower plate having an upper end movable downwardly from a position adjoining said lower end, means for feeding sheet stock across said plate ends when the same are disposed in adjoining position, a mandrel, and means for moving said mandrel upwardly against said sheet between said plate ends when the end of said lower plate has been moved downwardly.

11. In combination, a fixed upper plate having a lower edge, a lower plate having an upper edge movable from a position adjoining said lower edge to a parallel position spaced from said edge, means for feeding sheet stock across said edges, a cup-shaped mandrel having an upper open end, and means for moving said mandrel end upwardly against the portion of said sheet spanning the gap between said edges when the latter are separated to fold the sheet over said open end.

12. In combination, a fixed upper plate having a lower edge, a lower plate having an upper edge movable from a position adjoining said lower edge to a parallel position spaced from said edge, means for feeding sheet stock across said edges, a cup-shaped mandrel having an upper open end, and a conveyor operable when said lower plate is moved to advance said mandrel upwardly against the portion of said sheet spanning the gap between said edges to fold the sheet over said open mandrel end.

13. In combination, a fixed upper plate having a lower edge, a lower plate having an upper edge movable from a position adjoining said lower edge to a parallel position spaced from said edge, means for feeding sheet stock across said edges, a cup-shaped mandrel having an upper open end, means for moving said mandrel end upwardly against the portion of said sheet spanning the gap between said edges when the latter are separated to fold the sheet over said open end and anti-friction means associated with the lower portion of said upper plate for stretching said sheet over said mandrel.

14. In combination, a fixed upper plate, a conveyor beneath said plate, a lower plate movable away from said upper plate and toward said conveyor, means for positioning sheet stock across the gap between said plates, a mandrel, and means for advancing said mandrel against the portion of said stock spanning said gap when said plates are separated and onto said conveyor to fold said sheet stock over the mandrel.

15. In combination, an upper plate having a lower edge, a lower plate having an upper edge, means for relatively moving said plates to separate said edges, means for feeding a wrapper sheet across said edges, a cup-shaped commodity laden mandrel having an upper open end, and means for advancing the open end of said mandrel against said sheet and between said plate edges when separated to fold said sheet over the mandrel end.

16. In combination, an upper plate having a lower edge, a lower plate having an upper edge, means for relatively moving said plates to separate said edges, means for feeding a wrapper sheet across said edges, a cup-shaped commodity laden mandrel having an upper open end, means for advancing the open end of said mandrel against said sheet and between said plate edges when separated to fold said sheet over the mandrel end, and means for subsequently folding the

opposite edges of said sheet over the sides of said mandrel to form a bag.

17. In combination, an upper plate having a lower edge, a lower plate having an upper edge, means for relatively moving said plates to separate said edges, means for feeding a wrapper sheet across said edges, a cup-shaped commodity laden mandrel having an upper open end, means for advancing the open end of said mandrel against said sheet and between said plate edges when separated to fold said sheet over the mandrel end, and anti-friction means carried by one of said plates and coacting with said sheet during the folding operation to maintain the sheet taut.

18. In combination, an upper plate having a lower edge, a lower plate having an upper edge, means for relatively moving said plates to separate said edges, means for feeding a wrapper sheet across said edges, a cup-shaped commodity laden mandrel having an upper open end, means for advancing the open end of said mandrel against said sheet and between said plate edges when separated to fold said sheet over the mandrel end, means for subsequently folding the opposite edges of the sheet over each other at the sides of the mandrel, and means for uniting said overlapped edges to form a bag.

19. In method of packaging, which comprises, confining a definite batch of bulk material in a cup-shaped mandrel having its open end upwardly directed, placing the mandrel with its open end uppermost laterally against the lower portion of an inclined flat wrapper sheet, moving the mandrel laterally and then upwardly through a confining gap to stretch the sheet over the upper open end of the mandrel and along the opposite side thereof, connecting the opposite side edges of the sheet to form a bag, and finally inverting the assemblage and sliding the mandrel upwardly out of the bag mouth to deposit the batch by gravity into the bag.

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