Aug. 18, 1931. W. MUIRHEAD 1,819,786

BAG MACHINE

Filed Feb. 3, 1930 4 Sheets-Sheet 1

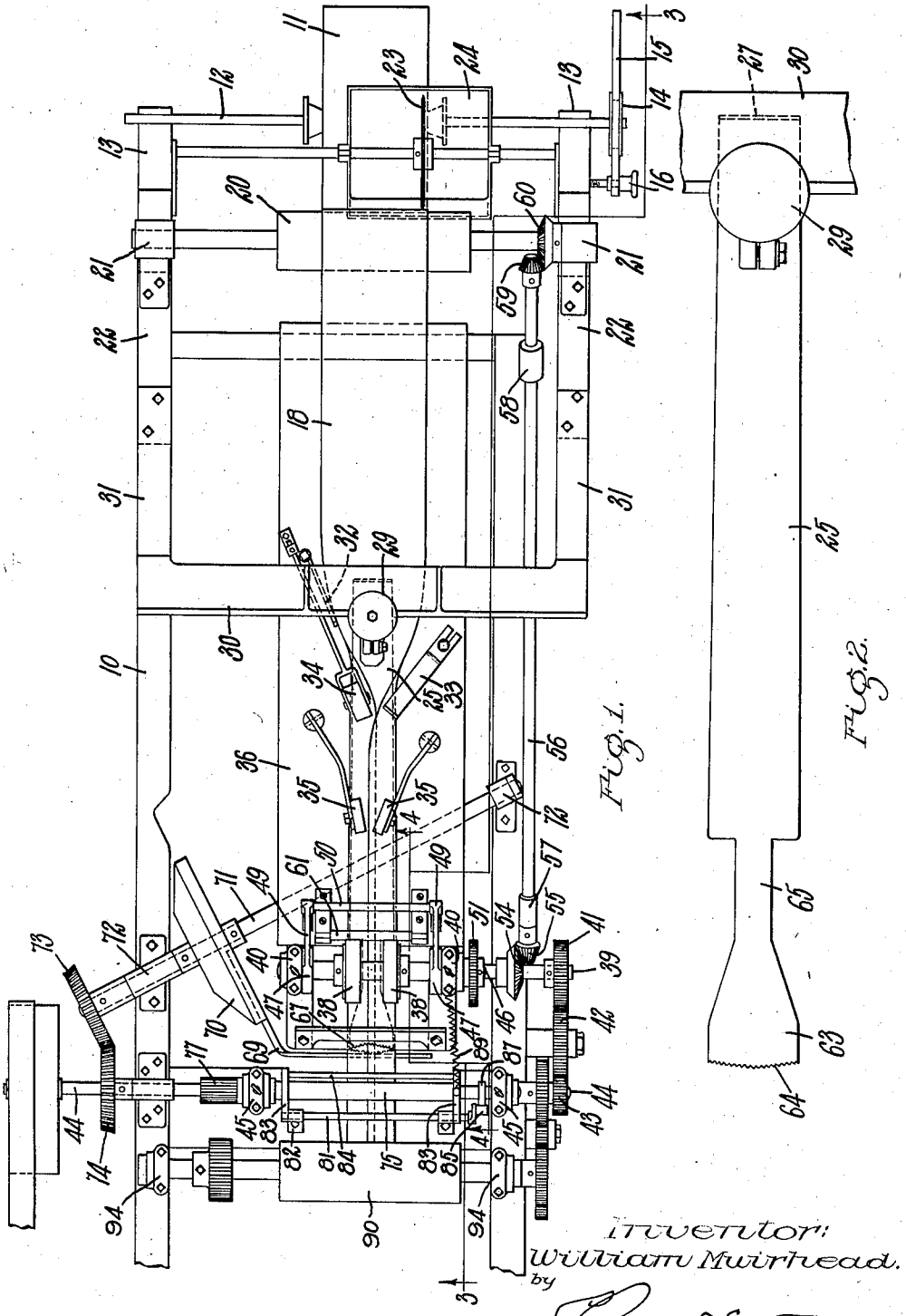


FIG. 1.

FIG. 2.

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Filed Feb. 3, 1930 4 Sheets-Sheet 2

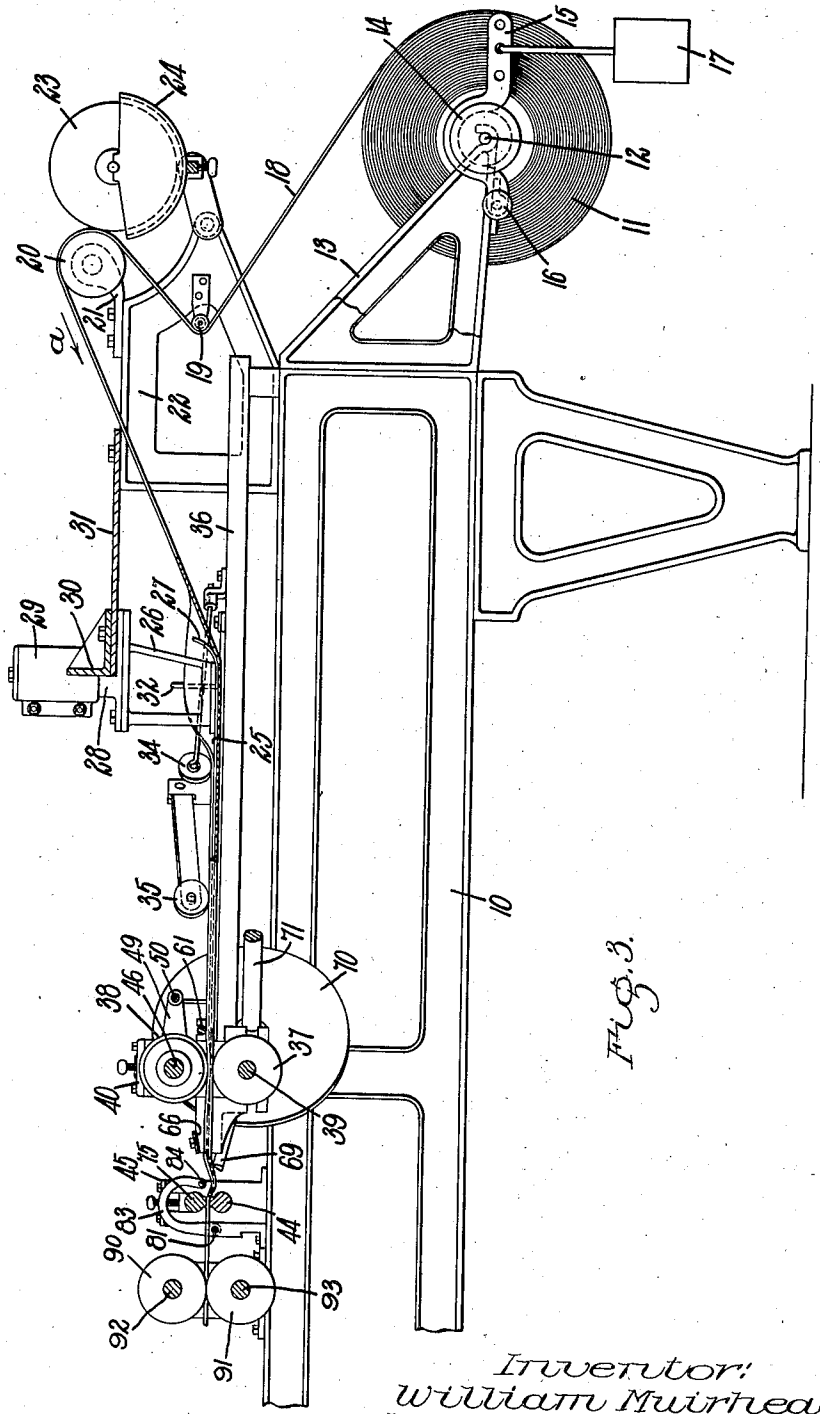


Fig. 3.

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BAG MACHINE

Filed Feb. 3, 1930 4 Sheets-Sheet 3

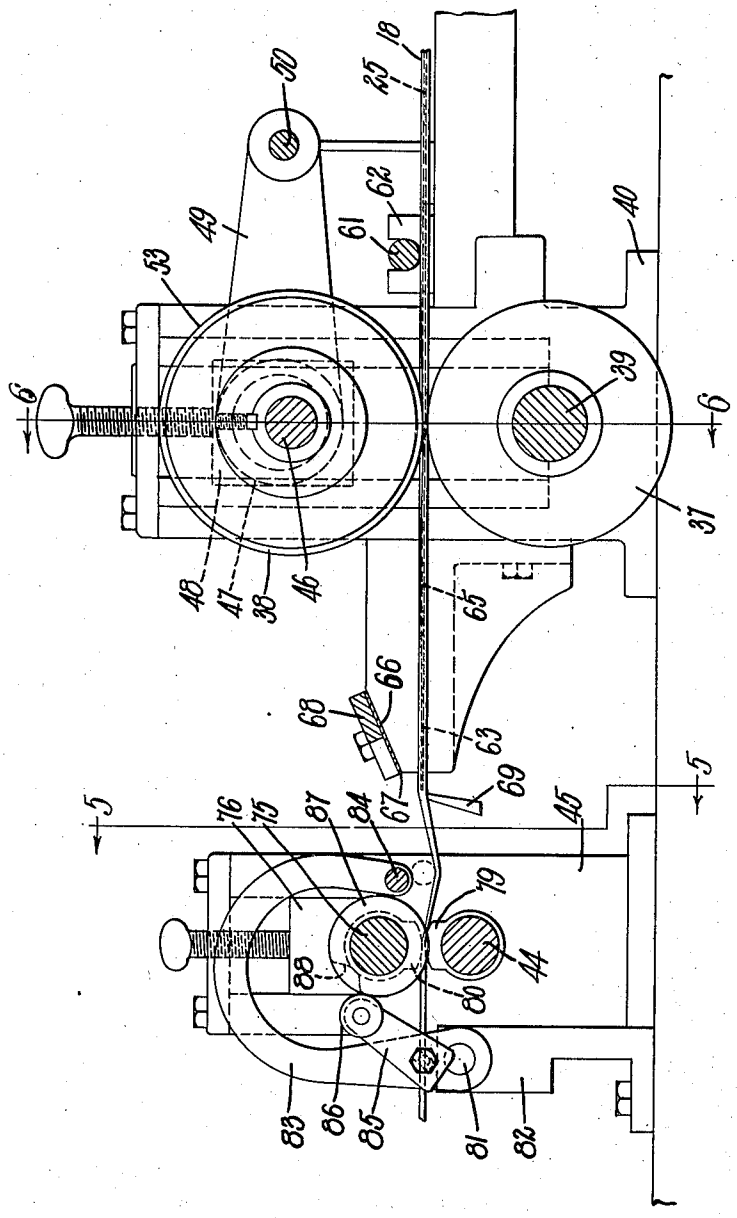


Fig. 4.

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Aug. 18, 1931. W. MUIRHEAD 1,819,786

BAG MACHINE

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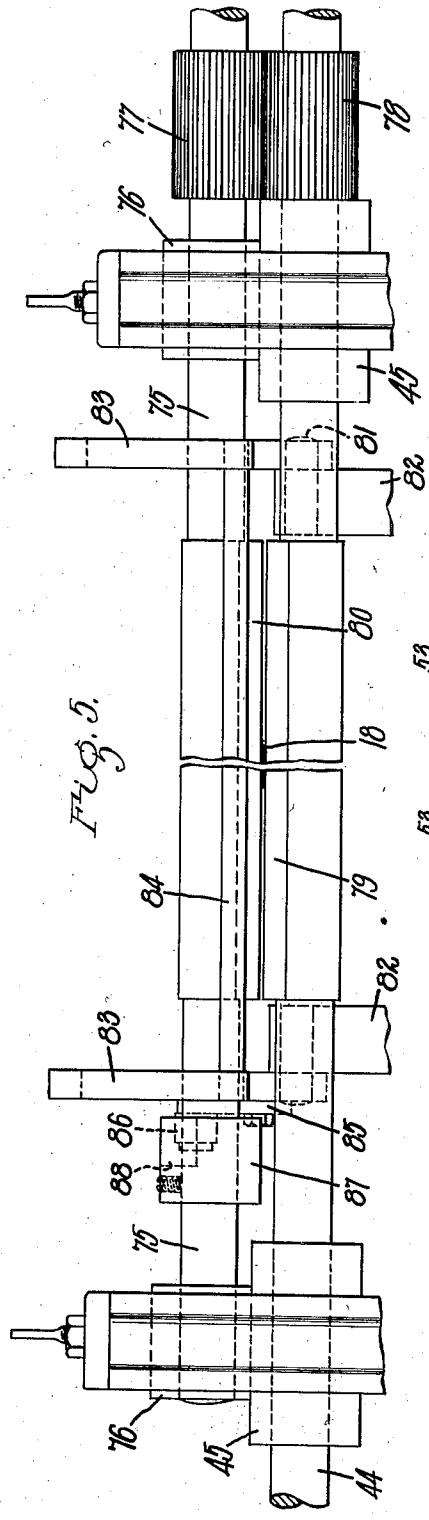


Fig. 5.

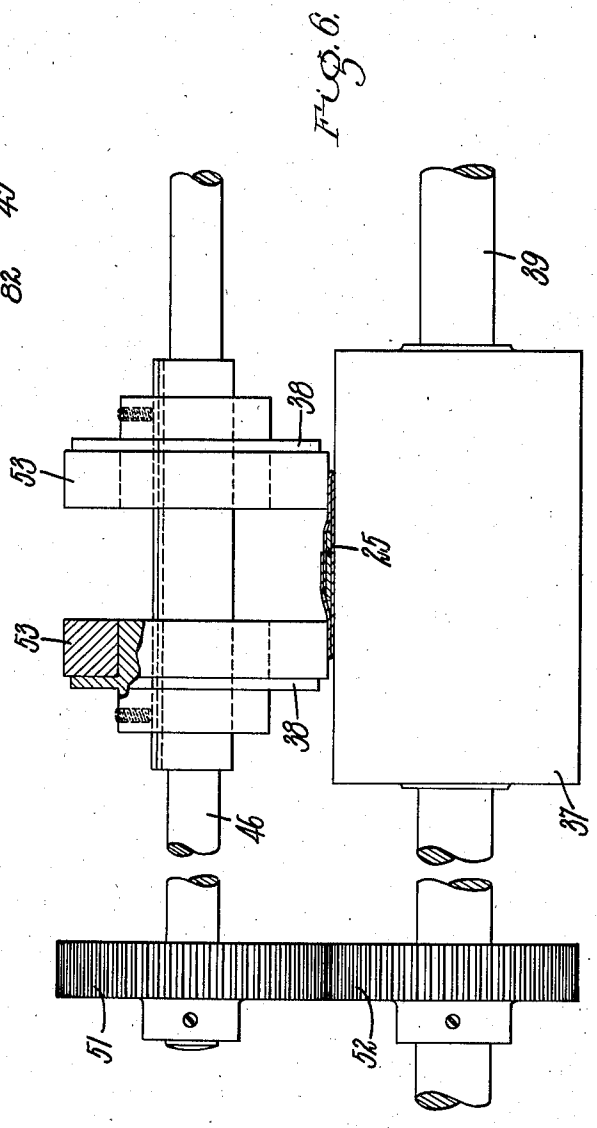


Fig. 6.

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1,819,786

UNITED STATES PATENT OFFICE

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BAG MACHINE

Application filed February 3, 1930. Serial No. 425,450.

This invention relates to a bag machine and particularly to a machine for forming bags from a continuous strip of cellophane or other materials having similar characteristics.

Cellophane, a new type of sheet material recently introduced and now used extensively as a wrapper for various articles, has certain characteristics that render it difficult to handle, particularly in the construction of bags. It is a very light, thin, transparent material, has a smooth, glossy surface and does not crease readily when it is folded. It is slightly elastic and, therefore, stretches easily, yet considering its extreme thinness, it has considerable tensile strength. On the other hand it has no resistance whatever to a tearing action and a tear once started may be extended indefinitely with no effort whatever. During its manufacture it is first cast in a block and is then rolled into a thin strip and because of this fact the center of the strip is always of better quality than the edge portion, and this fact makes it difficult to run in a rotary bag machine.

The primary object of this invention is to provide a rotary type machine which can utilize cellophane and similar materials in the construction of bags in an effective and efficient manner.

Another object of the invention is to provide a mechanism by means of which a continuous strip of cellophane may be fed to the bag forming instrumentalities in such a manner that the material will not be stretched or caused to wrinkle.

Still another object of the invention is to provide a predetermined amount of slack in the strip of cellophane, thereby enabling the material for the successive bags to be severed without breaking or splitting the material.

The invention consists of a machine for forming bags from cellophane and the like as set forth in the following specification and particularly as pointed out in the claims thereof.

Referring to the drawings:

Fig. 1 represents a plan view of a bag machine embodying my invention.

Fig. 2 is an enlarged plan view of the former plate.

Fig. 3 is a longitudinal sectional elevation taken on the line 3—3 of Fig. 1.

Fig. 4 is an enlarged detail sectional elevation taken on the line 4—4 of Fig. 1.

Fig. 5 is a detail sectional elevation taken on the line 5—5 of Fig. 4.

Fig. 6 is a detail sectional elevation taken on the line 6—6, Fig. 4.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 10 is the main frame of the machine and 11 is a roll of cellophane or similar material which is mounted upon a shaft 12, in turn rotatably mounted upon brackets 13 fast to the frame 10. A tension device is provided for the roll of material 11 consisting of a grooved pulley 14 which is engaged by a friction arm 15, the latter being pivotally mounted at 16 upon one of the brackets 13. The friction arm 15 partially surrounds the pulley 14 and is held in frictional contact therewith by means of a weight 17 which is suspended from any one of a number of openings provided therefor in the outer portion of the arm according to the amount of friction that is required.

A strip of cellophane 18 passes from the roll 11 upwardly and partly around a guide roll 19 and thence to a positively driven feed roll 20 which is mounted in bearings 21 mounted upon an auxiliary frame 22 which, in turn, is mounted upon the frame 10. As the strip of cellophane 18 passes over the feed roll 20, a strip of paste is applied thereto by means of a rotary paste wheel 23 which rotates in a mass of paste contained within a paste receptacle 24, the latter being supported upon the auxiliary frame 22.

After the paste has been applied to the strip of material 18, said strip is fed forwardly and downwardly in the direction of the arrow *a*, Fig. 3, to a former plate 25 which is mounted upon a bracket 26. The rear end portion of the former plate 25 is curved upwardly at 27 to form a guide for the strip of material 18 as it approaches

and passes beneath said plate. The bracket 26 is slidably mounted upon a member 28 which, in turn, is rotatably mounted in a split vertical sleeve 29 forming a portion of a cross bar 30 which extends transversely of the machine and is supported upon arms 31 which project forwardly from the auxiliary frame 22.

The bracket 26 which carries the former plate 25 may be moved longitudinally of the machine upon the member 28 and the latter may be either raised or lowered within the split sleeve 29 or may be rocked therein as may be required to properly position and adjust the former plate.

As the strip of material 18 is fed forwardly beneath the former plate 25, the opposite edges of said strip are folded around the longitudinal edges of said plate and toward each other above the plate by means of suitable guide fingers 32 and 33 and by means of a guide roller 34 and a pair of guide rollers 35, all of said fingers and rollers being supported upon a bed plate 36 which, in turn, is mounted upon the frame 10.

As the strip of material 11 is being folded around the former plate 25, it is fed longitudinally of said plate by means of a lower feed roll 37 and a pair of upper feed rolls 38, the strip being pinched between the upper and lower rolls. The lower feed roll 37 is fast to a shaft 39 which is mounted in bearings 40 supported upon the frame 10, and a rotary motion is imparted to said shaft by means of gears 41, 42 and 43 which operatively connect said shaft with a main drive shaft 44 rotatably mounted in bearings 45, in turn mounted upon the frame 10.

The upper feed rolls 38 are fastened to a shaft 46 which is rotatably mounted in eccentric bearing members 47, the latter, in turn, being mounted to rotate in bearing blocks 48 forming a part of the bearing 40. Each bearing member 47 has an arm 49 formed integral therewith, and these arms are connected together by means of a rod 50 which constitutes a handle, and when the latter is raised or lowered, the eccentric bearing members will be rotated in unison within their respective bearing blocks so that the upper feed rolls 38 can be raised or lowered to permit the strip of material 18 to be inserted in the machine between the upper and lower feed rolls when the tube of material is first threaded up in the machine.

The upper feed rolls 38 are driven in unison with the lower feed roll 37 by means of gear 51 and 52 which are fastened to the shafts 46 and 39 respectively. The upper feed rolls 38 are adjustable longitudinally upon the shaft 46 in order to accommodate different sizes of bags. The inner portion of the rolls 38 is constructed of metal, but the working portion 53 or periphery of said rolls is constructed of rubber to prevent splitting the material along the folded edges thereof, and, furthermore, the diameter of the upper rolls 38 is slightly greater than the diameter of the lower roll 37 in order that there will be an action between the perpiheries of said rolls tending to overcome any stretch that may develop in the material.

It is important that the roll 20 shall be positively driven at the same speed that the lower drawing roll 37 is driven. A bevel gear 54 which is fast to the shaft 39 meshes with and drives a bevel pinion 55 fast to a shaft 56 mounted to rotate in bearings 57 and 58 fast to the frame 10 and auxiliary frame 22 respectively. Another bevel pinion 59 fast to the shaft 56 meshes with and drives a bevel gear 60 which is fast to the roll 20.

As the strip of material 18 passes along the former plate 25, just prior to the time that said strip passes between the lower feed roll 37 and upper feed rolls 38, the upper folded portions of said strip that are located above the former plate and one of which has the strip of paste thereon, pass beneath a seam roll 61 which is mounted in bearings 62 upon the bed plate 36, and said roll engages said folded portions with sufficient pressure to cause them to stick together where they overlap and form a flattened tube.

The strip of material 18 after being formed into a flattened tube is severed as follows:—Located upon an extension 63 of the former plate 25 is a toothed cutting edge 64, see Fig. 2, the former 25 being reduced in width at 65 in order that the upper feed rolls 38 may engage the strip of material 18. The cutting edge 64 is provided for the purpose of cutting that portion of the flattened tube which passes beneath the former 25. Extending transversely across the machine above the flattened tube is a knife 66 having a toothed cutting edge 67 provided thereon. The knife 66 is secured to suitable brackets by means of a clamp 68. The cutting edge 67 is positioned to sever that portion of the flattened tube which passes above the former plate 25. Each of the cutting edges 64 and 67 are formed to make a V-shaped cut across the flattened tube of material and the action of both cutters is to sever the material with a shearing cut, the cutting edge 64 severing the lower portion of the tube from the center of the tube toward the edges, and the cutting edge 67 severing the upper portion of the tube from the edges thereof toward the center.

A rotary striker blade 69 co-operates with the cutters in severing the sections of the flattened tube from the main tube, and said blade is adjustably fastened to a disc 70

which is fastened to a shaft 71, in turn mounted in bearings 72 supported upon the frame 10. The shaft 71 is located at an angle to the driving shaft 44 and has a bevel gear 73 fast thereto which meshes with and is driven by a gear 74 fast to the driving shaft 44. The shaft 71 is located at an angle to the driving shaft 44 so that as the disc 70 is rotated, the striker blade 69 after engaging the under side of the flattened tube and causing the same to be severed, will pass over the feed rolls and the portion of the frame upon which they are supported and will pass around under the frame and up into position again as shown in Fig. 1.

It is essential in severing the sheet material without breaking or splitting the same that there shall be a considerable amount of slack material adjacent to that portion of the flattened tube that is to be severed, and it is furthermore essential that the flattened tube shall be positively gripped while the severing operation is taking place.

The mechanism for obtaining these results is as follows:—Located directly above the driving shaft 44 and positioned parallel thereto is a shaft 75 which is mounted to rotate in suitable bearing blocks 76 forming a part of the bearing 45. A gear 77 is fast to the shaft 75 and meshes with and is driven by a gear 78 which is fast to the driving shaft 44. Gripping portions 79 and 80 are provided upon the shafts 44 and 75 respectively and are so positioned relatively to each other that they will grip the opposite sides of the flattened tube at the proper time and hold the same while it is being severed.

A shaft 81 is mounted to rock in brackets 82 mounted upon the frame adjacent to the bearings 45, see Fig. 5, and a pair of arms 83 are rigidly fastened to the shaft 81. The outer extremities of the arms 83 are connected together by means of a rod 84 which is rigidly fastened in said arms. Another arm 85 is rigidly fastened to one of the arms 83 and has a cam roll 86 rotatably mounted at its outer end adapted to engage a cam 87 having a recess 88 provided in its periphery. A spring 89 is attached at one end thereof to one of the arms 83 and at its other end to one of the bearings 40 and acts to always hold the cam roll 86 against the periphery of the cam 87.

During the greater portion of the rotation of the shaft 75 the cam roll 86 will engage the periphery of the cam 87 in a manner to hold the arms 83 with the rod 84 positioned a slight distance above the path of the flattened tube, but when the recessed portion 88 of the cam arrives opposite the roll 86, the spring 89 will act to cause the roll 86 to enter the recess 88 of the cam and the arms 83 will be rocked in a manner to force the rod 84 downwardly into engagement with the upper surface of the flattened tube, causing the latter to be pushed downwardly a short distance, thereby providing the amount of slack that is required. As soon as the slack material is provided, the gripping portions 79 and 80 of the shafts 44 and 75 respectively engage the flattened tube and hold the same while the striker blade 69 engages the under surface of the flattened tube and causes the latter to be severed from the main portion of the tube by means of the cutter blades.

As the section of the flattened tube is fed beyond the point where it is severed and beyond the gripping portions 79 and 80 of the shafts 44 and 75 respectively, it passes between a pair of folding and pasting rolls 90 and 91 mounted upon shafts 92 and 93 respectively mounted in bearings 94 upon the frame 10 and geared together to rotate in unison in a well known manner.

The folding rolls 90 and 91 are well known to those skilled in the art and co-operate with each other in a well known manner to fold an end portion of the flattened tube to form the bottom of a bag, the folded portion being stuck to the main portion of the bag as it is folded.

The general operation of the machine hereinbefore specifically described is as follows:—A strip of cellophane is fed from the roll 11 of said material upwardly around the guide roll 19 and thence around the feed roll 20 at which point a strip of adhesive is applied thereto by means of the roll 23. The roll 20 is the same diameter as the lower feed roll 37 and is driven at the same speed as is said feed roll 37, and these rolls, together with the upper feed rolls 38, act upon the material to feed the same beneath the former plate 25 where suitable folding devices engage the edge portions of the strip of sheet material and act to fold said edge portions around the opposite edges of the former plate.

During the feeding operation, the lower feed roll 39 engages the entire under surface of the flattened tube, but the two upper feed rolls 38 only engage the upper surface of the folded over portions adjacent to the fold where in addition to co-operating with the lower roll in feeding the tube, they also act to "break" the fold. The upper feed rolls 38 are of slightly greater diameter than the lower roll 37 and act to overcome any stretch that may develop in the material during the feeding operation.

After the strip of material 18 has been folded and pasted to form a flattened tube and before the tube has been severed by the cutting instrumentalities, a rocking motion is imparted to the shaft 81, thereby rocking the arms 83 and forcing the rod 84 into engagement with the upper surface of the tube, forcing the latter downwardly a short dis-

tance and creating a slack portion in that section of the tube that is located just beyond the extremity of the former plate. The tube is then immediately gripped by means of the gripping portions 79 and 80 of the shafts 44 and 75 respectively, and the striker blade then engages the under surface of the tube, first causing the bottom portion of the latter to be severed by means of the cutting edge 64 and then causing the upper portion of the tube to be severed by means of the cutting edge 67. The severed portion of the flattened tube then passes to the folding and pasting rolls 90 and 91 where the entire forward end portion of the tube is folded and pasted in a well known manner to form the bottom of a bag.

The cutters 64 and 67 are so formed that in severing the separate sections of the flattened tube from the main section of said tube, the lower portion of the tube will be severed from the center of the tube toward the edges, while the upper portion of the tube will be severed from the edges thereof toward the center.

I claim:

1. A machine of the character described having, in combination, a former plate, a plurality of feed rolls adapted to feed a strip of sheet material thereto, means to fold the strip of sheet material around said plate, means to intermittently engage the strip of sheet material and positively force the same laterally of a face thereof to create a slack portion therein, and means to sever the slack portion of the strip from the main portion thereof.

2. A machine of the character described having, in combination, a former plate, positively driven means located adjacent to opposite ends of said former plate to feed a strip of sheet material thereto, means to fold the strip of sheet material around said plate, a member extending transversely of the strip parallel to a face thereof, means to rock said member into contact with said strip and positively deflect the same laterally, whereby a slack portion is formed therein, and means to sever the strip at said slack portion.

3. A machine of the character described having, in combination, a former plate, positively driven means located adjacent to opposite ends of said former plate to feed a strip of sheet material thereto, means to fold the strip of sheet material around said plate to form a tube, means to engage said tube and positively force the same laterally whereby a slack portion is formed therein, and means to sever the slack portion of the tube from the main portion thereof.

4. A machine of the character described having, in combination, a former plate, a plurality of feed rolls adapted to feed a strip of sheet material thereto, means to fold the strip of sheet material around said plate, a pair of rocker arms, a rod mounted upon said arms, means to rock said arms to force said rod into engagement with the strip of sheet material whereby a slack portion is formed therein, and means to sever the slack portion of the strip from the main portion thereof.

5. A machine of the character described having, in combination, a former plate, means to fold a strip of sheet material around said plate, means located partly in front of and partly at the rear of the folding means to positively feed the strip of material thereto, means to place a tension upon the strip of material at one side of the feeding means, means upon the other side of the feeding means to engage said strip and positively deflect the same laterally of a face thereof, whereby a slack portion is formed therein, and means to sever the slack portion of the strip from the main portion thereof.

6. A machine of the character described having, in combination, a former, means to fold a strip of sheet material around said former, co-operating rolls at one side of the folding means to feed the strip of sheet material thereto, another roll at the other side of the folding means to feed the strip of material, said last-named roll being operatively connected to the first-named rolls to rotate in unison therewith and at the same speed, a rocker arm pivotaly mounted at each side of said strip, a rod mounted in both said arms and positioned parallel to a face of said strip, means to impart a rocking movement to said arms to force said rod into engagement with the strip, whereby a slack portion is formed therein, and means to sever the strip.

In testimony whereof I have hereunto set my hand.

WILLIAM MUIRHEAD.