

March 10, 1936.

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METHOD OF MAKING FLAT TUBULAR BODIES WITH FLAPS

Filed March 28, 1934

3 Sheets-Sheet 1

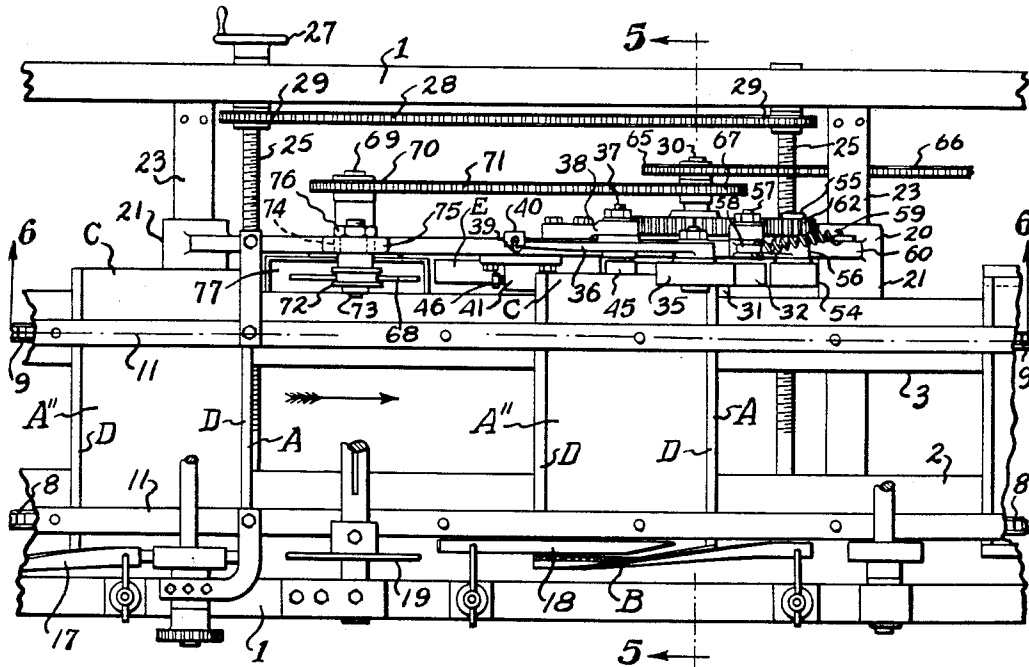


FIG. 1.

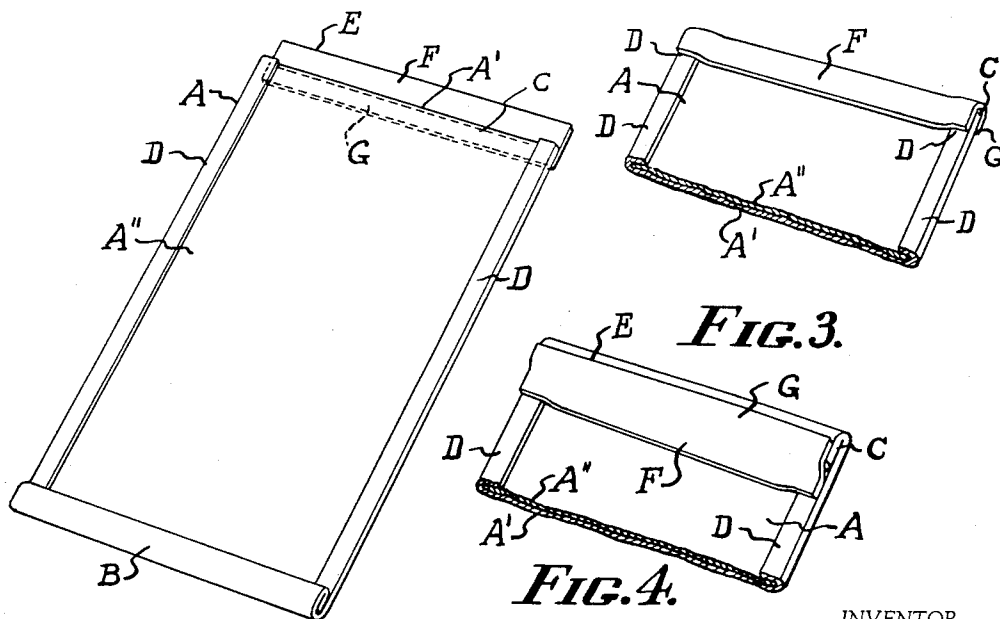


FIG. 2.

FIG. 3.

FIG. 4.

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3 Sheets-Sheet 2

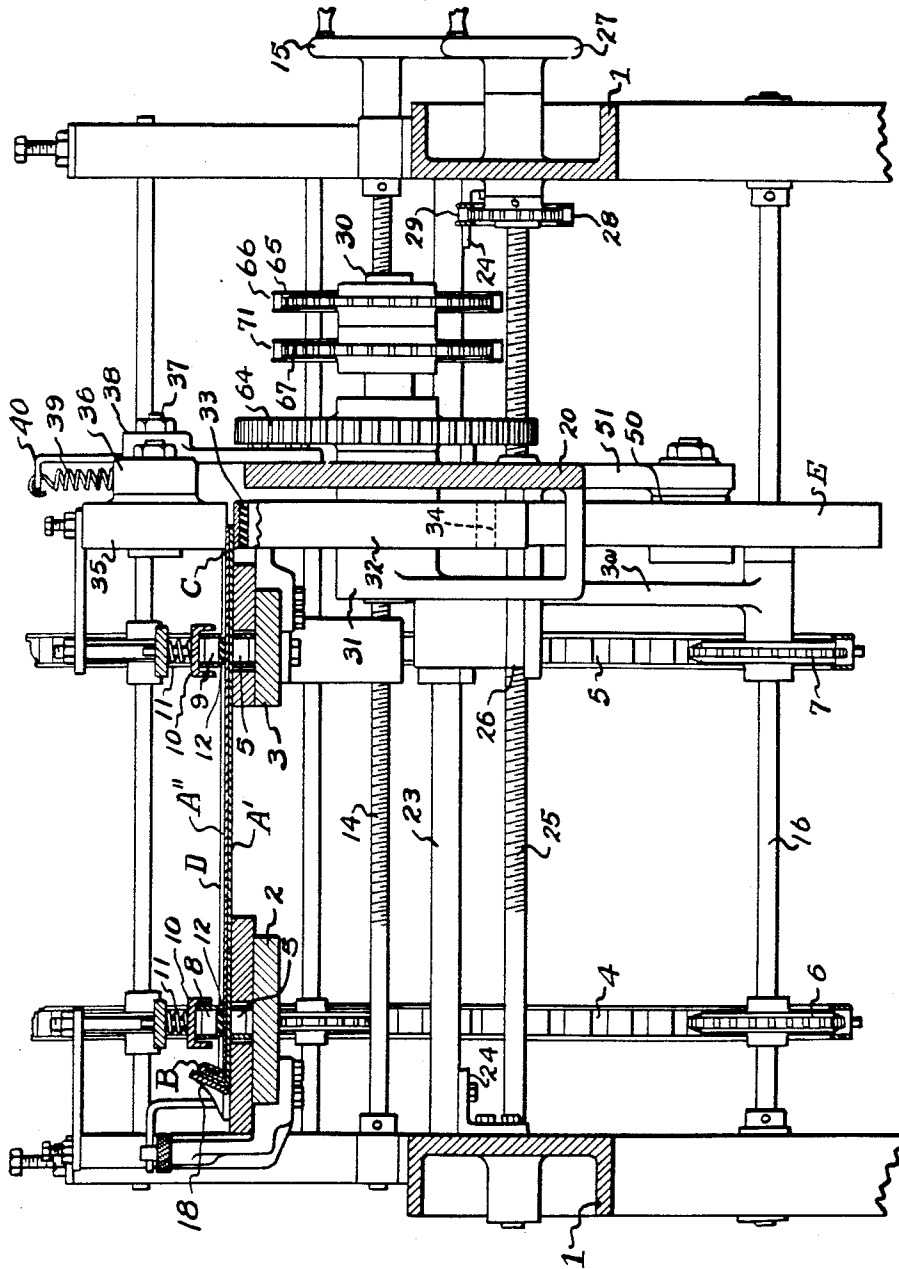


FIG. 5.

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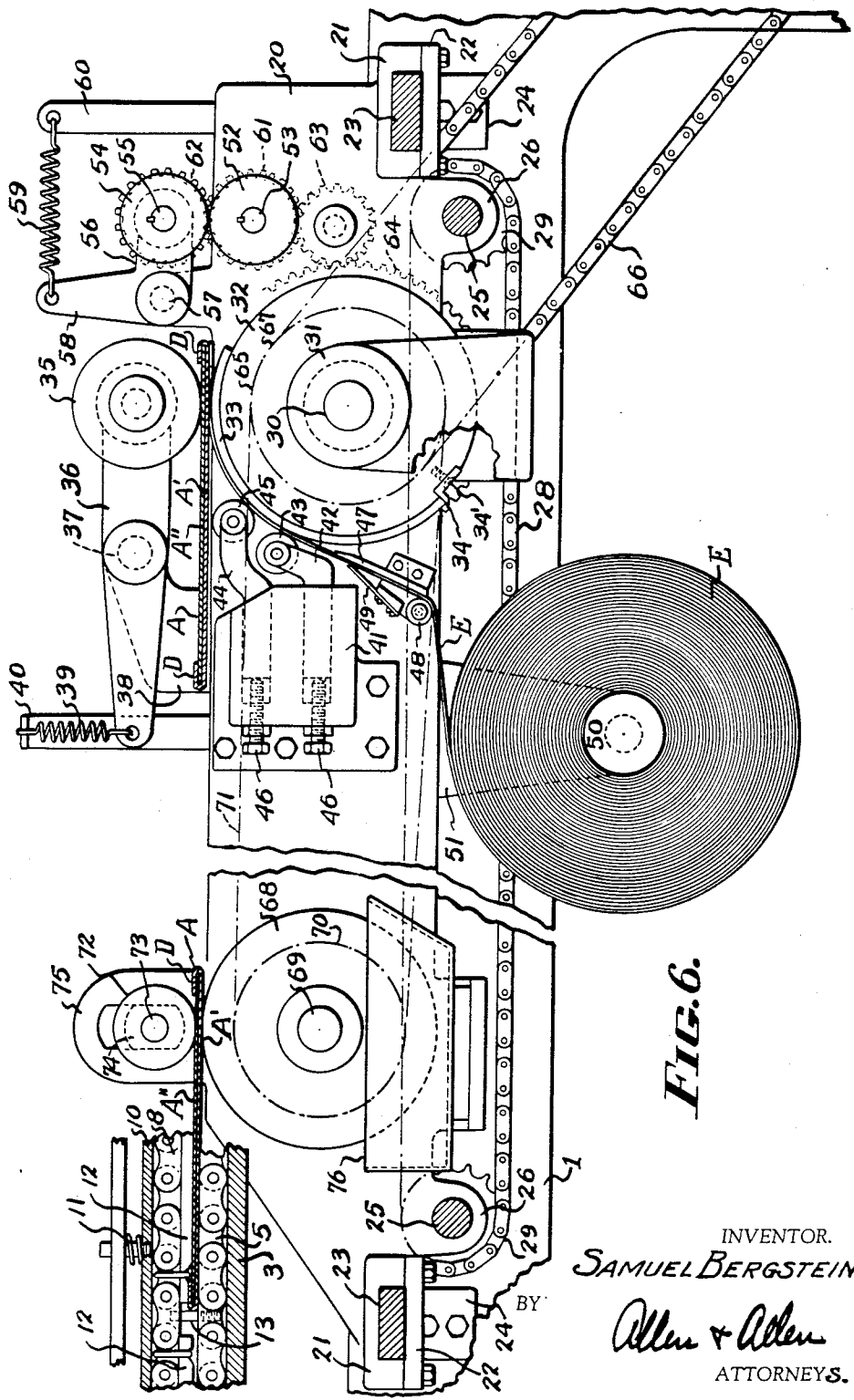


FIG. 6.

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METHOD OF MAKING FLAT TUBULAR
BODIES WITH FLAPS

Samuel Bergstein, Cincinnati, Ohio

Application March 28, 1934, Serial No. 717,799

5 Claims. (Cl. 93—35)

My invention relates to bags or similar flat tubular bodies made from paper or other sheet materials, and more especially to such bodies of which cellulosic sheet material forms all or a part thereof; and to methods of manufacturing such bodies, and apparatus for carrying out such methods, more especially when the bodies are composed either partly or wholly of cellulosic material. In my copending application, Serial No. 515,275, filed February 12, 1931, are disclosed and claimed methods of and apparatus for the rapid manufacture of bags from cellulosic material, in which tubular bag bodies are fed to a conveying device that carries them sidewise to means that folds one end of each bag body to form a closed bottom thereon as the end travels parallel with the direction of travel. It is in conjunction with this method and apparatus that I prefer to employ my present invention; although it will be understood that the present invention is not limited to use in conjunction with my just mentioned prior invention, or to use with any device forming bottoms on the tubular bodies and that my present invention is not limited to the manufacture of such bodies made up partially or wholly of cellulosic or like materials. It is in connection with such materials, however, that it finds its greatest advantage.

One object of my present invention is to provide a bag or similar flat tubular body with a flap, which is attached thereto and serves as a closure therefor, so that the flap material is not necessarily the same kind as the material of the body itself; and so that, if the body material, either all or a part thereof, is a relatively expensive material, a considerable saving is effected as to cost of the complete bag or other flat tubular body having a flap. This is especially desirable if the bag itself is either wholly or partly of such expensive material as cellulosic material, above mentioned; but may find value in the manufacture of bags not of such material.

Also, cellulosic material, because of its delicate nature and thinness, is not easily handled to provide it with an integral flap; and the difficulties of providing adhesive that will seal a cellulosic flap to a cellulosic bag body, in the closure by the user, make it especially desirable that the flap material be one which does not present these difficulties. It is therefore another object of my invention to provide a bag of cellulosic or like material with a flap of less delicate and thicker material which will adhere more readily to the bag material, both in attaching the flap to the

bag in the course of manufacture, and in the sealing of the flap, to close the bag, by the user thereof, after the contents have been inserted therein.

A further object is to effect the attachment of the flap to the bag body while the latter is being manufactured, as for instance while the tubular body is traveling sidewise in the conveyor of the machine of my copending application above mentioned. So done, the attachment of the flap entails no extra expense of manufacture; and except for the slight additional cost of the flap material, which may be an adhesive tape of thin paper such as glassine or the like, there is no increased expense over that of the manufacture of the bags without the flaps as in the prior invention. On the contrary, there is a decided saving in cost; as, without a flap, it has been the custom to make these bags with a considerable extension of the length beyond that required for contents, to form an ample folding over of the bag material to close the mouth of the bag. Besides the user, in such closing, after inserting the contents, has had to employ some kind of fastening means, such as tape or the like, with some difficulty in obtaining secure adhesion, to fasten the folded over part of the bag. My present invention makes it possible to save a large proportion of the bag material in forming the mouth closing fold; and when such material is cellulosic or like expensive material, the saving is especially valuable.

A further object in providing a bag of cellulosic or like material with a flap of different material, is due to the fact that cellulosic or like material may not practically be provided with a coating of gum or any kind of re-wetting adhesive, as is done on envelopes or the like. Also, so far as I am aware there is no practical machine available for coating such material with such adhesive or gum at the lips of bags and then allow them to dry. However, I have found it practical to cause a tape of glassine or other suitable paper, previously coated with suitable adhesive, to adhere to the cellulosic or like material of the bag, readily and rapidly; so that this can be done on a high speed machine that closes the bottoms of the bags, as disclosed in my copending application above mentioned.

This makes it possible to supply such tape in a roll, and to feed the tape and sever it in lengths suited to the width of the bag mouth, and apply the tape with a part of its width caused to adhere to one edge portion of the bag mouth, and the remaining part of its width, as a mar-

gin, extending a desired distance beyond said edge, and remaining dry, ready to be turned over across the bag mouth and sealed, after wetting, to the edge portion of the opposite side of the bag mouth, by the user, after enclosing the contents. It also makes it possible to give the mouth portions of the bag a fold, in the closing, and then seal the tape as above described, if the user desires a more secure closure of the bag.

In the example herein I have illustrated the manufacture of a bag with a back of glassine or similar thin paper, and a front of cellulosic transparent sheeting with its edge portions secured around the glassine. This forms a flat tube one end of which is closed by a double fold adhesively secured to this end, forming the bottom of the bag. The tape for the top closure is adhesively secured to the top edge portion of the cellulosic front of the bag, leaving the extended portion to be secured to material which, except for narrow portions of cellulosic material at the ends of this portion, is of glassine or the like, similar to the material of the tab; so that when this extended portion is folded back over the mouth of the bag it is readily secured by wetting the adhesive and pressing it onto the back portion of the bag. This makes it easy for the user of the bag to seal it after it has received its contents. An extensive use of the kind of bag just described is for packing shirts; and it is a bag of proportions and dimensions suitable for this that I have chosen to illustrate my invention. It will be understood however that other bags of different proportions are used for various articles; and also that such bags may be made entirely of cellulosic material; or they may be made of other material, such as glassine or the like. The illustrations therefore will be understood as being exemplary only and not as limiting.

Objects other than those stated will appear in the course of the following description, which is illustrated by the accompanying drawings, in which—

Figure 1 is a plan view of a portion of a bag-making machine having applied thereto my improved apparatus for operation, and the manufacture of bags, according to my invention.

Figure 2 is a perspective view of a bag embodying my invention looking at the back of the bag, the flap being in open position.

Figure 3 is a similar view of the top portion of the bag, having the flap sealed in closed position.

Figure 4 is a similar partial view of the bag with the top edge portion of the bag once folded and sealed in closed position.

Figure 5 is a vertical transverse section on the plane of the line 5—5 of Fig. 1.

Figure 6 is a vertical longitudinal section on the line 6—6 of Fig. 1.

The bag-making machine shown comprises the side frame members 1, which support mechanism comprising two assemblies of elongated plates 2 and 3 arranged to form channels in which are guided a pair of lower endless chains 4 and 5 driven by sprocket wheels 6 and 7, respectively; and a pair of upper endless chains 4 and 5, yieldingly held in coactive relation with the chains 4 and 5 respectively, by channels 10, which are held down on the respective chains 8 and 9 by suitable spring devices 11; all of which may best be understood from Fig. 5. The upper chains 8 and 9 have on their bottoms friction pieces 12 to press down on a bag body, and pins 13 to engage the trailing side edge thereof for definite and positive conveyance of the tubular bag bodies

through the machine, according to my prior invention above mentioned.

The rear assembly, comprising the chains 4 and 8 is fixed; but the front assembly, comprising the chains 5 and 9, is slidable with its support 3a, forwardly and rearwardly for the accommodation of the bag bodies of different lengths; being adjusted across the machine by a screw 14 having a hand wheel 15 outside the front frame member 1. It will be understood that the shaft 16 for the sprocket wheels 6 and 7 has the front wheel 7 splined on it; and that suitable similarly arranged sprocket wheels, not shown, are provided for the upper chains 8 and 9. It is not deemed necessary to more completely describe or illustrate this bag-making machine of my prior invention, other than to say that it propels the bag bodies A along the plate assemblies 2 and 3 with the bag body widths parallel with their direction of travel; and that suitable folding bars, such as the bars 17 and 18, mounted on the rear plate assembly 2 and acting in succession on the bottom edge portions of the bodies A give them successive folds as seen at B in Fig. 5; and that suitable mechanism 19 applies adhesive to seal these folds B at a certain stage of travel. During the course of operation just described, the bag body A has its other end portion projecting forward past the front edge of the front plate assembly 3, as seen at C in Fig. 5. It is with this portion of the bag body that my present invention is concerned.

The completed bag with its flap is best seen in Fig. 2, where the edge portions D of a certain cellulosic sheet A' are folded over and adhering to the edge portions of the glassine back A'', with the double fold B closing at the bottom. The piece of tape E is seen with one portion G of its width adhering to the top edge portion of the cellulosic sheet A' and the remaining portion F of its width projecting. In Fig. 3 is illustrated the closure of the top of the bag; the projecting portion F having been folded over and sealed to the glassine A'' and to the upper end portions B' of the back cellulosic sheet folds D. It is understood that the tape E is gummed tape and that the portion G has been attached to the bag body by the application of a suitable adhesive or other softening agent for the adhesive on the tape E; and that the closure has been made by the user moistening the portion F before folding back and pressing onto the back of the part C of the bag body. In Fig. 4 the user has at first folded portion C adjacent to the bag body back onto the adjacent portion, and has then caused the portion F of the tape E to adhere to the next adjacent portion of the bag body. This latter sealing gives an all-cellulosic closure to the bag; and may be preferred where an especially good closure is desired.

The apparatus by means of which the tape E is applied to the downwardly facing cellulosic side of the bag body as it passes on in the course of closure at its bottom, is supported on a frame 20 which has at its bottom near respective ends, transverse channels 21 with bottom caps 22 to embrace respective crossbars 23 of rectangular cross section; the ends of which bars 23 are fixed by brackets 24 to the respective side frames 1 of the bag-making machine. These channel portions 21 have enough length of bearing along the bars 23 to support the frame 20 in stable upstanding position when the frame is clamped to the bars 23 at any position thereon by tightening the caps 22. This frame 20 is adjusted

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crosswise of the bag-making machine by screws 25 threaded through lugs 26 depending from the bottom of the frame 20 near its opposite ends; these screws 25 being suitably journaled in the frame sides 1 of the bag machine, and one of them having outside the front frame side 1 a hand wheel 27; and the two screws 25 being operatively connected by a sprocket chain 28 passing around sprocket wheels 29 fixed on the respective screws near the front frame sides 1.

A shaft 30 is journaled transversely in the frame 20 and an inner upstanding arm 31 of the frame; and between this arm 31 and the main part of the frame a disc 32 is fixed on the shaft. This disc 32 has a periphery as wide as or slightly wider than the tape E; this periphery being plain and smooth throughout most of its extent to receive snugly fitting therearound a segment 33 made of rubber or like frictional material. This disc 32 rotates over in the direction of bag travel; and at the trailing end of the segment a cutter 34 is secured by a screw 34' in a slot transverse of the disc periphery.

Above the disc 32 is the top roller 35 journaled in one end of a yoke 36 which has a fulcrum 37 at its middle in a bracket 38 fixed on the top of the frame, and has a spring 39 stretched from its opposite end up to the top of a hanger 40 also fixed on and upstanding from the top of the frame 20.

At the side of the disc 32 that is approached by the bags, a bearing block 21 is bolted to the inner side of the frame 20 and has horizontal guideways, one above the other, opening toward the periphery of the disc 32. In the lower guideway is mounted the lower slide 42 with an upstanding forked end in which is journaled a roller 43 which preferably has a periphery of rubber or like frictional material. Mounted in the upper guideway is the upper bar 44, likewise having a forked end, which is extended up and over past the roller 43 of the lower bar, and has journaled in its forked end a roller 45 which may be of metal. The guideways and the parts of the bars 42 and 44 are of rectangular cross section and are fitted together snugly so as to support the rollers 43 and 45 for accurate coaction with the disc 32, its segment 33 and its cutter 34. Threaded through the opposite end of the block 41 into the respective guideways are adjusting screws 46 bearing against the adjacent ends of the bars 32 and 34 and serving to adjust the rollers 43 and 45 accurately at a desired spacing from or tightness of bearing against the segment 33 and cutter 34 as these pass them in the course of rotation of the disc 32.

Mounted on the inner side of the spring 20, just below the bearing block 41 is the tape guide 47, comprising a straight plate extending up toward the space where the rolls 43 and 45 coact with the segment 33 and cutter 34. The bottom of this tape guide 47 has a roller 48, and above this roller a spring 45 is mounted to have its upper end pressed resiliently toward the upward extension of the tape guide 47. A reel 50 is journaled in the lower end part of an arm 51 depending from the bottom of the frame 40. This reel 50 carries a large roll of the adhesive tape E, which passes therefrom, with its upper side bearing adhesive in a dry form, up around the tape guide roller 48 between the spring 49 and the extension 47, and between the rollers 43 and 45 and the disc 32, and over this disc in the direction of bag travel, as best seen in Fig. 6.

At the other side of the disc 32, a lower press-

ing roll 52, is fixed on a shaft 53 journaled transversely in the frame 20. Above this lower roll 52, the upper pressing roll 54 is fixed on a shaft 55, journaled transversely in a horizontally extended arm 56 of a two-armed lever which has a fulcrum 57 in an upward extension of the frame 20; the other arm 58 of this lever being extended upwardly and having stretched from its upper end part a spring 59 to the top of a post 60 upstanding from the frame 20. Gears 61 and 62 are fixed on forward extensions of the lower roll shafts 53 and 55, respectively, and meshed together. An intermediate gear 63 is journaled on a stud and meshes with the lower roll gear 61 and with the large gear 64 fixed on the shaft 30 with the disc 32.

Also fixed on the disc shaft 30 is a sprocket wheel 65 around which passes a sprocket chain 66, which will be understood to pass around another sprocket wheel, not shown, but which will be understood to be rotated with some suitable part of the bag-making machine.

A second sprocket wheel 67 is fixed on the disc shaft 30. Supported on the opposite end portion of the frame 20, where the bags are approaching the mechanism, is the device for applying a suitable medium to the under surfaces of the end portions C of the bags to soften the adhesive on the upwardly presented side of the tape E passing over the disc 32. This device, as shown here, comprises a thin disc 38 fixed on a shaft that is journaled transversely in the frame 20, with a sprocket wheel 70 fixed on its forward extension. A sprocket chain 71 passes around the second sprocket wheel 67 on the disc shaft 30; so that by this means the above described apparatus, driven by the bag-making machine, drives the latter apparatus for applying the adhesive softening medium.

Above the applying disc 68 is the top roller 72 for pressing the portions C of the bags down onto the disc 68. It is mounted on a shaft 63, journaled transversely in a bearing block 74, which is adjustable up and down in the slot of a guide 75 upstanding from the top of the frame 20. This block 74 may be held at any adjustment by the clamp nut 76. The lower part of the applying disc 68 dips in a reservoir 77 holding a supply of the softening medium.

It will be understood that the effective diameter of the disc 32 and its segment 33 is so proportioned to the spacing of the bags A as they travel through the machine that the advanced end of the tape will be registered with the advanced edge of each bag to which it is to be applied; and the distance from the advanced end of the frictional segment 33 to the cutter 34 at its other end will be equal to the width of the bag along the portion C thereof. For operating upon bags of different widths, longer or shorter segments 33 are substituted on the disc 32.

The cutting is done as the cutter 34 passes the upper roller 35; the cutter being so adjusted that it just cuts through the tape without material dulling contact with the metal roller, as is known in the art. The purpose of the lower roller 43, having a periphery of rubber or the like, is to coact with the segment 33 in frictionally drawing the tape from the coil on the reel 50; this withdrawal being controlled by the 70 spring 49 on the tape guide. Also, this lower roller 43 holds the remaining end of tape in position, and the next time the advanced end of the segment 33 passes this lower roller 43, the feed of the tape for the next bag begins.

When a piece of tape has been cut off by cutter 34 and roller 45, the part of the disc 32 not covered by the frictional segment 33 fails to coact with the lower roller 43; so that the withdrawn and severed tape will always be of the same length as the segment 33. Therefore it is only necessary to register the advanced edge of each bag A; whereupon with the proportioning of the disc 32 and its segment 33 to the spacing of bags as they travel on the bag-making machine, as before mentioned, a length of tape E equal to the width of the bag will be applied to each bag. Since the bag-making machine definitely spaces the bags by its pins 33, seen at the upper left of Fig. 6, this proportion will always be maintained.

The pressing rollers 52 and 54 press the tape and bag portions C closely together, completing the adhesion of the tape and bag. The bags then, with the tape on them as seen in Fig. 2, pass through the remainder of the bag-making machine and are delivered therefrom. Some kind of medium with more body than water is preferable for application by the disc 68 to the cellulosic material A'; since the cellulosic material is very thin and delicate. Such a medium may be a thin adhesive which will mix with and soften the adhesive on the tape E; which in turn is of a suitable kind to securely fasten the tape E to the cellophane. I am able to obtain suitable adhesive tape and suitable medium on the market and am able to securely fasten the adhesive portion to the bags by the bag-making machine.

Cellulosic material is tougher than the materials of which the tape may usually be made, but it is of a more delicate nature. It is not susceptible, for instance to the serrated cutting usual in paper bags; and my method and apparatus is especially suited for this material because it is not necessary to cut it with such serrated or notched edge. Cellulosic material with such notched edge is extremely liable to start tears at the notches. I have, therefore, by my improved method and apparatus afforded a practical enclosure or bag of such delicate material, with closure means which does not involve these difficulties with the use of such material.

It will be understood that my invention is not limited to the application of a tape to merely one end of a bag body. In some cases, tubular flat bodies of sheet material, such as cellulosic sheet material or other sheet material, are supplied with both ends open, for reasons of convenience in inserting the contents into them; in which case it is necessary for the user to close both ends of the tube. In such cases, the flat tubes may be provided with both ends open and with flaps at the respective ends, according to my invention.

The manufacture of such tubes with both ends open and with flaps at the two ends will be understood to be a mere variation of the specific methods herein disclosed; and the machines for carrying it out may be constructed without the folding means 17 and 18, with flap attaching means at both sides of the path of travel of the tubular bodies; or, for instance, the machine illustrated, and which is the subject of my copending application before mentioned, may have the bottom folding means 17 and 18 removed, leaving one end open while the opposite end has the tape attached by my improved mechanism attached to the machine as shown; and then the tubular bodies may be run through the machine with

first mentioned ends that were left open now passing through my flap applying apparatus. It will be understood, therefore, that by flat tubular bodies, I refer either to flat bag bodies each with one closed end, or to similar bodies, but having both ends open. In the latter case, the body becomes a bag as soon as the user closes one end with the tab that has been applied to it.

It will also be understood that, with certain materials, it is not necessary that the tape itself have adhesive thereon, but that adhesive may be applied to the end portion of the bag or tubular body to which the flap-forming tape is to adhere, as the only adhesive for forming such attachment. On the other hand, with certain materials, it is not necessary that moistening medium for the adhesive coated tape be applied to the end portion of the bag or tubular body; but that the portion of the width of the adhesive coated side of the tape may be softened by the application of moisture thereto as it is fed to the applying means. Also, the tape may be merely plain, and adhesive may be applied to the desired portion of its width to effect the attachment. It is sufficient for the purpose of, and within the scope of my invention, that the adhesive may in some way be brought between the end portion of the bag or tubular body and the desired portion of the width of the tape that is to be attached to said end portion.

Other modifications may occur, and although I have rather specifically illustrated and described a preferred example of my method and apparatus and of the bags made thereby, it will be understood I am not limited to such precise disclosure, but what I claim as new and desire to secure by Letters Patent is:

1. The method of providing a flat tubular body with a closure flap which comprises passing the body along with its end portions parallel with the direction of passage, applying a softening medium for an adhesive to one side of at least one open end portion in the course of passage, and, in the course of continued passage of the bag body, applying to said side of said end portion a portion of the width of a tape coated with said adhesive, with another portion of the width of said tape extending past said mouth portion.

2. The method of providing a flap on a flat tubular body, at least one side of which is of cellulosic material, which comprises applying medium to a portion of the cellulosic material in the region of at least one open end of the body which will soften the adhesive on a certain adhesive tape, and then bringing into contact said portion of the cellulosic material and a portion of the width of said adhesive tape, with another portion of the width of the tape left extending beyond the end of the body, with its adhesive in unsoftened condition, ready to be folded over said end and sealed to the opposite side of the body when it later has the adhesive on said other portion of said width softened.

3. The method of providing a flap on a flat tubular body at least one side of which is of cellulosic material, which comprises applying a medium to a portion of the cellulosic material in the region of at least one open end of the body which will soften the adhesive tape, and then bringing into contact said portion of the cellulosic material and a portion of the width of said adhesive tape, with another portion of the width of the tape left extending beyond said end of the body, with its adhesive in unsoftened condition, ready to be folded over said end and sealed to

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the opposite side of the body when it later has the adhesive on said other portion of said width softened, said method also comprising the step of feeding the tape from a coil of said tape to be applied as aforesaid to the bodies successively passing said coil of tape.

4. The method of providing a flat tubular body with a closure flap which comprises applying a medium to a portion of one side of the body near at least one open end thereof which will soften the adhesive tape, and then bringing together the portion of said body to which the softening medium has been applied and part of the width of a piece of said adhesive tape, with another part of said width extending beyond the mouth of the bag body, said softening medium and said piece of tape being applied in succession as the body passes along with said portion of the one

side of the body parallel with the direction of passage.

5. The method of providing closure flaps for the open end of flat tubular bodies which comprises passing the bodies along with their open end portions parallel with the direction of passage, measuring out and severing tape in timed relation to the passage of the bodies, applying the severed pieces of tape in registry with said end portions as the bag bodies pass along, and with only part of the width of each tape piece in contact with a respective end portion, and other part of the width extending beyond the end portion, and securing the contacting body and tape portions together in the course of said passage.

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