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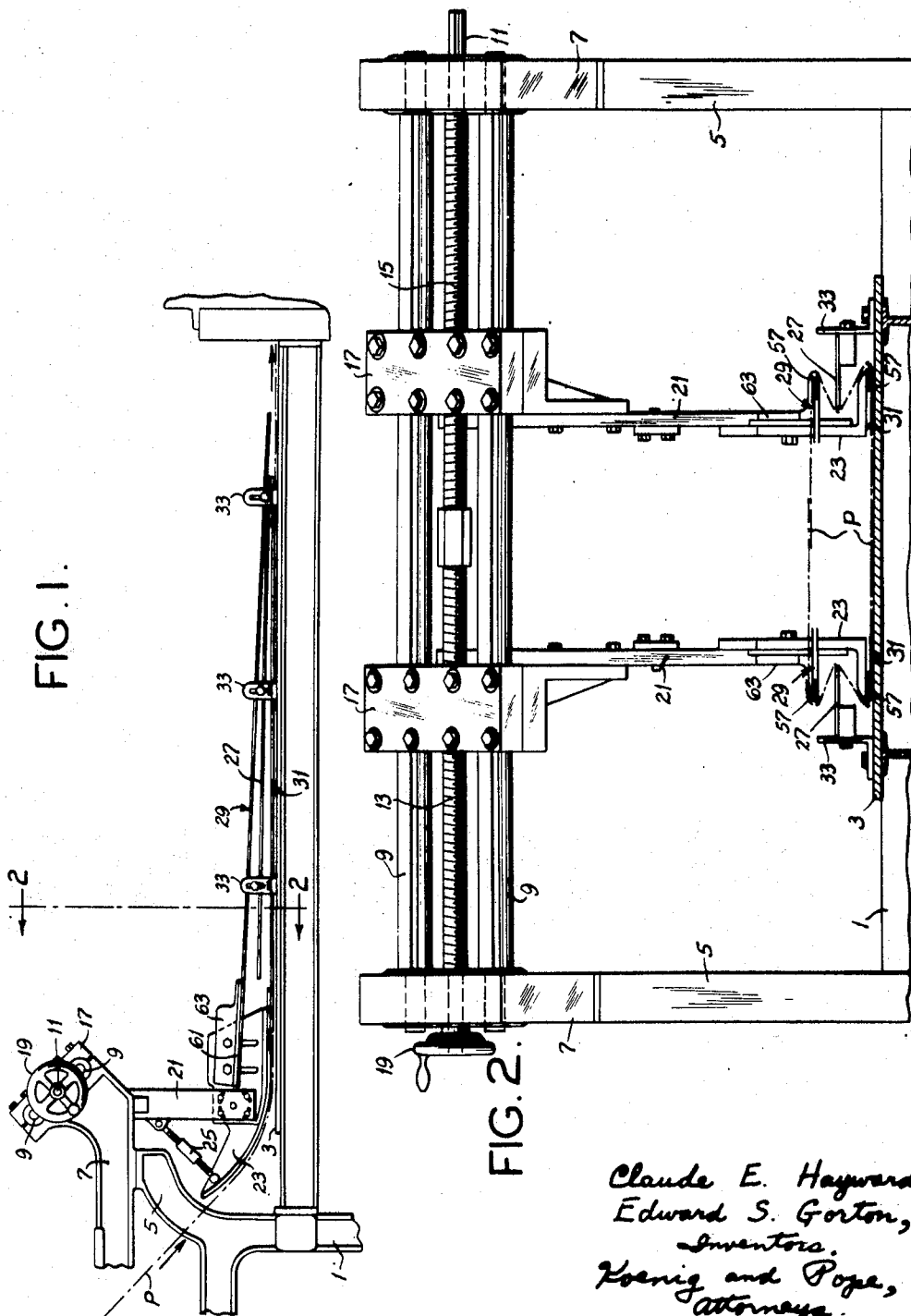
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APPARATUS FOR FORMING TUBING FOR BAGS OR THE LIKE

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FIG. 1.



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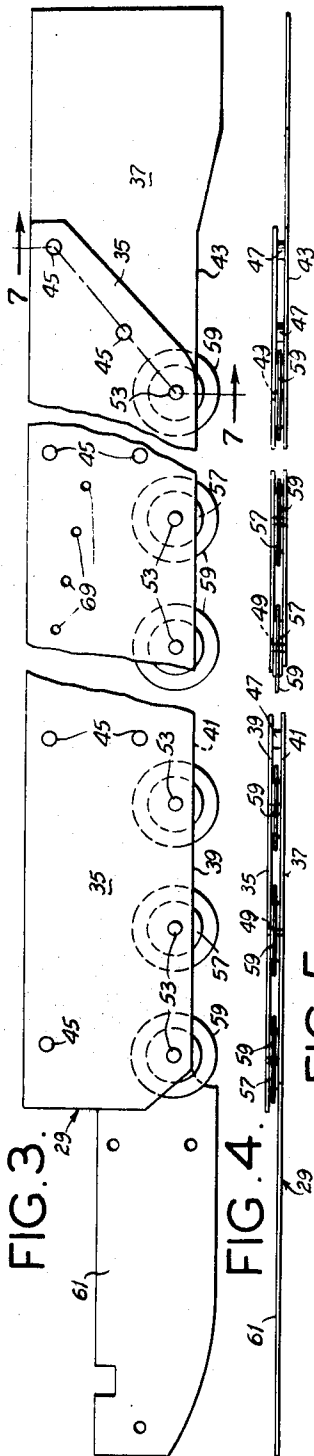
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APPARATUS FOR FORMING TUBING FOR BAGS OR THE LIKE

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1 Claim. (Cl. 93—20)

This invention relates to apparatus for forming tubing for bags or the like, and more particularly to apparatus for forming paper coated with plastic or other moisture resistant material or paper laminated together with plastic or other moisture resistant material into tubing with the coated or laminated paper on the inside and constituting a moisture-proof liner.

At the present time, a moisture-proof bag for which there is a demand is one made of kraft paper having a moisture-proof plastic film, of polyethylene or the like, on the inside and constituting a moisture-proof liner. Considerable difficulty has heretofore been encountered in the manufacture of such bags as it has been found that in many instances the lining is ruptured along the bag creases. We have found that such rupture occurs during the operation of forming the plastic-coated paper into tubing, resulting from excessive heating and consequent melting of the plastic along the bag creases generated by friction as the bag material is drawn along and rubs against the edges of the inside former blades of the tuber. The principal object of this invention is the provision in a tuber of inside former blades which, while being of the necessary thinness required for forming the tubing creases, reduce rubbing friction to such an extent as to eliminate overheating of the coating or laminant and thus eliminate rupture of the moisture-proof liner. Other objects will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of which will be indicated in the following claim.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated, Fig. 1 is a side elevation illustrating a tuber in which inside former blades of this invention are used;

Fig. 2 is an enlarged vertical transverse section taken on line 2—2 of Fig. 1;

Fig. 3 is a plan of an upper inside former blade, parts of which are broken away;

Fig. 4 is a side elevation of Fig. 3;

Fig. 5 is a plan of a lower inside former blade, parts of which are broken away;

Fig. 6 is a side elevation of Fig. 5;

Fig. 7 is an enlarged transverse section taken on line 7—7 of Fig. 3; and

Fig. 8 is an enlarged transverse section through the inside and outside former blades of the tuber and showing the tubing.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings, Figs. 1 and 2 illustrate a tuber having a frame 1 and a bed 3. The tuber is of known construction, apart from the inside former blades of this invention, hence full detailed description of the tuber is omitted. Those skilled in the art will readily recognize its construction. For the purposes of this description, it will suffice to say that the tuber has side supports 5 for a pair of bearing blocks 7. The latter are located above the rearward end of the bed 3 (as related to the direction of travel of the material being formed into a tube). A pair of rods 9 are fixed at their ends in blocks 7. A shaft 11 is journaled at its ends in the blocks. The shaft has oppositely threaded portions 13 and 15 on opposite sides of its center. A pair of slides

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17 are carried by the rods 9 for transverse adjustment, being threaded on shaft portions 13 and 15. The shaft 11 has a hand wheel 19. By turning the wheel in one direction or the other, slides 17 may be moved closer together or farther apart for making tubing of different widths. Each slide has a depending leg 21 carrying a shoe 23 at its lower end. The rearward end of each shoe is upwardly curved and is braced by a turnbuckle 25.

A web of paper P having a coating C of polyethylene or the like on one face (see Fig. 8) is drawn under the shoes 23 and over the tuber bed 3. Folding of the paper into a gusseted tube with the coating on the inside is initiated at the shoes and completed, as the paper travels over the bed, by a pair of outside intucking blades 27 and an upper pair 29 and a lower pair 31 of inside former blades of this invention. The upper and lower inside former blades 29 and 31 establish the tubing corner creases. The intucking blades 27 establish the inner gusset creases. Each intucking blade comprises, for example, a long narrow thin plate supported on the bed by brackets 33.

The two upper inside former blades 29 are inverse duplicates and only one will be described in detail. Each blade 29 (see Figs. 3, 4, 7 and 8) comprises upper and lower long narrow thin metal plates 35 and 37. The upper plate 35 has a long straight edge 39. The lower plate 37 has a long straight edge 41. This edge 41 constitutes the inner edge of a recess 43 in one side margin of the plate 37. The plates 35 and 37 are assembled in generally parallel face-to-face relation with a small space between them and with their straight edges 39 and 41 aligned by means of screws 45 extending through tubular spacers 47. The heads of the screws are countersunk in the upper plate 35 so that they do not project from the upper face of blade 29.

Each blade 29 is provided with a series of short shafts 49 mounted at their ends in the plates 35 and 37 extending transversely to the plane of the blade. The shafts all lie in a common plane perpendicular to the plane of the plates 35 and 37 and parallel to their edges 39 and 41. As shown in Fig. 7, each shaft has reduced-diameter ends 51 fitted in countersunk openings in the plates and headed as indicated at 53 to hold it in place. Rotary on a ball bearing 55 on each shaft is a thin flat roller or disk 57. Disks 57 are all identical. Each has a central portion slightly thinner than the space between the plates 35 and 37 and an even thinner rounded-edge rim 59. The diameter of each disk is greater than the distance from its shaft to the aligned edges 39 and 41 of the plates so that the disks project beyond these edges to provide an antifriction edge for the blade 29. The disks are relatively closely spaced; as illustrated, for example, their shafts are spaced less than twice the disk diameter.

The lower plates 37 of blades 29 are longer than the upper plates 35 and project at both ends beyond the upper plates. Projecting ends 61 of the lower plates 37 are fixed to brackets 63 mounted on the shoes 23 with the antifriction disk roller edges of the blades 29 outward for engagement by the coated side of the paper or the laminated paper being tubed. The two blades 29 are tied together by a strap 65 fastened to the blades by screws 67. The screws may be removed for transverse adjustments of the blades, a series of screw holes 69 (see Fig. 3) being provided for accommodating the strap at various blade spacings.

The two lower inside former blades 31 are inverse duplicates of one another and very much like the upper inside former blades 29 except for differences in the shape of their plates. For this reason, the upper and lower plates of blades 31 are designated 35a and 37a. Otherwise, the blades 31 are about the same as blades 29, having the same arrangement of disk rollers 57. Projecting ends 61a of the blades 31 are attached to the soles of shoes 23 with their antifriction disk roller edges outward for engagement by the coated side of the paper or the laminated paper being tubed. Blades 31 are tied together by a strap 65 in the same manner as blades 29.

The upper inside former blades 29 and the lower inside former blades 31 extend forward over the tuber bed 3 from the shoes 23, one blade 29 being above one blade 31, and the other blade 29 being above the other blade

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31. The intucking blades 27 reach in between the pairs 29-31. The disks 57 constitute anti-friction means at the outer edges of blades 29 and 31 for engagement by the coated side of the paper or the laminated paper. As the paper is drawn along the blades, the disks rotate substantially to eliminate rubbing friction as between the coating or the laminated paper and blades throughout the length of the series of disks. Accordingly, heating and melting of the coating or the laminant is avoided, and rupture-free tubing is produced.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

We claim:

In a tuber for forming gusseted tubing from a web of paper having a plastic film on one side with the film on the inside of the tubing, said tuber comprising a pair of intucking blades, a pair of upper inside former blades, and a pair of lower inside former blades, each of said

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former blades comprising a pair of long narrow thin plates each having a long straight outer edge, the plates being assembled in generally parallel relation face-to-face with a small space there between and with their said straight outer edges aligned, a series of short shafts mounted at their ends in the plates extending transversely with respect to the plane of the plates and all lying in a common plane perpendicular to the plane of the plates and parallel to said aligned straight outer edges, and a disk thinner than the space between the plates rotary on each shaft and having a diameter greater than the distance from each shaft to said aligned outer edges of the plates, the disks thereby projecting beyond said aligned outer edges of the plates to constitute an anti-friction blade edge.

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