Dec. 19, 1939. F. J. COTY 2,184,233

APPARATUS FOR MAKING PAPER BAGS

Filed May 13, 1936 2 Sheets-Sheet 1

Fig. 2.

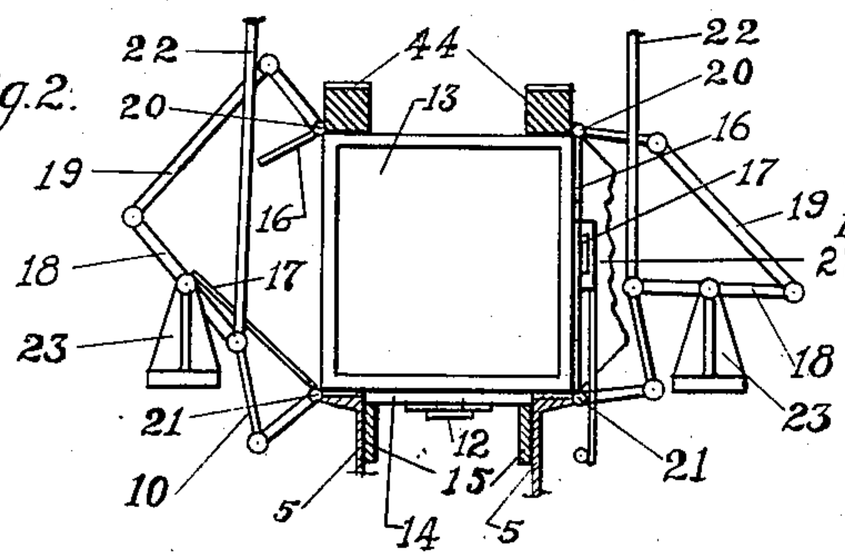


Fig. 3.

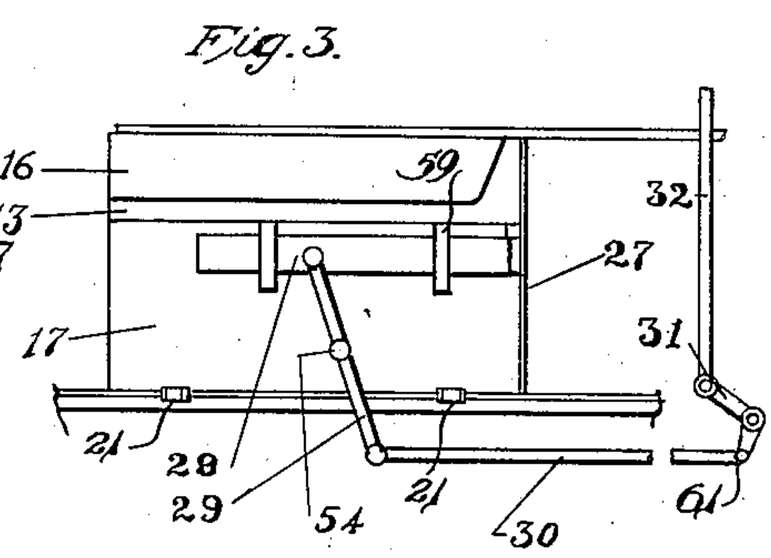


Fig. 1.

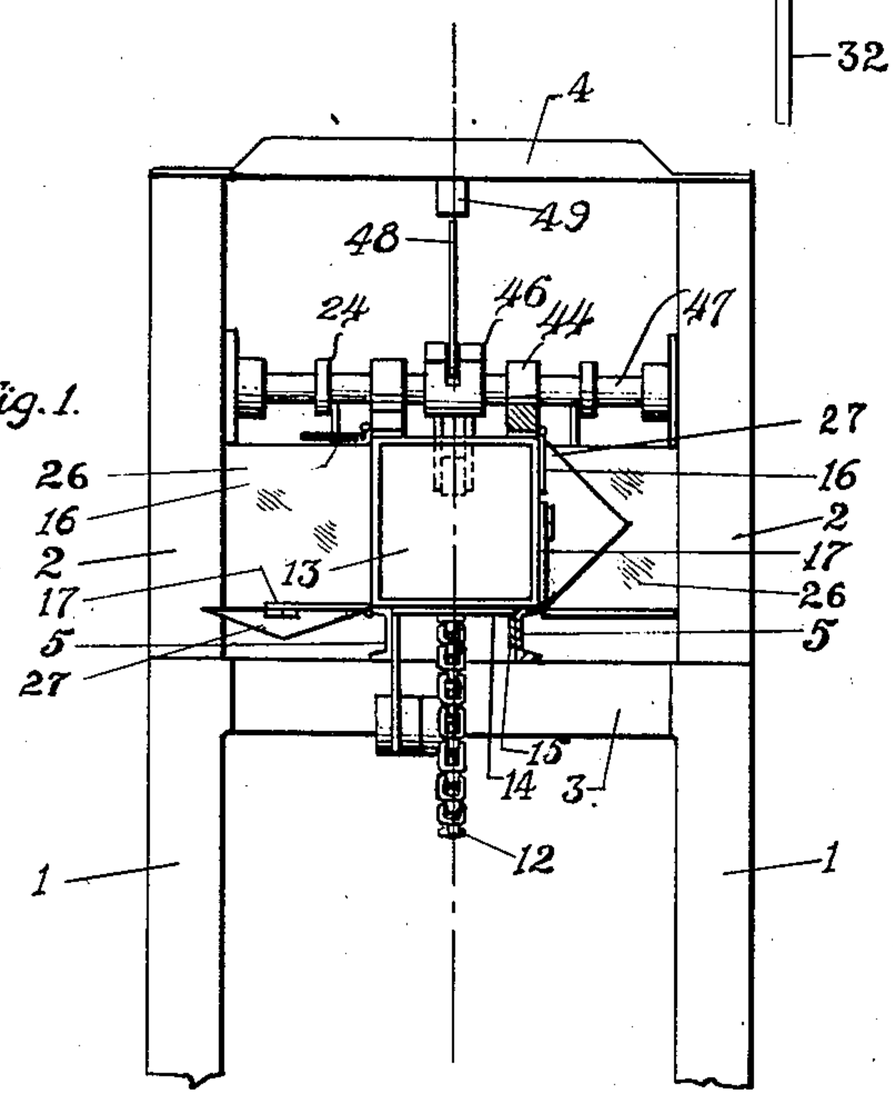
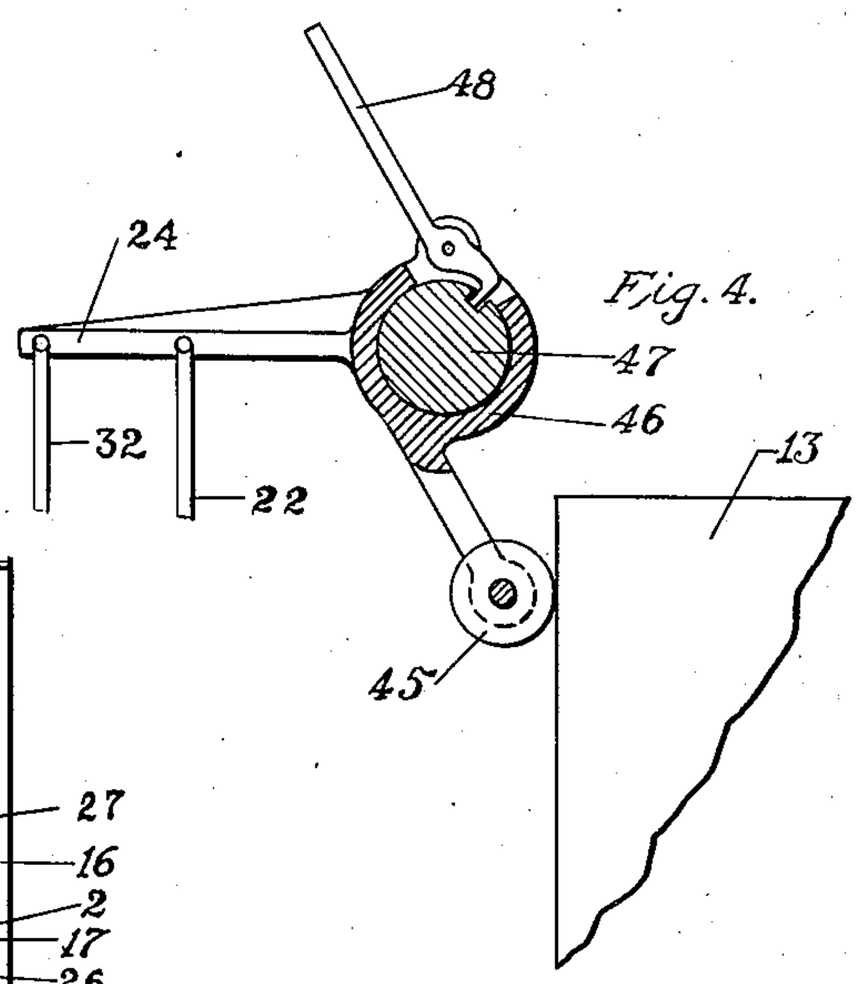


Fig. 4.



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Filed May 13, 1936 2 Sheets-Sheet 2

Fig. 5.

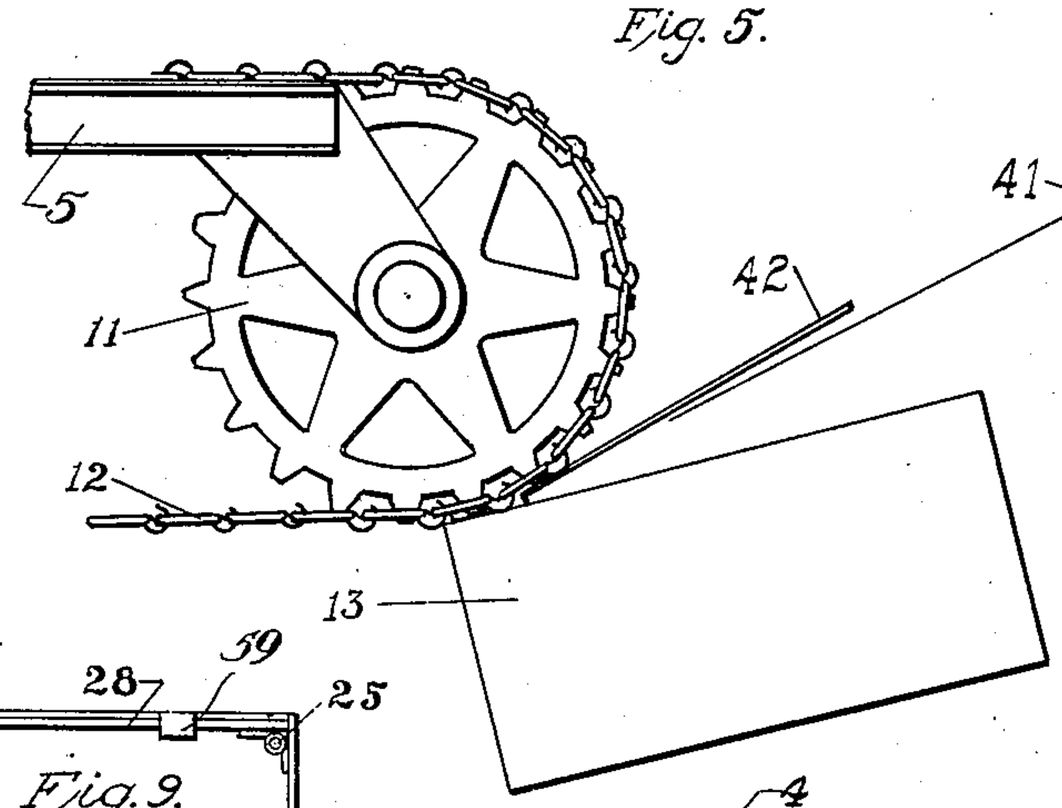


Fig. 8.

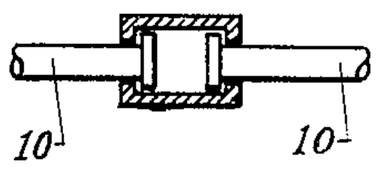


Fig. 9.

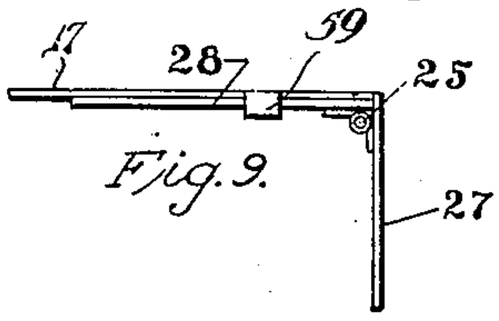


Fig. 6.

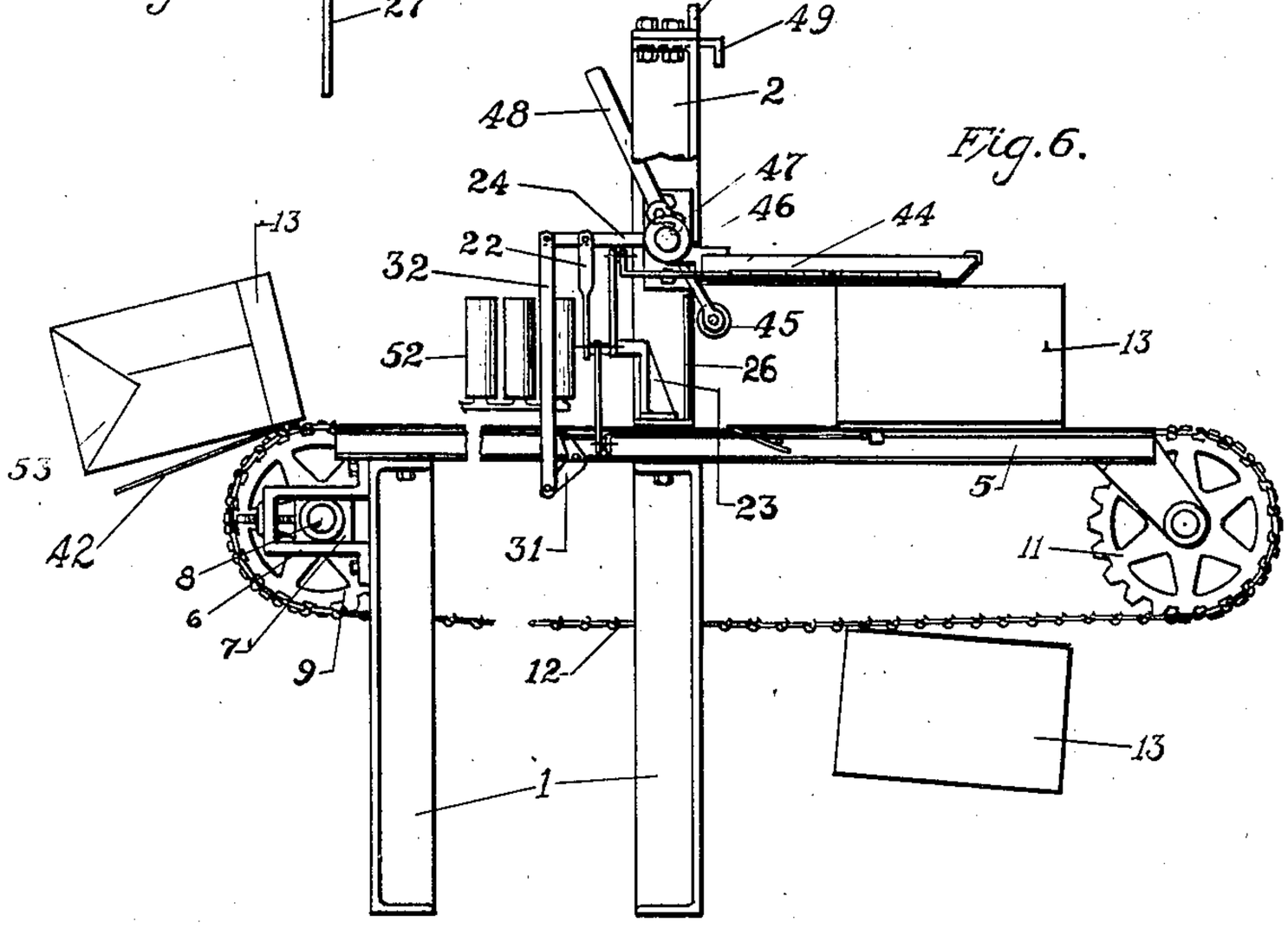
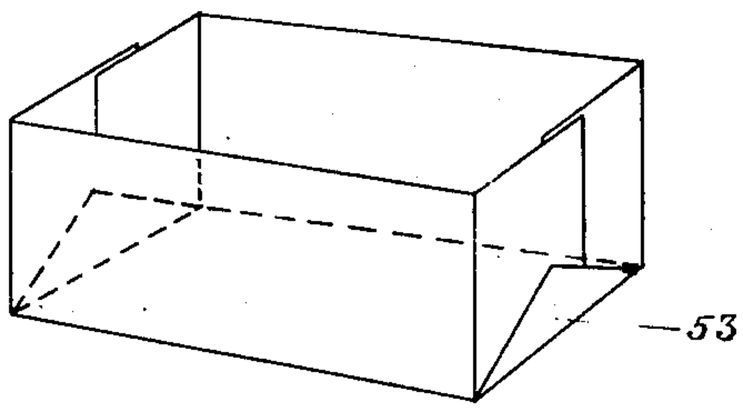


Fig. 7.



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Patented Dec. 19, 1939

2,184,233

UNITED STATES PATENT OFFICE

2,184,233

APPARATUS FOR MAKING PAPER BAGS

Fred J. Coty, Niagara Falls, N. Y., assignor of one-third to Albert Barney and one-third to Oliver D. Horton, both of Niagara Falls, N. Y.; Fred P. Coty, administrator of said Fred J. Coty, deceased

Application May 13, 1936, Serial No. 79,525

6 Claims. (Cl. 93—12)

This invention relates to apparatus for making paper bags of large capacity in commercial quantities and to methods of making such bags. The type of paper bag for which the apparatus to be described is particularly adapted is that known as the seamless bottom paper bag. The bag has when formed a rectangular transverse section and is adapted to hold large quartities of finely divided material. Difficulties have been encountered in attempts to form such bags with the open end in the uppermost or lowermost position. In accordance with the present invention these bags are formed in my machine with the open end in a vertical plane.

The type of apparatus which I have invented for making these bags will be understood from a study of the accompanying drawings in which:

Figure 1 is an end elevation of a machine for making paper bags, the view being taken from the right of the machine as shown in Fig. 6 and some of the forming mechanism being omitted to avoid excessive detail;

Figure 2 is an elevation partly in section of the bag forming mechanism that is partly shown in the central part of Fig. 1, the scale being somewhat enlarged and the view being taken in the same direction as Fig. 1;

Figure 3 is a fragmentary side elevation showing on an enlarged scale part of the mechanism used in the final forming operation;

Figure 4 is a fragmentary sectional elevation showing an operating shaft for the bag forming mechanism and indicating some of its connections;

Figure 5 is a fragmentary side elevation showing the feed end of the machine and illustrating the method of inserting a paper blank into the machine;

Figure 6 is a side elevation of the machine with part of the upper frame removed to show parts of the folding mechanism the view being directed toward the opposite side of the machine from that seen in Fig. 3;

Figure 7 is a perspective view of the completed bag;

Figure 8 is a detail showing a lost motion connection in one of the arms used to operate folding mechanism; and

Figure 9 is a detail plan view showing a portion of the mechnaism used to operate a flap for completing the folding operation, the mechanism shown belonging to the side of the machine seen in Fig. 3.

Referring to the drawings in detail, a supporting base is shown in Figures 1 and 6 as comprising vertically disposed standards 1. A horizontally disposed member 3 is shown in Fig. 1 as connecting two of these standards to form a lower frame of the machine. Two lower frames are shown in Fig. 6 attached to a rail 5 which extends longitudinally of the machine in a direction at right angles to the transverse member 3. An upper frame comprised of vertically disposed members 2 and a transverse member 4 is also shown in Figures 1 and 6. The upper frame is rigidly attached to the supporting base comprised of the lower frames and their horizontal connections described above. At the left end of the machine, as shown in Fig. 6, brackets 6 are mounted on the base for supporting a shaft 8 that is rotatable in adjustable bearings 7. The shaft 8 is driven by means of a source of power, not shown. The sprocket wheel 9 is keyed to the shaft 8 and drives the chain 12 and the sprocket wheel 11 which is mounted at the opposite end of the machine from the driving sprocket wheel 9. The sprocket chain 12 carries a plurality of forms or cases 13 each having the general form of a parallelopiped. These forms are used in shaping the paper bags as will be described in detail below. Each form 13 is attached near one end to the sprocket chain by means of bracket links and a mounting plate 14. In Figure 1 a form 13 is shown as mounted on a plate 14 which rides between side rails 5 and on guides 15 when the form 13 is traversing the upper horizontal portion of its path where the bag is formed. In Figure 6 a form 13 is indicated on the upper side of the sprocket chain in a position where it is approaching the folding mechanism in its movement toward the left.

The folding mechanism is shown in most detail in Fig. 2. The wings 16 shown in the upper part of Fig. 2 are used to fold portions of the paper blank downwardly against the form 13. On the left hand side of Fig. 2 the wing 16 is shown in open position from which it can be pressed down against the form 13 by means of the pull rod 22, the lever 18 and the link 19. The wing 16 is part of a bell crank lever that turns on the pivot 20. On the right hand side of Fig. 2 the wing 16 is shown in a closed position, the operating mechanism being of a similar character to that just described. In actual operation it is preferable that the wings 16 fold the opposite edge portions of the paper blank down simultaneously, the showing in Fig. 2 being used to illustrate different positions of the wing 16 in the same view for the sake of clearness. When the pull rod 22 is raised by the clockwise rota-

tion of the shaft 47 and the arm 24 indicated in Fig. 4, the lever 18 is rotated in a counterclockwise direction about a fixed pivot on the base 23, and the link 19 is pulled in a direction to give the bell crank lever a counterclockwise rotation about the pivot 20. This brings the wing 16 down toward the frame 13. Pull of the rod 22 in an upward direction acts a little later (through the lost motion connection in the link 10 indicated in a conventional manner in Fig. 8) to turn the bell crank lever pivoted on the pin 21 in a counter-clockwise direction to bring the wing 17 up toward the frame 13.

The wing 17 is used to fold an edge portion of the paper blank upwardly. The wing 17 forms part of a bell crank member which is pivoted on the pivot 21. This bell crank member is operated by means of the arm 10 which contains a lost motion connection such as is shown in Fig. 8. The object of this lost motion connection is to ensure the proper sequence of movement of the wings 16 and 17 when the rod 22 is pulled up. With the arrangement shown the wings 16 are pushed down first to fold opposite edge portions of the paper blank down on the form 13. This downward folding is followed after a very short interval by the upward folding movement of the wings 17. The fold produced by the wing 17 overlaps the fold produced by the wing 16. These movements of the wings 16 and 17 complete the formation of the bag except for the folding of triangular end flaps which are left projecting from either end of the box as a result of the side folding operations. These end flaps are shown in final position in Figures 6 and 7 where they are denoted by the reference character 53. The folding of the end flaps is assisted by the movement of the wings 27 outwardly into the position shown at the right of Fig. 1 subsequently to the upward movement of the wing 17. The mechanism by which the triangular flaps 27 are moved outwardly from the frame 13 will now be described for one of these wings, the mechanism for moving the wings 27 being similar in each case.

A wing 27 is shown in edge view in Fig. 3 as mounted on the slide 28 which in turn is mounted for horizontal movement in bearings on the wing 17. The train of mechanism which produces the sliding movement of 28 in the bag making operation also includes the arm 24 to which the pull rod 32 (like the pull rod 22) is pivotally connected.

The wings 27 are pivotally mounted or hinged on members 28, one of which is shown as slidably mounted on a wing 17 in Fig. 3. Guides 59 are provided on the wing 17 to permit sliding movement of the member 28 as indicated in Figures 3 and 9. In this view the wing 27 is at right angles to the plane of the paper. In Fig. 1 the wing 17 at the left hand side of the form 13 is shown in open position, the wing 27 depending from it at a small angle. On the right hand side of the form 13 the wing 17 is in closed position and the wing 27 is approximately at right angles to the wing 17. After the wing 17 has moved into its closed position by folding an edge portion of the paper blank upwardly against the form 13, the pull rod 32 is moved upwardly and acts through the bell crank lever 31, the link 30 and the lever 29 to slide the member 28 (on the attached wing 17) to the right as seen in Fig. 3. This movement brings the heel of the wing 27 (seen at the upper right hand corner of Fig. 9) adjacent a plate 26 which is shown in a face view in Fig. 1 and in an edge view in Fig. 6. The triangular flap 53 is formed between the wing 27 and the plate 26, the wing 27 being forced into the position shown in Fig. 9 and indicated roughly in the right hand part of Fig. 1, this movement being caused by the reaction of the plate 26 on the heel of the wing 27 which is shown in Fig. 9 adjacent the hinge 25. As the form 13 continues to the left the triangular flap 53 is forced inwardly toward the form 13, and the wing 27 is left behind as the flap 53 is squeezed between the plate 26 and the form 13. The plate 26 is stationary, being rigidly mounted on the frame 2. The wing 27 has as indicated above a sliding movement which it shares with the slide 28 in addition to the turning movement about the pivot 25 on the slide 28. The joint 61 (indicated in Fig. 3) is a ball and socket joint which allows the member 29 to rotate about the hinges 21 with the wing 17.

Adhesive can be applied to those portions of the paper blank which are brought together during the folding operations. This adhesive can be applied to the blank before it is fed to the machine or it can be quickly applied by a workman to one of the edges of the blank shortly before it is pressed against another edge to which it is to be joined. Similarly the inner surface of the triangular flap 53 may be brushed with liquid adhesive shortly before it is pressed against the side of the bag that has been already formed by the action of the wings 16 and 17.

After the form and the bag folded thereon have passed the plate 26 they are adjacent the heaters 52 which hasten the hardening of the adhesive. The finished bag is shown in side elevation at the left of Figure 6. At this stage the bag may be pulled off from the form 13 or it may be allowed to fall off under the influence of gravity as it passes downwardly adjacent the pulley 9.

Figure 6 shows a locking dog 48 which keys the sleeve 46 to the shaft 47 during the folding operations described above. After the folding operations have been completed the upper end of the dog 48 strikes the fixed member 49 shown at the top of Fig. 6. The force exerted by the projection 49 on the dog 48 releases it from the shaft 47 and the latter is turned in a counterclockwise direction by the weight of the arm 24 and its dependent connections as soon as the form 13 has passed under the pulley 45. The dog 48 can be brought back into locking position with respect to the shaft 47 (as seen in Fig. 4) by spring action or by gravity.

As each form 13 reaches the position shown in Fig. 5 adjacent the right hand sprocket wheel a paper blank 41 is fed into the machine as shown in Fig. 5 and is held against a face of the form 13 (the face adjacent the sprocket chain) by means of grippers 42. As the form moves up around the sprocket wheel shown in Fig. 5 the free end of the blank may be folded around the leading or advancing end of the form 13. As the form 13 and the attached blank pass under the frames 44 and over the rails 5 as indicated for example in Fig. 2. The leading end of the form is now covered with the blank, the portion in contact with the leading end becoming later the bottom of the bag. The portions of the blank which are pressed against the top and bottom faces of the form become two opposite sides of the bag, these opposite sides containing no glued joints. The ends of the bag contain the glued joints and are formed by the action of the folding wings 16, 17 and 27 as described in detail above. The general type of bag formed by the

operation of my machine on a succession of paper blanks is illustrated in perspective in Fig. 7, the dimensions there shown not being intended to correspond in exact proportions to the dimensions of the form 13 indicated in the drawings.

The bag produced by my apparatus has great utility as a container for light weight materials such as wool, cotton, solid carbon dioxide, etc.

One of the principal advantages of my apparatus lies in its compactness, especially in the case of the folding mechanism. The wings 16, 17, and 27, which are among the most important parts of the folding mechanism, all derive their motion from the arm 24. The folding movement of the wing 16 is in a vertically downward direction. This fact makes it comparatively easy to initiate this series of folding operations against the sides of the form 13, as it moves in its upper path as indicated in Fig. 6.

A number of variations can be made in the form and arrangement of my apparatus without changing my general method of manufacture of paper bags or without departing from my invention which is defined within the compass of the following claims.

I claim:

1. Apparatus for making paper bags and the like comprising a pair of sprocket wheels, a chain carrier driven by said sprocket wheels, a plurality of forms on each of which a bag is to be formed, the forms being attached to said carrier adjacent one edge of each form, grippers for holding a paper blank in contact with one face of the form, stationary means for drawing the paper blank over one end of the form and over the face of the form opposite to said first mentioned face, means operated by the continued motion of the form and attached blank for folding projecting portions of the blank against faces of the form disposed between the two faces of the form that have already been covered and for forming triangular end flaps of the residual portions of the paper blank, and means for folding said triangular flaps against the faces of the form last covered, thus completing the forming of the bag.

2. Apparatus for making seamless bottom paper bags having a rectangular cross-section when formed, said apparatus comprising a pair of sprocket wheels, a sprocket chain driven thereby, a plurality of forms mounted on said sprocket chain adjacent an edge of the back end of each form, means for holding a portion of an edge of a paper blank against the face of the form which lies nearer to the sprocket chain than the other faces of said form, a stationary member disposed outside the sprocket chain in such position that it draws the paper blank over the leading end of the travelling form and over a face of the form opposite to the first mentioned face, lateral extensions of the paper blank being left projecting away from the form as it passes said stationary member, wings set in motion by pressure of the leading end of the form and blank for folding successively the lateral extensions of the blank against the faces of the form disposed between the faces already covered, and means for compressing residual triangular flaps against the sides of the paper bag last folded against the form, thus completing the forming of the bag.

3. Apparatus for making paper bags of rectangular cross-section comprising a sprocket chain mounted for continuous movement in engagement with a pair of pulleys, a form in the shape of a rectangular parallelopiped attached to said sprocket chain at one of its rear edges, rectilineal guides for said form disposed on either side of the horizontal upper stretch of the sprocket chain, a plate disposed above said guides in such position that the form and an attached paper blank are carried by the sprocket chain between said guides and plate in close contact therewith, the central portion of the paper blank being stretched across the leading end of the form and the remaining portions of the blank extending horizontally across the upper and lower surfaces of the form and for some distance beyond the lateral edges of said upper and lower surfaces, an operating lever disposed above said guides and having one end projecting into the path of the form as the latter is passed between said guides and the plate above them, a horizontal shaft disposed perpendicularly to the path of the form, a dog pivotally mounted on said operating lever in such a way as to lock the lever to the shaft while the bag is being formed, a pair of wings operated by the pressure of the leading end of the form against the lever and the consequent rotation of the shaft which causes the depression of said wings for folding the upper projections of the paper blank down on the sides of the form, a second pair of wings subsequently operated in a similar manner to fold the lower projections of the paper blank up against the sides of the form and overlapping the downwardly folded edges, a third pair of wings which are caused by rotation of said horizontal shaft to push remaining portions of the paper blank into triangular flaps extending at an angle to the form, and stationary side members between which the form is passed subsequently to the formation of the triangular flaps and which press said flaps against the sides of the bag that have been folded against the sides of the form.

4. The apparatus described in claim 3 in which lost motion connections are provided between the wings of the second pair and their operating levers and between the wings of the third pair and their operating levers to give the sequence of wing movements.

5. The apparatus described in claim 3 in which lever mechanisms are provided between the shaft on which the operating lever is mounted and the first, second and third pairs of wings respectively.

6. The apparatus described in claim 3 in which the wing used to turn the triangular flap is rotated by means of a member slidably mounted on the wing used to fold the lower lateral extension of the paper blank against the form.

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