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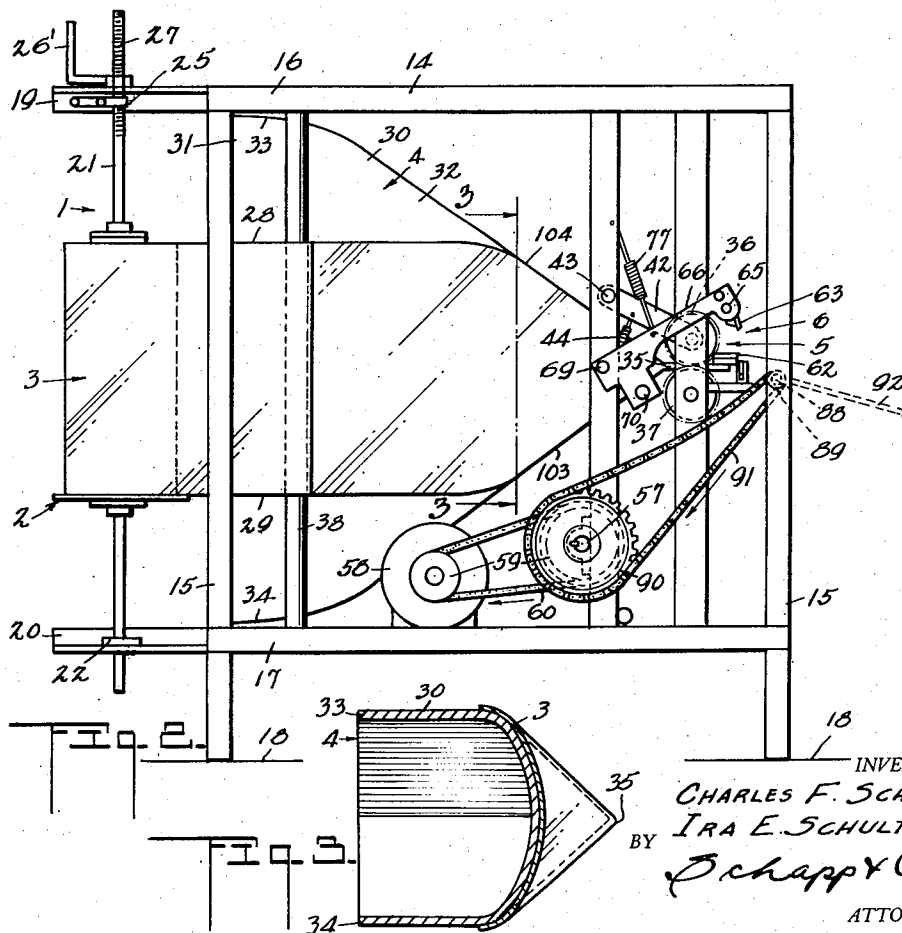
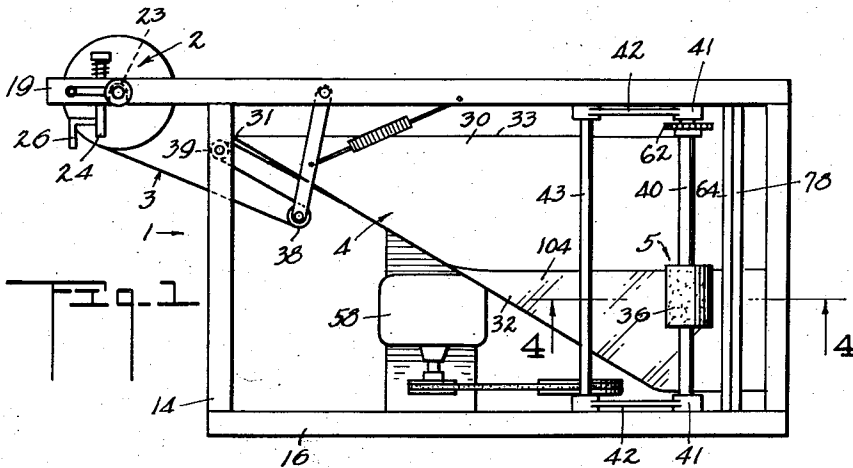
C. F. SCHULTZ ET AL

2,195,583

APPARATUS FOR FORMING BAGS

Filed April 25, 1938

3 Sheets-Sheet 1



INVENTORS.
CHARLES F. SCHULTZ
IRA E. SCHULTZ.

BY
Schapp & Cole
ATTORNEYS.

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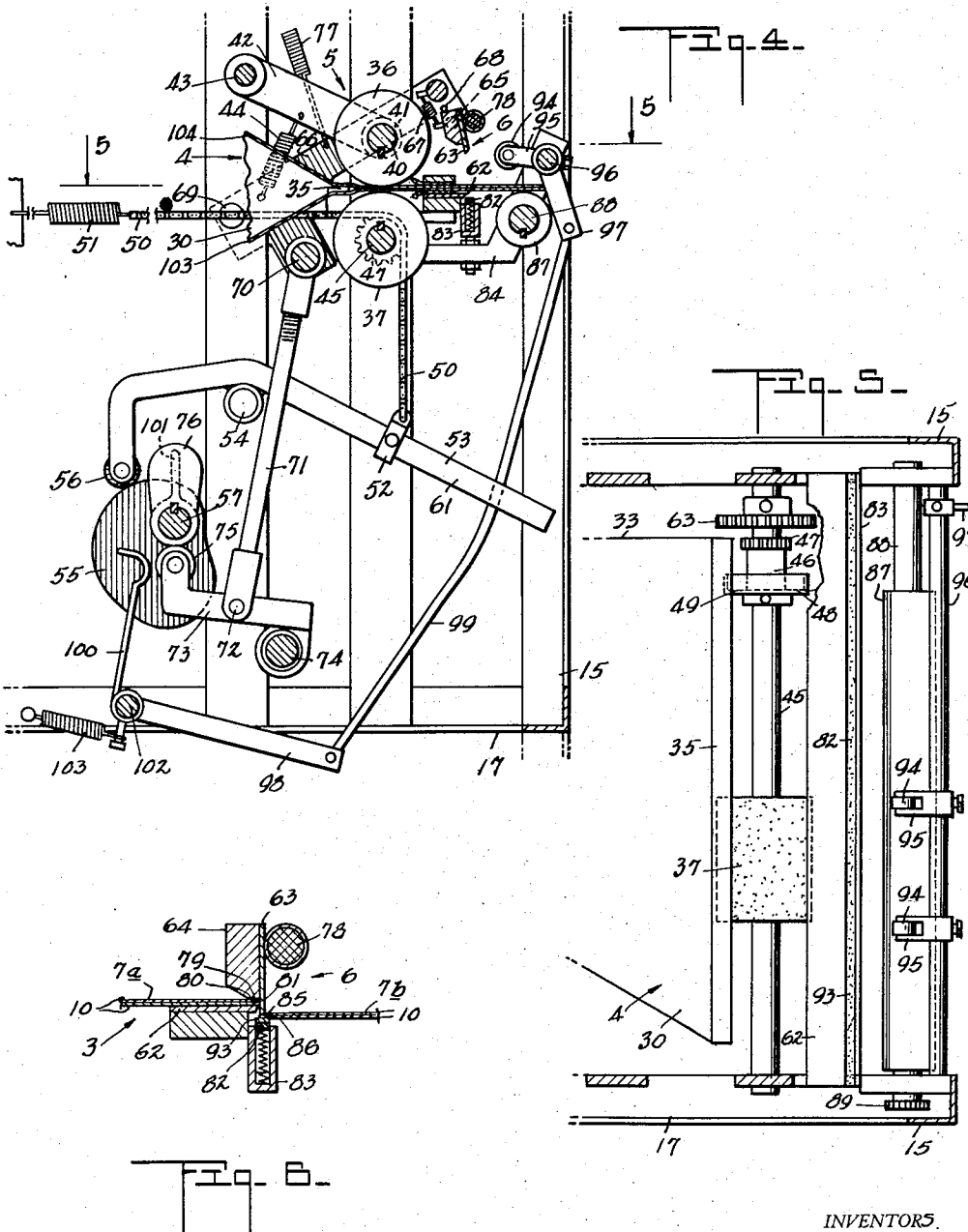
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3 Sheets-Sheet 2



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BY IRA E. SCHULTZ.
Schapp & Cole.
ATTORNEYS.

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3 Sheets-Sheet 3

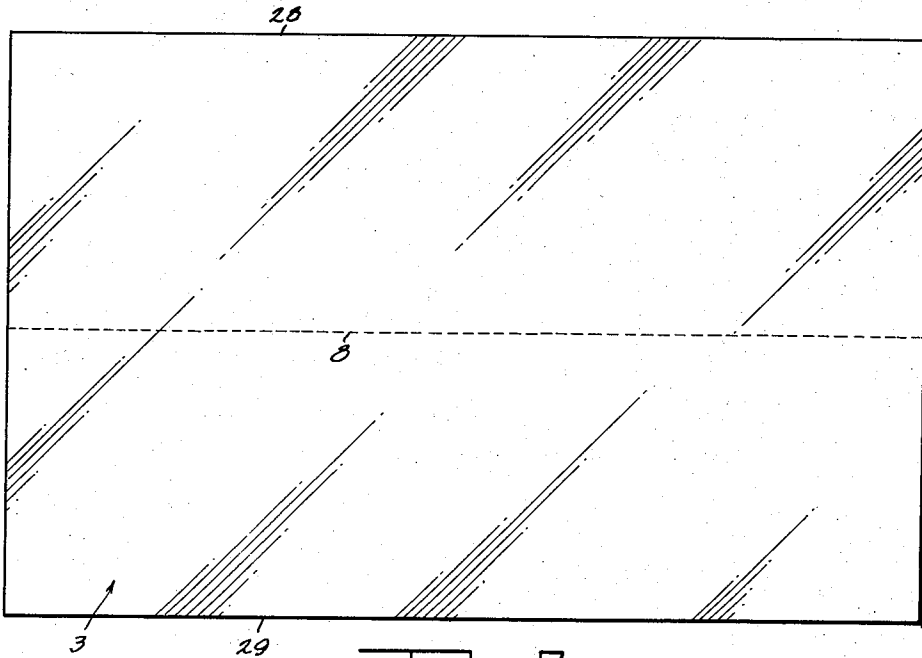


Fig. 2

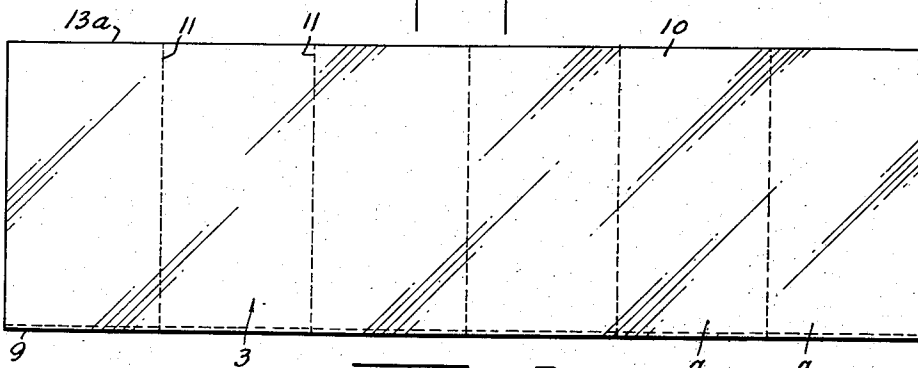


Fig. 9

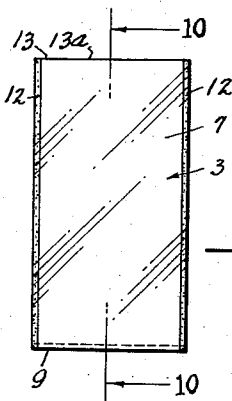


Fig. 8

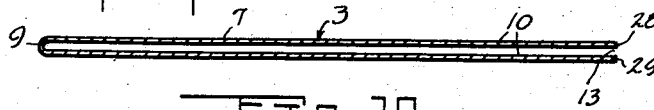


Fig. 10

INVENTORS.
CHARLES F. SCHULTZ.
IRA E. SCHULTZ.
BY Schapp & Cole
ATTORNEYS.

UNITED STATES PATENT OFFICE

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APPARATUS FOR FORMING BAGS

Charles F. Schultz and Ira E. Schultz, Oakland,
Calif.

Application April 25, 1938, Serial No. 204,022

3 Claims. (Cl. 93—18)

The present invention relates to improvements in an apparatus for forming bags, and has among its objects the production of an improved bag in which various articles of merchandise may be packed.

It is proposed to provide a bag that is durable in character, and which is made of suitable material for protecting the merchandise contained therein against the entrance of moisture or foreign matter. The bags which are made in accordance with our method will withstand rough handling without breaking.

More particularly we propose to manufacture bags from suitable fusible material, such as rubber hydrochloride sheet. It should be understood, however, that we do not wish to be restricted to any particular type of material. We find from practice that rubber hydrochloride sheet is pliable and sections thereof may be readily fused together in our apparatus and by utilizing our process.

A further object of our invention resides in the manufacturing of bags by an improved method, in which individual bags may be formed from a roll of sheet material, or the like, in a continuous process. The sides of the walls in each bag are firmly bound together by fusing, which will withstand considerable strain without rupture.

A still further object is to provide apparatus for forming the bags from fusible sheet material, in which the fusing of the walls of each individual bag together is accomplished during the cutting of the bags from the sheet material.

It is further proposed to provide an apparatus for carrying out the steps of our method, which is automatic in action and which will manufacture the bags at a relatively low cost, while maintaining a high standard product.

Moreover, we propose to arrange an apparatus in such a manner that bags of various sizes and shapes may be formed on the same apparatus, the latter being adjustable for changing from one size to another.

Other objects and advantages of our invention will appear as the specification continues, and the novel features of our apparatus will be particularly pointed out in the claims hereto appended.

For a better understanding of our invention reference should be had to the accompanying drawings, forming part of this application, in which:

Figure 1 is a plan view of an apparatus embodying our invention;

Figure 2 a front elevation thereof;

Figure 3 a transverse sectional view taken along line 3—3 of Figure 2;

Figure 4 an enlarged sectional view taken along line 4—4 of Figure 1;

Figure 5 a horizontal section taken along line 5—5 of Figure 4, parts being shown in plan view;

Figure 6 a transverse sectional view taken through the blades of our cutter illustrating the cutting and fusing action of the blades;

Figure 7 a blank sheet of material from which our bags are formed;

Figure 8 illustrates the same sheet after it has been folded back upon itself along a line extending lengthwise of the sheet;

Figure 9 a plan view of one of the completed bags; and

Figure 10 an enlarged sectional view along the line 10—10 of Figure 9.

While we have shown only the preferred form of our invention we wish to have it understood that various changes or modifications may be made within the scope of the annexed claims without departing from the spirit of the invention.

In carrying our invention into practice we provide an apparatus indicated generally at 1, and including in its structural features, a spool 2 for supporting a roll of sheet material 3, a folding device 4 adapted for folding the sheet back upon itself, a sheet advancing means 5, and a combined cutting and fusing mechanism 6 for forming the bags from the folded sheet.

Referring now to Figures 7 to 10, inclusive, it will be noted that we have illustrated a section of the sheet material 3 from which a number of individual bags 7 may be formed. The material 3 is folded back upon itself long a line 8, which extends lengthwise of the sheet, and this is accomplished by the folding device 4 in the manner hereinafter set forth.

The sheet thus folded presents a closed end 9 and confronting walls 10 for a plurality of bags. As the folded sheet passes through our apparatus, the sheet is cut transversely from edge to edge as indicated by the dotted lines 11 in Figure 8 to provide individual bags. This cutting is done by the combined cutting and fusing mechanism 6, and the latter fuses the marginal portion 12 of the confronting walls of each bag together along the sides of the bag. The tops of the bags are left open as at 13 (see Figure 10) for the insertion of merchandise therein.

We have found from practice that the commercial product known as "Pliofilm", which is a

rubber hydrochloride sheet, is particularly adapted for use in carrying out our method. The material may be obtained in various widths and weights and two sections thereof may be easily fused together. This material is mentioned only by way of illustration and we again point out that we do not wish to be limited to this particular material.

In Figures 1 and 2 we disclose a supporting structure 14 on which our apparatus is mounted, and including four upright posts 15, a horizontally disposed upper rectangular frame 16 secured to the top of the posts by any suitable means, and a lower rectangular frame 17 mounted on the posts above the floor 18.

The frames 16 and 17 have rearwardly projecting extensions 19 and 20, respectively, which are disposed in spaced and parallel relation with respect to each other (see Figure 2). The spool 2 is disposed between the extensions 19 and 20 and is fixed to a vertical spindle 21, the lower end of which is journaled in a bearing 22.

The upper extension 19 has a notch 23 formed therein for rotatably receiving the top section of the spindle. For holding the spindle in the notch 23 we provide a rod 24 having a lug 25 thereon (see Figure 2) that normally overlies the spindle. A crank 26 may be used to turn the rod 24, and this will allow the lug 25 to be moved into a position for clearing the spindle and permit the spindle to be withdrawn from the bearing 22 and the notch 23 when it is desired to change the supply of material on the spool 2.

For the purpose of raising or lowering the spool 2 we provide a crank 26', which is threaded onto the upper end of the spindle as at 27. This arrangement allows the spool to be adjusted axially for positioning the upper and lower edges 28 and 29, respectively, of the sheet material relative to each other as the material is folded back upon itself during the advance over the folding device 4.

In our apparatus the folding device 4 may be fashioned from a substantially rectangular piece of sheet metal 30 or other suitable material. The rear edge 31 of this metallic sheet is mounted vertically and is secured to the supporting frame structure, while the intermediate portion 32 is gradually twisted so as to bring the edges 33 and 34 of the sheet together to present a horizontally-disposed shelf 35 adjacent feed rollers 36 and 37.

As the sheet of material 3 is unwound from the spool 2, it is guided around a yieldingly-mounted vertical roller 38 and is then turned rearwardly again and guided around a second vertically-disposed roll 39 (see Figure 1). The sheet then passes over the outer face of the folding device 4, which automatically causes the sheet to be folded back upon itself to present the closed end 9 and the confronting walls 10 for the bags.

The feed rollers 36 and 37 which form part of the advancing means 5 previously referred to, are intermittently turned for drawing the sheet material 3 over the folding device. The roller 36 is fixed to a transverse shaft 40, the ends of which are journaled in bearings 41 formed in a pair of links 42.

In Figures 1, 2 and 4, we show the links 42 as being journaled at sides of the apparatus on a transversely-extending shaft 43. Springs 44 are connected to the links 42 so as to yieldingly urge the roller 36 toward the roller 37. These rollers are preferably formed with rubber outer surfaces

in order to grip the folded sheet 3 therebetween.

Intermittent movement is imparted to the roller 37 through the mechanism illustrated in Figures 4 and 5. The roller is fixed to a shaft 45 which is arranged parallel to the shaft 40. A sleeve 46 (see Figure 5) is loosely mounted on the shaft 46 and has a gear 47 fastened thereto. The sleeve forms the inner element of a conventional clutch 48 of the unidirectional drive type, the outer element 49 of the clutch being secured to the shaft 45.

Referring to Figure 4 it will be seen that we guide a chain 50 over the gear 47. One end of the chain is anchored to a spring 51 and the other end is fastened to a collar 52, the latter being adjustable along the length of a rocker arm 53. This rocker arm is suitably supported at 54 for swinging movement, which is imparted thereto by means of a cam 55 acting through a roller 56.

The cam 55 is fixed to a main drive shaft 57 and the latter is operated by a motor 58 through pulleys 59 and a belt 60 (see Figure 2). The cam is designed to cause the end 61 of the rocker arm to oscillate up and down as the drive shaft is turned.

On the down stroke of the end 61 of the rocker arm the chain 50 causes the gear 47 to rotate in a clockwise direction in Figure 4, which movement is imparted by the clutch 48 to the shaft 45.

As the shaft 45 is turned, the rollers 36 and 37 coact in gripping the sheet of material therebetween, and a section of the latter is caused to project to the right-hand side of the rollers. The rollers 36 and 37 are caused to rotate in opposite directions by gears 62 (Figure 1) and 63 (Figure 5), which are fastened to the shafts 40 and 45, respectively.

During the return up stroke of the rocker arm end 61 the chain 50 turns the gear 47 in a counter clockwise direction due to the spring 51. The gear 47, however, does not rotate the shaft 45 during this movement on account of clutch 48, which is allowed to idle.

It will be understood that the adjustment of the collar 52 along the rocker arm 53 determines the length of the strip of sheet material 3 that is projected to the right of the rollers 36 and 37 during each down stroke of the arm end 61. This length of sheet material determines the final width of the completed bag. The sheet material 3 is folded back upon itself as indicated in Figure 8 prior to being engaged between the rollers 36 and 37.

The cutting and fusing action now takes place. A stationary cutter blade 62 is mounted to have the double thickness of sheet material 3 pass thereover. We provide a movable cutter blade 63, which coacts with the stationary cutter blade in cutting the sheet material 3 along the lines 11 in Figure 8. These blades preferably taper from end to end so as to cut from one side of the material to the other side as the knives close upon the interposed material.

The movable cutter blade has a bar 64 fixed to its rear face, and this bar has trunnions 65 (Figures 2 and 4), projecting from the ends thereof into sockets which are formed in a pair of arms 66. Springs 67 (Figure 4) tend to swing the bar 64 about the trunnions 65 for the purpose of yieldingly holding the movable cutter blade against the sharpened edge of the stationary cutter blade 62 during the cutting action. A stop 68 (see Figure 4) limits the swinging movement of the bar 64 in a clockwise direction.

The arms 66 are pivotally supported at 69 and a shaft 70 is used to connect these arms together. For actuating the arms 66 and thereby swinging the movable cutter blade 63, we provide a connecting rod 71, the upper end of which is journaled on the shaft 70, while its lower end is pivoted at 72 to a second rocker arm 73. The latter is journaled at 74 at one end and its opposite end carries a roller 75 that rides on the surface of a cam 76 fastened to the main drive shaft 57.

At the proper time the connecting rod 71 is moved downwardly by the cam 76 and this draws the movable cutter blade down over the cutting edge of the stationary cutter blade 62. Further movement of the cam 76 will allow the arms 66 to be raised again by springs 77 (Figures 2 and 4).

The steps for fusing the marginal portions of the confronting walls of the individual bags together along the line of cut is accomplished during the cutting operation. A heating element 78 is fixed to the front face of the movable cutter blade 63 and extends along the entire length of the latter (see Figures 1, 4 and 6). This heating element maintains the blade 63 and the bar 64 in a heated condition during the operation of the apparatus and at a proper temperature for fusing the edges of the bags.

Referring now particularly to Figure 6, it will be noted that the leading edge 79 of the bag 7a is confined between the stationary cutter blade 62 and the lower reduced face 80 of the bar 64 when the latter reaches the limit of its downward movement. Since the bar 64 is maintained at the proper temperature, the confronting walls will be fused together as at 81.

A yielding platform 82 is mounted in front of the stationary cutter blade 62 and below the top of the latter as illustrated in Figure 6. The platform is guided for vertical movement in a channel 83, which is adjustably supported on brackets 84 (Figure 4).

As the movable cutter blade 63 descends, the trailing section 85 is pressed between the lower surface of the blade 63 and the yielding platform 82, which results in fusing the walls 10 of the bag 7b together at 86.

The bags are then guided over a roller 87 at the front end of our apparatus, which is fastened to a rotatable shaft 88. The latter carries a sprocket 89 (Figures 2 and 5) that is driven by a second sprocket 90 through a chain 91. The sprocket 90 is mounted on the main drive shaft 57. The bags are discharged upon any suitable stacking mechanism 92 (Figure 2) after they leave the roller 87.

In actual practice we find that there is a tendency for the bags to adhere to the platform 82. This may be prevented by covering the platform with a strip of fabric 93 (see Figures 5 and 6), and by providing a number of rollers 94 on swingable levers 95, which are arranged to press against the upper surface of the bags and pull the latter away from the platform 82.

The levers 95 are adjustably fixed to a rockable shaft 96 and the latter is oscillated by an arm 97, which is connected to a second arm 98 through a link 99 (Figure 4). When the link 99 is moved upwardly the rollers 94 are pressed downwardly against the bags to free the latter from the platform 82. The arm 98 is actuated by means of a lever 100, the upper end of which is curved and disposed in the path of a projection 101 that rotates with the main drive shaft 57.

The arm 98 and the lever 100 are both fixed to a rod 102 and a spring 103 yieldingly holds the arm and lever in the position illustrated in Figure 4.

It will be understood that the cams 55 and 76 and the projection 101 are secured to the main drive shaft 57 in three different planes along the length of the shaft.

The operation of our bag-making apparatus may be briefly described as follows:

A roll of suitable material 3 is placed upon the spool 2, and the free end of the roll is guided around the pulleys 38 and 39 and is drawn across the outer surface of the forming device 4. One section 103 of the material is positioned below the horizontal shelf 35 and a second section 104 above the shelf. The leading edge of the sheet material is then introduced between the rollers 36 and 37, and the collar 52 is adjusted along the rocker arm 53 to give the desired width to the bags.

The spool 2 is raised or lowered so that the edges 28 and 29 of the bag, which define the bag opening 13 (see Figure 10) will be aligned with respect to each other. If it is desired to offset one edge 28 with respect to the other edge 29, the spool 2 may be adjusted accordingly.

The apparatus is now ready to be set in motion. The motor 58 is started and thereupon the rollers 36 and 37 advance a section of the folded sheet material 3 and the section is projected to the right-hand side of these rollers. The movable cutter blade 63 is now drawn down over the stationary cutting blade 62 so as to cut off a bag from the projecting section of folded material. During the cutting operation, the marginal portions 12 of the confronting walls in each individual bag are fused together.

The cycle of operation is again repeated and a second bag is formed. The completed bags are discharged from the apparatus upon any suitable stacking device.

Although we have described our bags as being formed from a single sheet of material, we desire to point out that two strips of material may be fed from separate spools with the strips presented in confronting relation as they are advanced between the rollers 36 and 37. In this case the bottom of each individual bag would be formed by an extension on the bar 64 that would fuse the bottom edges of the walls of the bag together.

We claim:

1. In an apparatus for forming bags from confronting sheets of fusible material, a pair of co-acting cutters, means for feeding the confronting sheets between the cutters, means for heating one of the cutters, and means coacting with the cutters for fusing the confronting sheets together on both sides of the line of cut during the cutting operation.

2. In an apparatus for forming bags from confronting sheets of fusible material, a pair of co-acting cutters, means for feeding the confronting sheets between the cutters, means for heating one of the cutters, means coacting with the cutters for fusing the confronting sheets together on both sides of the line of cut during the cutting operation, and means for removing the cut part of the sheets from the cutters after the fusing step.

3. In an apparatus for forming bags from superimposed sheets of fusible material, a movable cutter blade having a bar mounted on one

face thereof, means for heating the cutter and the bar, a stationary cutter blade arranged to coact with the movable cutter for cutting the superimposed sheets therebetween, the bar and stationary cutter blade being disposed to fuse the sheets together on one side of the line of cut during the cutting operations, a yielding platform cooperating with the heated movable cutter blade for fusing the sheets together on the opposite side of the line of cut, and means for actuating the movable cutter blade.

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CHARLES F. SCHULTZ.
IRA E. SCHULTZ.

5