July 12, 1949. H. A. MEAD 2,476,057

MECHANISM FOR CUTTING, FOLDING, AND SEALING THE BOTTOMS OF BAGS

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Fig. 1

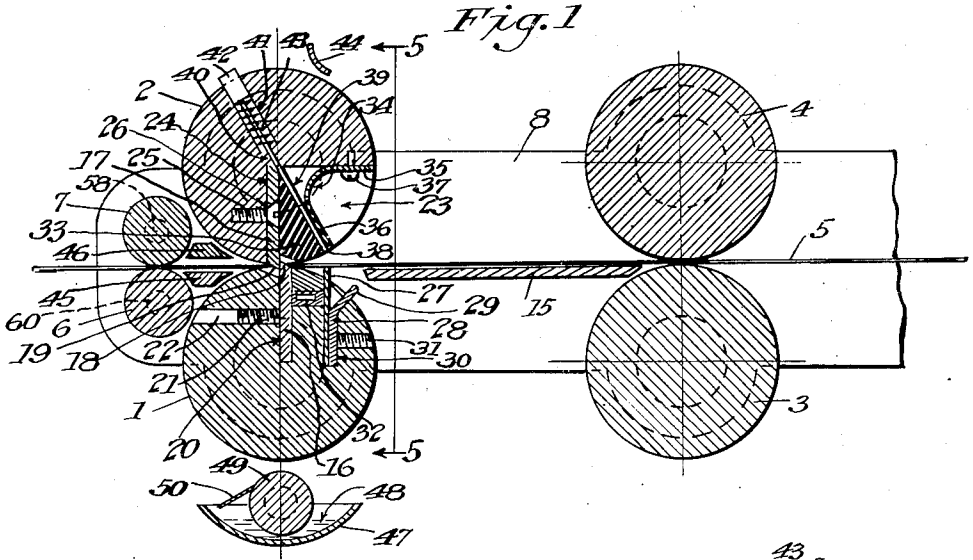


Fig. 2

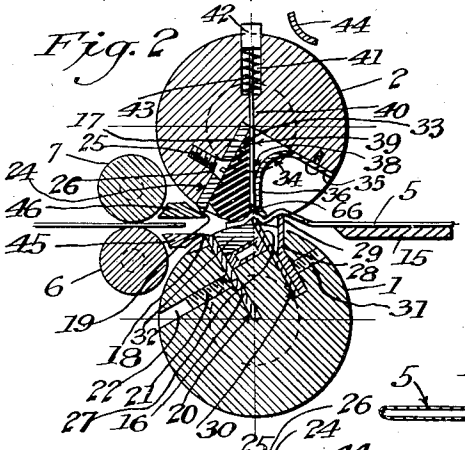


Fig. 3

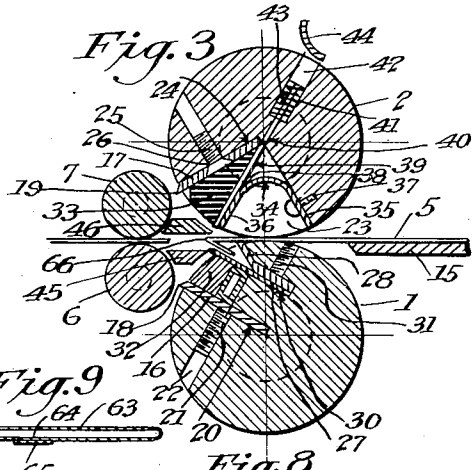


Fig. 9

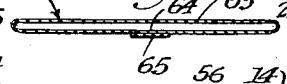


Fig. 8

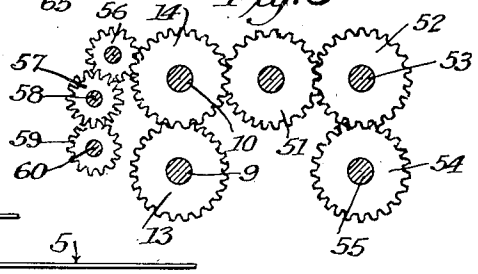


Fig. 4

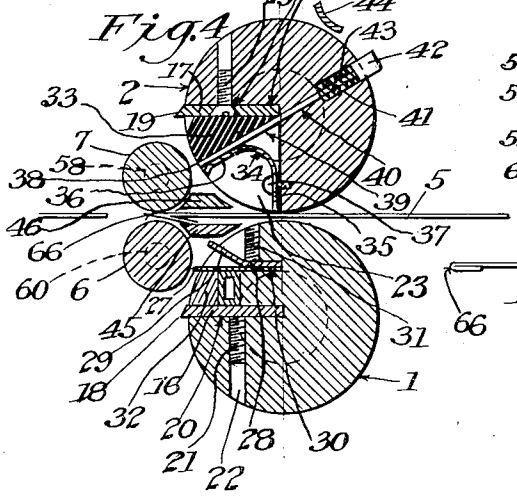


Fig. 10



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Fig. 5

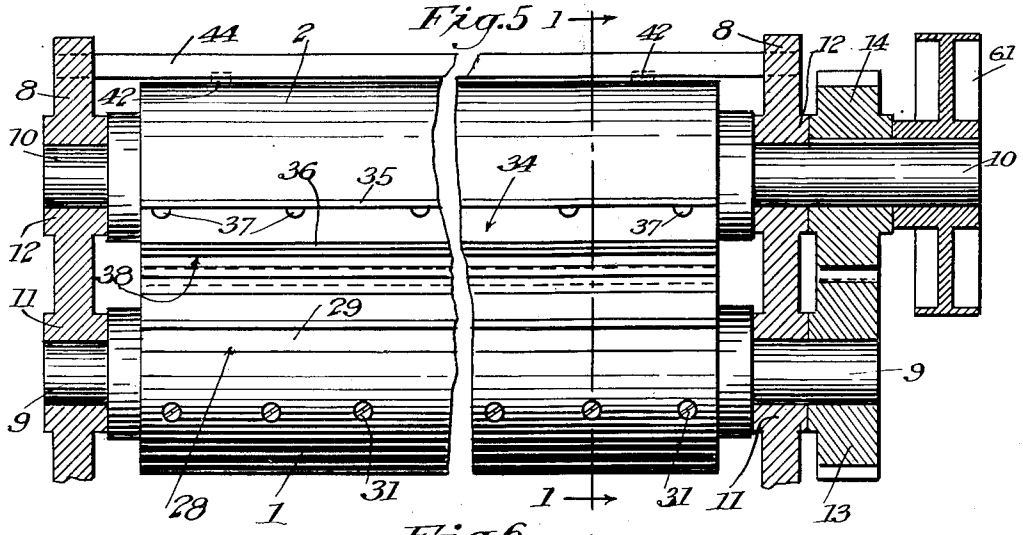


Fig. 6

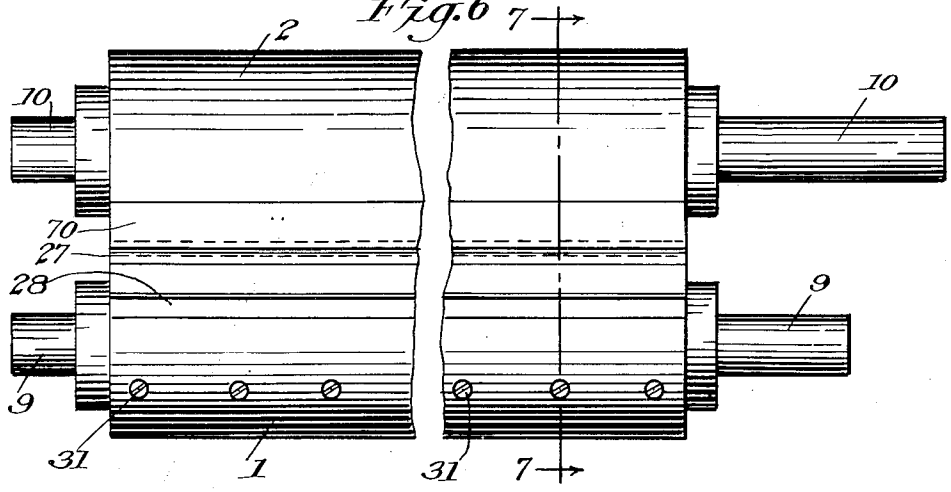
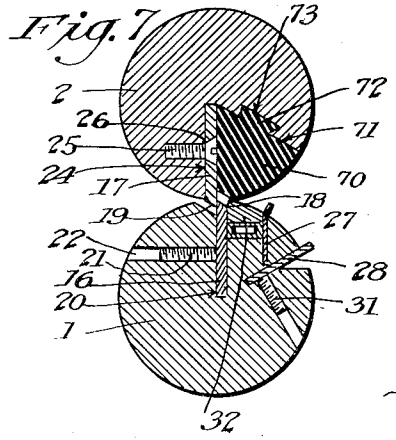


Fig. 7



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MECHANISM FOR CUTTING, FOLDING, AND SEALING THE BOTTOMS OF BAGS

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Application June 17, 1946, Serial No. 677,264

2 Claims. (Cl. 93—26)

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This invention relates to bag making machinery, and more particularly to a novel mechanism for forming the bottom of bags.

The general object of the invention is to provide an improved and simplified mechanism for cutting, folding and heat-sealing the bottoms of bags in the manufacture thereof, which mechanism is highly efficient and rapid in operation, and materially reduces the cost of manufacture of bags.

Other objects and advantages will appear hereinafter as this specification progresses.

The invention is illustrated in the annexed drawings, which form a part of this specification and in which:

Fig. 1 is a longitudinal vertical section of my invention, taken on line 1—1 of Fig. 5, showing the cutting blades thereof in the act of cutting off a bag from the bag stock.

Fig. 2 is a vertical longitudinal section of my invention showing the same in the act of tucking, heating and applying adhesive to the forward end of this bag stock for folding and heat sealing the bottom of a bag.

Fig. 3 is a vertical longitudinal section of my invention showing the same in the act of further applying adhesive to and folding the bottom of a bag.

Fig. 4 is a vertical longitudinal section of my invention showing the same in the act of sealing the folded bottom of a bag.

Fig. 5 is a transverse vertical section of my invention taken on line 5—5 of Fig. 1.

Fig. 6 is a transverse vertical section of a modification of my invention.

Fig. 7 is a longitudinal section of the modification of my invention shown in Fig. 6, taken on line 7—7 of Fig. 6.

Fig. 8 is a side elevation of the gearing through which my mechanism is drawn.

Fig. 9 is a cross section of the bag stock which is fed through my mechanism for cutting, folding and sealing the bottoms of bags.

Fig. 10 is a side view of a bag with the bottom thereof cut, folded and sealed by my bag forming mechanism.

Referring more particularly to the drawings, in which the same parts are designated by the same reference numerals in all of the figures my invention includes generally a pair of bag-tooling rollers 1 and 2, a pair of feed rollers 3 and 4 for feeding the bag stock 5 to said bag-tooling rollers, and a pair of bottom sealing rollers 6 and 7 for sealing the bottoms of bags at the forward end of said bag stock 5, after said bottoms have

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been formed between said tooling rollers 1 and 2 and have been fed forwardly therefrom. The tooling rollers 1 and 2, feed rollers 3 and 4 and sealing rollers 6 and 7 are journaled at their ends, respectively, in side frames 8, said bag-tooling rollers being journaled, respectively, at their ends by their journals 9 and 10 in bearings 11 and 12, respectively, in said side frames 8. The journals 9 and 10 at one end of the tooling rollers 1 and 2 extend through their bearings 11 and 12 beyond the frame 8 in which said bearings are located, and inter-meshing gears 13 and 14 are secured on the outer ends of said journals 9 and 10 for causing the bag tooling rollers 1 and 2 to rotate in unison, to enable the bag stock 5 to be fed forwardly between said rollers. A guide table 15 is mounted upon and between the frame members 8 extending from the feed rollers 3 and 4 to the bag tooling rollers 1 and 2, over which table extends and is guided the bag stock 5.

In the bag tooling rollers 1 and 2 are mounted a pair of shearing blades 16 and 17, respectively, which extend radially of said rollers with their outer cutting edges 18 and 19 extending a short distance beyond the peripheries of said rollers 1 and 2 respectively, for cutting the bag stock 5 into bag lengths when said blade cutting edges are brought together during each revolution of said rollers. The blade 16 is fitted in a radial groove 20 in the tooling roller 1 and is detachably and adjustably secured in said roller in said groove by a set screw 21 threaded in a threaded bore 22 in said roller, from the periphery thereof to one side of the groove 20, which set screw 21, engaging at its inner end the adjacent side of the blade 16, tightens the opposite side of said blade against the adjacent opposite side of the groove 20. The blade 17 is detachably secured in the tooling roller 2 in a sectoral recess 23 in said roller, adjacent the forward side 24 of said recess, by a screw 25 extended through an opening 26 in said blade 17 and threaded into said tooling roller 2, the head of said screw being countersunk in said blade. A tucker 27 and a sealer 28 are mounted in the bag-tooling roller 1 parallel to the blade 16 and spaced a short distance to the rear of said blade, said tucker and said sealer being in the form of flat plates, with said sealer bent rearwardly at an angle at its outer end as at 29, which end of the sealer and the outer end of said tucker 27 extend slightly beyond the periphery of said roller. The tucker 27 and the sealer 28 are fitted in a slot 30 in the bag-tooling roller 1 with

the sealer adjacent the rear side of the tucker and said tucker and said sealer are detachably secured in said roller in said slot 30 by a set screw 31 threaded in said roller from its periphery with the inner end of said screw against the outer side of said sealer 28, which screw, engaging the outer side of said sealer, tightens said sealer against said tucker 27, and the forward side of said tucker against the adjacent forward side of the slot 30. A conventional electrical heating element 32 is mounted in the outer part of the bag-tooling roller 1 between the blade 16 and the tucker 27 with outer side of said element coinciding with the periphery of said roller. A pressure sealing pad 33 of suitable resilient material, such as rubber, is secured in the bag tooling roller 2 in the recess 23 therein adjacent the outer side of the blade 17 with the outer side of the pad coinciding with the periphery of said roller.

A tucker guide 34 of flat sheet metal, bent substantially V-shape in cross section, is mounted in the bag tooling roller 2 within the sectoral recess 23 in said roller, with the side members 35 and 36 thereof diverging outwardly in said recess and with the side member 35 secured to the rear wall of said recess by a screw 37 threaded in said roller 2, so that the side member 36 rests close to the rear side of the pressure sealing pad 33, providing a narrow space 38 between said member and said side of said pad for the purpose hereinafter more fully described.

A spring plunger bag crease ejector 39 is slidably mounted in a radial bearing 40 in the bag-tooling roller 2, with one end portion thereof extending into the space 38 between the pressure pad 33 and the tucker guide member 36, and its other end portion extending into a bore 41 in said roller 2, there being a head 42 secured on the outer end of said last named end portion of said plunger ejector, with said head slidably fitted in the outer end of said bore 41. A spring 43 surrounds the plunger ejector 39 within the bore 41, bearing at one end against the inner end of said bore, and at its other end against the inner end of said plunger head 42, whereby the outer end of said head is normally projected a short distance beyond the periphery of the bag tooling roller 2 and the inner end of the plunger ejector 39 is withdrawn upwardly within the space 38 to permit entrance of the outer end of the tucker 27 into the outer end of said space when said space is brought opposite said tucker end during rotation of the bag tooling rollers 1 and 2. A bar 44 curved in cross section is secured at its ends to the side frames 8 and extends longitudinally over the upper part of the periphery of said tooling roller 2 a short distance to the rear of the center of said roller to be engaged by the outer end of the plunger head during rotation of said roller in the manner and for the purpose hereinafter more fully described.

Between the bag-tooling rollers 1 and 2 and the sealing rollers 6 and 7 are a pair of vertically spaced folder guides 45 and 46, between which the partly folded bottom of a bag on the forward end of the bag stock 5 passes and is guided from said tooling rollers 1 and 2 to the sealing rollers 6 and 7, and the partly folded bottom of the bag is thereby prevented from unfolding as it passes from said tooling rollers to said sealing rollers.

Below the bag-tooling roller 1 is located a receptacle 47 containing an adhesive 48, such as glue or paste, in which receptacle is located a feed roller 49 for said adhesive with the upper

part of its periphery in position to be wiped by the end 29 of the sealer 27 during each revolution of said bag-tooling roller 1, whereby adhesive 48 from said receptacle 47 is applied to said sealer end 29 for application to a bag bottom on the forward end of the bag stock 5 in the manner hereinafter more fully described. A scraper 50 is mounted in the adhesive receptacle 47 for scraping adhesive off the surface of the feed roller 49 to leave only a thin film of adhesive on said surface to be wiped off by the sealer end 29 to prevent said sealer end from applying more adhesive to the bag bottom than is required for sealing the bag bottom.

The bag-tooling rollers 1 and 2, feed rollers 3 and 4 and sealing rollers 6 and 7 are caused to rotate in synchronism by means of suitable gearing as shown in Fig. 8 of the drawing, which gearing may include the intermeshing gears 13 and 14 secured on the shaft 9 and journal 10 of said bag-tooling rollers 1 and 2, respectively, an idler 51 journaled on one of the side frames 8 in mesh with said gear 14, a gear 52 secured on the shaft 53 of feed roller 4 in mesh with said idler, a gear 54 secured on the shaft 55 of feed roller 3 in mesh with said gear 52, a pinion 56 journaled on said side frame 8 in mesh with said gear 14, a pinion 57 secured on the shaft 58 of the sealing roller 7, in mesh with said pinion 56 and a pinion 59 secured on the shaft 60 of the sealing roller 6 in mesh with said pinion 57; said feed roller shafts 53 and 55, and said sealing roller shafts 58 and 60 being suitably journaled in the side frames 8. On the outer end of the shaft 10 of the bag-tooling roller 2 is secured a pulley 61 to which power is applied through a belt (not shown) for rotating said shaft 10 for driving my bag-making mechanism through the gearing as above described.

The operation of my invention is as follows:

An elongated sheet 63 of bag material is bent laterally upon itself and its side edges 64 and 65 overlapped and secured together with an adhesive, forming the bag stock 5 as shown in Fig. 9, and the forward end of said stock is introduced between the feed rollers 3 and 4. Power is applied to the pulley 61 and my bag making mechanism is driven through the medium of the gearing shown in Fig. 8, whereupon the bag stock 5 is fed forwardly by the feed rollers 3 and 4 over the guide table 15 between the bag-tooling rollers 1 and 2, the folder guides 45 and 46 and the bottom sealing rollers 6 and 7. As the bag stock 5 is fed between the bag-tooling rollers 1 and 2, said rollers are rotated and the shearing blades 16 and 17 are brought together and cut the forward end of the bag stock 5 at a suitable point for folding the bottom of the bag, as shown in Fig. 1, during which operation the heating element 32 heats the forward end of the bag stock. As the bag-tooling rollers 1 and 2 continue to rotate the outer end of the tucker 27 engages the under side of the bag stock 5 a short distance to the rear of the cut forward end of the bag stock and tucks the stock upwardly in the space 38 between the rear side of the pressure pad 33 and the end of the side member 36 of the tucker guide 34 forming a transverse crease 66 in the bag stock, while the end 29 of the sealer 28, which has picked up adhesive from the periphery of the adhesive feed roller 49, engages and applies adhesive to the under side of the bag stock 5, a short distance to the rear of the crease 66 formed in the bag stock by the tucker 27, as shown in Fig. 3. As the bag-tooling rollers 1 and

2 continue rotation the forward cut end of the bag stock 5 is fed by said rollers between the folder guides 45 and 46, while the outer end of the head 42 of the bag fold ejector 39 engages the bar 44, which depresses said ejector so that the outer end thereof ejects the crease 66 in the bag stock from between the pressure pad 33 and the side member 36 of the tucker guide, whereupon said forward end of the bag stock is partly folded by said folder guides backwardly under the bag stock on the crease 66 formed in said stock by the tucker 27, as illustrated in Fig. 3. As the bag-tooling rollers 1 and 2 continue rotation the folded end of the bag stock is fed by said rollers between the sealing rollers 6 and 7, which complete the folding operation and seals the heated folded end of the bag against the under side of the bag stock with the adhesive applied by the sealer 28, between said folded end and the bag stock, thus forming the sealed bottom of a bag 67 which is cut at its rear-end at 68 by the shearing blades 16 and 17 as said blades are again brought together at the end of one revolution of the bag-tooling rollers 1 and 2. The above described cycle of operation may then be repeated to form the bottom of bags and cut the bags in suitable length from the bag stock.

In the modification of the tooling rollers 1 and 2 as shown in Figs. 6 and 7, the construction is the same except that the pressure pad 33, tucker guide 34 and ejector 39 are eliminated and an elastic pressure pad 70 is secured in a sector recess 71 in the tooling roller 2 by means of a dovetailed tongue 72 fitted in a dovetailed groove 73 in one side wall of said recess with the other side of said pad fitting against the blade 17 while said blade fits against the other side of said recess.

In operation the outer end of the tucker 27 tucks the bottom part of the bags into the yielding pressure pad 70 to form the folding crease 66 in said bottom part of the bags and as the rollers

1 and 2 rotate the tucker end is withdrawn from the crease and the pressure pad 70 expands and ejects the crease 66 therefrom so that the bottom end of the bag may be folded by the folder guides 45 and 46.

I claim:

1. A mechanism for forming the bottoms of bags including a pair of coacting tooling rollers, means for feeding bag-making stock between said rollers as said rollers are rotated, means on said rollers for cutting the ends of bag from said bag-making stock, a pressure pad and a tucker guide on one of said rollers, a tucker on the other roller for tucking a portion of the bottom ends of the bags between said pressure pad and said tucker guide for forming a crease in the bottom portion of the bags, an ejector on one of said rollers for ejecting the creased portion of the bags from between said pressure pad and said tucker guide when said tucker is withdrawn from between said pad and said guide, means for applying adhesive to one side of the bottom portions of the bags, means for folding the bottom ends on said creases formed in the bags, and means for sealing said folded bottom ends to the bags with said adhesive applied thereto.

2. A mechanism for forming the bottoms of bags, as characterized by claim 1, including means for heating the bottoms of the bags for sealing the same.

HARRY A. MEAD.

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