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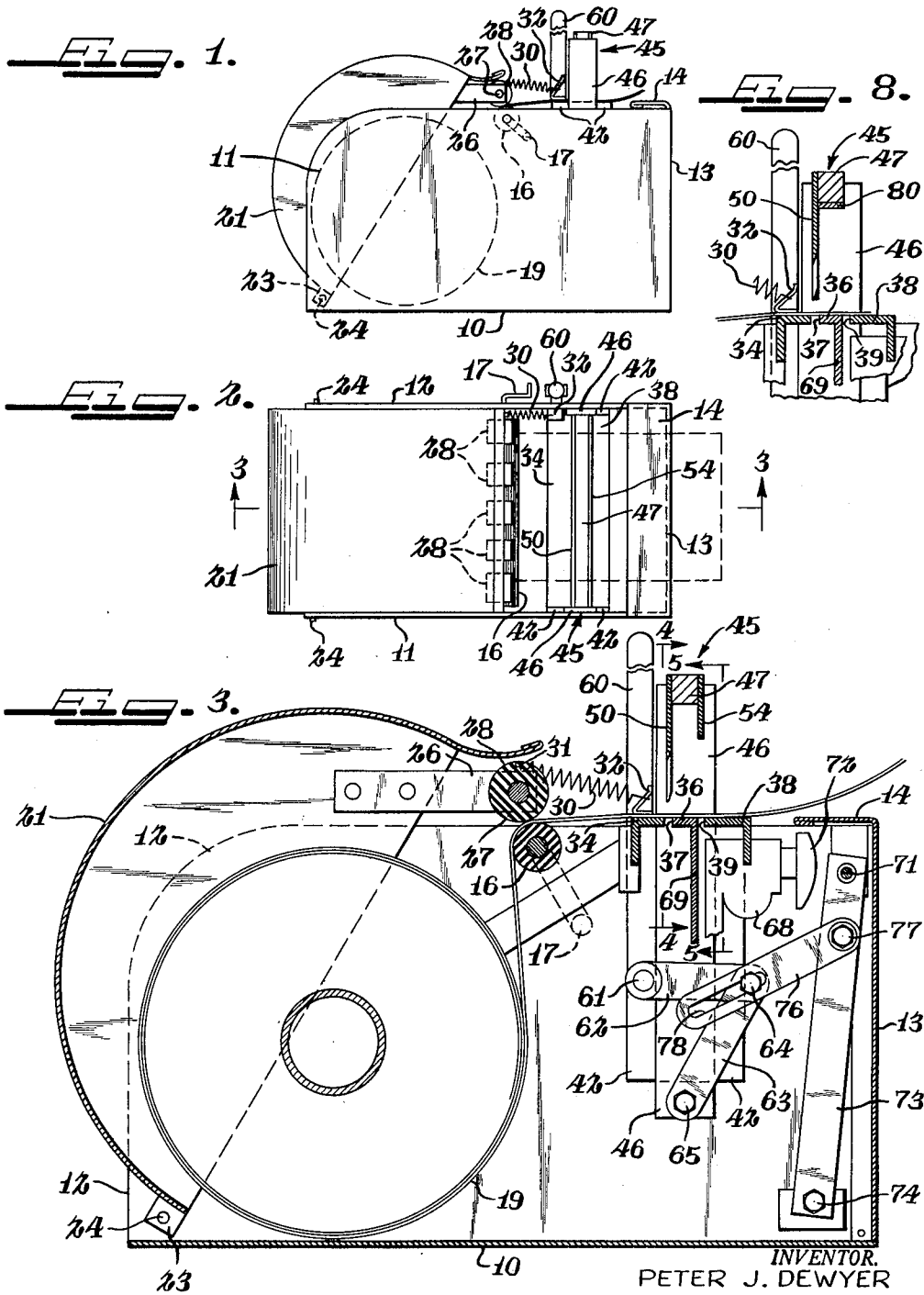
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3,237,533

BAG FORMING MACHINE

Filed Aug. 7, 1963

2 Sheets-Sheet 1



BY
Greist, Lockwood, Greenawalt & Dewey
Attys.

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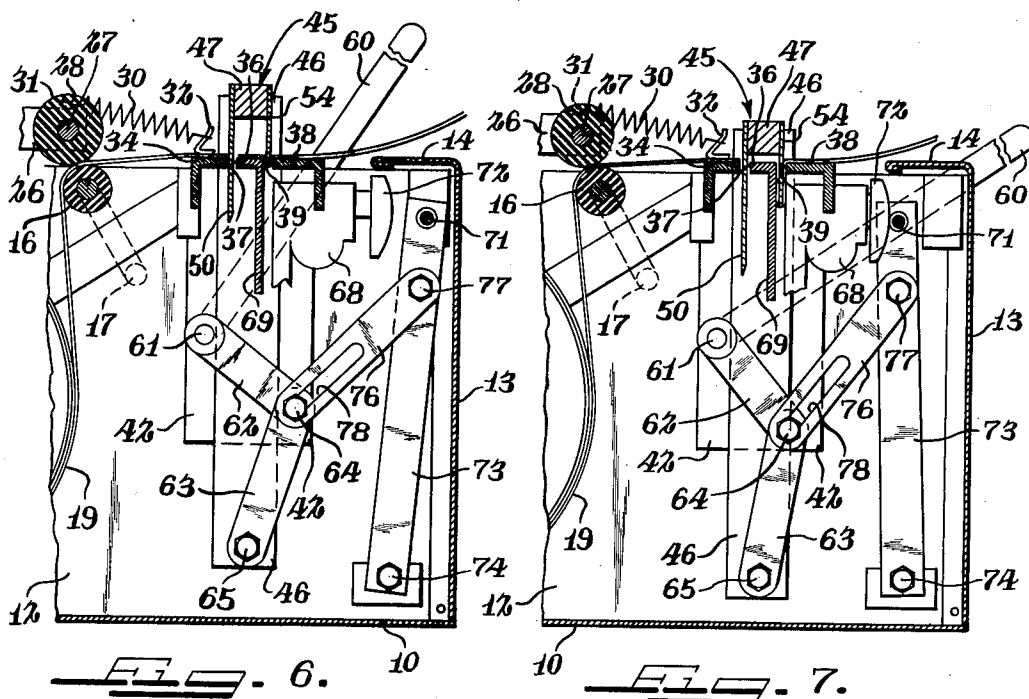
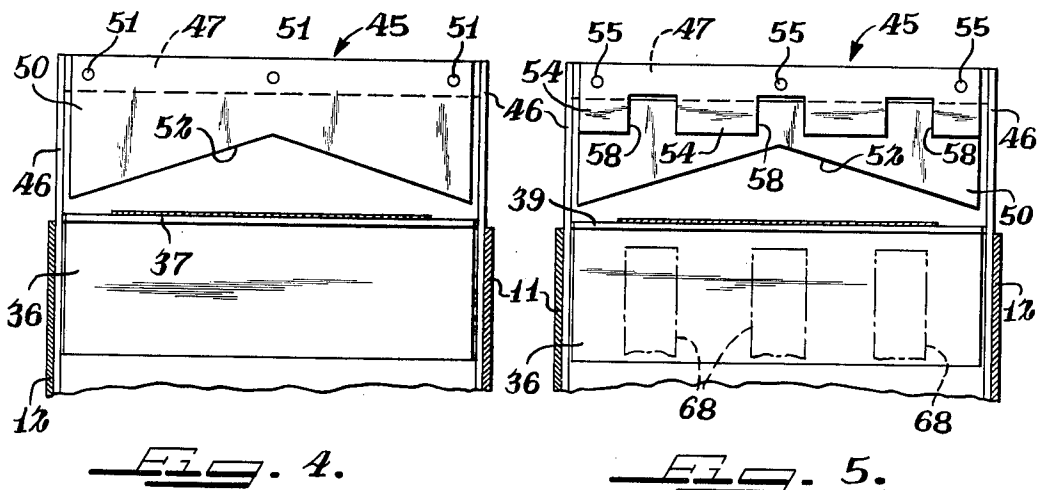
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2 Sheets-Sheet 2



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3,237,533
BAG FORMING MACHINE
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8 Claims. (Cl. 93—8)

The present invention relates to a bag forming apparatus and, more particularly, to a hand operable bag forming machine.

It is the general object of the invention to provide a new and novel hand operable machine adapted to permit the custom formation of bags of various lengths and circumferential dimensions from rolls of flat tubular bag stock of various widths.

A further object of the invention is the provision of an inexpensive bag forming machine which may be used to form bags of any desired length without limit, and of any desired width up to a maximum for a particular machine, from rolls of flat tubular bag stock, such machine being readily convertible from one which cuts, folds and staples the bottom ends of the bags to one that cuts and heat seals the bottom ends.

An important object of the invention is to provide a new and novel hand operable bag forming machine of the character described wherein a desired length of flat tubular bag stock is unwound from a roll thereof and cut off, wherein the trailing end of the cut-off length of bag stock is folded, and wherein the folded portions of the trailing end of the cut-off length of bag stock are interconnected whereby to close the bottom of the bag and complete the formation of a bag of a desired length.

A more detailed object of the invention is to provide a new and novel bag forming machine of the character described which includes a supporting structure adapted to have a roll of tubular bag stock of any one of several widths disposed at one end thereof, a flat table portion at the other end of the supporting structure, a hand operable roller device for advancing a desired length of bag stock along the table portion, a handle for actuating a vertically reciprocal operating head carrying a knife blade and a folding blade whereby to cut off a desired length of bag stock and then fold the trailing end thereof, and means operable by the handle for interconnecting the folded end portions of the cut-off length of bag stock whereby to complete the formation of the bag.

A further object of the invention is to provide a new and novel bag forming machine of the character described wherein the folded end portions of the cut-off length of bag stock are stapled together by conventional stapling devices mounted on the supporting structure.

A still further object of the invention is to provide a new and novel bag forming machine of the character described which is economical to produce and simple to operate whereby to permit the custom formation of bags of many varied sizes.

Certain other objects of the invention will, in part, be obvious, and will in part appear hereinafter.

For a more complete understanding of the nature and scope of the invention reference may now be had to the accompanying drawings wherein:

FIG. 1 is a side elevational view of a preferred form of the invention;

FIG. 2 is a top plan view thereof;

FIG. 3 is an enlarged vertical section taken generally on the line 3—3 of FIG. 2 with the operating head in its raised position;

FIG. 4 is a vertical section taken generally on the line 4—4 of FIG. 3 and illustrating the knife blade;

FIG. 5 is a vertical section taken generally on the line 5—5 of FIG. 3 and illustrating the folding blade;

FIG. 6 is a fragmentary vertical section similar to FIG. 3 showing the position of the operating head after the completion of the cutting operation;

FIG. 7 is a fragmentary vertical section similar to FIG. 6 showing the lowermost position of the operating head after the completion of the folding and stapling operations; and,

FIG. 8 is a fragmentary detail view showing how the machine as shown in FIG. 3 may be converted from one that cuts, folds and staples the bag ends to one that cuts and heat seals the ends.

As illustrated in the drawings, a preferred embodiment of the hand operable bag forming machine or apparatus includes a supporting structure which includes a bottom wall 10, a pair of spaced upstanding side walls 11 and 12, and a front wall 13 having a horizontally bent portion 14 at its upper end which extends rearwardly for a short distance along the upper edges of the front portions of the side walls 11 and 12. A knurled roller 16 extends between the side walls 11 and 12 approximately midway between the front and rear edges thereof. The roller 16 is rotatably supported between the upper portions of the side walls 11 and 12 with the uppermost surface thereof being disposed substantially flush with the upper edges of the side walls 11 and 12. The end portion of the roller 16 which is supported in the side wall 12 is provided with an external manually operable crank handle 17 for a purpose to be described.

A roll 19 of flat tubular bag stock is adapted to be supported on the bottom wall 10 generally rearwardly of the tubular roller 16. The circumferential dimension of the bags to be formed is determined by the width of the roll of bag stock disposed in the apparatus. It is a relatively simple matter to exchange a roll of bag stock of one width for a roll of another width as will be evident hereinafter. The rear end portion of the supporting structure is enclosed by a hood-like cover 21 which fits over the roll 19 and between the side walls 11 and 12 of the apparatus. The lower rear portion of the hood-like cover 21 is provided on opposite sides thereof with a pair of tabs 23 whereby to permit pivotally mounting the cover 21 on pins 24 which are supported in the lower rear corners of the side walls 11 and 12.

The upper front portion of the hood-like cover 21 is provided on opposite sides thereof with a pair of forwardly extending brackets 26 between which extends a rod or shaft member 27. A plurality of laterally spaced rubber-like rollers 28 are rotatably mounted on the rod member 27. A spring 30, which is interconnected between a lug member 31 secured to the forward end of one of the brackets 26 and an angled bracket 32 mounted on one end of an angled structural member 34 which extends transversely between the upper edges of the side walls 11 and 12 forwardly of the knurled roller 16, serves both to retain the hood-like cover 21 in its position over the roll of bag stock 19 and also to urge the rubber-like rollers 28 toward the knurled roller 16. Upon inserting the end of the flat tubular bag stock between the rubber-like rollers 28 and the knurled roller 16, rotation of the crank handle 17 in the proper direction will be effective to unwind and advance the flat tubular bag stock forwardly of the rollers 16 and 28 in an obvious manner. It has been found that using a series of laterally spaced rubber-like rollers 28 rather than a single rubber-like roller on the shaft member 27 serves to eliminate undesirable crinkling of the bag stock as it is advanced between the rollers 28 and the roller 16. Replacement of one of the rolls 19 of flat tubular bag stock either when the roll is exhausted or when it is desired to form bags from bag stock of a greater or lesser width may be readily accomplished by merely releasing one end of the spring 30 and tilting the hood-

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like cover 21 rearwardly whereby to permit access to the rear portion of the supporting structure.

An angled structural member 36 is secured between the upper edges of the side walls 11 and 12 and is spaced forwardly of the angled structural member 34 whereby to define a transversely extending slot 37. Another angled structural member 38 extends between the upper edges of the side walls 11 and 12 and is spaced forwardly of the angled structural member 36 whereby to define a transversely extending slot 39. The horizontally disposed portions of the three angled structural members 34, 36 and 38 and the horizontally extending portion 14 of the front wall 13 define a generally flat transversely slotted table portion at the forward end of the apparatus. Upon rotation of the crank handle 17, a length of flat tubular bag stock is advanced forwardly along this table portion.

Adjacent the slotted table portion of the apparatus, a pair of longitudinally spaced vertically extending guide members 42 is provided on the inner surface of each of the side walls 11 and 12 with the two pairs of guide members 42 being in transverse alignment. A vertically reciprocal operating head 45 which extends transversely of the apparatus is characterized by a pair of vertically disposed end members 46, each of which is slidable between a pair of the guide members 42, and by a horizontally disposed crosshead 47 which extends between the upper ends of the end members 46, the crosshead 47 being disposed generally above the transversely extending slots 37 and 39 in the table portion of the apparatus.

As best illustrated in FIG. 4, a transversely extending vertically disposed knife blade 50 is secured at its upper edge to the rear surface of the crosshead 47 by suitable fastening means 51 in vertical alignment with the transversely extending slot 37. The lower or bottom edge of the knife blade 50 is provided with a cutting edge 52 which is in the form of an inverted V. Thus, moving the operating head 45 downwardly after a length of flat tubular bag stock has been advanced along the table portion of the apparatus serves to cut off the length of bag stock as the knife blade 50 moves downwardly through the slot 37. It has been found that the inverted V-shape formation of the cutting edge 52, whereby the outer edges of the flat tubular bag stock are cut first with the lateral center thereof being cut last, prevents undesirable bending or crinkling of the length of bag stock during the cutting thereof.

A transversely extending vertically disposed folding blade 54, best illustrated in FIG. 5, is secured at its upper edge to the front surface of the crosshead 47 by suitable fasteners 55 whereby the folding blade 54 is vertically aligned with the transversely extending slot 39. The lower edge of the folding blade 54 extends horizontally and is positioned slightly above the apex of the cutting edge 52 of the knife blade 50 whereby upon downward movement of the operating head 45 the folding blade 54 does not contact the bag stock until after completion of the cutting operation. After the completion of the cutting operation by the knife blade 50, the folding blade 54 engages the cut-off length of bag stock a short distance forwardly of the cut-off trailing end thereof and continued downward movement of the operating head 45 folds the trailing end of the cut-off length of bag stock downwardly through the transversely extending slot 39 in an obvious manner, as illustrated in FIG. 7. The lower edge of the folding blade 54 is provided with a series of laterally spaced downwardly opening recesses or windows 58 for a purpose to be described herein.

Vertically reciprocal movement of the operating head 45 is controlled by a handle 60, disposed externally of the side wall 12, which is secured to a rod member 61 which rotatably extends through the side walls 11 and 12 and the rearmost ones of the two pairs of guide members 42 mounted on the side walls 11 and 12. A pair of identical linkage arrangements are provided between the rod member 61 and each end member 46 of the operating

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head 45 with each linkage arrangement being disposed adjacent the inner surface of one of the side walls 11 and 12. Each linkage arrangement includes a link member 62 which is secured at one end to the shaft 61 with the opposite end of each link member 62 being pivotally connected to one end of a link member 63 by a pin 64. The opposite end of each link member 63 is pivotally connected by a pin 65 to the lower end of one of the end members 46 of the operating head 45. With the linkage arrangements described, rotation of the handle 60 from the position illustrated in FIG. 3, wherein the operating head 45 is in its uppermost position, in a clockwise direction (as viewed in the drawings) serves to move the operating head 45 downwardly as illustrated in FIGS. 6 and 7. Rotation of the handle 60 in the opposite direction, of course, returns the operating head 45 to its initial uppermost position.

To complete the formation of a bag, provision is made for interconnecting or securing together the folded portions of the trailing end of the cut-off length of bag stock. In the embodiment of the invention illustrated in the drawings, these folded portions are stapled together to close the bottom of the bag. As illustrated in the drawings, a plurality of conventional wall-type staplers 68 are suitably supported in the apparatus in upright positions just forwardly of the folding slot 39 in laterally spaced relationship, as indicated in FIG. 5. The staple ejecting portions of the staplers 68 are located adjacent to and directed toward the folded end portions of the cut-off length of the bag stock when the folding blade 54 is in its lowermost position extending through the transversely extending slot 39. The recesses or windows 58 formed in the lower edge of the folding blade 54 are laterally aligned with the staplers 68 whereby to permit the passage of staples through the folded end portions of the cut-off length of bag stock with a vertically depending portion 69 of the angled structural member 36 serving as a staple-setting base member.

Simultaneous actuation of the staplers 68 upon completion of the folding operation is accomplished by the before described movement of the handle 60 by means of additional linkage arrangements. A transversely disposed horizontal push rod 71 adapted for actuating engagement with the plunger heads 72 of all of the staplers 68 extends between the upper ends of a pair of arms 73, the lower ends of which arms are pivotally mounted on pin means 74 suitably supported in the lower front corners of the side walls 11 and 12. To complete the stapler-actuating linkage arrangements, a pair of link members 76 are pivotally connected by pins 77 one each to the upper portions of the two arms 73 slightly below the push pin 71 and are pivotally connected at their opposite ends by means of elongated slots 78 to one of the pins 64 interconnecting each pair of link members 62 and 63. When the handle 60 is manually moved from the position illustrated in FIG. 6 to the position illustrated in FIG. 7 to complete the folding and stapling operations, the above described linkage arrangements serve to pivot the arms 73 rearwardly whereby to bring the push rod 71 into engagement with the plunger heads 72 of the staplers 68 so that at the completion of the folding operation the staplers 68 are operated in the usual manner whereby to staple together at laterally spaced intervals the folded portions of the trailing end of the cut-off length of bag stock to close the bottom end of the bag. After the staplers 68 have been operated, the formation of the bag is completed and, after the operating head 45 has been raised to its initial upper position by rotating the handle 60 in a counter-clockwise direction (as viewed in the drawings), the completed bag may be removed from the apparatus. Other means of closing the bottom of the bag could be utilized within the scope of the invention as, for instance, heat sealing the folded end portions.

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In operation, the crank handle 17 is first rotated whereby to advance a desired length of flat tubular bag stock forwardly along the table portion of the apparatus. Then, the handle 60 is pivoted in the manner described whereby to move the operating head 45 downwardly by means of the described linkage arrangements whereby the knife blade 50 first cuts off the desired length of bag stock after which the folding blade 54 immediately engages the cut-off trailing end of the length of bag stock whereby to fold the same in the manner described with the staplers 68 then being actuated to staple the folded trailing end portions of the cut-off length of bag stock to close the bottom thereof and complete the formation of a bag of a desired length. Bags of varying circumferential dimensions may be formed by selection of a roll of flat tubular bag stock of the desired width.

The foregoing apparatus, which permits the custom formation of bags of various circumferential dimensions and various lengths, may be formed of a size suitable to be placed on a typical store counter. This bag forming apparatus is particularly useful when it is necessary to package items of unusual and widely varying dimensions which would not fit in bags of conventional or standard sizes. For instance, in a sporting goods store this custom bag forming apparatus would be extremely useful in forming bags for packaging such items as baseball bats, golf clubs, fishing tackle, etc., which items at present cannot be bagged but must be separately wrapped, often a time-consuming operation.

The embodiment of the invention described above in connection with FIGS. 1-7 can be used to form bags of any of the common bag-forming materials such as paper, various films, and various laminate papers, film or foil. However, it is well known that certain bag-forming materials are available which lend themselves to be sealed. For example, bags formed of polyethylene film, cellophane with a heat sealable coating, Saran, Pliofilm, paper coated with heat sealable materials, etc. The machine described in FIGS. 1-7 may be readily converted to use a heat seal bar in connection with such materials, thereby eliminating the need for the folding and stapling operations.

Reference is now made to FIG. 8 which shows the table portion of the machine and the reciprocating knife 50 in the relative positions that they occupy in FIG. 3. However, the folding blade 54 has been removed and an electrically heated heat sealing bar 80 of known type has been positioned underneath the crosshead 47. It will be noted that the heat seal bar 80 does not touch the blade 50 but is spaced therefrom. This prevents heat from the bar from passing directly to the lower portion of the blade 50. If desired the cross head 47 may be formed of a heat insulating material of non-conductive material so as to further minimize the heat from passing through the blade. Alternately, a shim of insulating material may be positioned between the bar 80 of the crosshead 47 and/or between the knife 50 and the crosshead 47.

The thickness of the heat seal bar 80 is such that when the reciprocating head assembly 45 is in its lowermost position, the bar surface will press a transverse strip across the severed end of a bag against the top horizontal portion of the angle member 36 thereby heat sealing the same across the width thereof to form the closed bottom end of the bag.

Since with the folding blade 54 removed there is no longer any need for the staplers 68, they may be inactivated simply by removing the pins 77 which serve to connect the links 76 with the links 73.

It will be seen that the heat sealing bar 80 may be left in place unheated under the crosshead 47 even when the fold blade 54 is also present inasmuch as the presence of the heat sealing bar 80 would not interfere with the folding and stapling action if that is desired. Hence,

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the machine lends itself to being very readily converted from one that folds and staples the ends of the bag to one that heat seals the end. Of course, if it is known in advance that the machine is to be used only for heat sealing, then it would be in order to eliminate the folding blade 54, the staplers 68 and the links 76, links 73 and related parts.

It will be understood that certain further changes may be made in the construction or arrangement of the hand operable bag forming apparatus disclosed herein without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A hand operable bag forming apparatus comprising, a supporting structure adopted to have a roll of flat tubular bag stock disposed in one end thereof, said supporting structure including a transversely slotted horizontal flat stationary table portion at the opposite end thereof with at least one transverse slot for receiving a vertically reciprocating knife, manually operable means for advancing the end of the bag stock a desired distance over said table portion, and manually operable means associated with said table portion for sequentially cutting off a desired length of said bag stock and thereafter folding and closing the severed end portion whereby to complete the formation of a bag of a desired length.

2. A hand operable bag forming apparatus comprising a supporting structure adapted to have a roll of flat tubular bag stock disposed in one end thereof, said supporting structure including a horizontal, flat stationary table portion at the opposite end thereof having a pair of longitudinally spaced transversely extending slots formed therein, manually operable means for advancing the end of the bag stock a desired distance along said table portion, a manually operable knife blade adapted to be moved downwardly in a vertical direction through the slot nearest said roll of bag stock for cutting off a desired length of the bag stock, a manually operable folding blade adapted to be moved downwardly in a vertical direction through the other one of said slots whereby to fold the trailing end of the cut-off length of bag stock, and manually operable means for interconnecting the folded end portions of the cut-off length of bag stock whereby to complete the formation of a bag of a desired length.

3. A hand operable bag forming machine comprising, a supporting structure adapted to have a roll of flat tubular bag stock disposed in one end thereof and including a flat table portion at the opposite end thereof, said table portion having a pair of longitudinally spaced transversely extending slots formed therein, manually operable means for advancing the end of the bag stock a desired distance along said table portion, a vertically reciprocal operating head disposed above the slotted portion of said table, a knife blade having a cutting edge formed on its lower edge mounted on said head for movement downwardly through the slot nearest said roll of bag stock for cutting off a desired length thereof, a folding blade mounted on said head with a lower folding edge thereof being disposed slightly above said cutting edge of said knife blade, said folding blade being movable downwardly through the other one of said slots for folding the cut-off end of the length of bag stock, means for securing together the folded portions of the cut-off length of bag stock, and a manually operable handle and linkage arrangement for vertically reciprocating said operating head to sequentially perform the cutting and folding operations and for then actuating said securing means to complete the formation of a bag of a desired length.

4. The machine called for in claim 3 wherein there is a heat sealing bar supported underneath said head and intermediate said knife blade and folding blade for sealingly pressing said bag stock against said table portion intermediate said slots, and wherein said folding blade is

removable and said means for securing together said folded portions may be de-activated.

5. A hand operable bag forming apparatus comprising, a supporting structure characterized by a bottom wall, a pair of spaced side walls, a front wall, and a flat table portion extending between the upper edges of said side walls at the forward end of the apparatus, said supporting structure adapted to have a roll of flat tubular bag stock disposed in the open rear end thereof, a hood-like cover pivotally mounted between said side walls at the rear edges thereof for enclosing the roll of bag stock, said table portion having a pair of longitudinally spaced transversely extending slots formed therein, manually operable roller means disposed between said roll of bag stock and said table portion for gripping the end of the bag stock and advancing it a desired distance along said table portion, a knife blade movable downwardly in a vertical direction through the slot nearest said roll of bag stock for cutting off a desired length of bag stock, a folding blade movable downwardly in a vertical direction through the other one of said slots for folding the cut-off end of the length of bag stock, a plurality of stapling devices supported below said table portion for stapling the folded portions of the cut-off length of bag stock together whereby to complete a bag of a desired length, and a manually operable handle and linkage arrangement operably connected to said knife blade, said folding blade, and said stapling devices in a manner whereby said cutting, folding and stapling operations are performed in sequence upon actuation thereof.

6. A hand operable bag forming machine comprising, a supporting structure adapted to have a roll of flat tubular bag stock supported at one end thereof, said supporting structure including a flat table portion at the opposite end thereof having a pair of longitudinally spaced transversely extending slots formed therein, spring urged roller means gripping the end of the bag stock, manually rotatable crank means connected to said roller means for advancing the bag stock a desired distance along said table portion, vertically extending and laterally aligned guide means disposed on either side of said table portion and mounted on said supporting structure, a transversely extending operating head vertically reciprocal in said guide means and disposed generally above the slotted portion of said flat table, a knife blade mounted on said operating head for movement downwardly through the slot nearest said roll of bag stock for cutting off a desired length of the bag stock, the lower cutting edge of said knife blade being in the form of an inverted V, a folding blade mounted on said operating head for movement downwardly through the other one of said slots for folding the cut-off trailing end of the length of bag stock, the lower edge of said folding blade being disposed slightly above the apex of said inverted V-shaped cutting edge of said knife blade whereby the folding blade is not engageable with the length of bag stock until after the completion of the cutting operation, means supported below said table portion and adjacent said other slot for securing together the folded portions of the cut-off length of bag stock whereby to close one end of the bag being formed, a manually operable handle disposed externally of said supporting structure, and linkage means operably interconnected between said handle and the lower end of said vertically reciprocal operating head whereupon actuation of said handle said operating head is moved downwardly whereby to complete the cutting and folding operations in sequence, said bag closing means being operably connected to said linkage means for actuation thereby upon completion of said folding operation whereby to complete the formation of a bag of a desired length.

7. A hand operable bag forming machine comprising, a generally open topped supporting structure adapted to

have a roll of flat tubular bag stock supported in the rear end thereof, a hood-like cover pivotally mounted on the rear end of said supporting structure for enclosing said roll of bag stock, said supporting structure including a flat table portion at the forward end thereof, a pair of longitudinally spaced transversely extending slots formed in said table portion, spring urged roller means gripping the end of the bag stock, manually rotatable crank means connected to said roller means for advancing the bag stock a desired distance along said table portion, vertically extending guide means disposed on said supporting structure on either side of said table portion, a transversely disposed operating head vertically reciprocal in said guide means and having a crosshead disposed generally above the slotted portion of said flat table, a knife blade mounted on the rear surface of said crosshead for movement downwardly through the slot nearest said roll of bag stock for cutting off a desired length of the bag stock, the lower cutting edge of said knife blade being in the form of an inverted V, a folding blade mounted on the front surface of said crosshead for movement downwardly through the other one of said slots for folding the cut-off trailing end of the length of bag stock, the lower edge of said folding blade being disposed slightly above the apex of said inverted V-shaped cutting edge of said knife blade whereby during downward movement of said operating head the folding blade does not engage the length of bag stock until after the completion of the cutting operation, a plurality of laterally spaced stapling devices supported below said table portion and aligned with said other slot for stapling together at laterally spaced intervals the folded portions of the cut-off length of bag stock whereby to close one end of the bag being formed upon simultaneous operation thereof, the lower edge of said folding blade being provided with a series of laterally spaced windows aligned with said stapling devices whereby to permit the passage of the staples through the folded portions of the cut-off length of bag stock, a transversely extending push rod for simultaneously actuating said plurality of stapling devices, a manually operable handle disposed externally of said supporting structure, and linkage means operably interconnected between said handle, the lower end of said vertically reciprocal operating head and said transversely extending push rod whereupon actuation of said handle said operating head is moved downwardly whereby to complete the cutting and folding operations in sequence after which said stapling devices are simultaneously actuated by said push rod whereby to complete the formation of a bag of a desired length.

8. A manual bag forming machine comprising, a supporting structure adapted to have a roll of flat tubular bag stock disposed therein and including a stationary horizontal flat table portion over which the end of the bag stock is drawn having a transverse knife receiving slot therein, a vertically reciprocal operating head disposed above said slot, a knife blade having a cutting edge formed on its lower edge mounted on said head for movement downwardly through said slot for cutting off a desired length of said bag stock, a heat sealing bar carried on said head to one side of said knife so as to form a transverse heat seal across said bag stock by pressing the same against said table portion on one side of said slot, and manual means for reciprocating said head.

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