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BAG OPENING MACHINE WITH UPPER AND LOWER BAG FORMING
UNITS DISPOSED IN PARALLEL RELATIONSHIP

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2 Sheets-Sheet 1

FIG 1

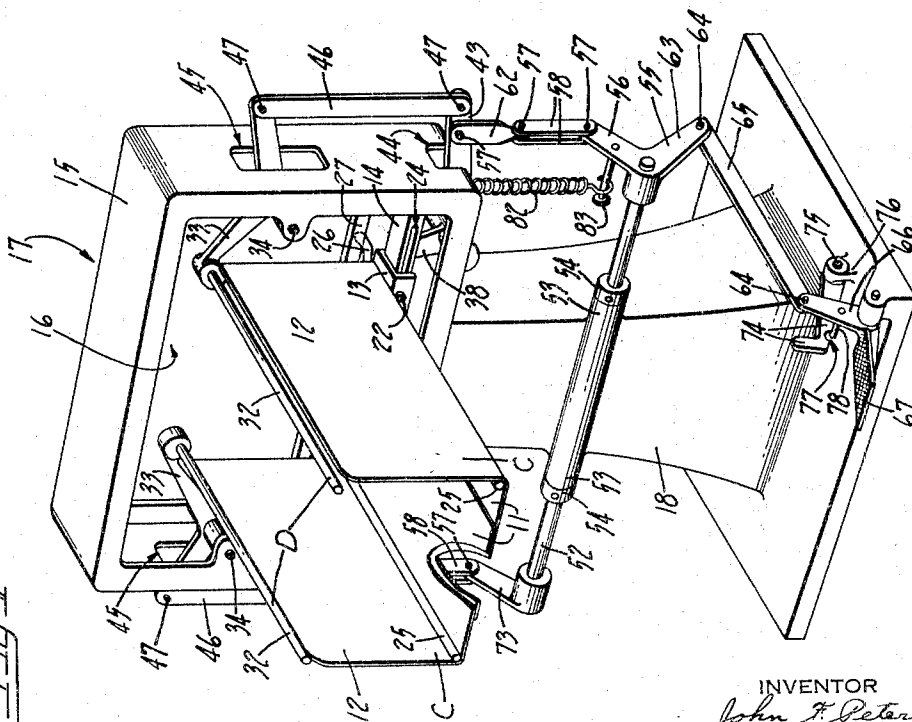
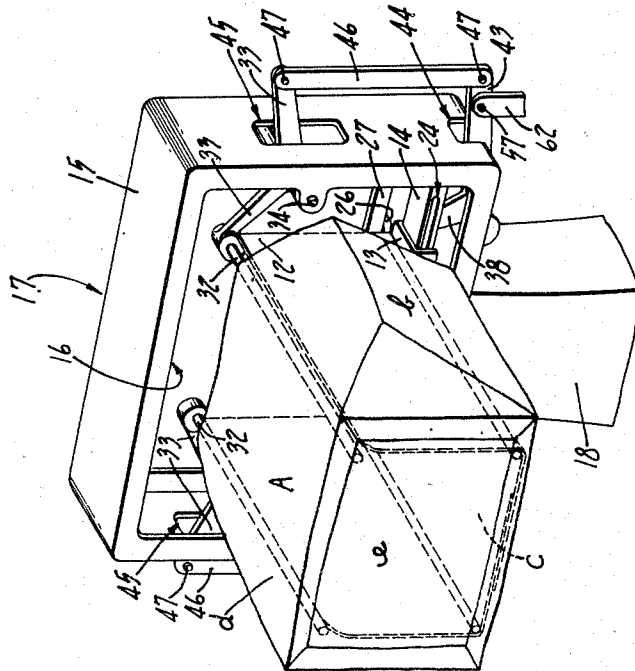


FIG 2



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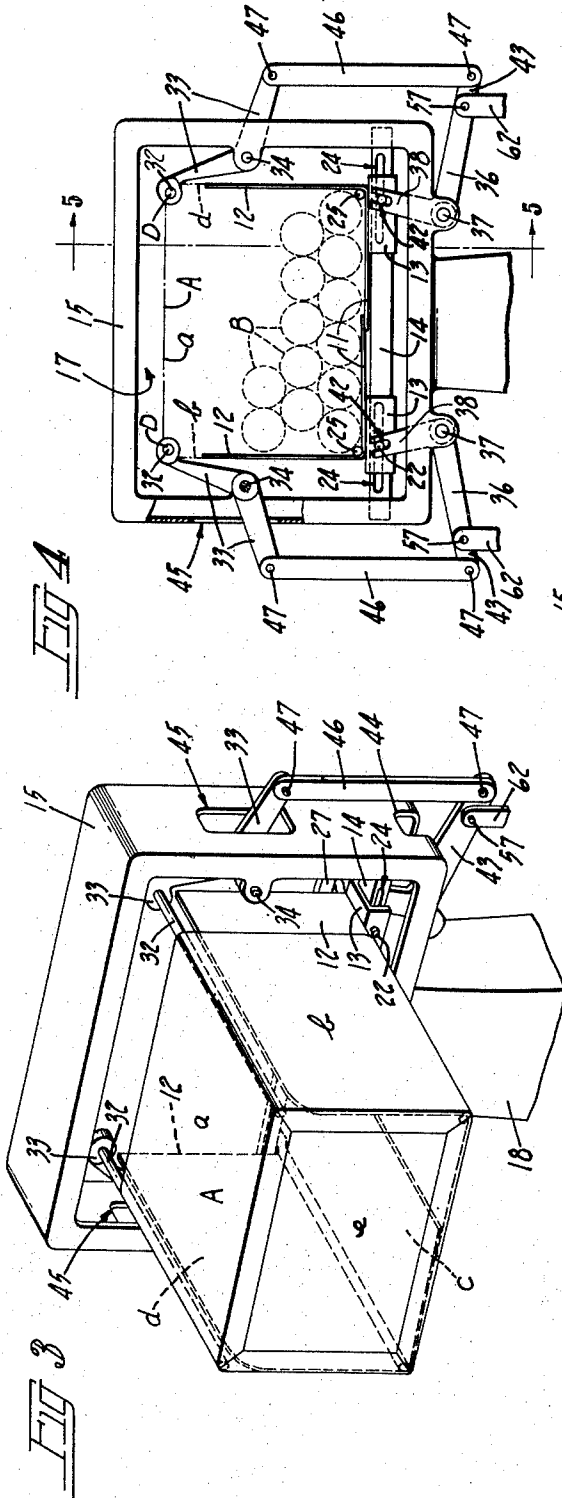
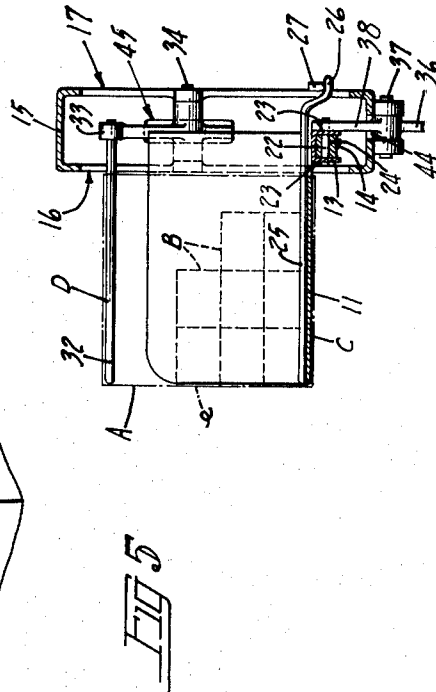
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BAG OPENING MACHINE WITH UPPER AND LOWER BAG FORMING
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2 Sheets-Sheet 2



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BAG OPENING MACHINE WITH UPPER AND LOWER BAG FORMING UNITS DISPOSED IN PARALLEL RELATIONSHIP

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This invention relates to bag or container opening machines and more particularly to a machine for opening or expanding flattened or folded bags, flexible containers and the like and for holding them in opened position for filling.

An object of the invention is the provision of a bag opening machine for opening flattened or folded, flexible bags, shipping carriers and the like into an expanded article receiving condition.

Another object of the invention is the provision of a bag opening machine having contractable and expandable elements, which in one position permit the telescoping of a partially opened bag thereover and which in another position expands the bag and holds it in condition for filling, the filled bag thereafter being released without disarranging the articles within the bag.

Still another object of the invention is the provision of such a machine of simple construction wherein coacting forming units expand a collapsed or partially opened bag and hold it in article receiving condition while supporting and guiding the articles into filling position within the expanded bag.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a perspective view of a bag opening machine embodying the present invention;

Fig. 2 is a view similar to Fig. 1 with certain parts removed and showing a partially opened bag being slipped or telescoped onto cooperating lower slidable and upper movable bag opening elements or units while they are in a contracted position;

Fig. 3 is a view similar to Fig. 2 showing the coacting units in an expanded position within a bag causing the latter to be fully expanded thereover;

Fig. 4 is a vertical elevation of the machine shown in Fig. 3 illustrating the back or loading end of the device, with a bag or shipping carrier held in position for filling and articles placed in the bag being indicated by broken lines; and

Fig. 5 is a sectional view of the machine during a bag filling operation as taken substantially along the line 5—5 in Fig. 4.

As a preferred embodiment of the invention, the drawings illustrate a machine for opening flattened or folded bags, flexible containers, shipping carriers and the like designated by the letter A, which, upon being partially opened and slipped

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over contractable and expandable forming or opening units or elements of the machine, may be expanded into filling condition.

The bag is usually made of flexible material such as paper and when expanded preferably forms a square or rectangular container as best illustrated in Figs. 3, 4 and 5 for shipping of articles such as empty cans. It is formed with four side wall members *a*, *b*, *c* and *d*. Each wall member *a*, *b*, *c* and *d* has its marginal edge bent and folded at one end and secured to a bottom wall member *e*.

The bag A just described is received, for example, at a can manufacturer's plant in a flattened or folded form and is used for packing empty cans or containers B (Figs. 4 and 5), which usually are formed with a tubular body having a bottom end secured thereto. Such cans are in a completed form ready for filling at a cannery (except for the top ends which are usually shipped separately). The ready to fill cans are packed in bags or flexible containers of the character described by the can maker for the purpose of shipping them to the canner or packer who fills the desired product therein.

The bag opening machine embodying the present invention comprises contractable and expandable bag wall engaging units or elements for opening the bags A and for holding them in expanded position while they are being filled. The units, designated by the letter C, of which there are two, each comprises an L-shaped or angular member located adjacent the lower corner at each front side of the frame of the machine. Each unit or angular member includes a bottom wall 11 and a side wall 12, disposed at a right angle to each other, and the bottom walls 11 are adapted to overlap and slide over each other when in contracted position.

The lower bag forming or corner units C are each carried on a slide 13, the bottom wall 11 of each unit being secured to the respective slide (Fig. 1). The slides 13 are movable on a slide bar 14, which is mounted in an open rectangular frame 15 of the machine. The frame 15 comprises the main frame of the machine and has a front opening 16 and a rear opening 17. The frame 15 may be formed integral with or mounted on a base or pedestal 18.

The slides 13 (Figs. 1, 4 and 5) are elongated, inverted U-shaped members which engage the slide bar 14 on three surfaces, namely, the top and along the two opposite sides. The slides 13 are carried on the slide bar 14 by means of a pin 22 which passes through suitable openings 23 in

the slide and moves in elongated slots 24 in the slide bar 14.

Each L-shaped bag forming or expanding unit C is reinforced or supported by a rod or tubular member 25 which is secured as by welding to the corner formed by each bottom wall 11 and side wall 12. These reinforcing and supporting rods 25 extend through the entire length of the units and project out at the rear opening 17 of the frame and their outer curved ends 26 (Figs. 1, 2 and 5) engage a transverse bar 27 mounted in the frame 15 and are slidable along said bar while the units C are slid along the slide bar 14.

The other of the contractable and expandable elements or bag forming units which cooperate with the lower corner units C are designated by the letter D. These elements comprise upper corner rods 32 which are located in a superimposed position over the upper edge of each side wall 12 when the units C and the elements D are in a contracted position (Figs. 1 and 2). The rods 32 of which there are two, one adjacent each upper corner of the machine, are secured to the inner ends of rocker arms 33. These rocker arms are pivotally mounted at opposite sides of the machine on shafts or bolts 34 secured in the main frame. Thus, as the lower corner units C are slid along the slide bar 14 from a contracted position to an expanded position or vice versa, the elements D are swung through an arcuate path and are thus expanded outwardly to follow the outward expansion of the units C.

The lower corner units C are slid from contracted position to expanded position by means of levers 36 which are pivotally carried on shafts or bolts 37 secured in the lower part of the frame 15 (Fig. 4). An inner arm 38 of each lever 36 is slotted as at 42 at its upper end and the walls of these slots are engageable with the pins 22 extending through the slides 13.

The levers 36 are formed with outwardly extended arms 43 which project out through openings 44 formed in the lower opposite corners of the frame 15. Actuation of the arms 43 effects the movement of the lower corner units C along the slide bar 14. This sliding movement preferably is simultaneous with the arcuate movement of the upper corner element D. For this purpose the outwardly extended arms 43 are pivotally connected to the outer ends of the rocker arms 33, which latter arms extend outwardly through openings 45 on opposite sides of the frame. Connecting links 46 thus are provided and these links are connected by pins 47 to the rocker arms 33 and to the lever arms 43 on opposite sides of the machine (Fig. 4).

The lower corner or bag forming units C and the upper bag forming elements D may be operated in any suitable manner to contract and to expand them. By way of example, the units C and elements D are interconnected, so that they may be operated from a single location, as by a foot treadle, which thus leaves both hands of the operator free to slip a partially opened mouth of a folded or flattened bag in place over the units C and elements D when they are in contracted position (Fig. 2).

The connected arms 33 and 43 on opposite sides of the machine preferably are connected by suitable linkage to a rocker shaft 52 (Fig. 1). Such a shaft is carried in suitable bearings 53 formed in the base 18. The shaft 52 is held in desired operating position by collars 54 which are secured to the shaft.

One end of the shaft 52 carries a bell crank 75

lever 55 which is secured thereto (as viewed on the lower right hand side of Fig. 1 of the drawings). An arm 56 of lever 55 is connected through pins 57 to links 58, 62 and to the arms 43. The other arm of the lever 55 identified by the number 63, is connected through pins 64 and a connecting link 65 to an arm 66 of a foot treadle 67.

The opposite end of the shaft 52 carries a lever 73 (Fig. 1) which, like lever 55, is secured to this shaft. Similarly, links 58, 62 connect the outer end of the lever 73 to the arm 43 on the opposite side of the machine. Pins 57 are used to effect the linkage of the lever 73, the links 58, 62 and the arm 43.

Thus, as the foot treadle 67 is depressed (Fig. 1), the lower corner units C expand or slide outwardly while the upper corner elements D swing upwardly and outwardly from the contracted position (Fig. 1) to the extended position (Figs. 3 and 4). In either the contracted position shown in Fig. 1 or the expanded position shown in Fig. 3, the expanding rods D are always in alignment with the side walls 12 of the angular units C. Provision is made to maintain the unit C and the elements D in their expanded position so that empty cans or other articles may be packed into a bag or shipping carrier A when the latter is in article receiving condition. For this purpose a latch link 74 is pivotally carried on a pin 75 secured in a lug 76 formed integral on the base 18 and is formed with a semicircular slot 77 adjacent its outer end which drops in place and engages a pin 78 secured in the arm 66, and locks the linkage and the bag forming units in an expanded position.

In order to restore the bag forming units C and D to their original or contracted position, disengagement of the latch link 74 from the pin 78 is accomplished by merely kicking the latch link upward and allowing the machine parts to return under spring action as an incident to positioning a bag in place for opening. This is effected by means of a tension spring 82 (Fig. 1) having one end secured to the frame 15 and the other to a pin 83 secured in the arm 56 of bell crank lever 55.

Operation of the machine just described is as follows: A bag A partially opened at its mouth, as best illustrated in Fig. 2, is slipped or telescoped over the outer ends of the lower corner units C and the upper corner elements D while in contracted position. The partially opened bag then is slipped further onto the units C and elements D to open the sides of the bag. The latter units and elements thereafter are moved to their fully expanded position (Figs. 3, 4 and 5) by stepping on the foot treadle 67 as previously described. This opens the bag or carrier A into article receiving condition.

During the expansion of the units C, the bottom walls 11 cooperate to produce a continuous wall along the bottom side of the expanded bag. Such a wall provides an interior lining wall or forming mandrel in the bag which also serves as a support for the empty cans, containers or other articles being packed into the bag. The side walls 12 cooperate with the bottom walls 11 in further lining the expanded bag, serving as side guides for the articles as they are passed into the opened bag through the rear opening 17 of the machine frame and the fully opened mouth of the bag.

The bag A upon being filled with empty cans or other articles then is slipped off the units C and elements D while they are still in expanded

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position without disturbing the arrangement of the cans or other articles in the filled bag. The filled bag thereafter may be closed and sealed at its opened end in any suitable manner and is ready for shipment to the cannery or other packing place.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction, and arrangement of the parts of the apparatus mentioned herein and in the steps and their order of accomplishment of the process described herein, without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the apparatus and process hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In machine for opening bags and the like and for holding them in expanded position for filling, the combination of a frame, a slide bar mounted in said frame, lower bag forming units slidably carried on said bar, levers pivotally carried in said frame and connected to said lower units for effecting the sliding of said lower units on said bar, rocker arms pivotally carried in said frame, upper bag forming units mounted on said rocker arms and movable relative to said lower units, and means for operating said levers, and said arms in unison for sliding said lower units and for moving said upper units to a contracted position and to an expanded position, said lower units and said upper units being disposed to receive a partially opened bag when in a contracted position and being expandable within the bag to open the same for filling.

2. In a machine for opening bags and the like and for holding them in expanded position for filling, the combination of an open frame through which articles are passed during said filling, a slide bar mounted in said frame, a pair of slides carried on said slide bar, a pair of lower bag forming units secured to said slides, each of said units comprising a bottom wall and a laterally bent side wall, the said bottom walls of said pair of units being disposed in overlapping and sliding relation, upper bag forming units pivotally carried in said frame and movable relative to said lower units, and means for sliding said lower units and for moving said upper units to a contracted position and to an expanded position, said lower units and said upper units being disposed to receive a partially opened bag when in a contracted position and being expandable within a bag to open the same, the bottom and side walls of said lower units providing a hollow forming mandrel for the expanded bag and to guide and to support articles filled into the held open bag.

3. In a machine for opening bags and the like and for holding them in expanded position for filling, the combination of a frame, a slide bar mounted in said frame, lower corner units slidably carried on said bar, levers pivotally carried in said frame and connected to said lower units for effecting the sliding of said lower corner units on said bar, rocker arms pivotally carried in said frame, upper corner rods mounted on said rocker arms and movable relative to said units, a rocker shaft associated with said frame, connecting linkage between said levers and said arms and said shaft for operating said levers and said arms in unison for sliding said lower corner units and for moving said upper corner rods to a contracted

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position and to an expanded position, and means for actuating said rocker shaft, said lower corner units and said upper corner rods being disposed to receive a partially opened bag when in a contracted position and being expandable within the bag to open the same for filling.

4. In a machine for opening bags and the like and for holding them in expanded position for filling, the combination of a frame, lower corner units slidably mounted in said frame, levers pivotally carried in said frame and connected to said lower units for effecting the operation of said units, rocker arms pivotally carried in said frame, upper corner rods mounted on said rocker arms and movable relative to said units, pivotal connectors between said levers and said arms to provide an interconnected linkage for operating said levers and said arms in unison for sliding said lower corner units and for moving said upper corner rods to a contracted position and to an expanded position, and a foot treadle for operating said interconnected linkage, said lower corner units and said upper corner rods being disposed to receive a partially opened bag when in a contracted position and being expandable within the bag to open the same for filling.

5. In a machine for opening bags and the like and for holding them in expanded position for filling, the combination of a frame, lower corner units slidably mounted in said frame, levers pivotally carried in said frame and connected to said lower units for effecting the sliding movement of said units in the frame, rocker arms pivotally carried in said frame, upper corner rods mounted on said rocker arms and movable relative to said units, pivotal connectors between said levers and said arms to provide an interconnected linkage for operating said levers and said arms in unison for sliding said lower corner units and for moving said upper corner rods to a contracted position and to an expanded position, a foot treadle for operating said interconnected linkage in effecting the movement of said lower corner units and said upper corner rods to an expanded position, and spring means attached to said interconnected linkage for returning said lower corner units and said upper corner rods to a contracted position, said lower corner units and said upper corner rods being disposed to receive a partially opened bag when in a contracted position and being expandable within the bag to open the same for filling.

6. In a machine for opening bags and the like and for holding them in expanded position for filling, the combination of a frame, lower corner units slidably mounted in said frame, levers pivotally carried in said frame and connected to said units for sliding said units in said frame, rocker arms pivotally carried in said frame, upper corner rods mounted on said rocker arms and movable relative to said units, pivotal connectors between said levers and said arms to provide an interconnected linkage for operating said levers and said arms in unison for sliding said lower corner units and for moving said upper corner rods to a contracted position and to an expanded position, a foot treadle for operating said interconnected linkage, and a latch link being engageable with said interconnected linkage when said lower corner units and said upper corner rods are in expanded position for locking the same within an expanded bag to hold it in position for filling, said lower corner units and said upper corner rods being disposed to receive a partially opened bag when in a contracted po-

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sition and being expandable within the bag to open the same during said filling.

7. In a machine for opening bags and the like and for holding them in expanded position for filling, the combination of a frame, a slide bar mounted in said frame, lower bag forming units slidably carried on said bar and having movement longitudinally of the bar with the units substantially parallel to each other, upper bag forming units disposed parallel to said lower units, said upper units being pivotally carried in said frame and having arcuate movement at right angles to said slide bar, link members connecting said lower and said upper bag forming units, and means for sliding said lower units longitudinally of said slide bar and simultaneously moving said upper units through said link members while maintaining the upper units parallel with the lower units to bring all units to a contracted position and to an expanded position, said lower units and said upper units being disposed to receive a partially opened bag when in a contracted position and being expandable within the bag to open the same for filling.

8. In a machine for opening bags and the like and for holding them in position for filling with articles, the combination of a frame, a pair of parallel lower bag opening units mounted in said frame and having bottom wall members disposed in parallel overlapping relation and movable relative to each other, a pair of upper bag forming

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units disposed parallel to said lower units, said upper units being movably carried in said frame, means for maintaining said lower and upper units in parallelism during said movements, and moving means for producing said relative movements in unison to move said lower units toward each other and to simultaneously move said upper units inwardly toward each other so that said lower and upper units then have a contracted form for receiving a partially opened bag thereon, said moving means also separating said lower and upper units to move them away from each other to an expanded form to open the bag fully, said overlapping walls serving as a platform to support said articles as they are placed in the opened bag during the filling operation.

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