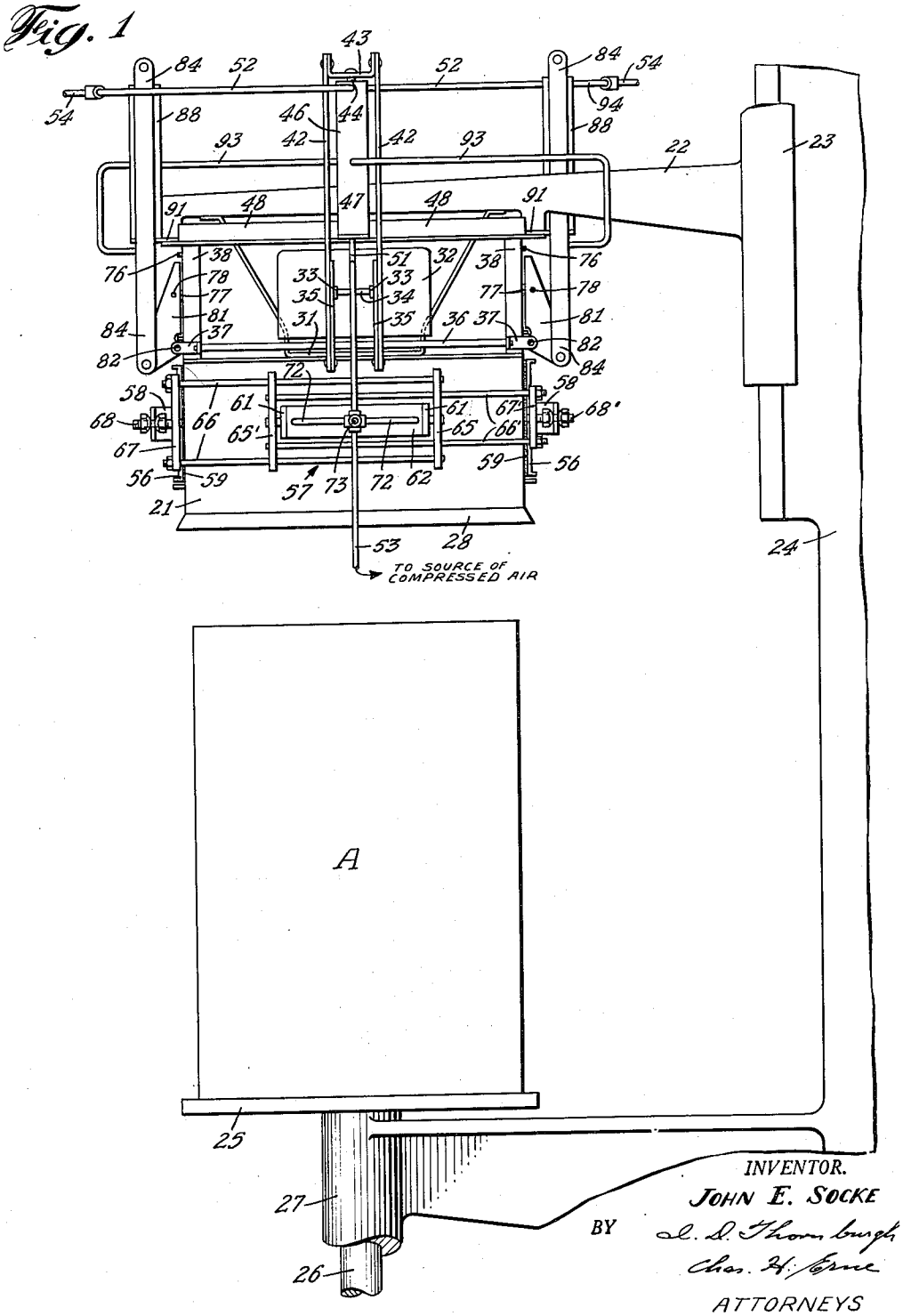
March 4, 1952 J. E. SOCKE 2,587,663

SEALING HEAD MECHANISM FOR CLOSING AND SEALING BAGS AND FLEXIBLE CONTAINERS

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Fig. 1



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Fig. 2

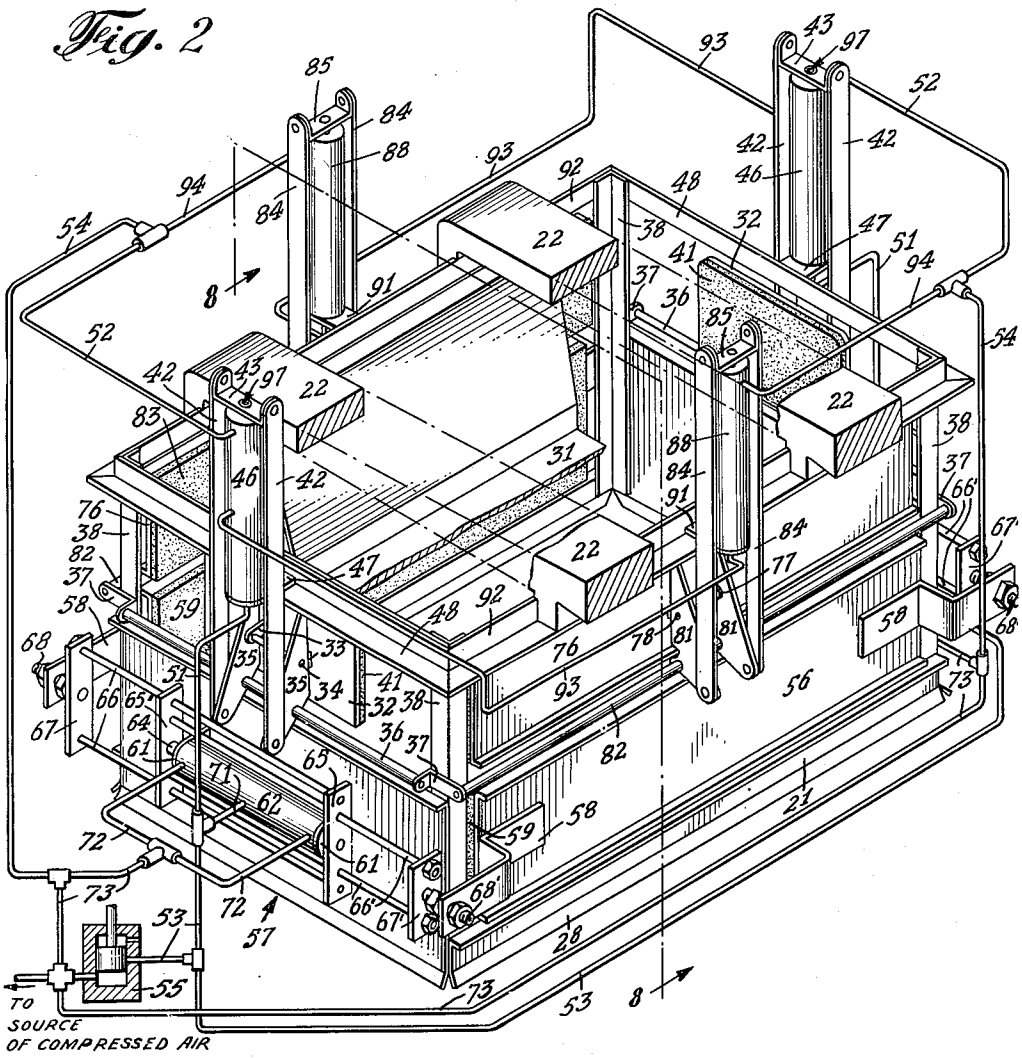
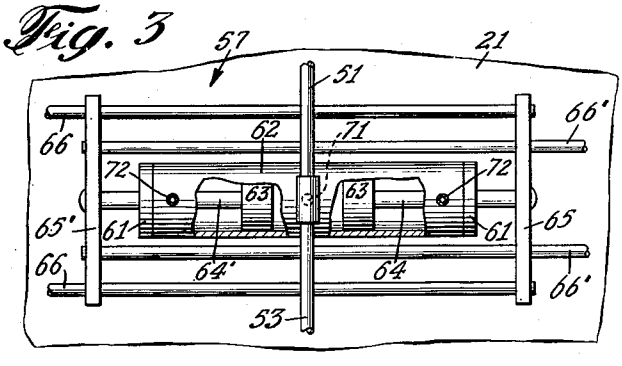


Fig. 3



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SEALING HEAD MECHANISM FOR CLOSING AND SEALING BAGS AND FLEXIBLE CONTAINERS

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Fig. 4

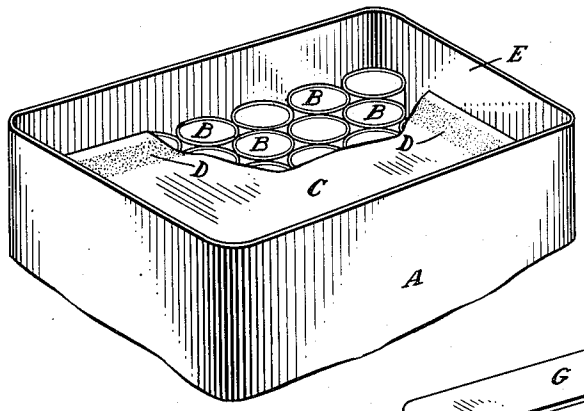


Fig. 5

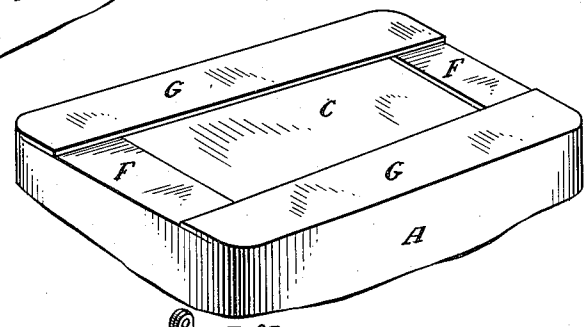
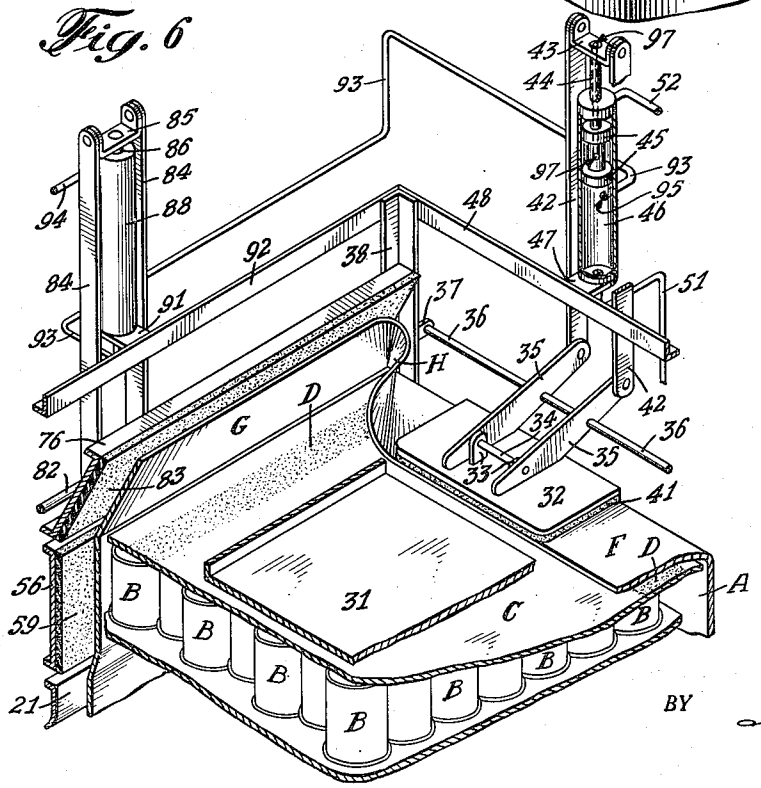


Fig. 6



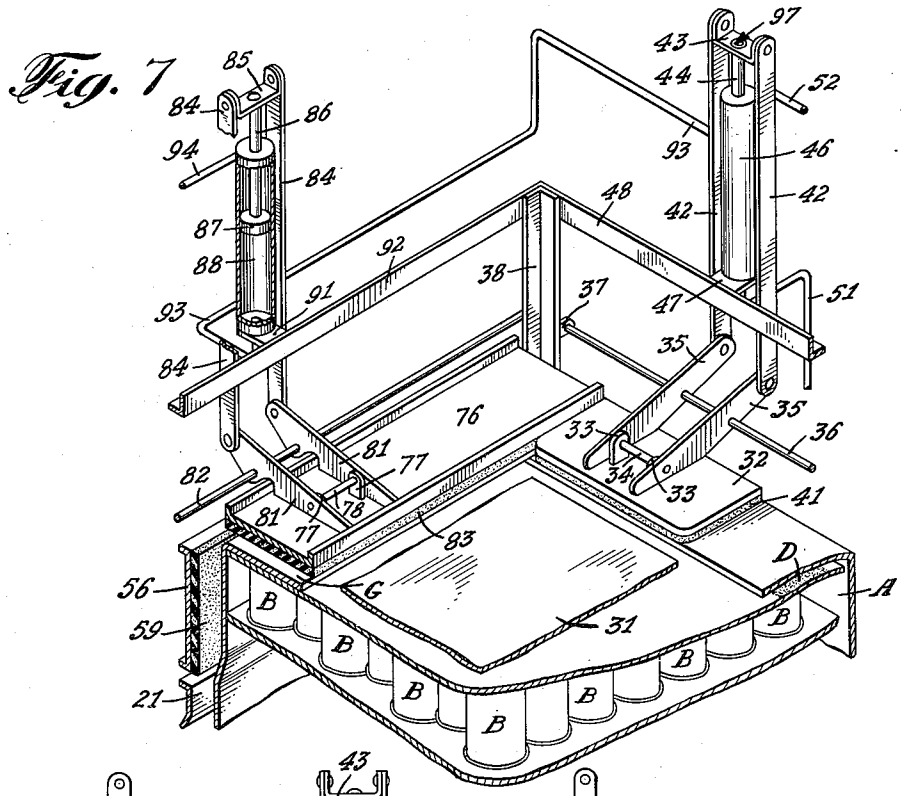
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Fig. 7



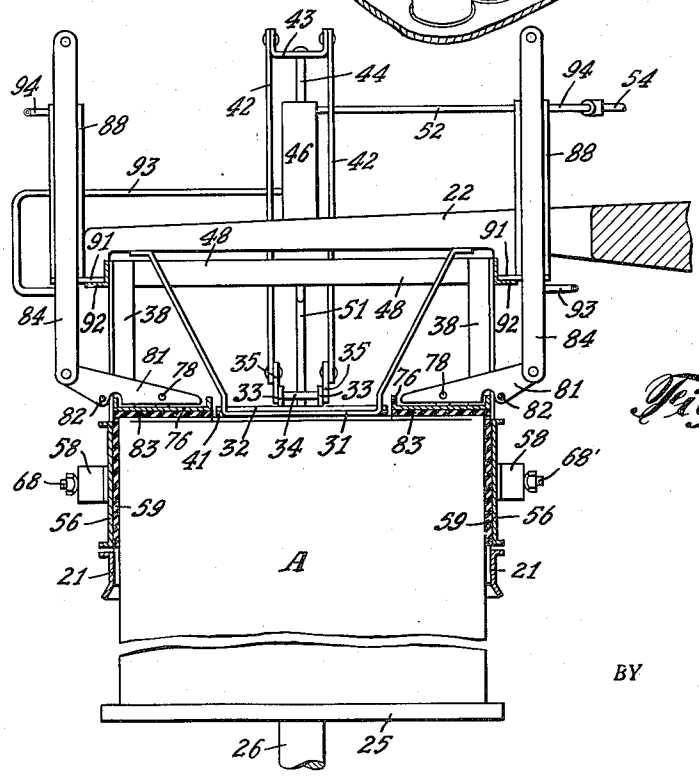


Fig. 8

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2,587,663

SEALING HEAD MECHANISM FOR CLOSING AND SEALING BAGS AND FLEXIBLE CONTAINERS

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Application April 29, 1948, Serial No. 23,927

11 Claims. (Cl. 53—102)

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This invention relates to a sealing head mechanism for folding and sealing flexible containers such as filled paper bags and has particular reference to the folding of a marginal edge portion of a bag and to sealing the folded portion while holding articles within such a bag in a desired formation.

An object of the invention is the provision of a mechanism for folding and sealing the open end of a bag or container filled with articles such as cans by folding or turning-in side section of a marginal edge portion while such a bag of cans is being pressed inwardly from opposite sides to push the cans together in a compact and desired arrangement and to hold them in such arrangement during the sealing of the bag.

Another object of the invention is the provision in a mechanism of the character described, of a plurality of side pressing elements which are operable with the folding of certain side sections of a marginal edge portion of a bag in advance of folding of other side sections thereof so that the cans within the bag are held snugly in their desired arrangement during the sealing of the folded sections.

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 side elevational view of a bag closing and sealing mechanism embodying the present invention, with parts broken away;

Fig. 2 is an enlarged perspective view of the sealing head used in the mechanism as viewed from the right in Fig. 1, with parts broken away and parts shown in section.

Fig. 3 is an enlarged view of one of the air cylinders shown in Figs. 1 and 2 with parts broken away and with parts in section.

Fig. 4 is a perspective view illustrating the upper open end of a bag filled with cans preparatory to being sealed;

Fig. 5 is a view similar to Fig. 4 showing the bag closed and sealed;

Figs. 6 and 7 are perspective views illustrating a corner of the bag and showing how the marginal side sections are folded into sealing position; and

Fig. 8 is a sectional view of the sealing head shown in Figs. 1 and 2 taken through a plane indicated by the lines 8—8 in Fig. 2 and showing the parts in position for sealing a filled bag.

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As an exemplary embodiment of the invention the drawings show a sealing head mechanism for closing and sealing a bag or flexible container A (Figs. 1, 4 and 5) of rectangular configuration and preferably made of fibre, which is filled with cans B. The cans are packed in layers or tiers with a division or separator sheet between each layer. The top layer of cans is covered with a flat sheet or closure member C having a band of adhesive or glue D on its top surface (Fig. 4) adjacent but in spaced relation to its outer periphery. An upper annular marginal edge portion E of the bag extends above the end member C and is folded inwardly and downwardly against the adhesive coated end member for sealing the bag.

In folding the annular marginal edge portion E of the flexible bag down against the flat closure member C, oppositely disposed side sections F of the marginal edge portion E, are first folded inwardly and downwardly against the closure member C as shown in Fig. 6. Simultaneous with this action side portions of the bag adjacent its open end are pressed inwardly from opposite sides for pushing the cans together in a desired arrangement and for holding them while intermediate or side sections G of the marginal edge portion E are folded inwardly and downwardly against the closure member C as shown in Fig. 7. This progressive folding of the marginal edge portion E forms corner folds H which overlap the ends of the side sections F as shown in Fig. 5 and thus provide a smooth and well formed multiple fold corner structure. Thereafter the folded sections F, G of the edge portion are pressed tightly against the end member C for effecting proper contact of these folded sections with the adhesive on the end member. This completes the sealing of the bag A.

A preferred form of sealing head mechanism for folding and sealing the marginal edge portion E of a filled bag A includes a rectangular shaped hollow sealing head frame 21 (Figs. 1, 2 and 8) which is secured to a pair of support arms 22 of a vertically movable slide 23, carried on a frame 24 which constitutes the main frame of the machine.

The sealing head frame 21 preferably is movable toward and away from a filled bag A to be sealed. For this purpose the bag is located beneath the head frame on a platform 25 mounted on the upper end of a stem 26 carried in a bearing 27 formed on the machine frame 24. The head frame 21 may be raised and lowered on the slide frame 24 in any suitable manner. If de-

sired, the head frame 21 may be held stationary and the bag moved up into the frame. For this purpose the platform stem 26 may be raised and lowered in any suitable manner.

As the sealing head frame 21 moves down from the position shown in Fig. 1 onto a filled bag A as shown in Fig. 8, preparatory to a sealing operation, the upper marginal edge portion E of the bag is surrounded and guided to maintain it in an upright position and thereby prevent its being crushed. For this purpose an outwardly tapered or flared rectangular apron or guide 28 is formed on the lower edge of the head frame 21 and telescopes over the end of the bag as the frame moves into sealing position.

When the head frame 21 is fully telescoped onto a bag to be sealed a hold down plate 31 engages against the closure member C to hold it in position on the upper layer of cans B in the bag (Figs. 6, 7 and 8). Such a plate extends down into the head frame and is secured to the support arms 22 (Figs. 1 and 8). With the head frame 21 in such a sealing position the marginal edge portion E of the bag is free to be folded inwardly and downwardly against the end member C as hereinbefore explained.

Folding of the side sections F of the marginal edge portion E of the bag is effected by pivoted side folding elements 32 (Figs. 1, 2, 6 and 7). There are two of these side folding elements located along and at opposite sides of the head frame 21. Each folding element 32 has a pair of spaced lugs 33 secured thereto which carry a pivot rod 34. The ends of the rods 34 extend beyond the lugs 33 and are secured in rocker arms 35. The edge folding elements 32 are free to float in their connections on the rods 34 relative to the arms 35 for evenly distributing the pressure of sealing the side sections F. The arms 35 serve as stops for limiting the floating action of the elements 32. The rocker arms 35 are carried on cross rods 36 secured in brackets 37 mounted on vertically disposed corner angle irons 38 which comprise part of the head frame 21. The inner or folding face of each folding element 32 preferably carries a cushion 41 of rubber or other resilient material.

The folding elements 32 are actuated by pairs of spaced vertically disposed links 42 which are pivotally connected at their lower ends to the rocker arms 35 (Fig. 6). The upper ends of each pair of links 42 are pivotally connected to a bridge member or yoke 43 which is secured to the upper end of a piston rod 44. The piston rod is secured at its lower end to a pair of spaced pistons 45 located within an air cylinder 46. There is one of these air cylinders 46 for each folding element 32.

The air cylinders 46 are mounted on plates or brackets 47 which are secured to horizontal angle irons 48 secured to the corner angle irons 38 of the head frame 21. These air cylinders are double acting and are in communication with lower and upper air pipes 51, 52 (Figs. 1, 2, 6, 7, and 8) having respective connecting pipes 53, 54. Pipes 53 communicate with a control valve 55 which may be manually operated and which is in communication with a suitable supply of compressed air. The pipes 54 are connected to the constant supply of air leading into the valve 55 and flows through the pipes 52 for maintaining the folding elements 32 in their normally raised positions.

When compressed air is admitted into the lower pipes 51, it acts against the lower faces of the bottom pistons 45 in the cylinders 46. The area of these lower faces is greater than that of the upper faces by the amount equal to the cross sectional area of the piston rods 44. Therefore, the force acting against the lower pistons is greater than that against the upper pistons and thus the pistons are moved upwardly in the cylinders (Fig. 6). This movement of the pistons actuates the arms 35 and rocks the folding elements from their normally raised positions, inwardly and downwardly against the marginal edge portion E of the bag and thus folds the sections F inwardly and downwardly against the end member C as hereinbefore explained.

Simultaneous with this action a pair of side pressing elements 56, one on each side of the head frame 21 are moved inwardly against the filled bag and crowd the cans therein into a compact arrangement (Figs. 6, 7 and 8). The elements 56 are carried by side pressing mechanisms 57 connected thereto by brackets 58 secured to the opposite ends of the side pressing elements. The inner or pressing face of each of these elements preferably carries a cushion 59 of rubber or other resilient material.

The two side pressing devices 57 are secured to brackets 61 located and mounted on opposite sides of the head frame (Figs. 1, 2 and 3). Each pressing device 57 includes a double acting air cylinder 62 which is secured to its brackets 61 and which houses a pair of pistons 63 operable therein for effecting a side pressing operation. One of the pistons 63 is secured to the inner end of a piston rod 64 which extends out through one end of the cylinder and is secured to a cross bar 65 which is connected by a pair of pull rods 66 to an auxiliary cross bar 67 which in turn is connected by a single rod 68 to the adjacent bracket 58 of the pressing elements 56. In a similar manner, the other piston 63 is secured to a piston rod 64' which extends out through the opposite end of the cylinder and is secured to a cross bar 65' which is connected by a pair of pull rods 66' to an auxiliary cross bar 67' which in turn is connected by a single rod 68' to the adjacent bracket 58 of the pressing elements 56. The pull rods 66, 66' slide in and are guided by the cross bars 65, 65'.

Hence when compressed air is admitted from the pipes 53 into the pipes 51, this air also flows through connecting pipes 71 which are in communication with an inlet disposed in each of the air cylinders 62 midway between its ends so that it is between the pistons 63 (Figs. 2 and 3). This air as it enters each cylinder forces its pistons 63 apart and thus they move outwardly.

This action of the pistons effects a pulling force on the pairs of pull rods 66, 66' which draws the oppositely disposed side pressing elements 56 inwardly against the cans as previously described. This pulling force is exerted as long as the valve 55 is open and thus the cans are held in their compressed arrangement during the remainder of the bag sealing operation.

The outward movement of the piston 63 is exerted against a constant supply of compressed air admitted into the cylinder 62 by pipes 72 having communication with the outer ends of these cylinders in a manner similar to the cylinders 46 hereinbefore described. Pipes 73 connect the pipes 72 and are communicable with the source of compressed air.

Folding of the side sections G of the marginal edge portion E of the bag is effected by pivoted

auxiliary side folding elements 76 (Figs. 1, 2, 6, 7 and 8). There are two of these auxiliary side folding elements located along opposite sides of the head frame 21 at right angles to the folding elements 32. Each element 76 has a pair of spaced lugs 77 secured thereto which carry a pivot rod 78. The ends of the rods 78 extend beyond the lugs 77 and are secured in rocker arms 81.

The edge folding elements 76 like the elements 32 also are free to float in their connections on the rods 78 relative to the arms 81 for evenly distributing the pressure of sealing the side sections G. The arms 81 serve as stops for limiting the floating action of the elements 76. The rocker arms 81 are carried on cross rods 82 secured in the brackets 37. The inner or folding face of each element 76 preferably carries a cushion 83 of rubber or other resilient material.

The folding elements 76 are actuated by pairs of spaced vertically disposed links 84 which are pivotally connected at their lower ends to the rocker arms 81 (Fig. 7). The upper ends of each pair of links 84 are pivotally connected to a bridge member or yoke 85 which is secured to the upper end of a piston rod 86. The piston rod is secured at its lower end to a piston 87 located within an air cylinder 88. There is one of these air cylinders 88 for each folding element 76.

The air cylinders 88 are mounted on plates 91 which are secured to horizontal angle irons 92 secured to the angle irons 38 of the head frame 21. These air cylinders are double acting and are in communication with lower and upper air pipes 93, 94 (Figs. 1 and 2). The lower pipes 93 connect the lower end of each of the cylinders 88 to a port 95 (Fig. 6) in each of the air cylinders 46. This port 95 is normally closed by the lower piston 45 in each of the cylinders 46. The upper pipes 94 of each cylinder 88 connects with the pipes 52, 54 and through these latter pipes with the supply of compressed air as previously described. Hence, this supply of air acts against the upper faces of the pistons 87 in the cylinders 88 and thus forces them downward in the cylinders for maintaining the folding elements in their normally raised positions.

Thus when compressed air is admitted into the cylinders 46 from the pipes 51 for moving the pistons 45 upward for folding over the bag sections F as previously described, the lowermost of the pistons 45 gradually uncovers the port 95 in each of these cylinders and thus bleeds air therefrom into the cylinders 88 (Fig. 6). The air thus admitted into the lower end of the cylinders 88 (Fig. 7) acts against the lower faces of the pistons 87 and forces them upward. This movement of the pistons actuates the arms 81 and rocks the folding elements 76 from their normally raised positions, inwardly and downwardly against the remaining vertical marginal edge portion E of the bag and thus folds the sections G inwardly and downwardly against the end member C and against the folded sections F as hereinbefore explained.

With both sets of the side folding elements 32, 76 in their inwardly swung positions, they temporarily hold the folded sections F and G against the closed member C for a predetermined period of time, depending upon the type and setting time of the adhesive being used, thus insuring a proper bonding of the container parts together. This seals the bag.

Following the sealing of the bag as explained above, the side folding elements 32, 76 are rocked upwardly from the folded sections of the bag to their normally raised positions. Simultaneously with this return of the folding elements, the side pressing elements 56 are released from the sides of the bag. This is effected by the closing of the control valve 55. Closing of the valve cuts off the supply of compressed air to the pipes 53 and immediately thereafter vents the air cylinders 46, 62 by way of the communicating pipes 51, 71 and 53 through the air valve 55.

The air cylinders 88 also are vented during the venting of the cylinders 46, 62 just described, by means of the lower connecting pipes 93 into the valves 46. This is effected during the downward movement of the lower pistons 45 in the cylinders 46 as these pistons gradually move down past the ports 95 in the cylinders and allow the air to pass into the space between the upper and lower pistons 45 (Fig. 6). This space between the pistons communicates with a vent channel 97 which extends up through the piston rods 44 to the outside atmosphere.

The constant supply of compressed air in communication with the cylinders 46, 62 and 88 through the pipes 52, 72 and 94 now acts against the upper faces of the top pistons 45, the outer faces of the pistons 63 and the upper faces of pistons 87 returning them to their original positions. It is through this action of the air that the side folding elements 32, 76 are rocked upwardly into their normal raised positions and the side pressing elements 56 are released from the sides of the filled and sealed bag. The sealing head frame 21 then is lifted from the sealed bag. This completes the cycle of operations of the mechanism.

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 without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a mechanism for folding an open end of a substantially rectangular bag or other container filled with articles and for sealing the end of the bag against a closure member overlying said articles, the combination of a rectangular sealing head frame for surrounding the open end of a filled bag to be sealed, opposed flat side folding elements pivotally carried on two sides of said frame for folding-in adjacent marginal edge portions of the open end of the bag, opposed flat auxiliary side folding elements pivotally carried on the intermediate sides of said frame for folding-in the other opposed marginal edges of the bag, means for first simultaneously pivoting both of said side folding elements inwardly to fold the engaged marginal edges of the bag against said inserted closure member, and means for subsequently simultaneously pivoting both of said auxiliary elements inwardly to fold the other marginal edges of the bag against the closure member, said auxiliary folding elements when in folded position extending beyond the two ends of each positioned side folding element and in close abutting relation to substantially surround and hold the peripheral folded margins of the bag for sealing.

2. A mechanism for folding and sealing an open end of a bag or other container filled with articles, the combination of a sealing head frame

for surrounding the open end of the filled bag to be sealed, a side pressing element in said frame engageable against at least one side of the article filled bag, and a plurality of side folding elements pivotally carried in said frame for folding in oppositely disposed side sections of a marginal edge of the open end of the bag.

3. A mechanism for folding and sealing an open end of a bag or other container filled with articles, the combination of a sealing head frame for surrounding the open end of a filled bag to be sealed, a top pressing element carried in said frame engageable against a top closure overlying the articles, and a plurality of side folding elements pivotally carried in said frame and for folding in oppositely disposed side sections of a marginal edge of the open end of the bag, said top pressing element engaging against said top closure prior to the operation of said side folding elements.

4. A mechanism for folding and sealing an open end of a bag or other container filled with articles, the combination of a sealing head frame for surrounding the open end of a filled bag to be sealed, a top pressing element carried in said frame engageable against a top closure, a side pressing element in said frame engageable against at least one side of the article filled bag, said pressing elements cooperating to hold the articles in said bag in compact arrangement, and a plurality of side folding elements pivotally carried in said frame for folding in oppositely disposed side sections of a marginal edge of the open end of the bag.

5. In a mechanism for folding and sealing an open end of a bag or other container filled with articles, the combination of a sealing head frame for surrounding the open end of a filled bag to be sealed, side pressing elements carried in said frame engageable against the article filled bag to hold the articles therein in compact arrangement, side folding elements pivotally carried in said frame for folding in oppositely disposed side sections of a marginal edge portion of the open end of the bag, and auxiliary side folding elements pivotally carried in said frame for folding in the remaining side sections of said marginal edge portion to seal the bag.

6. In a mechanism for folding and sealing an open end of a bag or other container filled with articles, the combination of a sealing head frame for surrounding the open end of a filled bag to be sealed, a closure member hold down plate in said frame and engageable against a closure member disposed in the open end of the bag for holding said closure member in place against articles within the bag prior to the bag folding and sealing operation, side folding elements carried in said frame for folding in oppositely disposed side sections of a marginal edge portion of the open end of the bag for pressing said sections against bordering edge portions of said closure member, and auxiliary side folding elements carried in said frame for folding in the remaining intermediate side sections of said marginal edge portion against bordering edge portions of said closure member and against said folded-in side sections at the corners thereof for sealing the bag.

7. In a mechanism for folding and sealing an open end of a bag or other container filled with articles, the combination of a support for a filled bag to be sealed, a sealing head frame for surrounding the open end of a filled bag to be sealed, side pressing elements carried in said frame engageable against the article filled bag to hold the articles therein in compact arrangement, side folding elements pivotally carried in said frame for folding in oppositely disposed side sections of a marginal edge portion of the open end of the bag for pressing said side sections against a closure member inserted in said bag, and auxiliary side folding elements pivotally carried in said frame for folding in the remaining side sections of said marginal edge portion against said inserted closure member and against said folded-in side sections at the corners thereof in overlapping relation to seal the bag.

8. In a mechanism for folding and sealing an open end of a bag or other container filled with articles, the combination of a sealing head member for surrounding the open end of a filled bag for sealing, a support member for supporting a filled bag to be sealed, one of said members being movable relative to the other for effecting the sealing, side pressing elements carried in said sealing head member engageable against the article filled bag to hold the articles therein in compact arrangement, side folding elements pivotally carried in said sealing head member for folding in oppositely disposed side sections of a marginal edge portion of the open end of the bag for pressing said side sections against a closure member inserted in said bag, and auxiliary side folding elements pivotally carried in said sealing head member for folding in the remaining side sections of said marginal edge portion against said inserted closure member and against said folded-in side sections at the corners thereof in overlapping relation to seal the bag.

9. In a mechanism for folding and sealing an open end of a bag or other container filled with articles, the combination of a sealing head frame for surrounding the open end of a filled bag to be sealed, side pressing elements carried in said frame for pressing against the article filled bag to hold the articles therein in compact arrangement during the sealing of the bag, side folding elements pivotally carried in said frame for folding in oppositely disposed side sections of a marginal edge portion of the open end of the bag for pressing said side sections against a closure member inserted in said bag, means for operating said side pressing elements and said side folding elements simultaneously, auxiliary side folding elements pivotally carried in said frame for folding in the remaining side sections of said marginal edge portion against said inserted closure member and against said folded-in side sections at the corners of the bag in overlapping relation for sealing the bag, and means for operating said auxiliary side folding elements.

10. In a mechanism for folding and sealing an open end of a bag or other container filled with articles, the combination of a sealing head frame movable into position for surrounding the open end of a filled bag, side pressing elements pivotally carried in opposite sides of said frame for pressing against the article filled bag to hold the articles therein in compact arrangement during the sealing of the bag, fluid pressure means for operating said side pressing elements, side folding elements pivotally carried in said frame for folding in oppositely disposed side sections of a marginal edge portion of the open end of the bag for pressing said side sections against a closure member inserted in said bag, independent fluid pressure means for operating said side folding elements, auxiliary side folding elements pivotally carried in said frame for folding in the

remaining intermediate sections of said marginal edge and against said inserted closure member and against said folded-in side sections at the corners of the bag in overlapping relation for sealing the bag, and auxiliary fluid pressure means for operating said auxiliary side folding elements, said fluid pressure means also operating in unison to retract said side pressing elements and said folding elements for a repetition of their operations.

11. In a mechanism for folding and sealing an open end of a substantially rectangular bag or other container filled with articles, the combination of a rectangular sealing head frame for surrounding the open end of a filled bag to be sealed, side pressing elements arranged on two opposite sides of said frame and closely adjacent the two sides of the bag, side folding elements pivotally carried in said frame and located adjacent the other two sides of the bag, means for rocking said folding elements inwardly against the bag to fold the engaged side sections of the marginal edge portion of the open end of the bag inwardly and to press said folded sections against a closure

member in the bag, means for bringing said pressure elements inwardly into engagement with the adjacent walls of the bag to compact the articles therein, auxiliary side folding elements pivotally carried in said frame adjacent said side pressing elements, and means for rocking said auxiliary side folding elements inwardly to fold the intermediate marginal edge portions of the bag against said inserted closure member thereby overlapping the folded-in sections at the corners.

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