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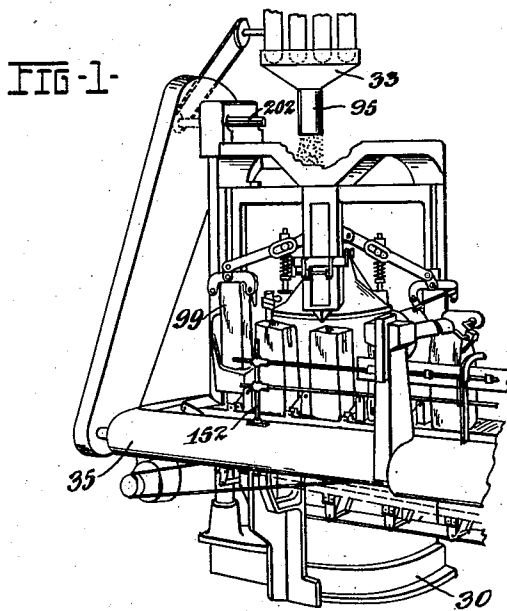
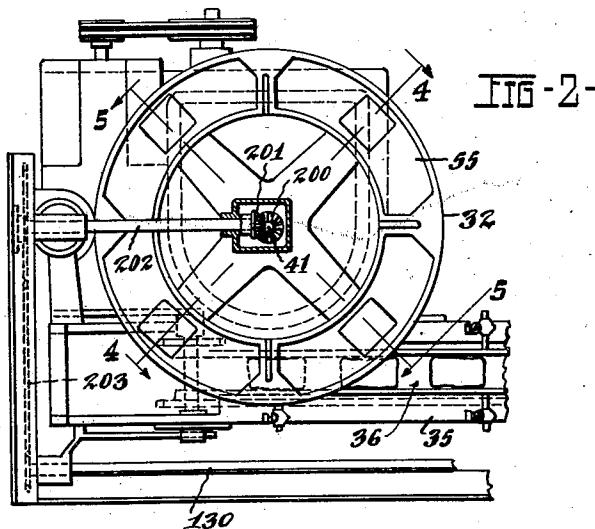
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2,350,554

APPARATUS FOR OPENING AND FILLING BAGS

Original Filed May 2, 1939

4 Sheets-Sheet 1



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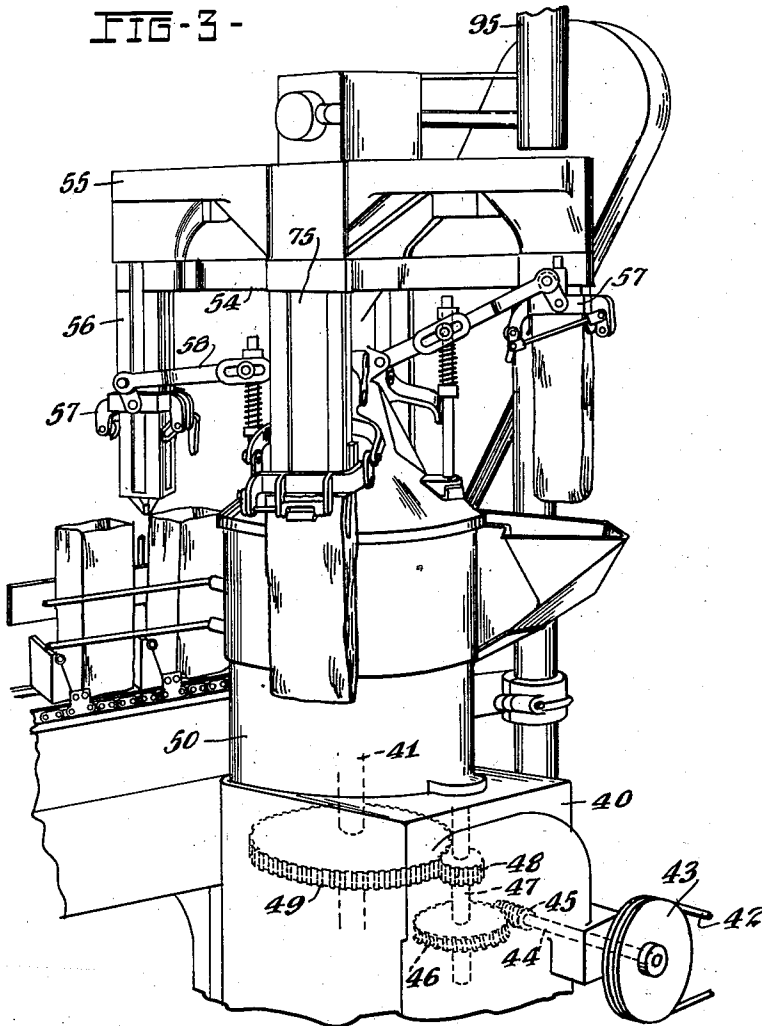
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FIG-4-

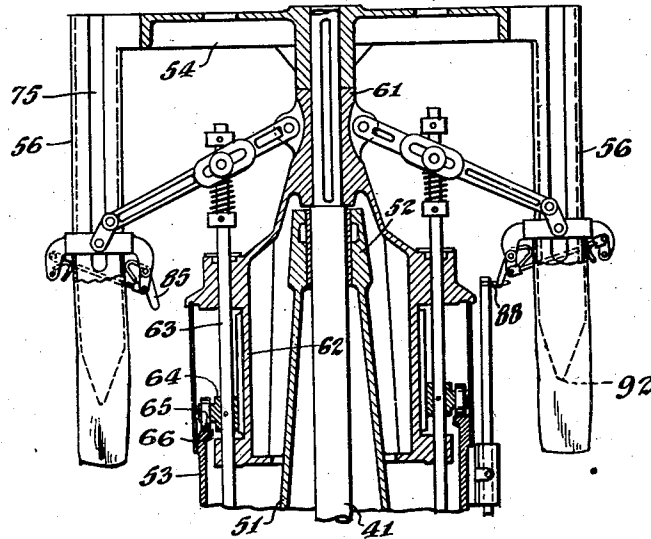
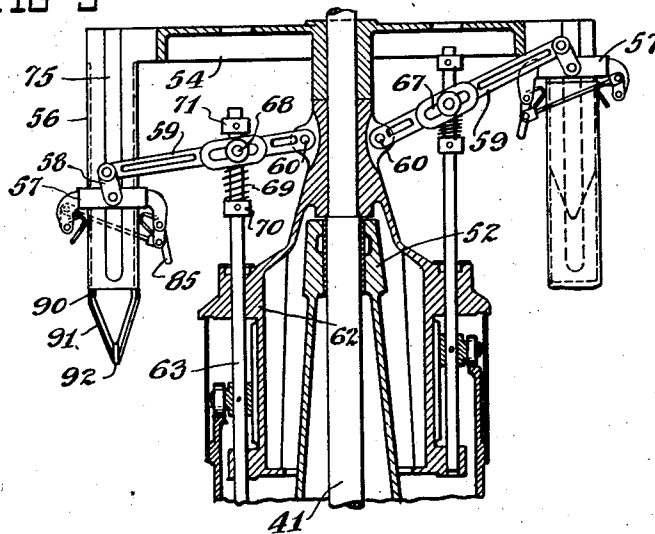


FIG-5 -



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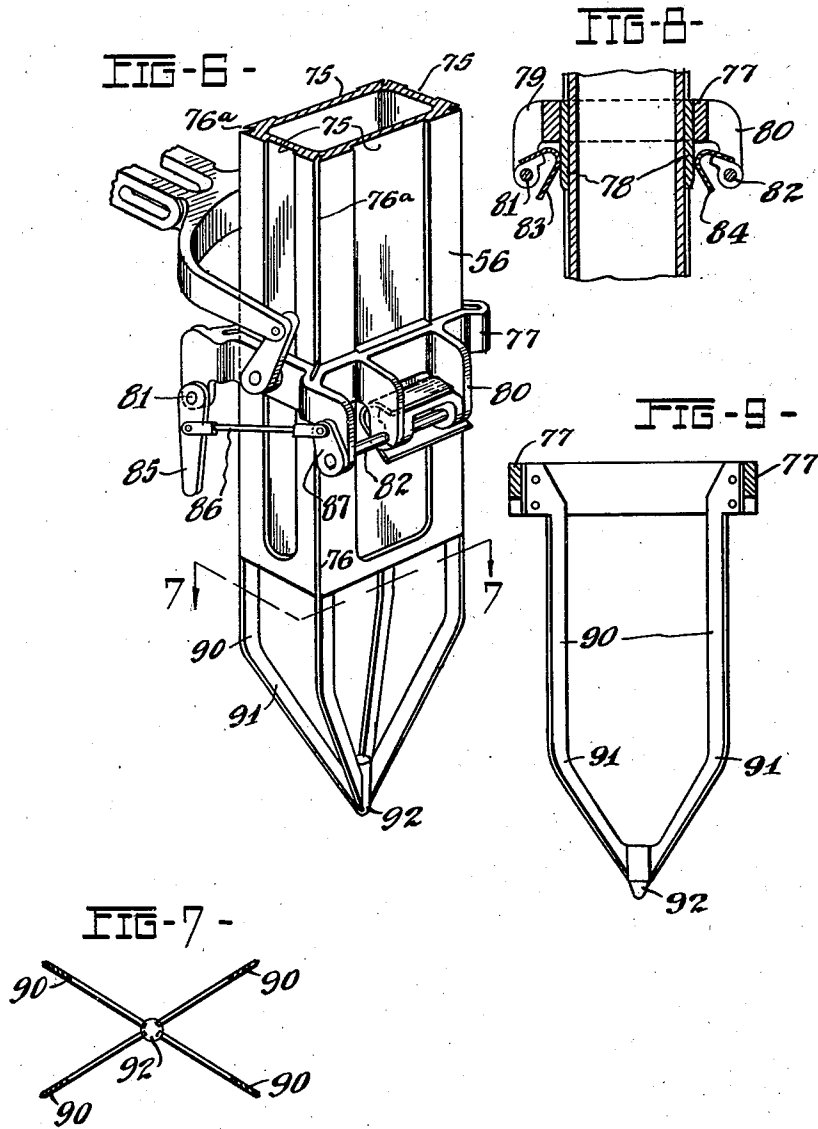
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APPARATUS FOR OPENING AND FILLING BAGS

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UNITED STATES PATENT OFFICE

2,350,554

APPARATUS FOR OPENING AND FILLING BAGS

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Original application May 2, 1939, Serial No. 271,372. Divided and this application August 14, 1941, Serial No. 406,828

14 Claims. (Cl. 226—59)

This application is a division of prior application Serial No. 271,372, filed May 2, 1939, for "Apparatus for opening, filling, and closing bags."

This invention relates to apparatus for opening and filling bags, and has for its main object the provision of apparatus of this character which will quickly and efficiently open bags to the proper shape and fill them with charges of material.

A more specific object of the invention is to provide apparatus which will quickly open up paper bags or the like to the desired shape and at the same time position them for receiving charges so that the positioning and opening operation takes place simultaneously.

Other details and objects of the invention will appear as the description proceeds.

In the accompanying drawings forming a part of this invention

Fig. 1 is a perspective view of the apparatus viewed from the side where the bags are discharged;

Fig. 2 is a plan view of the apparatus shown in Fig. 1;

Fig. 3 is an elevation of the apparatus shown in Fig. 1, but viewed from the side where the empty bag is fed to the machine, and being shown on a larger scale;

Fig. 4 is an enlarged partial section on the line 4—4 of Fig. 2;

Fig. 5 is an enlarged partial section on the line 5—5 of Fig. 2;

Fig. 6 is an isometric view of the lower end of the bag spreading and filling spout;

Fig. 7 is a detail on the line 7—7 of Fig. 6;

Fig. 8 is a vertical detail section through the bag clamp; and

Fig. 9 is a detail vertical section through the bag spreading plunger.

Referring to the apparatus as shown in Fig. 1, the general construction comprises a base 30 upon which there is mounted bag opening, filling and discharge means. There is indicated diagrammatically a weighing apparatus designated by 33 in position to deliver weighed charges to the successive bags.

The bag opening and filling apparatus shown in detail in Figs. 3 to 7, inclusive, comprises a housing 40 mounted upon base 30. Shaft 41 is mounted in suitable bearings within housing 40. Said shaft 41 is driven continuously by any suitable means. In the drawings, this means is indicated on Fig. 3 as a driven belt 42 which drives a pulley 43 on shaft 44. Shaft 44 carries a worm 45 driving a wormwheel 46 on countershaft 47.

The countershaft carries a gear 48 in mesh with a gear 49 on shaft 41.

Mounted upon housing 40 there is a drum 50 having a conical upward extension 51 carrying a bearing 52 for central shaft 41. (See Figs. 4 and 5.) The drum carries also a cylindrical member 53 surrounding cone extension 51 and having a cam surface on its top edge, as will be described later.

Mounted near the upper end of shaft 41, there is a spider 54 carrying annularly arranged hoppers 55. (Figs. 2 and 3.) From each hopper there depends a feeding tube and guide 56. A bag clamp 57 reciprocates vertically upon each guide 56. Each clamp is supported and moved by links 58 connecting the clamp to the end of a lever 59 pivoted at 60 upon sleeves 61 keyed to the central shaft below spider 54. Bracket 62 depends from sleeve 61 and provides guides for a vertical rod 63 to operate each lever 59. Near the lower end of each rod, there is fixed a collar 64 carrying a roller 65 which travels on the upper cam surface 66 of member 53. Each lever 59 is provided with slots 67 through which project pins 68 mounted on a collar, not shown, which in turn rests upon a spring 69 confined between the collar to which pins 68 are attached and a collar 70 fastening on the rod 63. Normally the spring maintains the collar to which pins 68 are attached in contact with collar 71 thereabove, which limits the upward movement with respect to rod 63. When roller 65 is at the highest point on the cam, as shown at the right of Fig. 3, spring 69 is slightly compressed for reasons which will be discussed later.

Each guide 56 consists of a substantially rectangular member comprising four sides, each of which is grooved to provide a guideway 75, as appears most clearly from Fig. 6. The guide is also provided with a slot 76 at each corner, which slot extends from the bottom of the guide for a distance, and is continued at its outer side by a groove 76^a, as shown at the top of Fig. 6.

These slots 76 divide the lower end of the spout into four guide members which are shaped and spaced so as to fully spread the bottom of a bag raised thereabout.

Each clamp comprises a rectangular slide 77 having a projection 78 fitting within each slide-way 75. Projecting from the sides of the slide 77, as clearly shown in Figs. 6 and 8, there are brackets 79 and 80 carrying rockshafts 81 and 82 to which are attached spring clamping members 83 and 84 adapted to press the upper end of a bag against the adjacent members 78, as clearly

appears from Figs. 4, 5 and 8. Rockshaft 81 carries a trip member 85 which is connected by a link 86 to an arm 87 on shaft 82. During the rotation of the spider and the parts carried thereby, trip 85 comes in contact with an abutment member 88, as indicated on Fig. 4, and forces the clamps upward out of clamping position.

Depending from clamp slide 77 there are four members 90, one sliding in each corner slot 76, and the continuing groove 76^a. The lower ends of these members are bent inward, as indicated at 91 and join at a central point 92.

The operation of the bag opening and filling means described above is as follows:

An empty bag is raised so that point 92 enters the mouth of the bag. The top of the bag is then raised and as it rises is spread out in rectangular form by the spreading lower ends 91 of the members 92. This opens up the top of the bag in rectangular form so that it slides upward around the bag guide and is inserted between clamping members 83, 84 and the adjacent slide members 78. This operation is carried out at the central position shown on Fig. 3 and is shown at the left in Fig. 4.

As the spider continues to rotate, roller 65 travels upward upon cam surface 66 and raises lever 59 and clamp 57. This continues until the bottom of the bag is brought up against the lower rectangular end of guide 56, as shown at the right of Fig. 5. It will be seen that in this way the bag is fully opened out so that it is rectangular in cross-section from top to bottom. Slots 76 extend upward far enough to allow the inwardly slanting portions 91 to pass there-through in this raised position, the straight portions 90 being received by grooves 76^a.

Preferably, there is a slight upward movement of lever 59 after the bottom of the bag reaches the bottom of the guide 56, the clamps yielding enough to permit this continued upward movement without injury to the bag.

If preferred, the clamps may be arranged to grip the bag tightly enough so that there will be no slipping at this point, in which case spring 69 yields when the bottom of the bag reaches the bottom of guide 56.

By the time that the bag has reached the position in which it is shown at the right of Fig. 5, the associated hopper 55 has reached a position beneath the discharge outlet 95 of the weighing device and by suitable means, not shown, the weighing device is timed to deliver a weighed charge of material into the hopper while it is passing beneath the spout 95. It will be readily seen that the material passes immediately downward through guide 56 into the bag and is lowered with the bag as roller 65 rolls down the cam 66 towards the position in which it is shown at the right of Fig. 4. As previously indicated, the trip 85 is contacted so as to release the bag and drop it from the guide as it moves past member 88, the bag being received by a conveyor disclosed in said parent application, but forming no part of the present invention. The clamp is then raised to bring point 92 above the top of the bag, as shown in the central position of the guides in Fig. 1 and at the left of Fig. 5, whereafter it is returned to the bag receiving position shown at the left of Fig. 4.

It will be seen that the above device affords a means by which a bag may be quickly opened and spread at the top and placed beneath the clamp, after which the completion of opening

the bag into the desired rectangular cross-section throughout its length is accomplished automatically and the bag is filled immediately upon the completion of the spreading operation and the material enters the bag throughout its length while the bag is maintained in its rectangular cross-sectional shape. The bag is then automatically released and discharged simultaneously with the completion of the lowering of the charge into the bag and with the bag.

What we claim is:

1. Apparatus for opening and filling bags comprising vertical guide members, a bag clamp movable vertically of said guide members and adapted to clamp the top of a bag, bag opener members attached to the clamp at their upper ends, fitting between the guide members, and bent to a common center at their lower ends.

2. Apparatus for opening and filling bags comprising vertical guide members, a bag clamp movable vertically of said guide members and adapted to clamp the top of a bag, bag opener members attached to the clamp at their upper ends, fitting between the guide members, and bent to a common center at their lower ends, and means to deliver filling material between the guide members.

3. Apparatus for opening and filling bags comprising a hopper, spaced guide members depending below the hopper, a bag clamp movable vertically outside of said members, and bag opening members attached to the clamp, passing inward between the guide members and downward to a common center.

4. Apparatus for opening and filling bags comprising a hopper, spaced guide members depending below the hopper, a bag clamp movable vertically outside of said members, and bag opening members attached to the clamp, passing inward between the guide members and downward to a common center below the lower ends of the guide members when the clamp is in its lowest position and as high as the lower ends of the guide members when the clamp is in its highest position.

5. Apparatus for opening and filling bags comprising a hopper, spaced guide members depending below the hopper, a bag clamp movable vertically outside of said members, and bag opening members attached to the clamp, passing inward between the guide members and downward to a common center, the upper ends of the opening members being spaced to spread the top of a bag around the bottom ends of the guide members and the bottom ends of the guide members being shaped and spaced to spread the walls of the bottom of the bag to filled shape when the clamp is raised.

6. Apparatus for opening and filling bags comprising a hopper, a vertical guide tube below and in position to receive material from the hopper and having a vertical slit therein, a clamp slidable vertically around said tube, and a bag opener flaring upwardly and comprising a member attached to the bag clamp at its upper end and fitting in said slit.

7. Apparatus for opening and filling bags comprising a hopper, a vertical guide tube below and in position to receive material from the hopper and having a vertical slit therein, a clamp slidable vertically around said tube, and a bag opener flaring upwardly and comprising a member attached to the bag clamp at its upper end and fitting in said slit, the lower end of the tube hav-

ing the shape of the fully opened bottom of the bag to be filled.

8. Apparatus for opening and filling bags comprising a hopper, a guide depending from the hopper and terminating in four members shaped and spaced to form a rectangular spout with a vertical slit at each corner, a bag clamp slidable vertically outside of said spout, members attached to the clamp at their upper ends, fitting within said slits, and extending downward and inward to a common point.

9. Apparatus for opening and filling bags comprising an annular series of hoppers, a filling spout, means to rotate the hoppers beneath the spout, means to discharge filling material into each hopper as it passes beneath said spout, a guide spout depending from each hopper, a bag clamp movable vertically about each guide spout, and a bag opener attached to the clamp and tapering downward.

10. Apparatus for opening and filling bags comprising an annular series of hoppers, a filling spout, means to rotate the hoppers beneath the spout, means to discharge filling material into each hopper as it passes beneath said spout, a guide spout depending from each hopper, a bag clamp movable vertically about each guide spout, and a bag opener attached to the clamp and tapering downward, the guide spout having a vertical slit therein and the upper end of the bag opener fitting through said slit.

11. Apparatus for opening and filling bags comprising an annular series of hoppers, a filling spout, means to rotate the hoppers beneath the spout, means to discharge filling material into each hopper as it passes beneath said spout, a guide spout depending from each hopper, a bag clamp movable vertically about each guide spout, and a bag opener attached to the clamp and tapering downward, the guide spout having a vertical slit therein and the upper end of the bag opener fitting through said slit, and means to raise the clamp to bring the lower end of the opener as high as the bottom of the guide spout as soon as the hopper associated therewith receives material from said filling spout.

12. Apparatus for opening and filling bags comprising an annular series of hoppers, a filling spout, means to rotate the hoppers beneath the spout, means to discharge filling material into each hopper as it passes beneath said spout, a

guide spout depending from each hopper, a bag clamp movable vertically about each guide spout, and a bag opener attached to the clamp and tapering downward, the guide spout having a vertical slit therein and the upper end of the bag opener fitting through said slit, means to release the clamp at a point beyond the charging position, and means to raise and lower said clamp timed to lower the clamp with the opener extending below the guide spout as the guide spout approaches charging position, to raise the clamp so the lower end of the opener is as high as the bottom end of the guide spout by the time charging position is reached, and to thereafter lower the clamp to releasing position.

13. Apparatus for opening and filling bags comprising an annular series of hoppers, a filling spout, means to rotate the hoppers beneath the spout, means to discharge filling material into each hopper as it passes beneath said spout, a guide spout depending from each hopper, a bag clamp movable vertically about each guide spout, and a bag opener attached to the clamp and tapering downward, the guide spout having a vertical slit therein and the upper end of the bag opener fitting through said slit, means to release the clamp at a point beyond the charging position, and means to raise and lower said clamp timed to lower the clamp with the opener extending below the guide spout as the guide spout approaches charging position, to raise the clamp so the lower end of the opener is as high as the bottom end of the guide spout by the time charging position is reached, and to thereafter lower the clamp to releasing position to raise the clamp to carry the opener above a released bag, and then to lower the clamp to its original position.

14. In bag opening and filling apparatus, a clamp for the top of a bag, a bag opener depending from the clamp and flaring upward toward the clamp, whereby the raising of the bag top about the opener to the clamp opens the top of the bag, means to raise the clamp and open the bottom of the bag, means to fill material into the raised and opened bag, means to lower the clamp and filled bag, and means to release the lowered clamp.

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