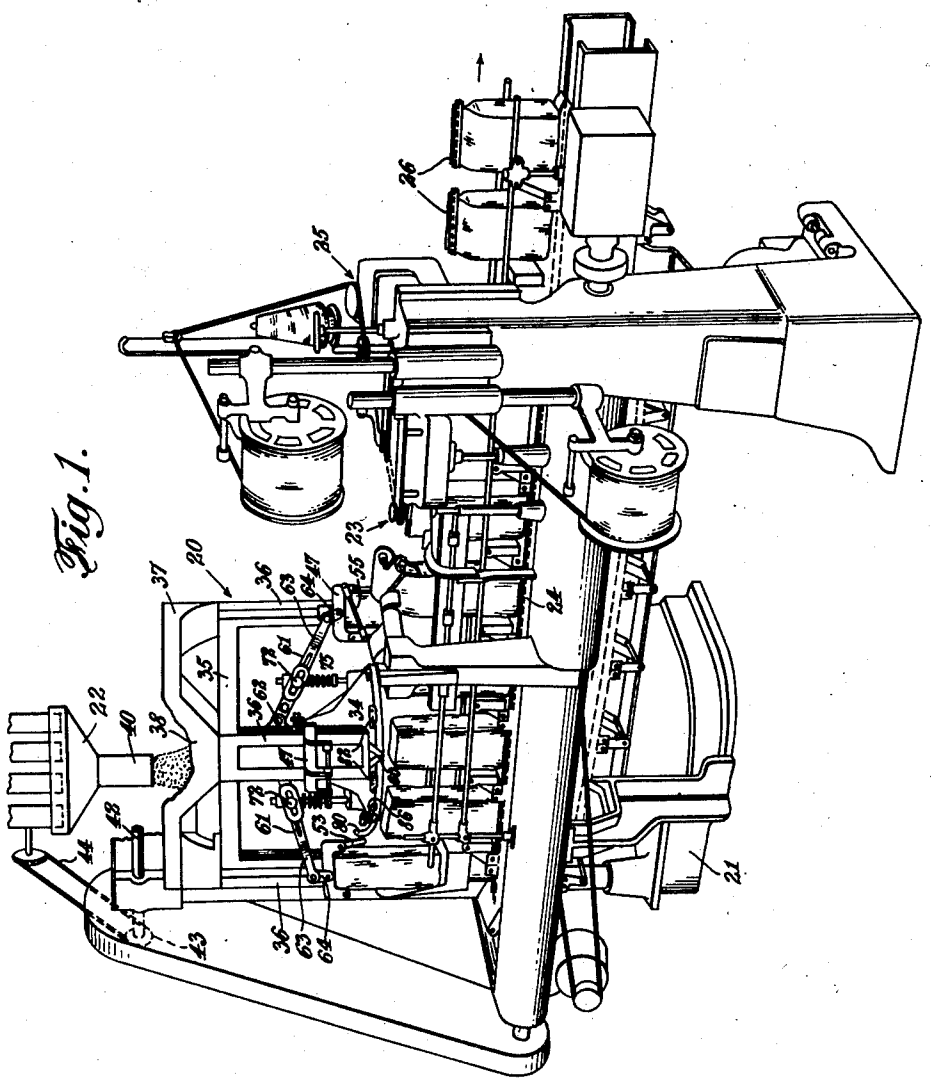
Oct. 10, 1950 C. H. HARTMAN ET AL 2,524,908

APPARATUS FOR FILLING BAGS

Filed March 1, 1946 6 Sheets-Sheet 1

Fig. 1.



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APPARATUS FOR FILLING BAGS

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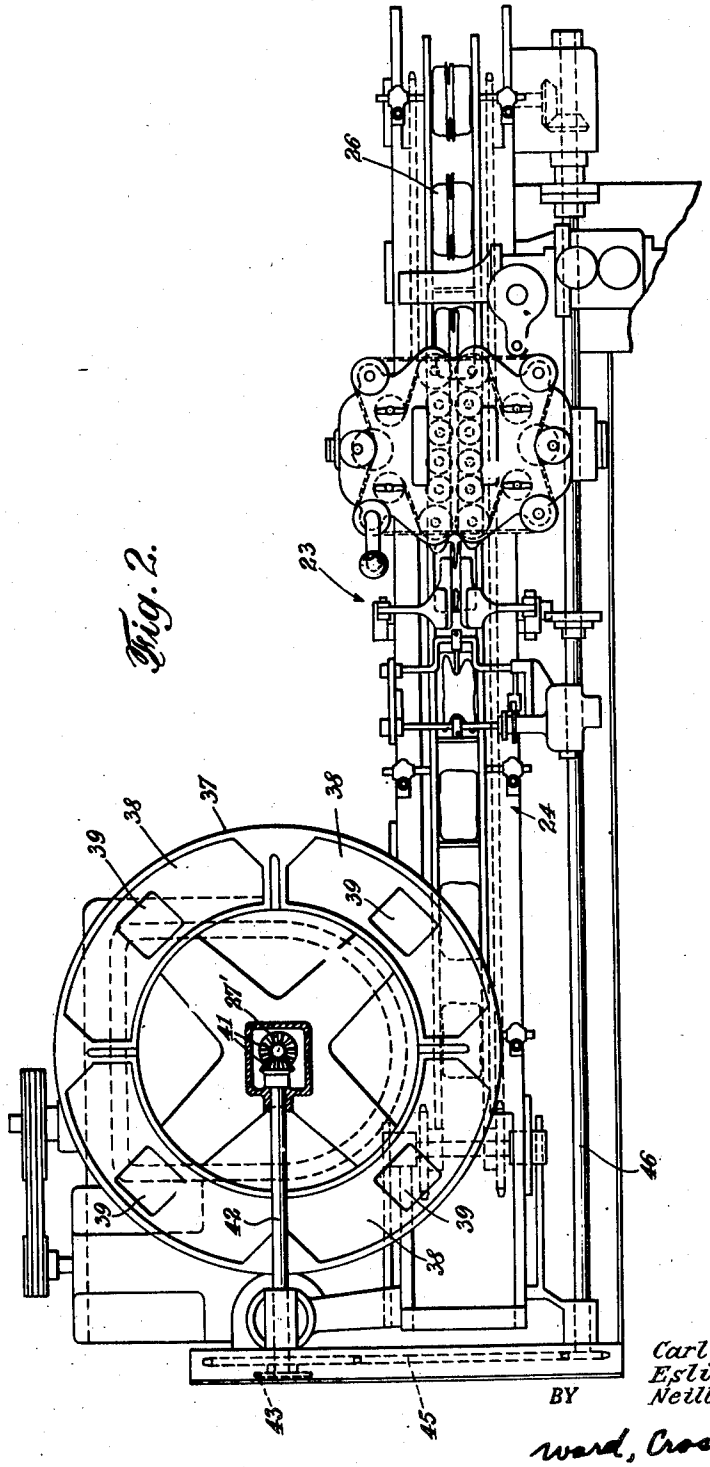

Fig. 2.

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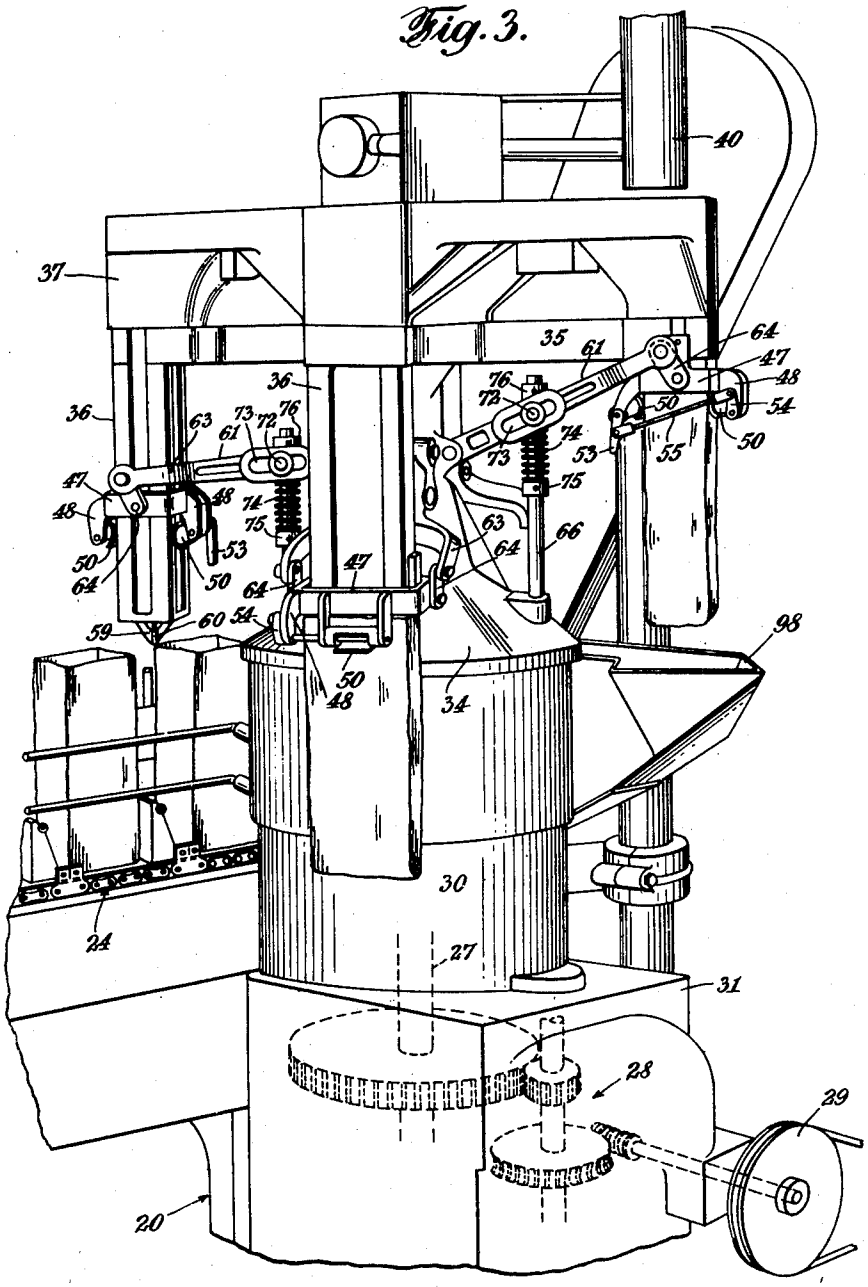
Fig. 3.



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APPARATUS FOR FILLING BAGS

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Fig. 4.

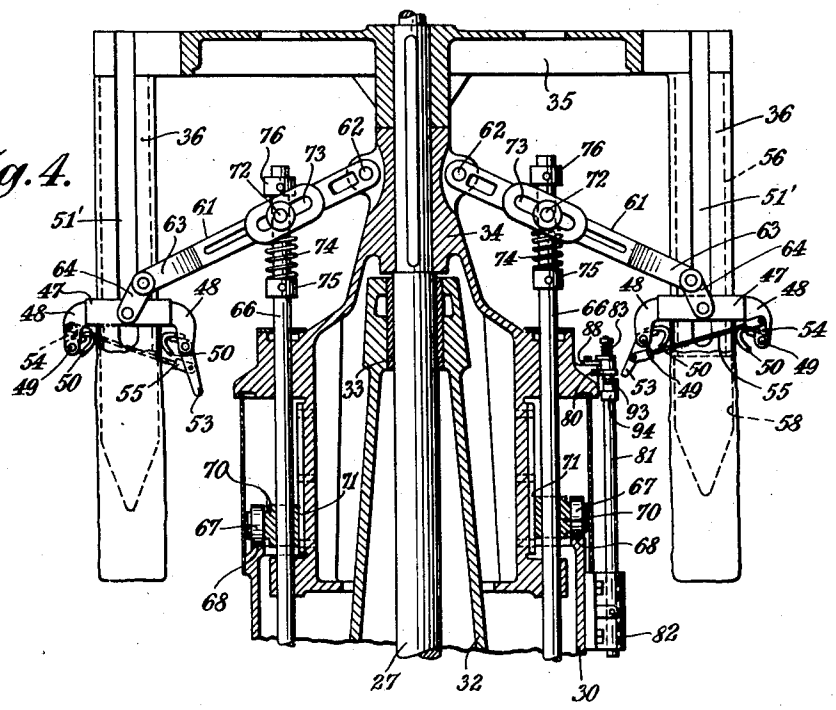

Fig. 5.

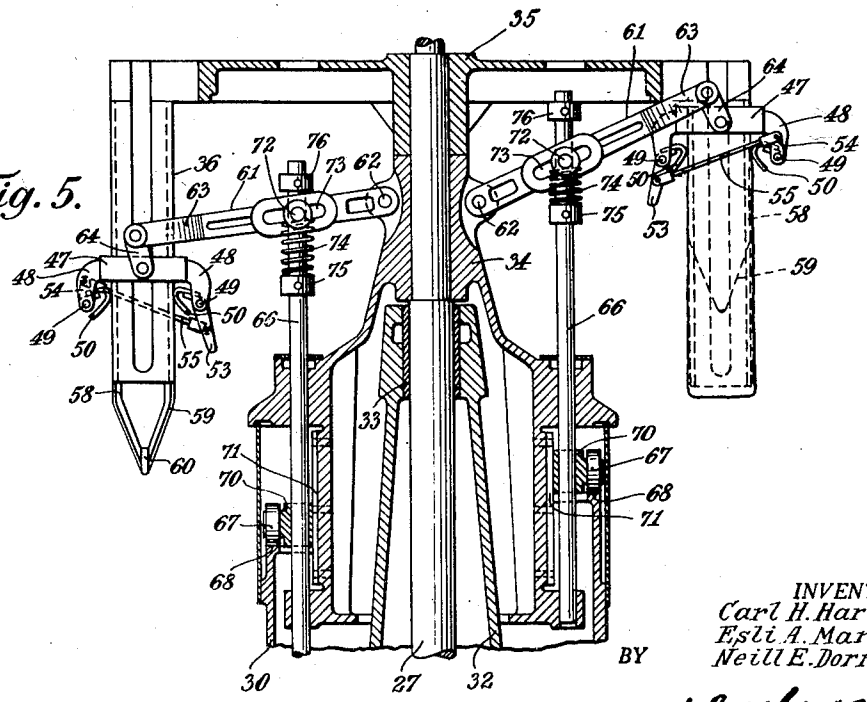

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Fig. 6.

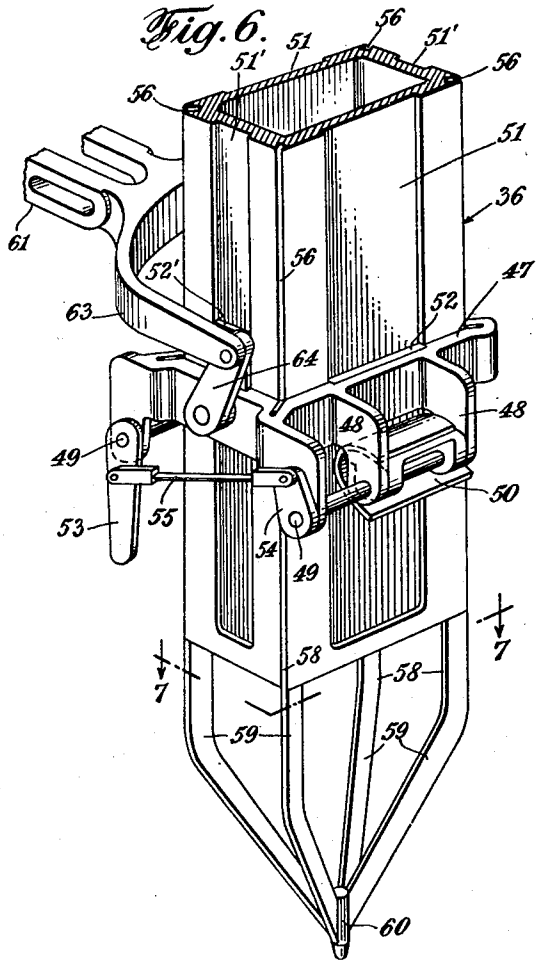

Fig. 8.

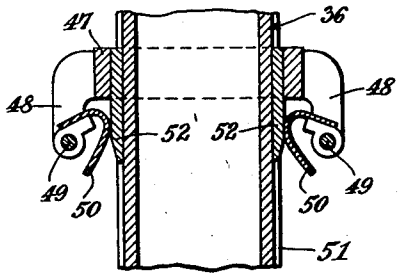

Fig. 9.

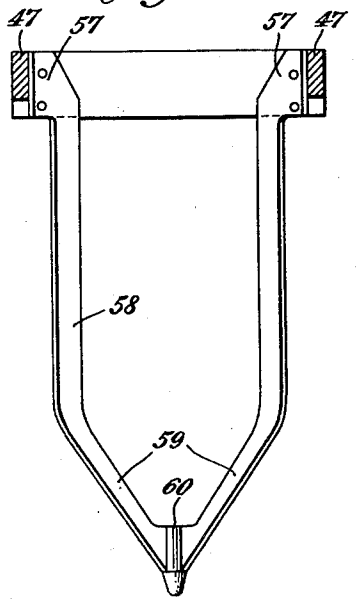

Fig. 7.

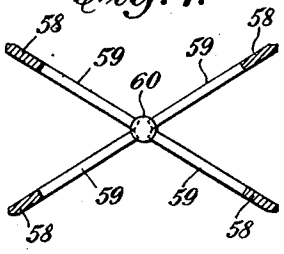

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Fig. 10.

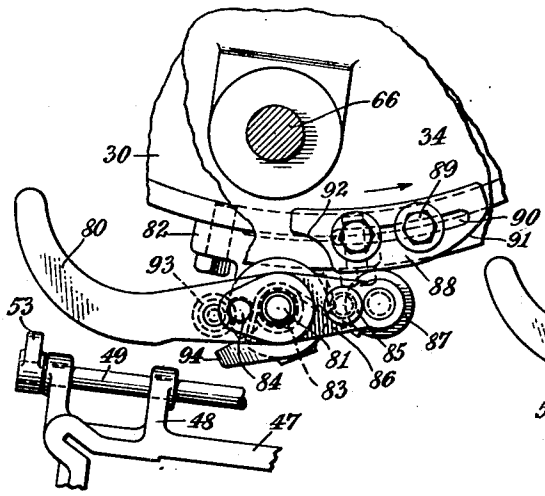


Fig. 12.

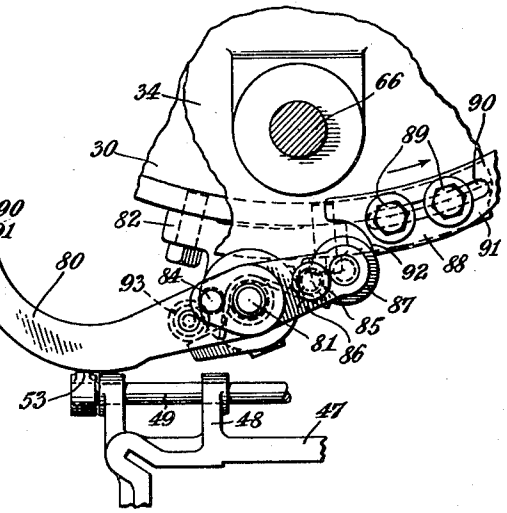
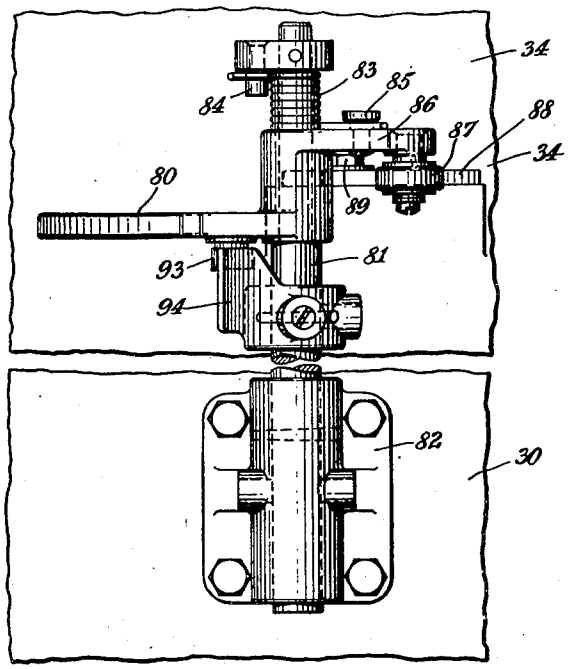


Fig. 11.



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Patented Oct. 10, 1950

2,524,908

UNITED STATES PATENT OFFICE

2,524,908

APPARATUS FOR FILLING BAGS

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Application March 1, 1946, Serial No. 651,218

3 Claims. (Cl. 226—59)

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This invention relates to bag filling machines.

This application is a continuation in part of copending application Ser. No. 271,372, filed May 2, 1939 (Patent No. 2,396,262 of March 12, 1946), the present application being directed more particularly to features divided from said prior application.

In accordance with the present invention, a novel machine is provided having a plurality of filling tubes suspended in generally upright position from the periphery of a wheel-like structure by which the tubes are rotated around a substantially vertical axis. At one position the operator places the open mouths of bags on successive filling tubes as they pass, clamping means being provided on the tubes for retaining the bags thereon. Each filling tube preferably has a spreading device which initially protrudes from the bottom of the tube for spreading the mouth of the bag as the operator places same on the tube. As the tubes with the bags thereon then progress around to a filling position, the clamping means is automatically slid up on the filling tubes, thus drawing the bags up around the tubes which are of the same cross-sectional shape as desired for the filled bags. At the same time the spreader devices are automatically retracted up into the filling tubes. As each filling tube with a bag thereon passes the filling position, an automatically weighed charge of material is filled into the tube as surrounded by a bag and the bag then progresses around to a position above conveying means for carrying the filled bags to closing and sealing apparatus. Meanwhile, the bag clamping means on the filling tubes are automatically lowered, thus lowering the filled bags at a point above said conveying means and at the same time means is provided for preferably automatically releasing the bag clamping means to allow the filled bags to be deposited on said conveying means. The spreading devices are then retracted to a position high enough to permit the filled bags to travel away on the conveyor. As the filling tubes finally progress around again to the operator's position, the spreading devices therein are automatically lowered, as is also the clamping means, into position for receiving empty bags.

The apparatus is such that the opened mouth portions of the empty bags may very quickly and easily be applied to the lower ends of the filling tubes, whereupon all succeeding operations may be performed rapidly, dependably and automatically. That is, the bags are automatically drawn up around the filling tubes into fully expanded condition with the same shape as desired when the bags are filled. Preferably, although not

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necesssarily, the filling tubes are of a rectangular cross section corresponding to and adapted to snugly fit the usual bag of the same cross section when filled, and thus well adapted to be packed in cartons or stored with the most economical use of the space available. Since the bags are automatically filled with an accurately weighed or measured charge when they are in the desired final shape, irregular bulging of the filled bags is avoided and the mouth portions of the filled bags are of uniform shape well adapted for dependable closing and sealing thereof by automatic means.

Various further and more specific objects, features and advantages will more clearly appear from the detailed description given below taken in connection with the accompanying drawings which form a part of this specification and illustrate merely by way of example, a preferred form of the invention. The invention consists in such novel features, arrangements and combinations of parts as may be shown and described in connection with the apparatus herein disclosed.

In the drawings:

Fig. 1 is a perspective view of a complete assembly of equipment for filling bags and subsequently closing and sealing the same;

Fig. 2 is a plan view of the equipment shown in Fig. 1, portions being cut away and other portions being shown in section;

Fig. 3 is an elevational view of the bag spreading and filling portion of the machine as viewed from the side from which the empty bags are applied to the machine;

Figs. 4 and 5 are vertical sectional views of that portion of the equipment of Fig. 3 which rotatably supports the filling tubes and including the mechanism for automatically operating the bag clamping and retractable spreader means. these figures showing the mechanism in two different typical positions of operation;

Fig. 6 is a perspective view of a portion of one of the filling tubes and accompanying bag clamping and spreader means;

Fig. 7 is a sectional view of the spreader device taken substantially along line 7—7 of Fig. 6;

Fig. 8 is a vertical sectional view showing portions of the bag clamping means;

Fig. 9 is an elevational view partly in section of the spreader device and the supporting structure therefor;

Fig. 10 is a plan view showing certain mechanism for automatically releasing the bag clamping means;

Fig. 11 is a side view of the mechanism of Fig. 10; and

Fig. 12 is a view similar to that of Fig. 10 but showing the parts in another operating position.

The apparatus as shown in Fig. 1 includes an assemblage of mechanism comprising the bag spreading and filling equipment forming the particular subject matter of the invention of this application, together with accompanying apparatus for closing and sealing the filled bags as claimed in the above mentioned copending prior application. That is, the bag spreading and filling portion of the mechanism is indicated generally at 20 supported on a base 21. A weighing apparatus is diagrammatically indicated at 22 positioned above the machine 20 and connected to deliver automatically weighed charges to successive bags as they pass the filling position on machine 20. Mechanism generally indicated at 23 is provided for closing the mouths of the filled bags as they travel on conveying means 24 from the machine 20. Sewing machine apparatus is generally indicated at 25 for sealing the mouths of the closed bags, so that the bags finally emerge in sealed condition as indicated at 26 in Fig. 1.

Referring now to Fig. 3, the apparatus here shown for spreading and filling the bags may be operated by a constantly rotating vertical shaft as at 27 driven through suitable reduction gearing as indicated at 28 from a belt and pulley connection 29 to a suitable source of power.

The body of the machine as shown in Fig. 3 may include a stationary cylindrical housing as at 30 mounted upon the enclosure 31 for the gears 28. As shown in Figs. 4 and 5, a small stationary upstanding conical extension 32 is mounted to extend up from the mid portion of the housing structure 30 for supporting a bearing 33 on the upper end of shaft 27. Above this bearing a mechanism supporting frame 34 is mounted to rotate with shaft 27, and above the frame 34 a spider or wheel-like member 35 is also mounted on shaft 27 to constantly rotate therewith.

A plurality of filling tubes as at 36 are mounted to depend in upright position from the periphery of the spider 35. In the example shown, four of these filling tubes are provided.

An annular shaped member 37 rests upon and rotates with spider member 35 (Figs. 1–3). The member 37 is formed with a plurality of funnel-shaped cavities as at 38, one for each filling tube, and having discharge openings 39 at the bottom, communicating with the upper open ends of the filling tubes 36 respectively. Each of the funnel-shaped cavities 38 as shown in Fig. 2 may extend for a considerable distance circumferentially of the member 37, so that as they travel past a discharge spout as at 40 from the weighing apparatus (Fig. 3), the material as discharged for a substantial interval will all be funneled into one of the filling tubes.

The automatic weighing apparatus 22 as diagrammatically indicated in Fig. 1 may be of a suitable known type preferably connected to operate in timed relationship with the rotation of shaft 27. As indicated in Figs. 1 and 2, such connection may be accomplished by beveled gears 41 driven by an extension 27' at the upper end of shaft 27 and acting to drive a shaft 42 carrying a sprocket or the like 43 having a drive connection as at 44 with the weighing apparatus (Fig. 1). As indicated in Fig. 2, shaft 42 may also have a drive connection 45 with a shaft 46 for operating the conveyor 24 and accompanying apparatus for closing the bags.

Referring now to Fig. 6, each of the filling tubes

36 may be formed of a rectangular cross section and of a height preferably somewhat greater than the height of the filled bags. Each tube may also be embraced by a sleeve-like rectangular frame member as at 47 which is slidable vertically of the tube by automatic means hereinafter described. The member 47 as shown in Fig. 8 is formed at opposite sides with pairs of spaced lugs as at 48 which carry small rock shafts 49 upon which are mounted members 50 formed of resilient sheet metal of a generally U-shaped cross section and adapted to act as means for engaging the mouth portions of the bags when slid onto the filling tube.

As further shown in Figs. 6 and 8, the exterior wall surfaces of the tube 36 may be formed with vertically extending recesses as at 51, 51' for slidably receiving members as at 52, 52' which are mounted within and secured to the sleeve-like member 47. The downwardly protruding lower ends of members 52 provide surfaces, as shown in Fig. 8, against which the top edges of a bag are adapted to be held into engagement by the spring members 50.

As shown in Fig. 6, the shafts 49 respectively may have mounted thereon small levers as at 53, 54 interconnected by a link member 55 in a manner whereby when lever 53 is moved toward the filler tube the shafts 49 will be rocked in directions to raise the spring bag engaging members 50 into positions spaced from the portions 52, 52' thereby releasing the mouth of the bag from the clamping means. The trip lever 53 may be operated automatically at the proper time by means hereinafter described.

As further shown in Fig. 6, the walls at all four corners of the filler tube 36 may be formed with vertically extending slots as at 56, each of said slots being adapted to slidably receive the upper end portions 57 of spreader elements 58. That is, the upper ends of these spreader elements extend through the slots 56 and are attached externally of the filler tube to the sleeve or frame member 47 so that the spreader device will slide up and down with the clamping means. As shown, the lower ends of the spreader elements 58 may converge as at 59, the lower tips being suitably secured together as at 60 whereby a downwardly directed pointed spreader frame is provided so that when the mouth of an empty bag is placed thereover, it will be spread apart and its four corners will be directed accurately by the four spreader elements 58 up around the four corners respectively of the filler tube.

The mechanism will now be described for raising and lowering the clamping means and accompanying spreader devices on the filling tubes. This mechanism is best shown in Figs. 4 and 5 and may comprise levers as at 61 pivotally attached at their inner ends as at 62 to the rotatable frame member 34. At their outer ends these levers may terminate in yoke portions as at 63 (Fig. 6) connected by links as at 64 to the sleeve or clamping frame members 47 in a manner such that when the levers 61 are raised and lowered about their pivots 62 the bag clamping means on the corresponding filler tubes will be raised and lowered. The levers 61 may be operated by push rods as at 66 mounted to slide vertically in the frame 34, and actuated as by rollers 67 suitably mounted thereon to bear against the upper edge 68 of the stationary housing structure 30. That is, the edge 68 acts as a cam surface and is suitably shaped to cause the mechanism to be actuated for the sequence of operations herein else-

where explained. The rollers 67 may, for example, be mounted to rotate on members such as at 70 fixed to the rods 66 and having slidable guiding engagement as at 71 with portions of the frame 34.

The upper ends of the rods 66 may have members suitably formed to slide thereon, these members having transverse studs which appear at 72, these studs being adapted to slidably engage in slots 73 formed in the levers 61. The members carrying the studs 72 may be yieldably supported as by helical springs 74 surrounding the rods 66 and bearing at their lower ends against collars as at 75. Travel of the studs 72 upwardly along the rods 66 may be limited as by collars 76. It will be apparent that various other suitable forms of connecting means between the levers 61 and rods 66 might be provided.

The mechanism for automatically releasing the bag clamping means will now be described. This is shown in Figs. 10–12 and at the right hand side of Fig. 4 and may comprise a curved finger as at 80 pivotally mounted on a stationary shaft as at 81 and adapted at the proper times to thrust the trip levers 53 outwardly of the machine to cause disengagement of the bag clamping means. The shaft 81 may for example be attached to the stationary housing structure 30 as by a suitable clamp 82. The finger 80 may normally be resiliently pressed outwardly as by a coil spring 83 surrounding shaft 81 and having one of its ends bearing against a stud as at 84 fixed with respect to shaft 81 as indicated in Fig. 11. The other end of this spring may bear against a stud 85 carried by an arm 86 integral with finger 80 and which also carries at its outer end a roller 87. This roller is adapted to bear against a cam 88 which is mounted at the periphery of the rotatable frame 34.

The cam 88 may be secured in place as by screws 89 passing through a slot 90 whereby the position of the cam may be adjusted somewhat in circumferential directions along the periphery of the frame 34. It will be apparent that as the frame 34 revolves the cam 88 once during each revolution, will engage the roller 87 and cause the finger 80 to first be retracted as roller 87 rides up over cam portion 91 and then as the roller reaches cam portion 92 it will be suddenly released, allowing the spring 83 to thrust the finger 80 against the trip lever 53 for disengagaing the bag clamping means as shown in Fig. 12. The finger 80 on its underside may carry a suitable stud or lug as at 93 for engaging a stop member 94 fixed on shaft 81, for limiting the outward movement of the finger under the pressure of spring 83.

In the operation of the machine herein described a bag to be filled may be opened partially by the operator of the machine, and the mouth of the bag pressed upwardly around the converging portions of the spreading elements 58, until the top edges of the bag overlie the projections 52, 52' (see Fig. 8) and are positioned under the spring clamping members 50. The bag is applied when a filler tube reaches approximately the location shown in the center of Figure 3 at which time the clamping means and the retractable spreader are at substantially their lowest points of travel.

As the filler tube 36 passes around toward the right as viewed in Figure 3, the clamping means thereon is raised by the action of the cam surface 68 acting through the rod 66 and lever 61 whereby the bag is drawn upwardly to a position for snugly fitting the filling tube, the spreader elements 58 being at the same time retracted upwardly into the tube so that they do not rupture the bottom of the bag. By the time the spider 35 has rotated approximately 90 degrees and the filler tube is positioned under the discharge outlet 40 of the weighing apparatus the mechanism will have raised the bag engaging clamps to their uppermost point of travel as indicated at the right hand side of both Figures 3 and 5. The bottom of the bag is then close to or in engagement with the bottom of the filler tube so that the filler tube serves to shape the entire bag to a form desired when filled.

As indicated at the right hand side of Figure 5 the spreader elements 58 will have been retracted largely into the upper portion of the filler tube. The springs 74 above referred to, provide the linkage with the requisite yieldable characteristics as the bag clamping means reaches the top of its stroke so that the bottom of the bag will not engage the lower end of the filler pipe with sufficient force to cause rupture of the bag. Thus, as shown at the right hand side of Figure 5 at this time, the springs 74 may be compressed to a substantial extent.

Upon the filler tube reaching a position approximately under the discharge outlet 40 of the weighing apparatus, the operation of the weighing apparatus may be so timed as to release a charge of material which falls into one of the funnel-like hoppers 38 and thence immediately into the filler tube 36 within the bag.

As the filler tube continues its rotation about the axis of shaft 27, the cam surface 68 causes the mechanism to move the bag clamping means toward the bottom of the filler tube as shown for example at the right hand side of Figure 4, in order to lower the filled bag into proximity with the entrance end of the conveyor 24. As the bag is lowered the material deposited within the filler tube passes out through the bottom thereof and between the converging spreader elements 58 thus leaving the material contained only by the bag.

Upon the bag reaching a relatively low point in its travel, and in a position above the entrance end of the conveyor 24 the finger 80 will be brought into engagement with the trip lever 53 of the clamping means, thus causing the latter means to disengage the mouth of the filled bag and permitting the latter to be deposited on the conveyor. Thereafter, due to the shape of cam surface 68 and its actuation of the mechanism operated thereby, the bag clamping means is again raised so that the spreader elements are at least partially retracted into the filler tube in order to clear the mouth of the bag and permit the bag to travel along the conveyor while the filler tube continues its rotation back to the position for receiving an empty bag. But just before the parts arrive at the later position the clamping and spreader means are again lowered.

If a bag should be defective or become torn so that material leaks therefrom, or if it should slip off from the filler tube at the filler position shown in Figure 3 then the contents may be caught in a hopper as indicated at 98.

While the invention has been described in detail with respect to a particular preferred example, it will be understood by those skilled in the art after understanding the invention that various changes and modifications may be made without departing from the spirit and scope of the invention, and it is intended therefore in the

appended claims to cover all such changes and modifications.

What is claimed as new and desired to be secured by Letters Patent is:

1. In a bag filling machine, the combination comprising a plurality of substantially upright bag filler tubes each adapted to have a bag slipped up around the same, means for mounting said tubes for rotation about a common generally vertical axis, clamping means slidably mounted on each of said filler tubes and including parts for engaging the mouth portions of bags to be filled, the rotatable mounting means for said filler tubes being arranged to move the latter in succession past a filling position to effect filling of the bags through said tubes, conveying means at a subsequent position to receive the filled bags, mechanism operable in response to rotation of said rotatable mounting means for sliding said clamping means upwardly on said filler tubes to draw bags applied thereto up around the filler tubes substantially throughout the entire lengths thereof to shape the bag sides prior to movement of the bags to filling position and to also slide said clamping means downwardly to deposit the bags after filling on said conveying means, and means to effect release of said clamping means when each bag engaged thereby reaches said conveying means.

2. In a bag filling machine, the combination comprising a plurality of generally upright filler tubes adapted to have bags slipped up over the lower ends thereof, means for mounting said tubes for rotation about a common generally vertical axis and successively past a filling position and then to a position above a bag-conveying means, means on each of said filler tubes for engaging the mouth portion of the bag thereon to be filled, means actuated in timed relationship with the rotation of said mounting means for sliding said engaging means upwardly to draw substantially the entire lengths of the bags up around the lower portions of the tubes to shape the bag sides prior to movement of the bags to filling position and to also slide said engaging means downwardly for depositing the bags after filling on the conveying means, and means to effect release of said engaging means when each bag engaged thereby reaches the conveying means.

3. In a bag filling machine, the combination comprising a generally upright filler tube, means mounting the same for rotation about an exterior upright axis and successively past a filling position and a position above a bag-conveying means, means on said filler tube for engaging the mouth portion of bag thereon to be filled and for drawing said bag substantially throughout its length up around the lower portions of the tube to shape the bag sides prior to filling and for then lowering the bag into proximity with and above the conveying means after filling, and means to effect release of said engaging means subsequent to its downward movement.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,054,279	Briggs	Sept. 15, 1936
2,097,449	Cundall et al.	Apr. 2, 1937
2,183,081	McCallum	Dec. 12, 1939
2,340,225	Nowak, Jr.	Jan. 25, 1944
2,350,554	Hartman et al.	June 6, 1944