

Oct. 22, 1946.

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2,409,626

BAG OPENING AND FILLING APPARATUS

Filed June 11, 1943

3 Sheets-Sheet 1

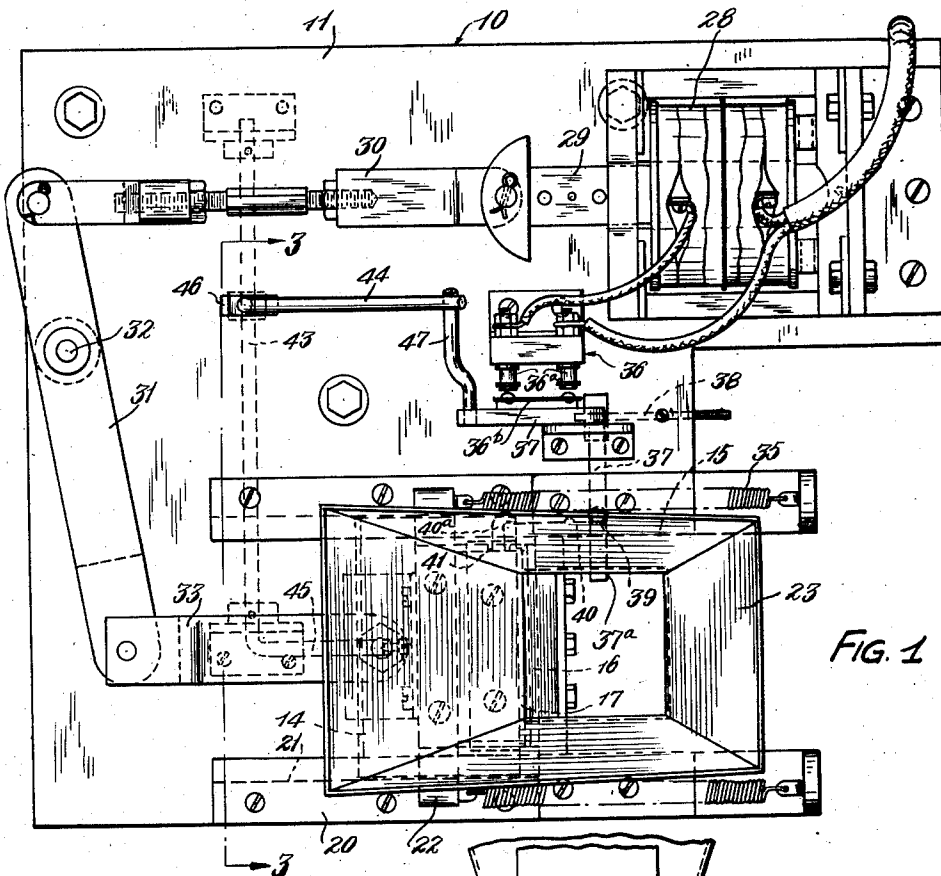


FIG. 1

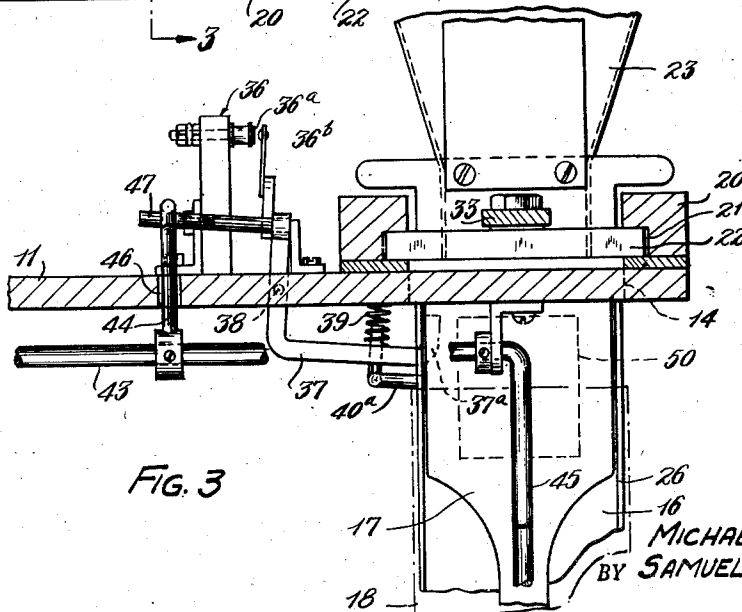


FIG. 3

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3 Sheets-Sheet 2

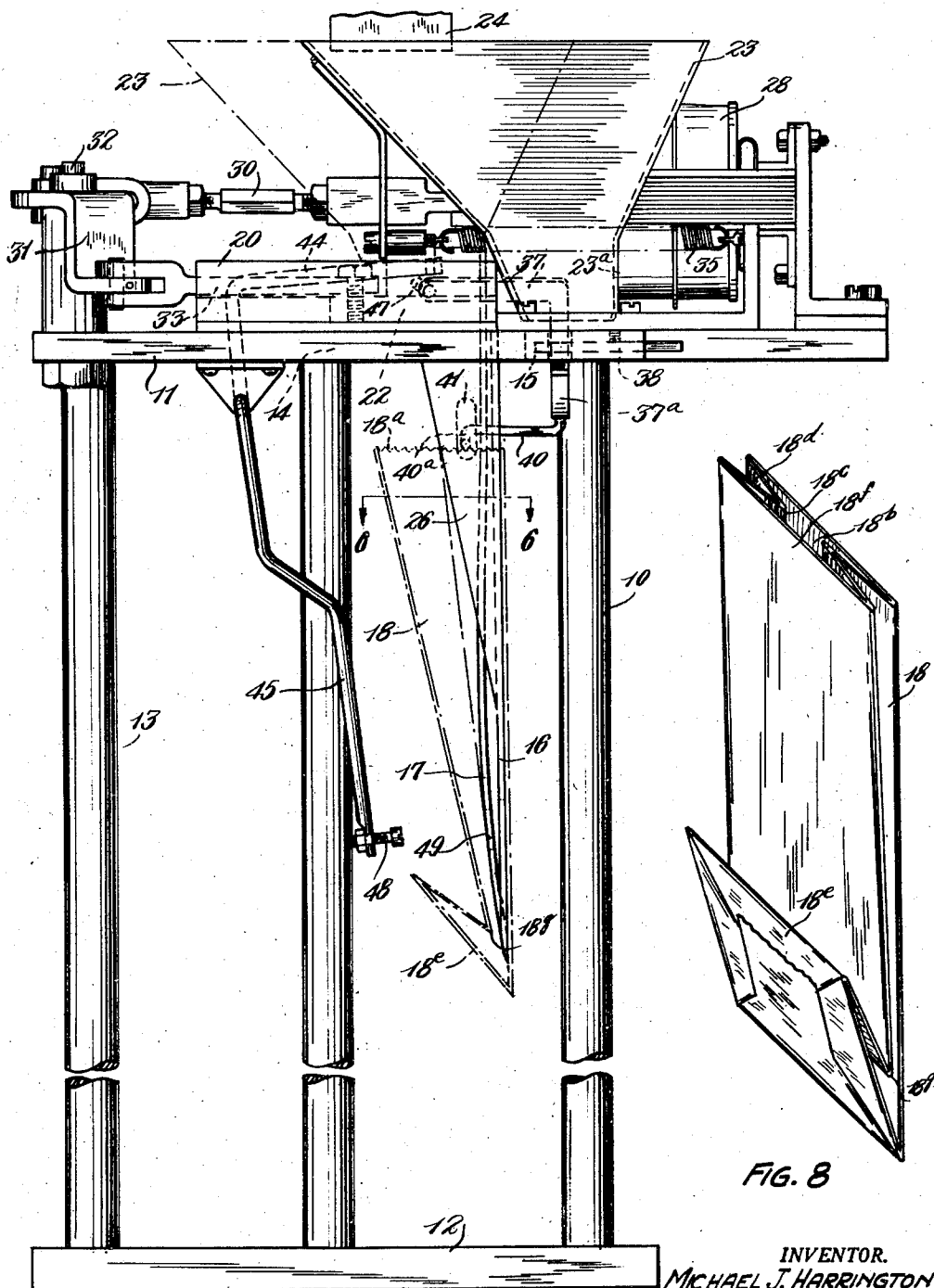


FIG. 2

FIG. 8

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3 Sheets-Sheet 3

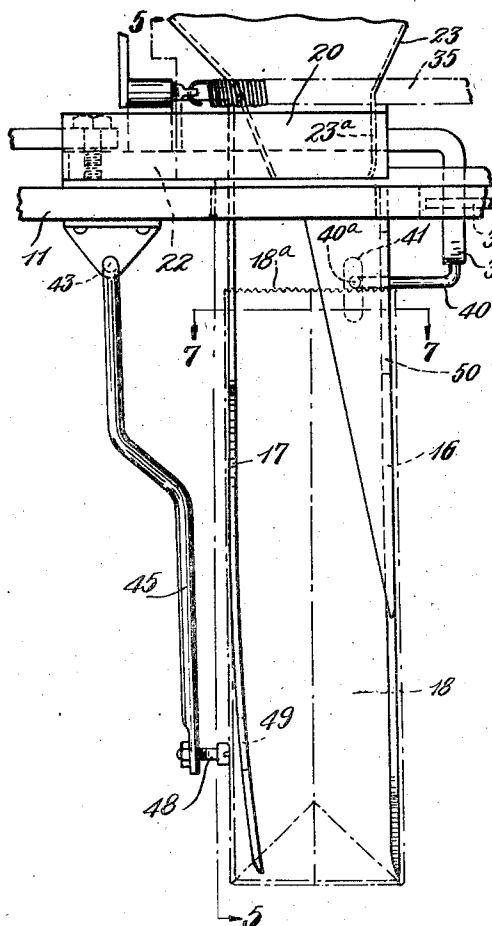


FIG. 4

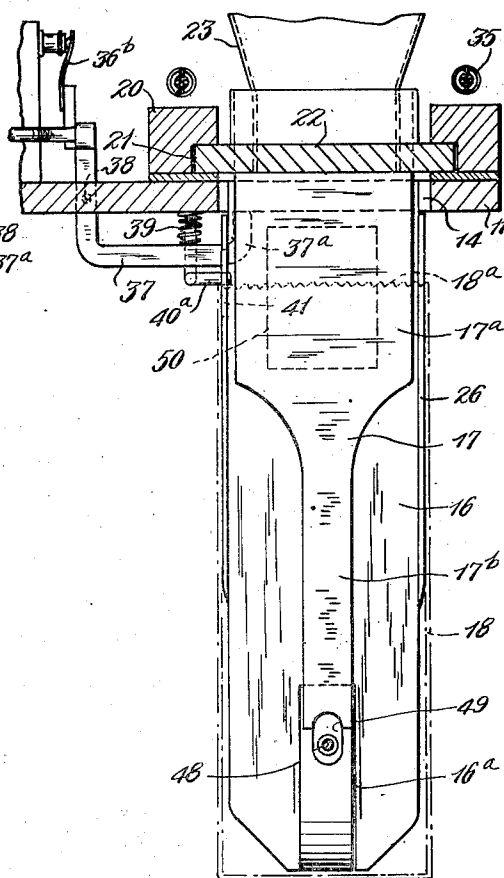


FIG. 5

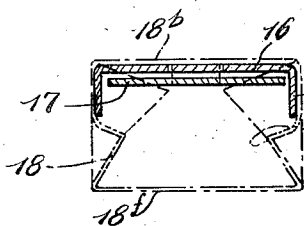


FIG. 6

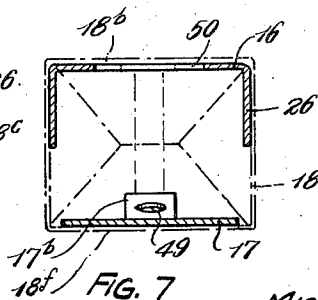


FIG. 7

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BAG OPENING AND FILLING APPARATUS

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12 Claims. (Cl. 226—59)

1

This invention relates to the opening and filling of bags and aims to provide improved apparatus for this purpose which is capable of rapid, efficient and reliable operation.

Another object of our invention is to provide improved apparatus of the kind mentioned in which substantially parallel relative separating movement is produced between a pair of substantially coextending members to cause positive opening of a bag which has been applied to such members.

A further object of the invention is to provide improved apparatus of this character in which the relative bag-opening movement between said members is produced by an electric power device and is initiated concurrently with the movement of the bag onto said members.

Still another object of this invention is to provide improved apparatus of the character referred to in which holding means is employed so that the bag will be retained in its open position by said members during the filling operation and in which such holding means is responsive to the removal of the bag from said members.

Yet another object of the invention is to provide improved apparatus of this character wherein the bag opening members are of novel form enabling them to readily enter a bag which is in its folded or collapsed condition and wherein one of the members causes an initial opening of the upper end of the bag.

It is also an object of our invention to provide improved apparatus of this kind wherein one of the bag-opening members is carried by a slide which controls the feeding of the material to be bagged or packaged.

The invention may be further briefly summarized as consisting in certain novel combinations and arrangements of parts hereinafter described and particularly set out in the appended claims.

In the accompanying sheets of drawings,

Fig. 1 is a plan view of bag opening and filling apparatus embodying our invention.

Fig. 2 is a side elevation thereof.

Fig. 3 is a partial vertical sectional view taken on line 3—3 of Fig. 1.

Fig. 4 is a partial side elevation similar to Fig. 2 but showing the bag fully opened.

Fig. 5 is a partial vertical sectional view taken on line 5—5 of Fig. 4.

Fig. 6 is a sectional view taken across the bag opening members as indicated by line 6—6 of Fig. 2.

Fig. 7 is a similar sectional view taken on line

2

7—7 of Fig. 4 and showing the bag fully opened, and

Fig. 8 is a perspective view showing one type of bag which can be used with our apparatus, the bag being shown in its unopened condition.

Proceeding now with a more detailed description of the embodiment of our improved bag opening and filling apparatus shown in the drawings, we provide the apparatus with a suitable frame 10 which includes a transverse plate member or table 11 and a base 12 with which the table is connected by the uprights or columns 13. The table 11 is provided with an opening 14 for the passage of the material to be bagged or packaged 15 and has a notched portion or recess 15 adjacent such opening.

A pair of bag opening members 16 and 17 extend in depending relation from the table adjacent the opening 14 thereof and, as will be explained more in detail hereinafter, serve to open a bag 18 and hold the same with its upper end 18a in position to receive material which is discharged or dispensed through the opening 14.

The table 11 has a pair of spaced members 20 thereon located on opposite sides of the opening 14 and defining guideways 21 in which a slide or carriage 22 is reciprocably movable. The slide 22 controls the opening 14 and carries a chute 23 which intermittently receives predetermined quantities of the material from a delivery spout 24. The chute 23 has a discharge spout 23a at its lower end which extends past the slide 22 and registers either with the opening 14 or the recess 15 of the table, depending upon the position of the slide.

Fig. 2 of the drawings shows the initial condition of the apparatus, that is at the time when the bag 18 has just been telescopically applied to the bag-opening members 16 and 17 but has not yet been expanded by those members. At this time the opening 14 is closed by the slide 22 and the discharge spout 23a of the chute 23 is in register with the recess 15 so that if any material is prematurely dropped from the delivery spout 24 it will be directed downwardly in front of the bag-opening members 16 and 17 and will be prevented from dropping into the bag 18 which is not yet ready to receive its charge of material. In this way we prevent prematurely discharged material from interfering with the bag-opening operation and also prevent the bag from receiving an inaccurately measured quantity of material.

In the operation of completing the opening of the bag 18 that is, the spreading or expanding of

its walls which will be further described hereinafter, the slide 22 is moved toward the left from the position in which it is shown in Figs. 1 and 2, thereby uncovering the opening 14 and shifting the chute 23 to the position shown in Fig. 4 in which its lower delivery end 23a is in register or alignment with the opening 14 and the upper end of the fully opened bag 18.

The chute 23 is flared upwardly and its upper end is of a size such that it remains in communication with the delivery spout 24 for both of the positions to which the chute is movable with the slide 22, as just described.

The bag opening members 16 and 17 constitute an important part of our improved apparatus and, as shown in the drawings, comprise tongue-like members of which the member 16 is a stationary or fixed member having its upper end connected to the table 11 at one side of the opening 14 and the member 17 is a movable member having its upper end connected to the reciprocable slide 22 so as to be actuated thereby. The stationary member 16 is relatively wide and may have the same width for the major portion of its length so that it will tend to hold and support the side 18b of the bag during the spreading or expanding operation. Adjacent its lower end the stationary member 16 may have a slot 16a therein which extends upwardly for a portion of the length of this member. The movable member or tongue 17 has a relatively wide portion 17a adjacent its upper end and therebelow has a portion 17b of relatively narrow width which is bowed or curved relative to the stationary member 16 so that the lower end of the member 17 will extend into the slot 16a of the member 16 when the bag opening members are in their initial position as shown in Fig. 2. While in this initial position it will thus be seen that the lower ends of the members 16 and 17 lie in substantially the same plane and will readily enter the upper end of the bag 18 when the bag is manually lifted or slid upwardly telescopically onto these members. The width of the portion 17b of the movable member 17 will be determined by the spacing of the inner edges 18c of the gussets 18d of the bag 18 and should be capable of passing freely between the spaced edges 18c during the bag-expanding movement.

It should be explained at this point that an important feature of the stationary member 16 is the provision of the tapered flanges 26 at the sides thereof. When the upper end of the bag 18 is slid onto the members 16 and 17 the flanges 26 enter the bag and extend between the side 18b and the gussets 18d and produce a partial opening of the upper end of the bag as shown in Figs. 2 and 6. This partial opening of the upper end facilitates the subsequent opening or expanding of the remaining portions of the bag and also enables air to freely enter the bag to prevent the formation of a vacuum therein during the opening operation. It should also be explained that the bag-opening members 16 and 17 are of a length to extend substantially to the bottom 18e of the bag to be opened although bag-opening members of different lengths can be employed or substituted, depending on the length or depth of the particular bags to be opened.

Since the movable bag opening member 17 is carried by the slide 22 which is reciprocably movable in the guideways 21, it will be seen that this member has a substantially parallel movement at all times during the bag-expanding operation. In other words, the relative separating movement obtained between the members 16 and 17 during

the operation of spreading or expanding the bag to its fully opened condition is a substantially parallel relative separating movement. We find this substantially parallel movement to be very satisfactory and desirable in the opening of the bags because it produces a positive action which quickly pushes the side 18f of the bag away from the side 18b and thereby causes the bag to be stretched or distended in a manner such that the gussets 18d and the folded bottom 18e of the bag permit it to be quickly and fully opened. Moreover, this relative parallel separating movement between the bag-opening members eliminates the likelihood of the bag being torn or punctured and enables the bag to be properly held in its fully opened position during the period that the material is being charged into the bag. It will be noted also that, since the movable member 17 is of a length to extend nearly to the bottom of the bag and of reduced width to pass between the substantially parallel edges 18c of the folded bag, the lower end of this member will promptly engage the sharply folded portion or "lock" 18g of the bag during the expanding operation and will push or snap the same out to its straight or distended position as shown in Fig. 4.

Suitable mechanism may be provided for actuating the slide 22 to produce the above-described relative parallel spreading movement between the members 16 and 17 and the above described shifting of the chute 23. In the present embodiment of our apparatus we show an electric power device for this purpose which may be in the form of a solenoid 28 mounted on the table 11 and having a movable armature or core 29 therein. The core 29 is connected by means of the link 30 with one end of a lever 31 which is pivoted on the table 11 at the point 32. The other end of the lever 31 is connected with the slide 22 by the link 33. When the solenoid 28 is energized the core 29 shifts toward the right as seen in Fig. 1 causing movement to be transmitted through the links 30 and 33 to the slide 22 shifting the latter from the position shown in Fig. 1 to the position shown in Fig. 4. Such actuation of the slide produces the above described bag-opening movement and shifting of the chute 23. Upon deenergization of the solenoid 28 the tension springs 35 return the slide 22, and the members 17 and 23 carried thereby, to their initial position shown in Figs. 1 and 2.

The energization of the solenoid 28 is controlled by a switch 36 having stationary contacts 36a and a movable contact 36b. Actuating and holding means for the switch 36, which will be described next, constitute another important feature of our improved apparatus. As shown in the drawings the movable contact 36b is carried by an angular member or lever 37 which extends through an opening of the table 11 and is mounted on a pivot pin 38. The lever 37 has an arm portion 37a which extends laterally beneath the table 11 to a position just in front of the stationary bag-opening member 16 at a height or point to lie adjacent the upper end 18a of the bag. In this position the arm portion 37a is readily accessible to the forefinger of the operator's hand which is lifting or pulling the bag 18 onto the bag-opening members 16 and 17. By the time that the bag has been slid onto the bag opening members and occupies the position shown in Fig. 2 the operator's fore-finger will have arrived at a point to engage the arm portion 37a. During the remaining upward movement of the bag to bring it to its fully lifted position the operator's

5

finger lifts the arm portion 37a thereby rocking the lever 37 and moving the contact 36b against the contacts 36a to close the switch 36 and energize the solenoid 28. The contact 36b is resilient or flexibly mounted so that it will permit more or less overtravel of the lever 37 after the point at which the contact 36b engages the stationary contacts 36a. It will be noted also that the end of the arm portion 37a is bent upwardly to form a stop which is engageable with the underside of the table for limiting the rocking movement of the lever 37. A compression spring 39 acts on the lever 37 and tends to move the same in a direction to cause opening of the switch 36.

Instead of actuating the lever 37 manually as just described to cause closing of the switch 36 we may provide for an automatic closing of this switch by the mere movement of the bag onto the bag-opening members 16 and 17. For this purpose we provide the lever 37 with an arm 40 which extends toward the bag opening members and has a trip portion or trigger 40a projecting through a slot 41 of one of the flanges 26 of the stationary member 16. As shown in the drawings the trigger 40a extends into the path of upward movement of the bag 18 and is adapted to be engaged and actuated by the upper end of the bag during the final portion of the upward movement of the bag onto the bag-opening members 16 and 17. Such actuation of the trigger by the bag produces the above described rocking of the lever 37 and closing of the switch 36.

When the bag has been fully opened by the members 16 and 17 it is desirable that the bag be held open by these members until the desired amount of material has been charged into the bag. To this end we maintain the solenoid 28 energized during the bag filling operation and accomplish this by the use of holding means which temporarily prevents opening of the switch 36. This holding means may comprise a rock shaft 43 mounted on the underside of the table 11 and carrying upwardly and downwardly extending arms 44 and 45. The arm 44 extends upwardly through a slot 46 of the table and overlies a projection 47 of the switch, actuating lever 37. The downwardly extending arm 45 is located in the line of movement of the bag-opening member 17 and at its lower end carries a projection or screw 48 which cooperates with an opening 49 of this bag-opening member. When the bag-opening member 17 is moved away from the stationary member 16 to spread the bag to its open position as shown in Fig. 4, a portion of the bag overlying the opening 49 engages the screw 48 and swings the arm 45 in a direction to cause rocking of the shaft 43 and downward swinging of the arm 44. While in its depressed position the arm 44 prevents upward movement of the projection 47 and thus holds or maintains the switch 36 in its closed position. When the desired amount of material has been charged into the bag and the bag has been released by the hand of the operator the weight of the material in the bag causes it to slide downwardly off of the bag-opening members and this results in the opening 49 being uncovered. Thereupon the screw 48 enters the opening 49 and the resulting rocking of the shaft 43 swings the arm 44 upwardly to release the projection 47 and permit opening of the switch 36. The springs 35 thereupon return the slide 22 to the above-mentioned initial position and the apparatus is then ready for another cycle of operation.

During the bag opening and filling operation

6

the station or position of the operator is in front of, and facing toward, the stationary member 16 and to enable him to observe the flow of material into the opened bag we provide the opening 50 in this member. This opening also provides clearance for the fingers of the operator which are gripping the upper end of the bag and, in addition, provides a spillway for excess material if the bag should be filled to an overflowing condition.

In the foregoing detailed description we have shown and referred to only one type of bag but it should be understood that our apparatus will operate satisfactorily and successfully with all available types of bags which are used for packaging purposes.

From the foregoing description and the accompanying drawings it will now be readily understood that we have provided an improved bag-opening and filling apparatus of a compact and economical construction and which is capable of rapid and satisfactory operation.

Although we have illustrated and described our improved apparatus in considerable detail it will be understood, of course, that we do not wish to be limited to the particular details and arrangements herein disclosed but regard our invention as including all changes and modifications coming within the scope of the appended claims.

Having thus described our invention we claim:

1. In apparatus of the character described, a pair of adjacent substantially coextending generally flat members adapted to be inserted into a bag by relative telescopic movement between said members and bag, and means for imparting substantially parallel movement to one of said members to cause opening of the bag by spreading the walls thereof, one of said members having an opening therein adjacent its lower end and the lower end of said other member being curved toward said one member and adapted to extend into said opening when said members are in their bag-receiving position.

2. In apparatus of the character described, a pair of adjacent substantially coextending members adapted to be inserted into a bag by relative telescopic movement between said members and bag, one of said members having wedge-shaped edge flanges thereon at a point above its lower end adapted to cause opening of the upper end of the bag during said relative movement and the other of said members being generally flat and of a narrower width than the spacing of said flanges so as to lie adjacent said one member when said members are in the bag-receiving position, and means for causing separation of said members by substantially parallel movement to produce a further opening of the bag.

3. In bag opening and filling apparatus, a frame having an opening therein for the passage of material to be bagged, a pair of adjacent substantially coextending members adapted to be inserted into a bag by relative telescopic movement between said members and bag, a slide movable on said frame and normally closing said opening, one of said members being fixed to said frame and depending therefrom adjacent said opening and the other of said members being carried by said slide, and means for actuating said slide to uncover said opening and impart substantially parallel bag-opening movement to said other member to cause spreading of the walls of the bag.

4. In bag opening and filling apparatus, a frame having a transverse table portion provided with

an opening for the passage of material to be bagged, a pair of substantially coextending members depending relative to said table portion at a point adjacent said opening and adapted to receive a bag telescopically thereon and to locate such bag with its upper end beneath said opening, a slide movable on said table portion and controlling said opening, one of said members being fixed to said table portion and the other being carried by said slide for bag-opening movement for spreading the walls of the bag apart, and means for actuating said slide to uncover said opening and cause said bag-opening movement.

5. In apparatus of the character described, a pair of adjacent substantially coextending members adapted to telescopically receive thereon a bag to be opened by endwise movement of the bag relative thereto, one of said members being fixed and the other being capable of relative spreading movement so as to spread the walls of the bag apart, means for producing such spreading movement including an electric power device of the solenoid-type connected with the movable member and having an energizing circuit, a switch controlling said circuit, and movable means operably connected with said switch to actuate the same and located adjacent said fixed member so as to be engaged and moved by the bag during said endwise movement.

6. In apparatus of the character described, a pair of adjacent substantially coextending members adapted to telescopically receive thereon a bag to be opened, one of said members being fixed and the other being capable of relative spreading movement so as to spread the walls of the bag apart, means for producing such spreading movement including an electric power device operably connected with said other member and having an energizing circuit, and circuit closing means for said power device having a movable element located to be engaged and actuated by the upper end of the bag during the telescopic movement of the bag onto said members.

7. In apparatus of the character described, a pair of adjacent substantially coextending members adapted to telescopically receive thereon a bag to be opened, one of said members being fixed and the other being capable of relative spreading movement so as to spread the walls of the bag apart, means for producing such spreading movement including an electric power device having an energizing circuit, a switch controlling said circuit, said other member having an opening adjacent its lower end adapted to be covered by said bag, and holding means for maintaining said circuit energized, said holding means being movable to its effective position by said other member and being rendered ineffective upon movement of a portion thereof into said opening when the latter is uncovered by the bag.

8. In bag opening and filling apparatus, a frame having a transverse table portion provided with an opening for the passage of material to be bagged, a reciprocable slide normally closing said opening, means responsive to opening movement of said slide for spreading open a bag and locating the same with its upper end beneath said opening, a chute carried by said slide for movement of its delivery end from a free-discharge position to a position substantially in register with said opening, and means for actuating said slide.

9. In apparatus of the character described, a pair of adjacent substantially coextending members adapted to receive a bag thereon by relative

telescoping movement between said bag and members, means for causing relative substantially parallel spreading movement between said members so as to spread the walls of the bag apart including an electric power device operatively connected with one of said members and having an energizing circuit, a switch in said circuit, and movable means connected with said switch to actuate the same and being located adjacent said members so as to be engaged and operated by the bag during said relative telescoping movement.

10. In apparatus of the character described, a supporting means having an opening for the passage of material to be fed into a bag, a member slidable on said supporting means, a pair of adjacent substantially coextending bag-opening members depending from said supporting means and adapted to telescopically receive a bag thereon, one of said bag-opening members being fixed on said supporting means and the other being mounted on said slidable member so as to be capable of a substantially parallel relative spreading movement for spreading the walls of the bag apart, means for producing such spreading movement including an electric power device operably connected with said other bag-opening member and having an energizing circuit, and circuit closing means for said power device having a movable element located to be engaged and actuated by the upper end of said bag during movement of the bag onto said bag-opening members.

11. In apparatus of the character described, a supporting means having an opening for the passage of material to be fed into a bag, a pair of adjacent substantially coextending relatively movable members depending from said supporting means and adapted to telescopically receive thereon a bag to be opened, means for producing relative spreading movement between said members so as to spread the walls of the bag apart including an electric power device mounted on said supporting means and means operably connecting one of said members with said power device to be actuated thereby, an energizing circuit for said power device, a switch in said circuit, movable switch actuating means located adjacent said members so as to be engaged and actuated by the bag during movement of the bag onto said members, and holding means for maintaining the circuit energized while the bag remains on said members.

12. In apparatus of the character described, a pair of adjacent substantially coextending relatively movable members adapted to telescopically receive thereon a bag to be opened, means for producing relative spreading movement between said members so as to spread the walls of the bag apart including an electric power device mounted on said supporting means and means operably connecting one of said members with said power device to be actuated thereby, an energizing circuit for said power device, a switch controlling said circuit, movable switch actuating means located adjacent said members so as to be engaged and actuated by the bag during movement of the bag onto said members, and movable holding means for maintaining said switch closed, said holding means comprising a member which is movable in response to the removal of the bag from said pair of members so as to permit opening of said switch and deenergization of said power device.

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