

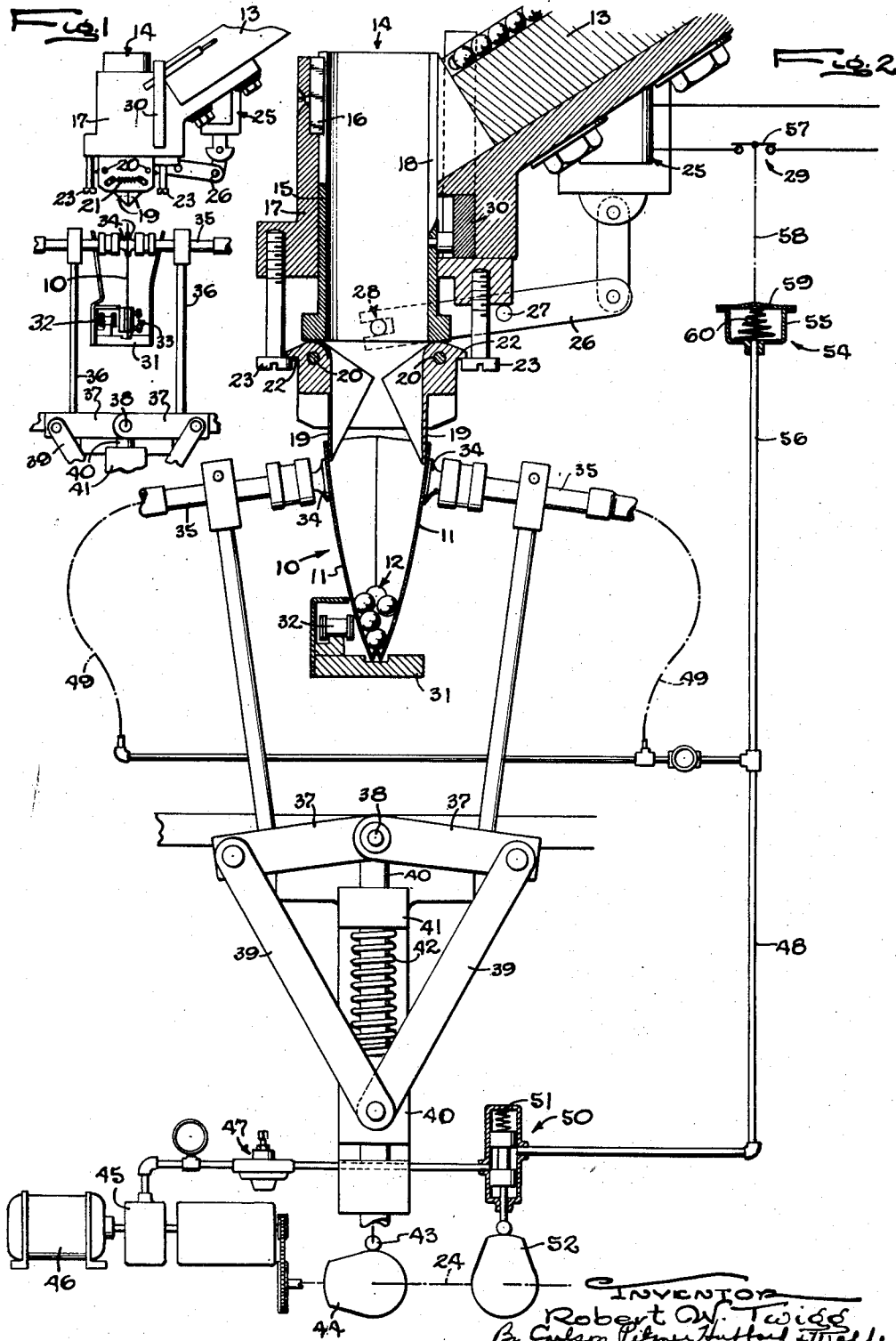
Sept. 14, 1954

R. W. TWIGG

2,689,073

FILLER FOR FLEXIBLE WALLED BAGS

Filed June 30, 1951



INVENTOR
Robert W. Twigg
By Cushman, Peterson, Haddock & Wolfe
ATTORNEYS

UNITED STATES PATENT OFFICE

2,689,073

FILLER FOR FLEXIBLE WALLED BAGS

Robert W. Twigg, Rockford, Ill., assignor to Bartelt Engineering Company, Rockford, Ill., a corporation of Illinois

Application June 30, 1951, Serial No. 234,523

6 Claims. (Cl. 226—59)

1

This invention relates to a mechanism for depositing charges of material to be packaged into bags successively presented to a filling position. More particularly, the invention relates to a filler associated with a vacuum actuated mechanism by which the bag to be filled is opened and held open.

One object is to hold a filler mechanism of the above character disabled until a bag has been presented thereto and opened so as to be conditioned to receive the material charge delivered by the filler.

Another object is to utilize a vacuum actuated bag-opening mechanism for sensing the presence and open condition of the bag to be filled and controlling the operation of the filler whereby to prevent the delivery of a material charge by the filler in the absence of an open bag to receive the same.

A more detailed object is to sense the presence and open condition of a bag in filling position by the existence of a subatmospheric pressure in a conduit leading to a vacuum cup by which a wall of the bag is gripped and separated from another wall to open the bag.

The invention also resides in the novel manner of correlating the action of the filler and the vacuum actuated bag opener.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

Figure 1 is a fragmentary elevational view of a bag filling and opening mechanism embodying the novel features of the present invention.

Fig. 2 is a vertical cross-sectional view on a larger scale of the filling and opening mechanism together with their actuators which are shown schematically.

For purposes of illustration, the invention is shown in the drawings incorporated in a bag handling and filling mechanism for supporting a flexible walled bag 10 open end up, separating the opposite side walls 11 thereof and delivering a charge of material 12 to be packaged downwardly into the bag. The material or articles 12 are, in this instance, stored in a chute 13 along which they advance by gravity and are delivered singly or in groups into the filler 14 whose construction is determined by the character of material 12 and, in this instance, is of the type disclosed in a copending application of Harold L. Bartelt, Serial No. 98,660, now Patent No. 2,649,674; to which reference may be made for further details. The filler includes a tube 15 slidable vertically

2

along a key 16 in a guideway formed in a bracket 17 secured to the machine frame. The tube has a side opening 18 near its upper end for receiving the articles 12 gravitating downwardly from the inclined chute 13 in which the articles are maintained in a row by means well known in the art.

The lower end of the tube 15 is closed by doors 19 of arcuate clam-shell shape suspended from pivot pins 20 on opposite sides of the tube at the lower end thereof and swingable toward each other to bring their adjacent sides into abutment as shown in Fig. 1, the doors being normally held in this closed position by a spring 21 stretched between pins which project outwardly from opposite sides of the doors. In this closed position, the doors form a receptacle which tapers downwardly substantially to a central line and is adapted to enter between the walls of the open bag as the tube 15 is lowered. In the final part of this motion, short arms 22 (Fig. 2) projecting outwardly from the doors encounter vertically adjustable stops 23 and, in the continued movement of the tube, the doors are swung apart to further spread the walls of the bag as shown in Fig. 2 and also to release the batch of articles then held in the receptacle, the articles falling directly into the bag. Then, as the tube 16 is retracted upwardly, the doors are allowed to swing together and close the bottom of the tube ready to receive the next charge of the material 12.

While the lowering of the tube may be effected by a cam on a timing shaft 24, it is actuated in the present instance by a solenoid 25 whose armature is connected to the outer end of a lever 26 pivoted at 27 on the bracket 17 and having a pin and slot connection 28 at its inner end with the tube 15. A spring (not shown) operates to raise the tube when the solenoid is deenergized by opening of a switch 29 by which the energizing circuit for the solenoid is controlled.

If desired, the upward motion of the tube 15 may be utilized to release a new charge of the material 12 from the chute 13 and allow the same to gravitate into the tube. This is accomplished as disclosed in the above mentioned application by a yoke 30 responsive to the vertical movements of the tube 15.

The bag 10 to be filled is supported beneath the filler tube 15 on a plate 31 along which the bag is preferably moved edgewise into filling position by a suitable conveyor such as that disclosed in the above mentioned patent application. This conveyor comprises an endless chain 32 disposed and indexed step by step along the station-

3

ary support 31 and having releasable clamping devices 33 spaced therealong and gripping the leading edge portion of the successive bags.

Preparatory to receiving the charge of material, the bag is opened in the outward movement of two suction cups 34 which move inwardly against the outer surfaces of the bag walls 11 as shown in Fig. 1, are subjected to a vacuum to grip the imperforate and non-porous bag walls, and then are moved apart to separate the walls and hold the bag as shown in Fig. 2 while the articles 12 are being delivered from the tube 15.

The cups 34 are mounted on the ends of horizontally disposed tubes 35 rigid with the upper ends of upstanding arms 36 of bell crank levers 37 which are swingable about a common pivot 38. Herein such swinging is effected through links 39 connecting the outer ends of the bell cranks with a slide 40 guided for vertical movement in a bracket 41 and urged downwardly by a spring 42. On the lower end of the slide is the follower 43 of a cam 44 fast on the shaft 24 and adapted to raise the slide as shown in Fig. 2 and thereby swing the cups inwardly into alinement with each other and against the opposite bag walls 11 (Fig. 1). As the follower rides off from the high point of the cam, the bell cranks swing outwardly to the position shown in Fig. 2.

Before such separation occurs, the cups 34 are subjected to a vacuum which, in the present instance, is created by a pump 45 driven by a motor 46 which through appropriate speed reduction gearing also drives the timing shaft 24. Through a pressure regulator 47, the pump outlet communicates with a pipe 48 leading to the tubes 35 through flexible branches 49 and having interposed therein a valve 50 which is normally closed by a spring 51. The valve plunger carries the follower of a cam 52 fast on the shaft 24 and arranges to open the valve 50 as the cups 34 reach their innermost position Fig. 1 and to maintain the valve open until after the filler has been actuated to discharge the articles 12 into the bags.

In accordance with the present invention, the bag opening mechanism above described is utilized to detect the presence of a properly opened bag in filling position and to prevent energization of the filler actuator 25 until such a condition occurs. This condition is evidenced by the existence of a predetermined sub-atmospheric pressure in the pipe 48 after opening of the valve 50 for, in the absence of a bag in filling position with its walls properly engaged by and covering the cups 34 while the latter are moving apart, the vacuum would be destroyed. Accordingly, the switch 29 controlling the activation of the filler actuator 25 is arranged to be closed by a pneumatic operator 54 whose casing 55 communicates with the pipe 48 through a conduit 56. The movable switch contact 57 is suitably connected as indicated at 58 to a flexible wall 59 covering the casing 55 and urged in the switch opening direction by a spring 60. The latter is so stressed as to be overcome when the pressure in the casing 55 has fallen to the desired low valve.

With this arrangement, it will be apparent that if both of the vacuum cups 34 are properly covered by the bag walls 11 when the cups are separated by the cam 44 and the vacuum source is connected to the pipe 48 by opening of the valve, the pressure within the casing 55 will fall and the diaphragm 59 will move downwardly to close the switch 29 and thus activate the filler. If, however, a bag is not presented properly on the

4

support 31 or if either of its walls 11 is not properly engaged and gripped by its cup 34, the pipe 48 will remain open at the cup and a reduction in pressure within the operator 54 will not occur when the valve 50 is opened by the cam 52. In this event, the filler will be held disabled and no charge of the material 12 will be delivered. Loss of the material or clogging of the mechanism by an accumulation of unpackaged material is thus avoided.

I claim as my invention:

1. In a machine for filling flexible walled bags, the combination of, means for supporting a bag to be filled with the open end of the bag facing upwardly, a filler having a power actuator and operable to deliver a charge of material toward said bag when said actuator is rendered active, a control device for said actuator having a pneumatic operator adapted when energized to activate said actuator, a vacuum cup engageable with a wall of said bag, mechanism for moving said cup toward and away from said bag to separate the walls of the bag when the cup is subjected to a vacuum, means providing a vacuum source, and valve mechanism operated in timed relation to the movements of said cup to connect said operator and the cup to the vacuum source during engagement of the bag by the cup and while the latter is being moved outwardly to open the bag.

2. In a machine for filling a bag having a flexible imperforate, the combination of, means for supporting the bag to be filled, a filler adapted when activated to deliver a charge of material toward said bag, a control device having a pneumatic operator adapted when energized to activate said filler, a vacuum cup engageable with said bag wall, mechanism for moving said cup toward and away from said bag to separate the walls of the bag when the cup is subjected to a vacuum, and mechanism operated in timed relation to the movements of said cup to apply a vacuum to said operator and to said cup after engagement of the bag by the cup and while the latter is being moved to open the bag.

3. In a machine for filling flexible walled bags, the combination of, means for supporting a bag to be filled, a filler operable to deliver a charge of material toward and into said bag, vacuum cup engageable with a wall of said bag, mechanism for moving said cup toward and away from said bag to separate the walls of the bag when the cup is subjected to a vacuum while engaging the bag wall, and a pneumatic operator connected in parallel with said cup and adapted when subjected to a predetermined vacuum, to activate said filler and deliver a material charge into the open bag.

4. The combination of, a filler adapted when actuated to deposit a charge of material, a device operable in response to the application of sub-atmospheric pressure to actuate said filler, means for supporting a bag to receive said material charge, vacuum actuated means for opening and closing the supported bag including a vacuum cup engageable with a wall of the bag, means providing a vacuum source, and mechanism operable to connect said cup and said device simultaneously to said source.

5. In a machine for filling a flexible walled bag, the combination of, means for supporting a bag to be filled, a filler adapted when activated to deliver a charge of material to said bag, a vacuum cup engageable with a wall of said bag, mechanism for moving said cup inwardly into engagement with said bag wall and then outwardly,

5

means for subjecting said cup to sub-atmospheric pressure during said outward movement whereby to open the bag, and mechanism responsive to pressure changes within said cup and operable in response to a pressure fall to a predetermined valve to activate said filler.

6. In a machine for filling flexible walled bags, the combination of, means for supporting a bag to be filled with the open end of the bag facing upwardly, a filler having a power actuator and operable to deliver a charge of material toward said bag when said actuator is rendered active, means engageable with a wall of said bag and operable to open the bag and permit the same

6

to receive said material charge from said filler, means operable to sense an open condition of said bag in filling position, and mechanism controlled by said sensing means and operable to disable said actuator so long as the supported bag remains closed.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,892,148	Hohl -----	Dec. 27, 1932
2,051,483	Jones -----	Aug. 18, 1936
2,350,666	Allen -----	June 6, 1944