Aug. 21, 1951 M. GOLDBERG 2,564,969

INTERMITTENT ACTUATED VACUUM BAG FILLING MACHINE FOR FIBROUS MATERIAL

Filed July 23, 1946 3 Sheets-Sheet 1

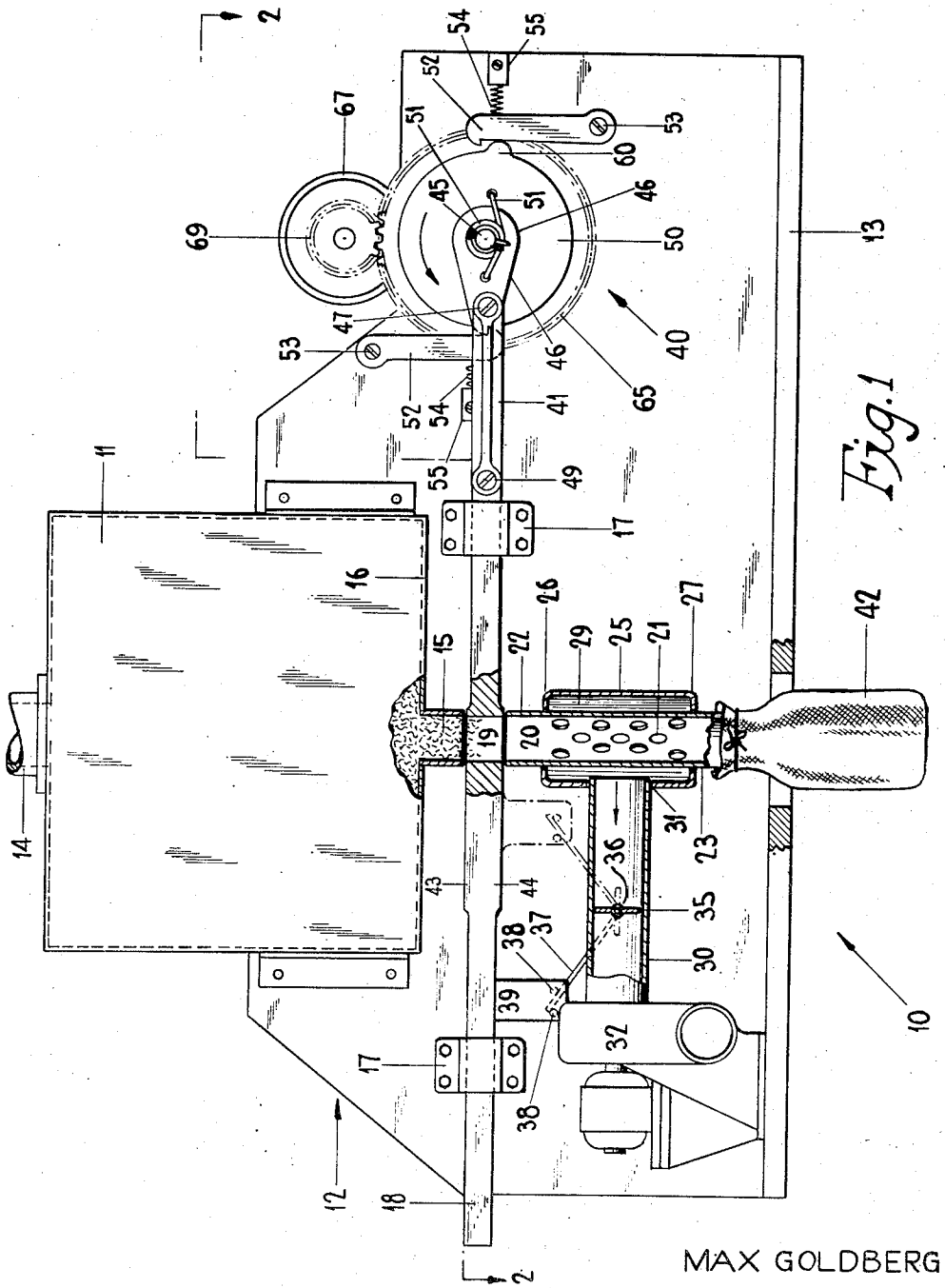

Fig. 1

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Filed July 23, 1946 3 Sheets-Sheet 2

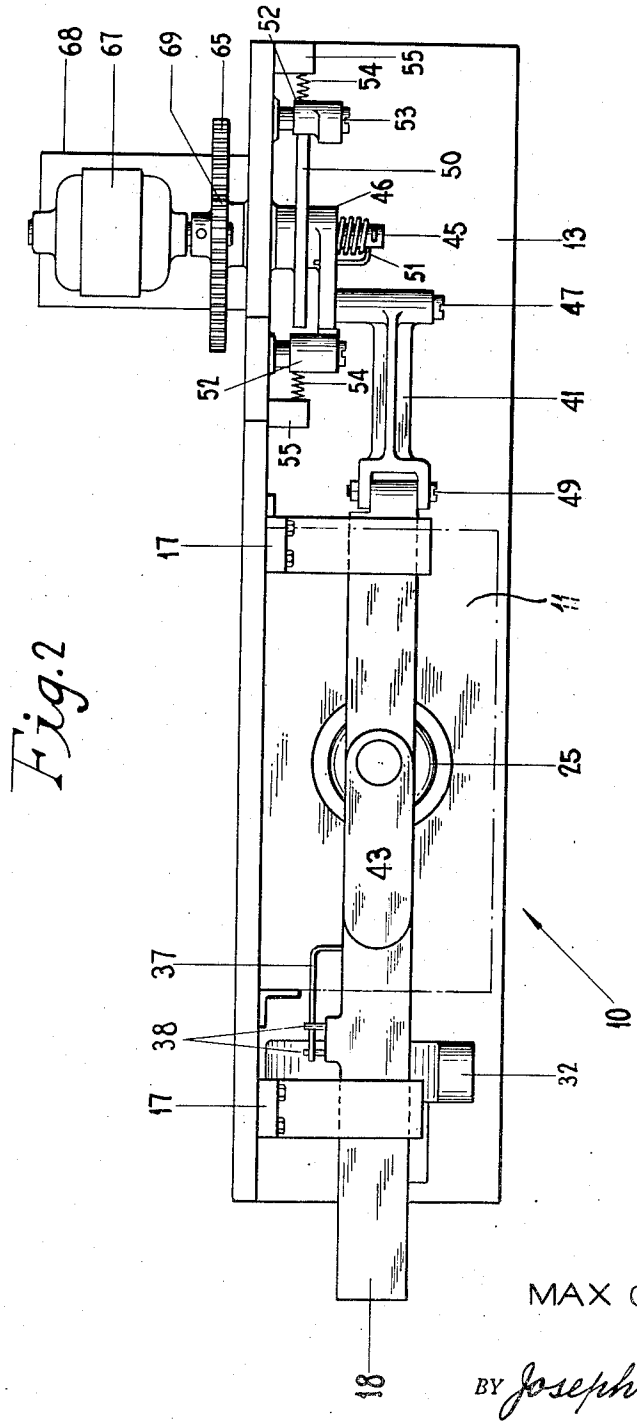

Fig. 2

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Filed July 23, 1946 3 Sheets-Sheet 3

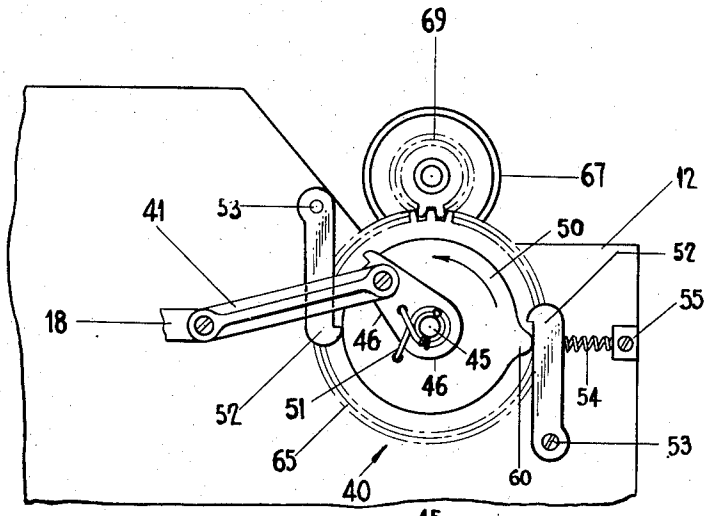

Fig. 5

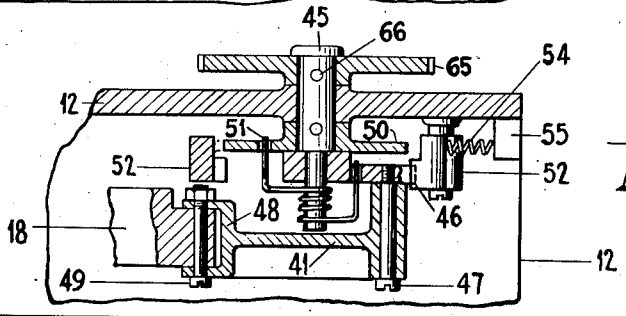

Fig. 4

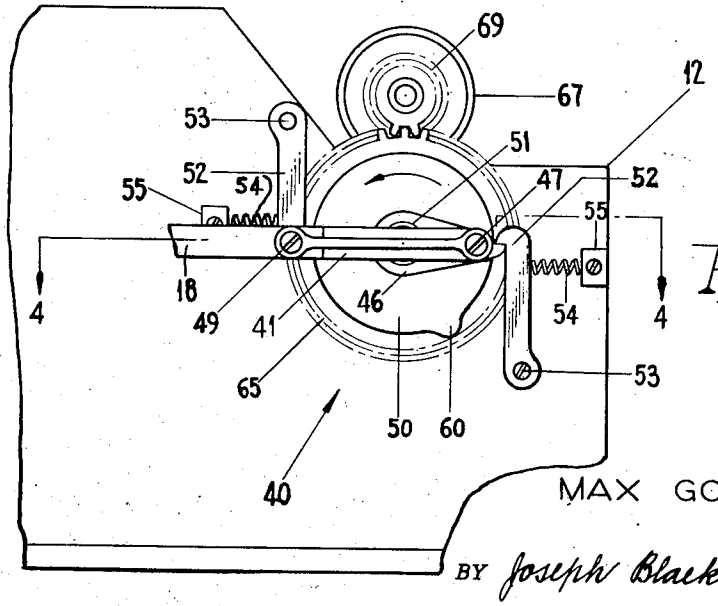

Fig. 3

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Patented Aug. 21, 1951

2,564,969

UNITED STATES PATENT OFFICE

2,564,969

INTERMITTENT ACTUATED VACUUM BAG FILLING MACHINE FOR FIBROUS MATERIAL

Max Goldberg, New York, N. Y.

Application July 23, 1946, Serial No. 685,600

3 Claims. (Cl. 226—43)

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This invention relates to an improved apparatus for filling pillow casings and the like with fibrous material and particularly into casings made of non-porous but collapsible fabrics.

An object of this invention is to provide a filling machine having air suction means and means for shutting off the air current during the movement of filling material from a bin into a receiver and for closing the communication between the bin and the receiver while the air suction is turned on.

Another object of this invention is to provide in combination with the filling machine, a reciprocably mounted valve and an intermittent mechanism for automatically and intermittently actuating the valve, comprising an arm rotatably mounted on a shaft and connected to the valve, a cam disc fixed to the shaft, a torsion spring mounted on the shaft and having one end fixed to the arm and the other end fixed to the cam disc, two pivotally mounted pawls respectively adapted to hold the arm at diametrically opposite points of the disc, and means for rotating the cam disc to tension the spring, whereby when the cam disc is rotated 180 degrees, the cam causes one of the pawls to release the tensioned spring and the arm which imparts a quick reciprocation to the valve.

Casings for pillows, etc., presently in use are mostly made of non-porous washable or coated fabrics which are waterproof.

In practice, when filling non-porous casings, after a certain quantity of fibers is blown into a casing, the casing also contains air which cannot escape through the non-porous fabric and the air therein prevents a complete filling of the air carried material.

The mechanism disclosed herein functions to remove the air alternately to permit filling the casings in steps or puffs. The air is removed or evacuated before a new charge of air carried filling fibrous material enters the non-porous casings.

With the above and other objects in view, the invention will be hereinafter more particularly described, and the combination and arrangement of parts will be shown in the accompanying drawings and pointed out in the claims which form part of this specification.

Reference will now be had to the drawings, wherein like numerals of reference designate corresponding parts throughout the several views, in which:

Figure 1 is a front elevation of the filling mechanism, the valve means and the suction means being partly broken away.

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Figure 2 is a plan view of the filling mechanism, taken as on line 2—2 in Figure 1.

Figure 3 is a view of a fragmentary portion of the valve control mechanism, showing the slide valve in closed position, and showing a valve actuating arm in extreme right-hand position.

Figure 4 is a cross-sectional view, the section being taken as on line 4—4 as in Figure 3.

Figure 5 is a view similar to that shown in Figure 3, showing the actuating arm in released position.

In the illustrated embodiment of the invention the numeral 10 indicates a filling machine, comprising a bin 11 for the storage of the filling material. The bin 11 is secured to an upright wall of a bracket 12 having a base plate 13.

The bin 11 has an inlet 14 at its upper elevation and an outlet 15 in its bottom 16. Slidably mounted in bearings 17 below the outlet 15 is a valve plate 18 having an opening 19 equal in size to the outlet 15.

The valve plate 18 fits closely against the under side of the outlet 15 to prevent passage of air therethrough during the filling operation.

Mounted below and concentric with the outlet 15 is a tubular receiver 20 having apertures 21 at its mid-portion. The receiver 20 is peripherally intact at its upper and lower end portions 22, 23, the portion 22 being the inlet to the receiver and the portion 23 being the nozzle.

A cylindrical jacket 25 having a larger inner diameter than the outer diameter of the apertured receiver 20 is mounted thereon in circumscribing relation. The jacket 25 has upper and lower flanges 26, 27 in suitably contacting relation with the receiver 20. A chamber 29 of annular cross-section is formed between the jacket 25 and the receiver 20.

A tube 30 has one end mounted in an aperture 31 in the jacket 25. The other end of the tube 30 is connected with the suction or inlet of an exhaust fan 32, well known in the art.

A butterfly or disk valve 35 is mounted on a pin 36, passing diametrically through the valve 35 and through the tube 30. The valve 35 is actuated by an arm 37, secured to the pin 36. The free end of the arm 37 is positioned between pins 38 in an extension 39 of the valve plate 18.

It is to be noted that in the positions shown in Figures 1 and 2, the extension 39 of the valve plate 18 moved the arm 37 to the left and caused the valve 35 to close the tube 30. When the slide valve 18 is moved to the right hand position the arm 37 is moved to the right and this opens the tube 30.

Motion is intermittently and automatically

communicated to the valve plate 18 by a valve control mechanism 40 through a link 41, so that the opening 19 is brought into registry with the inlet 22 to the receiver 20 and simultaneously swings the butterfly valve 35 into position to close the suction tube 30. In this position, a quantity of filling material drops into a casing 42, frictionally held on the nozzle 23 of the receiver 20.

The link 41 and the slide-valve 18 is then moved to the right hand position, thereby cutting off the flow of filling material from the bin 11. The extension 39 on the slide-valve 18 simultaneously swings the butterfly valve 35 into position to open the suction tube 30. The suction causes the air in the receiver to be withdrawn therefrom.

It is to be noted that the upper face of the slide-valve 18 has an elongated boss 43 which is in close contacting relation with the lower face of the outlet 15. Also, that the lower face of the slide-valve 18 has an elongated boss 44 which is in close contacting relation with the upper face of the inlet 22. The contacting faces between the slide-valve 18 and the outlet 15 and the inlet 22 are in close inter-fitting relation to prevent air leakage.

The intermittent valve control mechanism 40 for actuating the valve plate 18 comprises a shaft 45 rotatably mounted in the bracket 12. An arm 46 is freely rotatably mounted on the shaft 45. The link 41 is pivotally mounted on the arm 46 by means of a screw 47. The other end of the link 41 has a bifurcated portion 48 which is pivotally connected to the valve plate 18 by a screw 49.

A cam disc 50 is fixed to the shaft 45. A torsion spring 51 is mounted on the shaft 45 and has one end fixed to the arm 46 and the other end fixed to the cam disc 50.

Pawls 52 are pivotally mounted on pivots 53 secured in the bracket 12. A compression spring 54 is mounted on the bracket 12 so as to react at one end against an abutment 55 on the bracket 12. The other end of each spring 54 reacts against a pawl 52.

It is to be noted that the cam disc 50 is in alignment with the pawls 52 and that a projecting portion 60 on the cam disc 50 successively contacts the pawls and disengages the pawls from the arm 46. This disengagement of the pawls permits the torsion spring 51 to move the arm 46 and the connected valve plate 18 into and out of alignment with the outlet 15 from the bin 11 and with the receiver 20.

As shown in Figures 1 and 2 a spur gear 65 is fixed to the shaft 45 by a pin 66. A motor 67 is mounted on a platform 68 fixed to the bracket 12 and carries a gear 69 which is in meshed relation with the gear 65.

When the motor 67 rotates, the gear 69 on the motor shaft rotates the gear 65 in the direction indicated by the arrows in Figures 1, 3, and 5. The gear 65 rotates the shaft 45 and the cam disc 50. Rotation of the cam disc 50 causes the torsion spring 51 to be wound up. When the cam disc 50 is rotated 180 degrees, the extension or rise 60 on the cam disc moves a pawl 52 out of engagement with the arm 46 and releases the tension spring 51. The released and tensioned spring carries the arm 46 and the link 41 to a position diametrically opposite the last position. This motion imparts a pre-determined reciprocation to the valve plate 18 which moves quickly to bring the opening 19 in or out of alignment with the outlet 15 from the bin and the inlet 22 to the receiver 20.

It is to be noted that under operating conditions the bin is under air pressure, that is, a pressure sufficient to cause the filling material to be ejected from the bin through the nozzle into the receiver from an air compressor (not shown). It is further to be noted that the filling material is preferably broken up into divided form in the bin by suitable mechanism (not shown).

It is also to be noted that the mechanism shown herewith for fully opening or for fully closing the valve means, may be taken as representing any suitable means for performing the same function.

Furthermore, it is to be noted that while the mechanism herewith shown operates during predetermined time intervals, that I contemplate making filling machines wherein the actuating means for controlling the valve may be dependent upon the air pressure or the air suction in the nozzle to which the container to be filled is attached.

It is to be noted that the container 42 collapses when the air is drawn out therefrom. This collapsed condition permits a greater quantity of air-carried material to be delivered into the container at the next blowing charge.

In accordance with the patent statutes I have described and illustrated the preferred embodiment of my invention, but it will be understood that various changes and modifications can be made therein without departing from the spirit of the invention as defined by the appended claims.

I claim:

1. In a filling mechanism for automatically and intermittently filling a fabric container made of non-porous but collapsible fabric with fibrous material in successive steps, a bin under air pressure and having an outlet in its lower face, a jacketed receiver having a perforated portion and an inlet in its upper face in alignment with said bin outlet and in fixed spaced-apart relation from said outlet, a slide valve having a through opening and being reciprocably mounted between said bin outlet and receiver inlet, said valve having elongated and parallel upper and lower faces in close contacting relation with both said outlet and inlet, preventing leakage of air into said receiver, means for automatically and intermittently bringing said valve opening in full alignment with said outlet and inlet, or for bringing said valve opening fully out of alignment with said outlet and inlet, an air suction means connected with the perforated portion of said receiver, and means actuated by said reciprocating valve for shutting off said air suction means when said valve opening is in alignment with said bin outlet and said receiver inlet to permit movement of filling material from said bin through said receiver and into said container.

2. In a filling mechanism for automatically and intermittently filling a fabric container made of non-porous but collapsible fabric with fibrous material in successive steps, a bin under air pressure and having an outlet in its lower face, a jacketed receiver having a perforated portion and an inlet in its upper face in alignment with said bin outlet and in fixed spaced-apart relation from said outlet, a slide valve having a through opening and being reciprocably mounted between said bin outlet and receiver inlet, said valve having elongated and parallel upper and lower faces in close contacting relation with both said outlet and

inlet, preventing leakage of air into said receiver, a rotatable shaft, an arm freely rotatably mounted on said shaft, means for connecting said arm to said valve means for actuating said valve means, a cam disc fixed to said shaft, a torsion spring mounted on said shaft and having one end fixed to said arm and the other end fixed to said cam disc, two pivotally mounted pawls respectively adapted to hold said arm at pre-determined intervals at diametrically opposite points of said disc, means for rotating said cam disc to tension said spring, whereby when said cam disc is rotated 180 degrees, said cam causes one of said pawls to release said tensioned spring and said arm, for imparting a pre-determined reciprocation to said valve means, said arm being engaged and fixedly held by the other pawl at the completion of said reciprocatory movement during the interval when said cam disc is rotated another 180 degrees, an air suction means connected with the perforated portion of said receiver for exhausting air therefrom, and means actuated by said reciprocating valve for shutting off said air suction means when said valve opening is in alignment with said bin outlet and said receiver inlet to permit movement of filling material from said bin through said receiver and into said container.

3. In a filling mechanism for automatically and intermittently filling a fabric container made of non-porous but collapsible fabric with fibrous material in successive steps, a bin under air pressure and having an outlet in its lower face, a jacketed receiver having a perforated portion and an inlet in its upper face in alignment with said bin outlet and in fixed spaced-apart relation from said outlet, a slide valve having a through opening and being reciprocably mounted between said bin outlet and receiver inlet, said valve having elongated and parallel upper and lower faces in close contacting relation with both said outlet and inlet, preventing leakage of air into said receiver, valve actuating means comprising a rotatable shaft, an arm rotatably mounted on said shaft and adapted to actuate said valve, a cam disc fixed to said shaft, a torsion spring mounted on said shaft and having one end fixed to said arm and the other end fixed to said cam disc, two pivotally mounted pawls respectively adapted to hold said arm at diametrically opposite points on said disc, means for rotating said cam disc to tension said spring, whereby when said cam disc is rotated 180 degrees, said cam causes one of said pawls to release said tensioned spring and said arm for imparting a pre-determined reciprocation to said valve, said arm being engaged and fixedly held by the other pawl at the completion of said reciprocatory movement, an air suction means connected with the perforated portion of said receiver for exhausting air therefrom, and means actuated by said reciprocating valve for shutting off said air suction means when said valve opening is in alignment with said bin outlet and said receiver inlet to permit movement of filling material from said bin through said receiver and into said container.

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