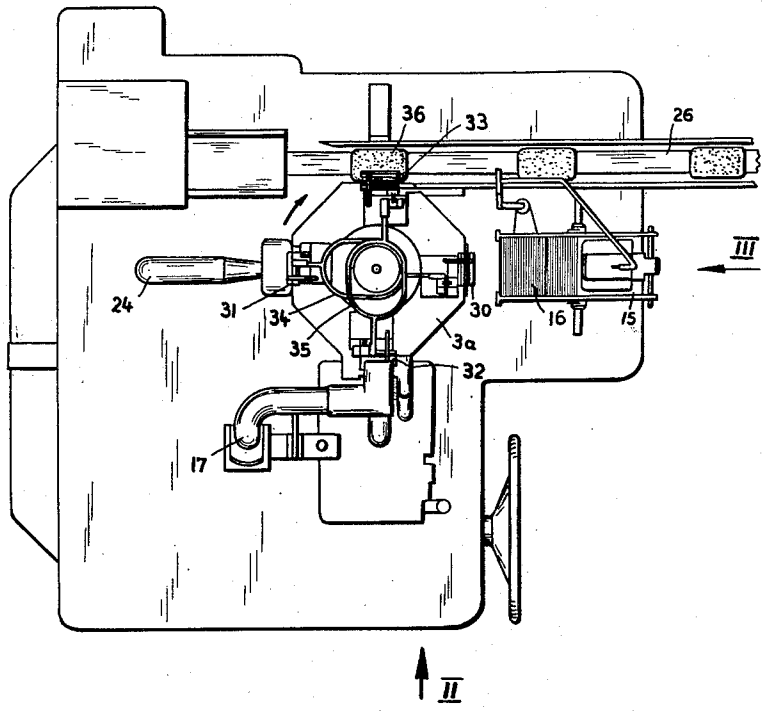
Oct. 30, 1956 H. HÖLLER 2,768,493

FULLY AUTOMATICALLY OPERATING MACHINE FOR FILLING BAGS OF ALL TYPES

Filed June 29, 1954 4 Sheets-Sheet 1

FIG. 1



INVENTOR
HANS HÖLLER
BY
Raymond W. Colton

Oct. 30, 1956 H. HÖLLER 2,768,493

FULLY AUTOMATICALLY OPERATING MACHINE
FOR FILLING BAGS OF ALL TYPES

Filed June 29, 1954 4 Sheets-Sheet 2

FIG. 2

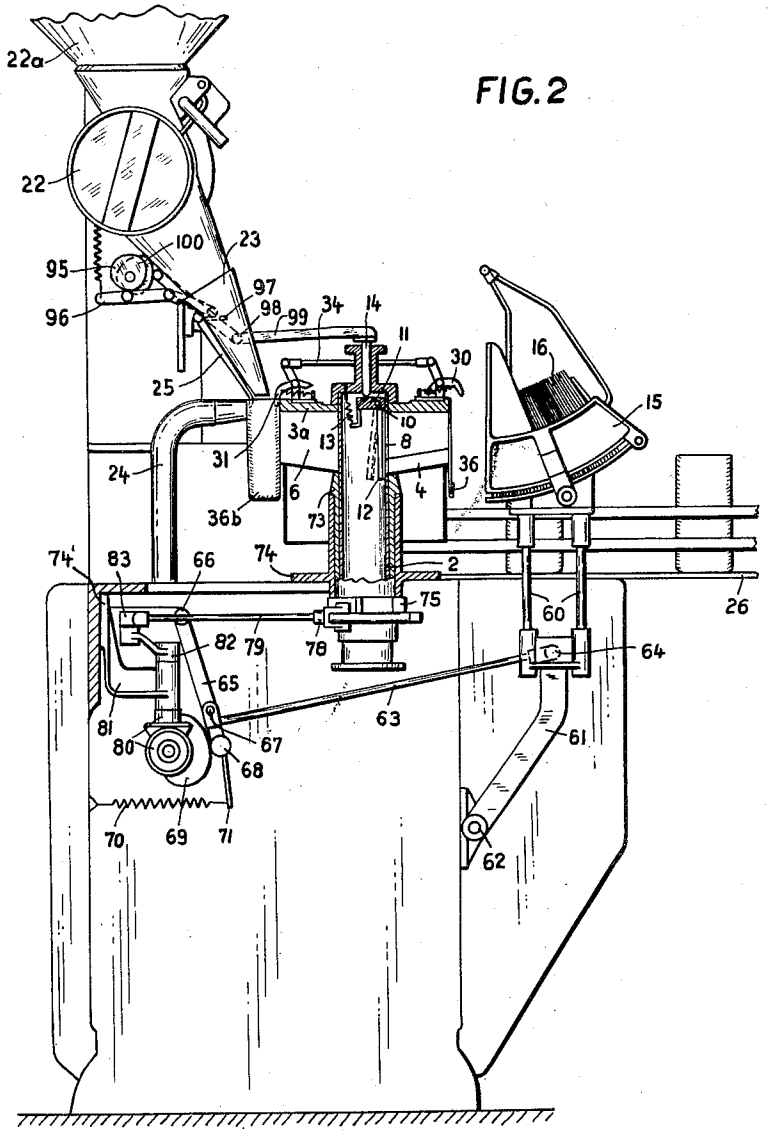
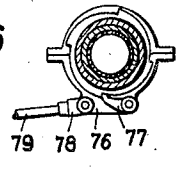


FIG. 6



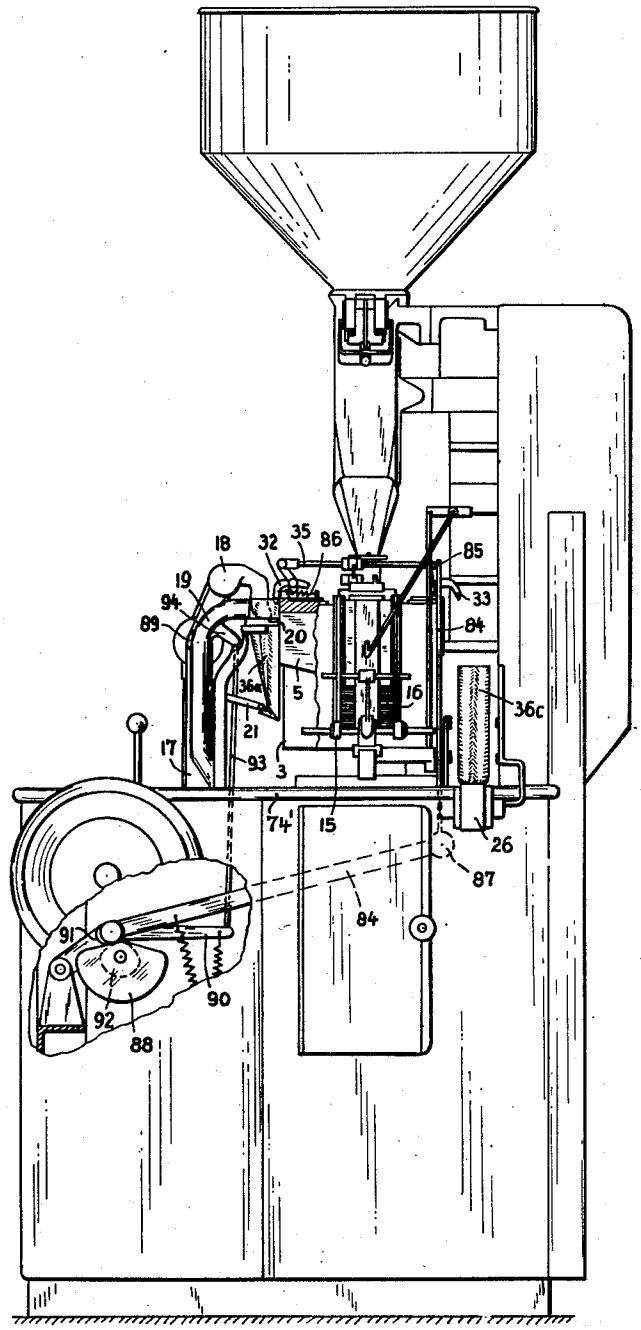
INVENTOR
HANS HÖLLER
BY
Raymond Wolfe

Oct. 30, 1956 H. HÖLLER 2,768,493

FULLY AUTOMATICALLY OPERATING MACHINE
FOR FILLING BAGS OF ALL TYPES

Filed June 29, 1954 4 Sheets-Sheet 3

FIG.3



INVENTOR
HANS HÖLLER
BY
Raymond Woolson

Oct. 30, 1956 H. HÖLLER 2,768,493

FULLY AUTOMATICALLY OPERATING MACHINE
FOR FILLING BAGS OF ALL TYPES

Filed June 29, 1954 4 Sheets-Sheet 4

FIG.4

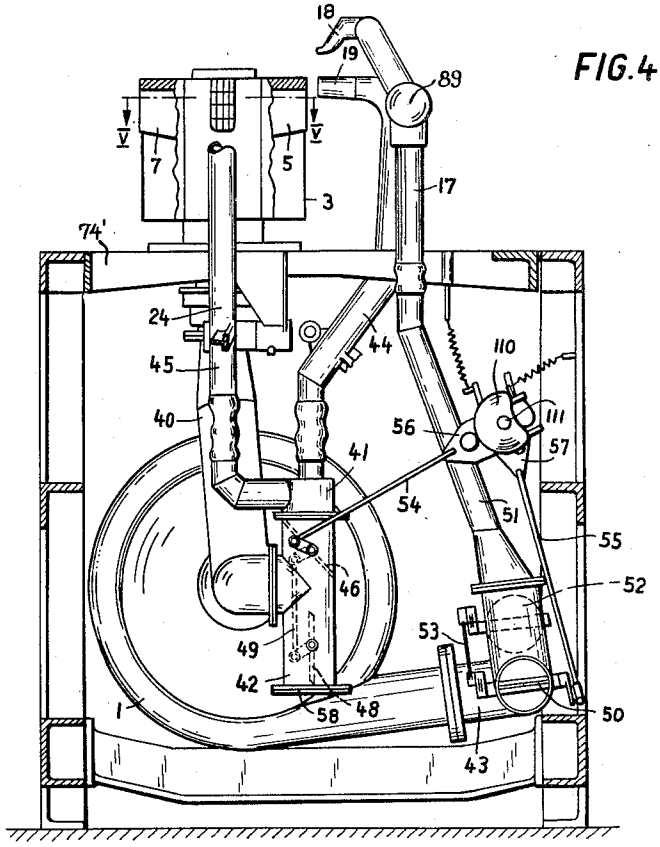
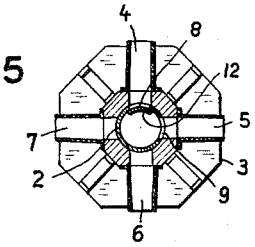


FIG.5



INVENTOR
HANS HÖLLER
BY
Raymond W Holler

United States Patent Office 2,768,493 Patented Oct. 30, 1956

2,768,493

FULLY AUTOMATICALLY OPERATING MACHINE FOR FILLING BAGS OF ALL TYPES

Hans Höller, Bergisch-Gladbach, Germany, assignor to the firm: Gebruder Holler Maschinenfabrik, Bergisch-Gladbach, Germany

Application June 29, 1954, Serial No. 440,189

6 Claims. (Cl. 53—385)

The invention relates to automatic machines for filling bags, particularly those having gusseted bottoms, with fluent granular, pulverulent and other material. The invention is more particularly concerned with structural improvements in a bag filling machine of the type, wherein the bag feeding, opening, filling and discharging devices or mechanisms are cooperatively interconnected on a support or frame, and are rectangularly displaced relative to one another around a central rotary carrier.

This application is a continuation in part of my copending application Serial Number 312,708, filed Oct. 2, 1952, now abandoned.

The primary object of the invention is to provide a structurally improved and simplified machine of the type set forth, wherein the bag feeding opening and filling mechanisms or stations are all under pneumatic and aerodynamic control by an air pump and blower unit, acting upon the bags to be fed into the machine by suction, and by opening the bags to be filled by compressed air.

Other objects contemplated and advantages achieved by the present invention are disclosed in the specification, and will be more fully understood by those skilled in the art from the accompanying drawings, wherein a preferred embodiment of the invention is shown by way of an example.

In the drawings

Figure 1 is a plan view, diagrammatically showing the machine as seen from above,

Figure 2 is an elevation—partly in section—taken in the direction of the arrow II of Figure 1,

Figure 3 is another elevation of the machine—partly in section, and viewed in the direction of the arrow III of Figure 1,

Figure 4 is an elevation of the suction and blower unit and the pipe lines connected therewith,

Figure 5 is a section on line V—V of Figure 4, and

Figure 6 is a plan showing the central rotating mechanism.

The bag filling machine shown and described is of a turntable type known in the art, having a rotary carrier or casing in the centre of the machine for taking around the bags in quarter circular steps of movements to feeding, opening, filling and delivering mechanism and is equipped according to the invention with an air pump and blower, and accessorial parts, cooperatively so associated within and without the turntable that the folded bags, even such with gusseted, square or rectangular bottom and bellows folds in their sides are forcibly dealt with, namely, blown open by compressed air in their travel through the machine.

According to the invention, a suction pipe 2 is connected with an air pump and a blower 1 (Figure 4) and arranged coaxially within a rotatable casing 3, provided with chambers 4, 5, 6, and 7 (Figure 5) at right angles to one another. The connection of the suction pipe 2

with the blower 1 is not shown in the drawing. The casing 3, being preferably a one-piece casing, has on its top an octagonal platform 3*a*, and in its lower part a thick-walled tube 73 through which the suction pipe 2 is passed; the tube 73 is rotatably fixed within a flanged bearing 74, which is supported by the machine frame 74'.

For the rotation of the casing 3 there is fixed underneath the flanged bearing 74 on the thick-walled tube 73 a ratchet wheel mechanism 75, in a notch of which there is a shift ring 76 (Figure 6), having a sector shaped enlargement; on the latter a shifter pawl 77 is fixed laterally by a stay bolt, for actuation by a draw bar 79 having a bifurcated end 78 linked thereto.

By means of a pair bevel gear wheels 80 (Figure 2), a crank 82 lying above the bearing 81 is rotated, whereby the drawbar 79 is reciprocated, since the end 83 of the drawbar is mounted on a crank 82.

By the shifter pawl 77 said reciprocations of the drawbar 79 are transmitted as intermittent rotations acting in clockwise direction, and will turn around the casing 3 through angles of 90°.

The chambers 4, 5, 6, and 7, referred to above, are fixed below the upper octagonal platform 3*a* of the rotatable casing 3 (Figs. 2 and 4); they are open on both sides, so that, as seen in Figure 5, the chambers 4 and 5 are in direct connection with corresponding openings 8 and 9 provided in the suction pipe 2. As shown in Figure 2, a flap 12, provided with a lever 11 and pivoted at the hinge 10, lies in front of the opening 8 of the suction chamber. The flap 12 is held against the opening 8 of the suction pipe 2 by a pin 14 pressing on the lever 11, against the action of a spring 13 engaging the lever 11, thus closing the opening 8. If the pressure on the pin 14 is reduced, the flap 12 is swung about the hinge 10 by the spring 13 and assumes the position shown in Figure 2 in dotted lines, in which position the opening 8 is uncovered. The pin 14 is operated by a lever 99, pivoted at 98, which is positively controlled by a cam disc 100.

Opposite the chamber 4 a container 15 is arranged in which the bags to be filled are accommodated in a stack 16.

The bag container 15 (Figure 2) is fixed on a pair of round bars 60, by which its level or height can be conveniently adjusted, in a lever 61, having two parallel bore holes for said bars and being capable of being reciprocated around the bolt or pivot 62. A bar 63 is pivotally linked with its front end 64 at the outer end of lever 61, and is reciprocated by an actuating lever 65, which can be swung around bearing 66 by a cross piece 67. The operating lever 65 has a roller 68 running upon a cam disc 69. A draw spring 70, fixed at a spring bar 71 of actuating lever 65, will keep the roller 68 in permanent engagement with the cam disc 69.

Disposed in front of the chamber 5 there is a device for opening the bag, shown in Figs. 1, 3 and 4. This device comprises a swingable mouth-piece 18, which is connected to the pressure pipe line 17 of the blower 1, and also its suction pipe line 19, and a collar 20 which abuts against the wall of the casing 3.

The blow-pipe mouthpiece 18 is fixed upon a hinged pipe 89; an actuating lever 90, provided with a roller 91, is in engagement with a cam disc 92. A connecting bar 93, linked to the actuating lever 90 will shift the blow pipe mouthpiece 18 to and fro in the direction of the stroke imparted by cam disc 92, reciprocating it by a crank 94, which is rigidly fixed at the upper end of the connecting bar 93.

Disposed opposite to the chamber 6 as shown in Fig. 2 is the bag filling device 22, which consists of a container 22*a*, a filling pipe 23, a suction pipe 24 for opening the

bag, and a spreading finger **25** serving the same purpose. The spreading finger or strut-lever **25** is fixed in a hinge attached to the bag filling pipe or funnel **23**; after the suction pipe **24** has at least partially opened the bag, an actuating lever **96**, operated by the cam **95** through its pressure upon the arm **97**, will turn the spreading finger **25** outwardly, whereby the bag will be opened completely so as to assume a rectangular form.

An endless conveyer belt **26**, as shown in Figs. 1, 2 and 3, is arranged in front of the chamber **7**.

Hooks or grippers **30**, **31** and **32**, **33** disposed in crosswise relationship to one another and mounted on the platform **3***a* of the casing **3**, are used to hold the bags to assure their rotation with the casing. Each of the opposed hooks constituting a pair are connected together, the hooks **30** and **31** by a connecting rod **34**, and the hooks **32** and **33** by a connecting rod **35**. The hooks and rods are so interconnected, that as seen in Figures 2 and 3, only one of each pair of the oppositely disposed hooks is in the bag holding position at any time.

As seen in Figure 3 of the drawing, a crank **85** is rigidly connected to the grippers **33**, and a lever **84** bears against said crank whereby the gripper **33** is radially lifted, thus releasing a filled bag **36***c* which drops on the conveyer belt **26**, while at the same time the hook or gripper **32**, under positive control through connecting bar **35**, is lowered, thus pressing the bag **36***a* with its side adjacent to the rotatable casing **3**, against the latter and keeping it in place.

A draw spring **86** prevents the hooks or grippers **32** and **33** from being opened and closed inadvertedly.

It will be seen, that each pair of hooks or grippers which are cooperatively interconnected, can only be operated by lever **84**, which is pivotally fixed at **87** and is controlled by its engagement with a cam disc **88**.

The machine operates as follows:

The container **15**, in which the bags are substantially vertically accommodated, is conveyed as described above so as to assume a position in front of the chamber **4**. The flap or valve **12** is opened by the pin **14**, so that chamber **4** being connected through the suction pipe **2** to the air pump and blower **1**, is subjected to a vacuum and will extract by suction a bag from the stack **16**, holding the bag **36** in front of the opening of the chamber **4** by suction, as seen in Figure 2, while the hook **30** is raised and not in contact with the bag **36**. The casing **3** is now turned, as described above, through an angle of 90°, and the flap **12** is closed by the pin **14** operated by the lever **99** and the cam disc **100** as described. The chamber shown at **4** in Figure 5 will then move to the position of chamber **5** of Figure 5. The bag lying in front of the chamber **4** in Figure 2, shown therein at **36**, will also remain in front of this chamber until it is filled and delivered to the conveyer belt **26**.

As shown in Figure 5, the suction pipe **2** is connected with the chamber **5** by the opening **9**. As the chamber **4** is cut-off from the suction pipe by the flap **12**, the whole vacuum is effective on the chamber **5** so that the bag **36** is firmly held in front of this chamber.

By the action of the suction pipe **19** (see Figure 3) lying above the mouth of the bag **36**, the side of the bag **36***a* remote from the wall of the casing, is drawn away by suction while the upper part of the bag is opened. Immediately after this opening operation the hook **32** moves down and retains the bag **36** mechanically, whereupon the mouthpiece **18** will be swung into the bag. The suction air is now cut-off. The bag is blown open by the air emanating from the mouthpiece **18**, the bag **36***a* is held in position by the wall of the casing **3** on the one hand and by the collar **20** on the other hand, so that the compressed air becomes fully effective.

In case the bottom of the bag remains folded it can be opened by means of a finger-like lever **21**, so that the bag is opened to its full length by the compressed air.

The bag **36***a* is pressed against the casing wall by the hook **32** as the bag during a further turn of the casing through 90° ceases to be under the influence of the suction. The chamber, in front of which the bag is located, now assumes the position indicated at **6** in Figure 5, in which the bag **36***b* lies below the filling pipe **23** of the filling device **22**.

The side of the bag remote from the casing is again drawn away by the suction pipe **24** and retained in this position by the spreading finger **25**, so that the filling funnel **23** is directed into the bag **36***b*. After filling the bag **36***b*, the casing is again turned through 90° and the chamber **6** now assumes the position indicated at **7** in Figure 5. The hook **33** is raised, so that the bag **36***c* drops on to the conveyer belt **26**.

The air pump and blower **1** is used for producing suction in the pipe **2**, in the chambers **4** and **5** as well as in the suction pipes **19** and **24**, and furthermore producing compressed air which is blown through the mouthpiece **18** for opening the bag; the blower **1** is cooperatively connected with the chambers **4**, **5** by pipes and other conduits in the following manner. Disposed on the suction side of the blower **1** are the interconnected connecting pipes **40**, **41** and **42** and on the pressure side the connecting pipe **43**. The connecting pipe **40** is connected with the suction pipe **2**; the connecting piece **41** is connected with the suction piece **19** by a pipe **44** and by pipe **45** with the suction piece **24**. The flap **46** is disposed in the connecting pipe and the flap **48** in the connecting pipe **42**. The flaps **46** and **48** are interconnected by rod **49**, hinged thereon, and are thus mutually controlled in a positive manner. A pressure connecting pipe **43** is opened and closed by a flap **50** and thus permits air to escape into the outer atmosphere. When the flap **50** is closed, the compressed air flows into the pipe **51**, in which a flap **52** is provided for its opening and closing. The flaps **50** and **52** are positively controlled by a rod **53** linked thereto. The pipe **17** is connected to the pipe **51**. The actuation of the flaps **46** and **48** and **50** and **52** respectively which are connected by rods **49** and **53**, is effected by means of the levers **54** and **55**, which are linked on the one hand to the flaps **46** and **50** respectively, and on the other hand, are connected with followers **56** and **57** moved by a cam **110** rotating on the shaft **111**.

The blower device shown in Figure 4 co-operates with the devices of the machine according to the invention shown in Figures 1 to 3 and 5 in the following manner:

Whenever a bag has been extracted by suction from the stack **16** while the flap **12** of the suction pipe **2** is open, the flap **46** is closed and the flap **48** is open. Air may enter through the bore provided in the closure flange **58** shown in Fig. 4, in order to prevent a complete throttling of the blower. Thus the flap **52** is closed, the flap **50** however is open, so that compressed air may escape into the outer atmosphere.

Whenever the casing is rotated together with a bag extracted by suction from the stack **16**, so that the bag may be filled in a second operation, then the flap **48** closes and the flap **46** closes, so that air is sucked from the pipes **44** and **45**; the flap **50** is then open, whilst the flap **52** is closed. Then the mouthpiece **18** is moved into the opened bag, the flap **46** closes and the flap **48** opens, whilst in the pressure pipe the flap **50** closes and the flap **52** has opened, so that compressed air can enter the bag, which has been opened at the top through the mouthpiece **18**, which has been lowered into the bag in order to open the latter completely.

It will be seen, that the machine redesigned according to the invention offers the advantage, that it is wholly controlled and operated by a blower and air pump.

By closing the flap **12** the suction of the blower produces the full effect wherever it is required, thus, for example, for opening the bag.

The provision of the suction device with mechanical grippers or hooks is particularly useful, as otherwise the

retaining of a filled bag by suction may result in that, in the event of a bag bursting, the contents of it get into the blower. This however is impossible in the machine redesigned according to the invention, as the bags to be filled are not retained by the suction of the blower, but by hooks.

What I claim is:

1. An envelope filling machine comprising a frame, arcuately disposed feeding, opening, filling and discharging mechanism mounted on said frame, a rotary carrier having four radial chambers each having inner and outer radial ports displaced from corresponding ports of the next adjacent chamber by a right angle for sequential registry with said mechanisms, means defining a central chamber about which said carrier is rotatable, said central chamber having two radial openings spaced by a right angle and registrable with adjacent pairs of said inner ports, a valve controlling one of said openings and an actuator for intermittently operating said valve, said opening mechanism including a compressed air nozzle registrable with the open ends of envelopes supported on said carrier, a pump having suction and discharge ports, a conduit interconnecting said suction port with said central chamber, a conduit interconnecting said discharge port with said nozzle, and an intermittent driving mechanism for shifting said carrier by quarter turns and energizing said actuator.

2. An envelope filling machine as set forth in claim 1 wherein said opening mechanism includes a suction nozzle

adapted to retract a wall of an envelope remote from said carrier, a conduit interconnecting said suction nozzle with said suction port, and means synchronized with said driving mechanism applying suction to said suction nozzle.

3. An envelope fillng machine as set forth in claim 2 comprising a control valve for each of said conduits, and actuating means for said control valves synchronized with said driving mechanism.

4. An envelope filling machine as set forth in claim 1 wherein said opening mechanism includes a movably supported arm and intermittent actuating means synchronized with said driving mechanism for shifting said arm relative to said carrier to displace a portion of an envelope.

5. An envelope filling machine as set forth in claim 1 comprising a mechanical envelope clamping member supported by said carrier adjacent each of said outer ports and actuating means synchronized with said driving mechanism intermittently shifting said clamping members to envelope-gripping positions.

6. An envelope filling machine as set forth in claim 5 wherein oppositely disposed clamping members are interconnected to assume their gripping positions alternately.

References Cited in the file of this patent

UNITED STATES PATENTS

2,051,483 Jones ---------- Aug. 18, 1936