Dec. 16, 1958 J. D. KNISELY 2,864,219

BAG HANDLING AND FILLING MACHINE

Filed Oct. 28, 1957 5 Sheets-Sheet 1

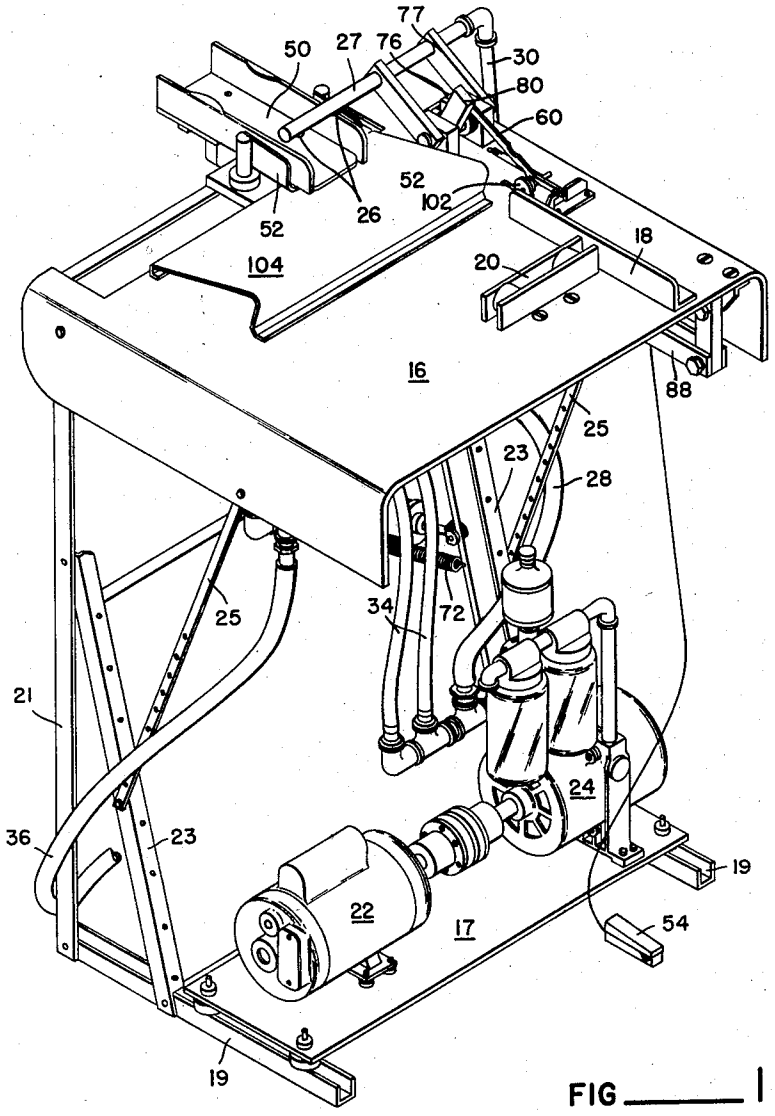


FIG. 1

JAMES D. KNISELY
INVENTOR.

BY Smith & Tucker

Dec. 16, 1958 J. D. KNISELY 2,864,219

BAG HANDLING AND FILLING MACHINE

Filed Oct. 28, 1957 5 Sheets-Sheet 2

FIG 3

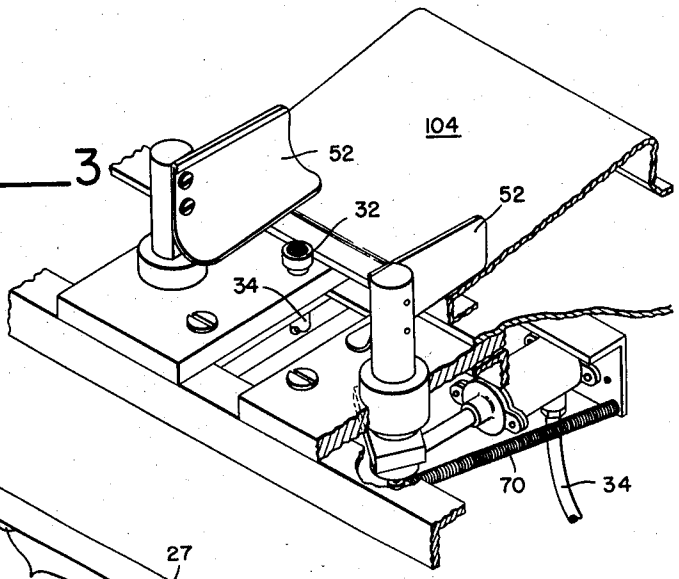
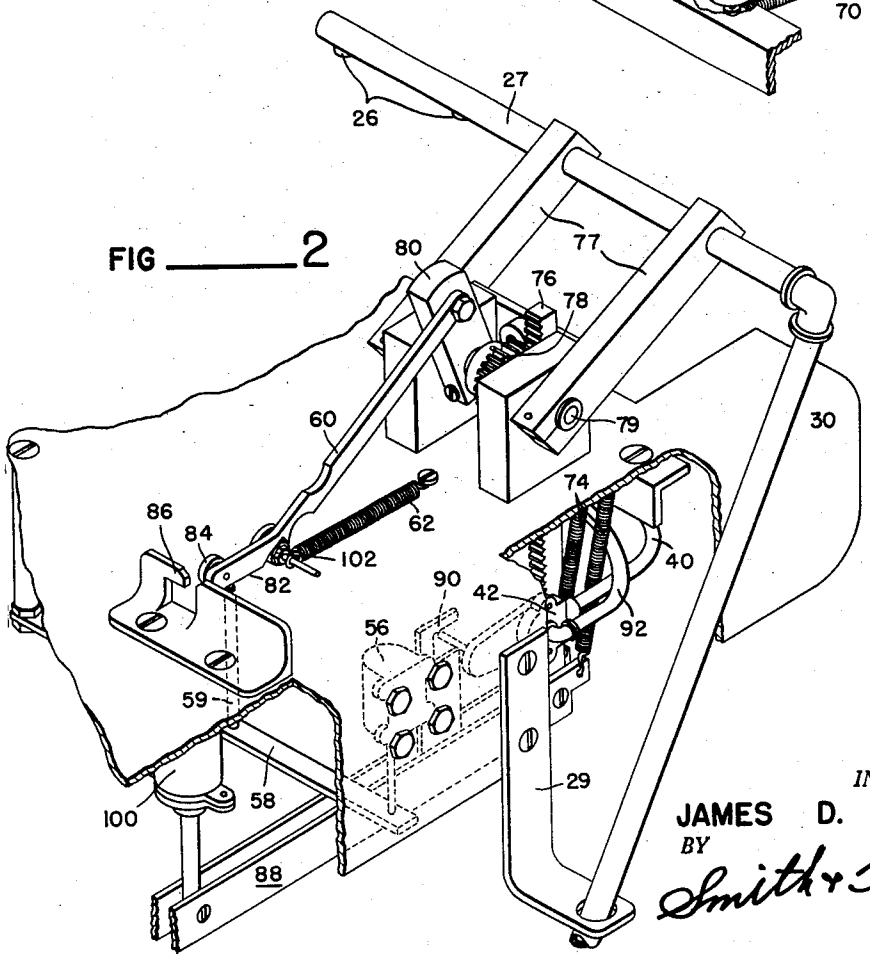


FIG 2



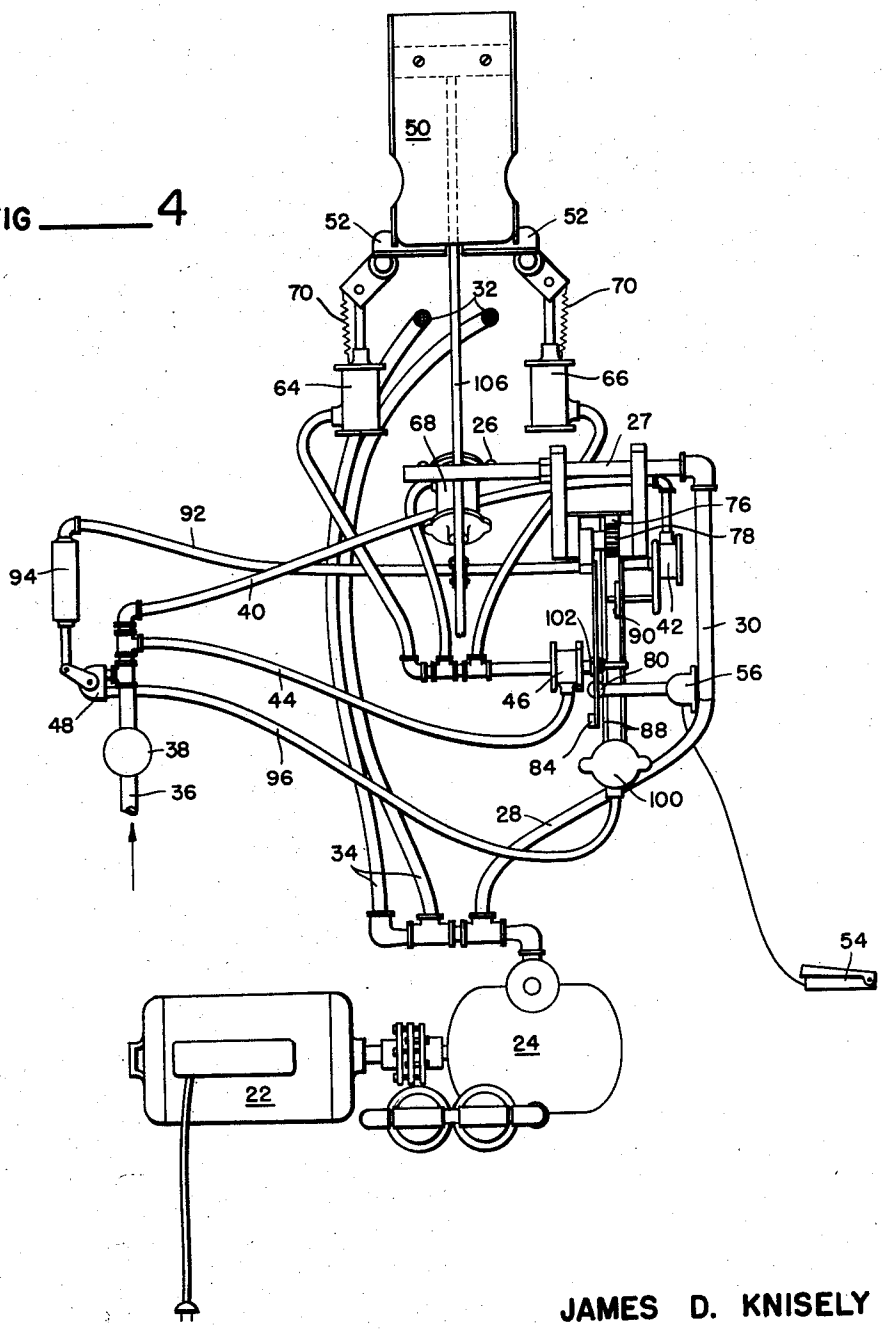
INVENTOR.
JAMES D. KNISELY
BY
Smith & Tuck

Dec. 16, 1958 J. D. KNISELY 2,864,219

BAG HANDLING AND FILLING MACHINE

Filed Oct. 28, 1957 5 Sheets-Sheet 3

FIG. 4



JAMES D. KNISELY
INVENTOR.

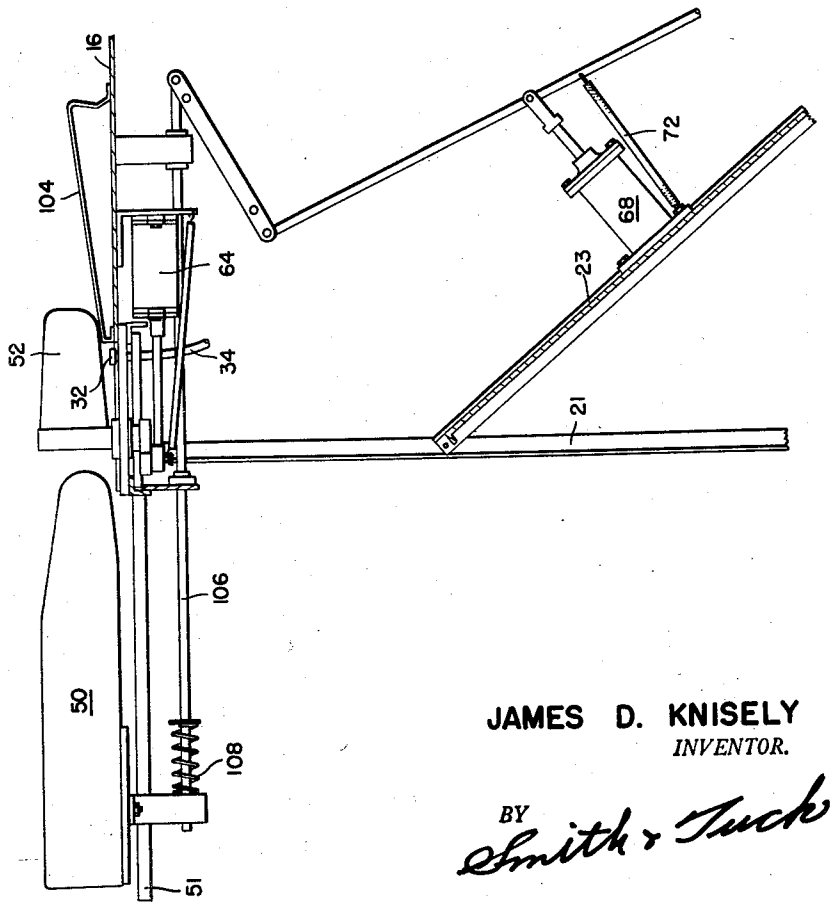
BY Smith & Tuck

Dec. 16, 1958 J. D. KNISELY 2,864,219

BAG HANDLING AND FILLING MACHINE

Filed Oct. 28, 1957 5 Sheets-Sheet 4

FIG. 5



JAMES D. KNISELY
INVENTOR.

BY Smith & Tuck

Dec. 16, 1958 J. D. KNISELY 2,864,219

BAG HANDLING AND FILLING MACHINE

Filed Oct. 28, 1957 5 Sheets-Sheet 5

FIG. 6

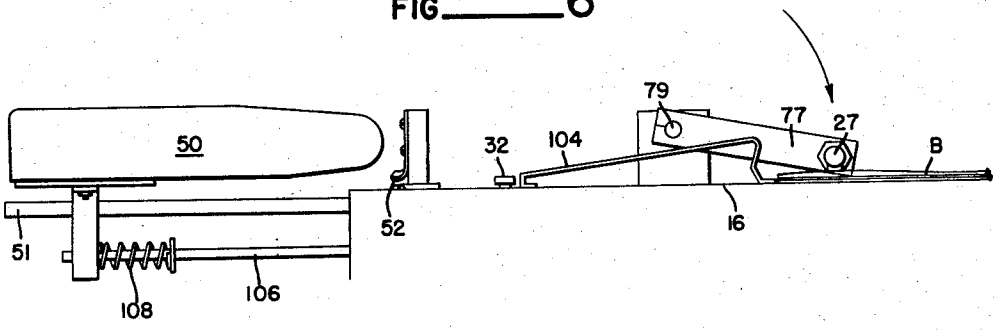
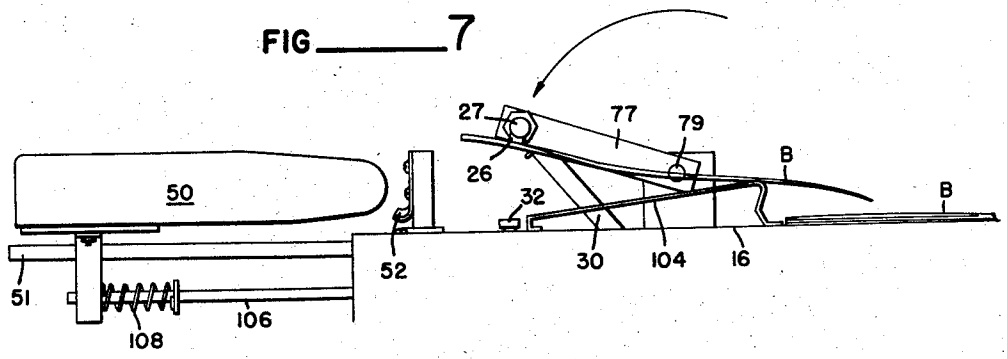


FIG. 7



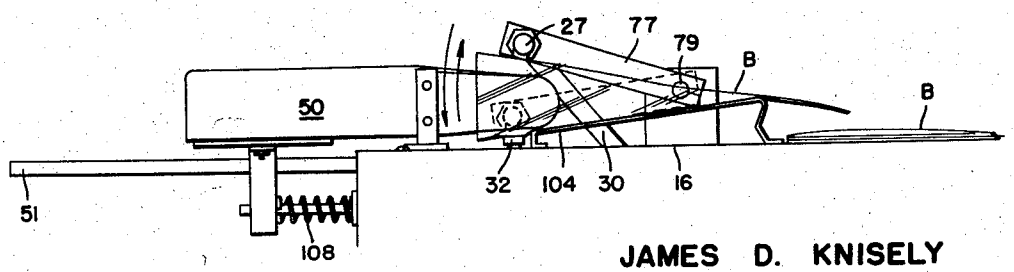


FIG. 8

JAMES D. KNISELY
INVENTOR.

BY
Smith & Tuck

United States Patent Office

2,864,219

Patented Dec. 16, 1958

2,864,219

BAG HANDLING AND FILLING MACHINE

James D. Knisely, Kirkland, Wash., assignor of one-half to James Keith Payne, Kirkland, Wash.

Application October 28, 1957, Serial No. 692,598

4 Claims. (Cl. 53—187)

This present machine relates to the general art of bag handling and bag filling equipment and more particularly to a machine that is particularly adapted to handling small bags of the plastic, glassine types of materials and paper materials of relatively small size. Means are provided for accepting bags in stacks, in their flat unopened condition, and taking a bag from the stack, opening it and placing it in position where it can be filled with merchandise to be packaged. Means are further provided for bringing a merchandise chute into position so that merchandise can be easily placed in the bag. The chute means is then removed so that the bag filled with merchandise can be removed and sealed. This equipment, while conceivably might be made in many sizes, it is particularly adapted to the packaging of small items of manufactured goods normally, food stuffs and other items normally packaged for sale.

The changing modes in merchandising has called for the packaging of merchandise of many types, including food stuffs in bags normally sealed so that a convenient sales package is provided that is particularly adapted to self-service forms of merchandising. Paper bags were used early and these gradually gave way to the so-called glassine or translucent or transparent paper bags. As techniques developed to the point where the transparent plastic based sheet stock became commercially available in large quantities and at a reasonable price, these clear transparent bags have gradually come into use almost to the exclusion of other forms as they not only keep the merchandise in an unsoiled and uncontaminated condition but they also permit the thorough examination of the merchandise through the colorless material. One disadvantage of the "pliofilm" type of bag has been the great difficulty in handling the same, filling it with goods and then moving it to a point where it could be sealed. These plastic bags are usually made of incredibly thin material so that they stack very compactly when they are empty and flat folded but this also poses a very time-consuming operation of the bags are to be hand filled. The lightness of the material and the fact that it is given to becoming charged with static electricity very easily, has greatly complicated this problem. In the past many attempts have been made to provide equipment that would take the stacked bags and fill them with merchandise and many very complex machines have been produced for this purpose. However, many of these machines as observed are given to repeated malfunctioning due to the difficulty of handling a bag made of material that has no stiffness and practically no weight. This complicates the handling and filling operation to the extent that the large expensive machines quite often fail to serve their purpose in that while they may be keeping up with the production line for periods, when they do have periods of malfunctioning the whole production must be stopped until this machine is cleared. This present invention provides a machine of comparatively simple form with the parts of the equipment that might in any way malfunction up on top of the machine where any stoppage can be very quickly cleared and

further the machines are relatively inexpensive because of their basic simplicity so that a number of them may be employed on a single production line. By permitting the employment of a number of machines as a unit, large volumes of merchandise can be handled in a given time and any stoppages of any one of the small machines will not seriously interfere with production schedules.

The principal object of this invention, therefore, is to provide a bag handling and filling machine which will accept a stack of very thin and small bags and which will take a bag off the stack, advance it to a point where it can be opened and held in the opened position until it is filled with goods.

A further object of this invention is to provide a relatively simple machine for the handling and filling of lightweight bags, which machine is simple in construction so that it may be easily operated and can be expected to operate for long periods without malfunctioning.

A further object of this invention is to provide a bag-filling machine that can be quickly changed over to accept a wide variety of bag sizes.

A further object of this invention is to provide a bag filling machine that is largely fluid operated to the end that sequential operations can be easily timed with respect to each other so that high speed operation can be achieved with a minimum of malfunctioning.

A further object of this invention is to provide a bag filling machine that is light in weight, small in size, and can be readily adjusted to fit widely varying operational conditions, such as may be encountered in certain types of manufacturing establishments where different types or sizes of equipment or manufactured or processed goods or foods are handled.

Further objects, advantages and capabilities will be apparent from the description and disclosure in the drawings, or may be comprehended or are inherent in the device.

In the drawings:

Figure 1 is a perspective view showing the general appearance and arrangement of this bag handling and filling machine.

Figure 2 is a perspective view, partly in section and partly in dotted line showing, illustrating the bag handling equipment.

Figure 3 is a fragmentary view, partly in section and showing the essential parts employed in holding the bag open and in position to receive merchandise.

Figure 4 is a view in which the various essential machine parts are shown without any of their supporting structures. It is diagrammatic to a degree but actually illustrates the essential parts so that they can be more readily recognized in the other views of the drawings.

Figure 5 is a side elevation in somewhat fragmentary form illustrating those essential parts that assist in feeding goods into the opened sack. Parts generally not used in this operation are not shown in this view.

Figures 6, 7 and 8 are end elevations of the bag handling and filling means with only the parts essential to these operations being shown.

Throughout the drawings, wherein like reference numerals indicate like parts **16** designate the table top which serves as the principal mounting base for the majority of the functioning parts. Experience has indicated that this should be a relatively heavy unit formed of metal plate, preferably steel, because of its weight and which is bent down on each of its sides so as to serve first to mask and protect the parts underneath the table and secondly to give added rigidity to the table top. This rigidity should be stressed in that there are many functioning parts that are arranged to work sequentially and it is very critical that these various elements function timely. This appears best achieved when the base is

substantial and the various operating parts are held positively in fixed relationship to each other.

Secured on the table top is a fixed guide **18** which serves to form an abutment for the side of a stack of bags to be filled. Coacting with the fixed guide is a movable guide member **20**. This guide is preferably magnetically secured to the table top **16** as by a plurality of permanent magnets.

On a mounting or floor plate **17** is secured, in operational arrangement, an electric motor **22** which is directly coupled to a vacuum pump **24**. Floor **17** is secured to base members **19** to which is also secured supporting struts **21** and **23** which fixedly position and support the loading side of table **16**. The angularity of top **16** with the horizontal is determined by the positioning of the adjustable strut **25**. These parts are duplicated on the opposite side of the machine.

The vacuum pump **24** provides vacuum to the pick-up suction heads **26** which are secured to the swinging pick-up arm **27**. Connection is made from the vacuum pump through hose **28** and the supply pipe **30**. Pipe **30** is held in operational position with suction heads **26** downwardly disposed by bracket **29** which in turn is fixedly secured to the table top **16**. Suction is also supplied to the bag opening nozzles **32**, shown in Figures 3 and 4, by means of the connecting hoses **34**.

Air under pressure from an external source is brought to the machine through hose **36**. This air passes through a regulating valve **38** and then is divided so as to supply the various parts requiring air, under pressure, for their operation.

When a bag has been moved into position and opened by suction heads **26** and **32**, flippers **52** are revolved horizontally from the position shown in Figure 4 to the position shown in Figures 1 and 3 where they are properly positioned to enter the mouth of the bag and give the opening a definite shape and further provide guide means for materials being filled into the bag.

A foot switch **54** is provided so as to control solenoid **56**. This solenoid through other elements to be explained more thoroughly releases the locking arm **60**.

Compressed air passing through regulating valve **38** is then conducted directly to valve **48**, by hose **40** to valve **42** and by hose **44** to valve **46**. This machine begins and ends each operating cycle with the bag opening arm **27**, the feed tray **50** and flippers **52** in the positions as shown in Figure 1 and valve **46** is in its open position. With these parts in this position the bag B is normally filled but is not yet ready to be removed from the machine. The operator now depresses the foot switch **54** energizing solenoid **56** and as is illustrated in Figure **2** this action raises bar **58** and in turn through a vertical rod **59**, in turn raising release arm **60**. This action releases tension spring **62** allowing it to close valve **46** and thus shutting off the air supply to cylinders **64**, **66** and **68** as can be best understood from Figure 4. A pair of tension springs **70** disposed under the feed tray **50** then operate to close flippers **52** and to move tray **50**, which is slidably mounted on rods **51** away from the feeding point.

Simultaneously with this action a pair of springs **74** illustrated in Figure 2, supply the energy for operating the rack and gear assembly **76** and **78** respectively. Arms **77** which are secured to shaft **79**, upon which the gear **78** is also secured, are partially revolved carrying the pick-up tube or arm **27** to a position over the stack of bags awaiting to be filled. However, strut **59**, protruding through an opening in table **16**, is engaged by the flattened surface **82** of arm **60** and as this arm is being moved by block **80** secured to shaft **79** the free end of release arm **60** is raised enough to cause wheel **84** to engage stop **86**, shown in Figure 2 and halting the motion of bag pick-up arm **27** and the filled bag can now be removed.

After the removal of the filled bag the operator releases foot switch **54** and thereby de-energizes the solenoid and allowing arm **60** to drop and release pick-up arm **27**. Springs **74** are now able to take control of the movement of arms **77** through the rack and pinion arrangement **76—78** and to move the pick-up bar **27** to a point above the stack of bags which are normally positioned with the bottom and one side of the bags in contact with guide members **20** and **18** respectively. At this point in the operation, lever **88** and switching plate **90**, shown in Figure 2, coacting with valve **42** to connect air from hose **40** to hose **92** and then the air flows to a delayed action cylinder **94**. It is necessary to provide for a short delay in this part of the operation in order to insure that a sufficient time is allowed for vacuum pump **24** to re-establish a full vacuum in hose **28**, after the suction heads **26** have come in contact with a new bag. The delayed cylinder **94** coacting with valve **48** allows air to pass through hose **96** to air cylinder **100** which now forces lever **88** downwardly and through valve **42** shuts off the air to the delay cylinder **94**. The piston in cylinder **94** is now returned to its initial position by an internal spring and this action closes valve **48**.

During the period that air supplied to piston **100** pick-up arm **27** is rotated by pipe **30** and bracket **29**, as it is being moved through the positions shown in Figures 6, 7 and 8 so that the pick-up or suction heads **26** are maintained in a substantially level position as best suits the handling of the paper bags B. This movement is provided by the rack and gear arrangement **76**, **78** in coaction with lever **88** and by this means a fresh bag is brought against the bag opening nozzles **32** and is held there until vacuum is re-established in hoses **34**. As the air is now shut off from piston **100** springs **74** move the bag pick-up arm **27** upwardly from the dotted line position shown in Figure 8 to the full line position and this opens the new bag. This action may be assisted by providing a forwardly sloping plate **104**. Arm **60** is now being moved rearwardly or to the left as viewed in Figure 2, and engages the switch arm of switch **46**, illustrated in Figure 4, where the switch arm is shown at **102**. This action opens valve **46** and allows compressed air to pass simultaneously into pistons **64**, **66** and **68**. Pistons **64** and **66** operate to revolve flippers **52** from the position shown in Figure 4 to that shown in Figure 3. This as pointed out previously at the beginning of the description of this cycle of operation puts the flippers inside the mouth of the bag and pressing outwardly on it so that in effect it tensions the mouth of the bag, holds it in an exact position and it is ready to receive the charging tray **50** which is being moved in between flippers **52** by cylinder **68** acting through suitable connecting means. Tray **50** enters the bag to the extent shown in Figure 8 and suitable ejection means not shown moves the goods into bag **B**. While these cylinders all receive air at the same time the movement of the tray is delayed by inertia and the larger diameter of piston **68** so that it arrives at the bag mouth after the flippers have properly opened and positioned it. A buffer spring mounted on operating rod **106** at **108**, to cushion the stopping of tray **50**, as will be noted in Figure 8 and project materials carried by the tray into the bag that had been previously moved to the filling area and positioned and opened. The cycle is now complete and the parts stay in this position until the operator releases pressure on the electrical switch **54**.

It is believed that it will be clearly apparent from the above description and the disclosure in the drawings that the invention comprehends a novel construction of a bag handling and filling machine.

Having thus disclosed the invention, I claim:

1. A bag handling and filling machine comprising: a table top having bag handling equipment mounted on the top thereof and operating means for the same secured to the underside; supporting means for said table top having adjustable structs permitting the angular adjusting and positioning of said top; a pick-up arm having suction

heads disposed thereupon, suitable for lifting one end of a folded bag made of impervious sheet stock; pivoted, power driven arms arranged to move said pick-up arm from the area where folded bags are stacked on said table top to the position where the bags are filled; suction nozzles on the upper surface of said table top at the area where bags are filled; said suction nozzles disposed to hold one side of a bag mouth to the table top during the period said suction heads are engaged with the opposite side of the bag mouth and being raised by said pick-up arm and thus effect the opening of the bag; flippers pivoted for partial horizontal revolution and adapted to enter the mouth of a bag after it is opened, to determine the exact position and opening shape of the bag mouth; a reciprocating charging tray arranged to partially enter the mouth of a bag and assist in filling the bag that has been positioned for filling; a source of vacuum for said suction heads and suction nozzles; air cylinders for sequentially actuating the operating means for said bag handling equipment a source of compressed air for operating said air cylinders; and air valving means and air conveying tubing to provide for the sequential operation of said air cylinders.

2. A bag handling and filling machine comprising: a machine table top having bag handling equipment mounted on the top thereof and operating means for the same secured to the underside thereof; supporting means for said table top having adjustable struts permitting the angular adjusting and positioning of said top; a pick-up arm having suction heads disposed thereupon suitable for lifting and transporting a folded bag made of impervious sheet stock; pivoted power driven arms arranged to move said pick-up arm from the area where folded bags are stacked on said table top, to the position where the bags are filled; suction nozzles on the upper surface of said table top at the area where bags are filled; said suction nozzles disposed to hold one side of a bag mouth to the table top during the period said suction heads are engaged with the opposite side of the bag mouth and being raised by said pick-up arm and thus effect the opening of a bag; flippers pivoted for partial horizontal revolution and adapted to enter the mouth of a bag after it is opened, adapted to move the mouth of a bag to the exact position required for filling and to give the required shape to the bag mouth; means for moving the filling materials to the bag mouth and assisting in filling the bag that has been positioned; a source of vacuum for said suction heads and suction nozzles; and power means for sequentially actuating the operating means for said bag handling equipment.

3. The subject matter of claim 2 in which the means for moving the filling materials to the bag mouth consists of a tray having a closed bottom and upturned sides; said tray slidably disposed on a pair of rods secured to said table; power means for reciprocating said tray; a buffer spring disposed to stop the tray at the end of its filling travel and cause materials on the tray to be projected into the opened bag positioned on the table top and spring balanced linkage permitting a limited overrun of said tray after the buffer spring engages a stop secured to said table top.

4. A bag handling and filling machine comprising: a table top having bag handling equipment mounted on the top thereof and operating means for the same secured to the underside; supporting means for said table top having a pair of struts pivotably secured to the top and to base members adapted to rest on a floor, a pair of diagonal struts secured to the pivoted struts and the base members and a pair of adjustable struts pivoted to the table top and to the diagonal struts permitting the angular adjusting and positioning of said top; a pick-up arm having suction heads disposed thereupon suitable for lifting a folded bag made of impervious sheet stock; pivoted power driven arms arranged to move said pick-up arm from the area where folded bags are stacked on said table top to the position where the bags are filled; a bracket secured to said table top adapted to guide a downwardly extension of said pick-up arm and thus maintain said suction heads substantially level as the pick-up arm is moved by the power driven arms; suction nozzles on the upper surface of said table top at the area where bags are filled; said suction nozzles disposed to hold one side of a bag mouth to the table top during the period said suction heads are engaged with the opposite side of the bag mouth and being raised by said pick-up arm and thus effect the opening of a bag; flippers pivoted for partial horizontal revolution and adapted to enter the mouth of an opened bag after it is opened, to determine the exact position and opening shape of the bag mouth; a reciprocating charging tray arranged to partially enter the mouth of a bag and assist in filling the bag that has been positioned; a source of vacuum for said suction heads and suction nozzles; air cylinders for sequentially actuating the operating means for said bag handling equipment; a source of compressed air for operating said air cylinders; and air valving means and air conveying tubing arranged for the sequential operation of said air cylinders.

No references cited.