

April 1, 1947.

J. E. SOCKE

2,418,142

BAG LOADING MACHINE

Filed Sept. 10, 1942

2 Sheets-Sheet 1

Fig. 4

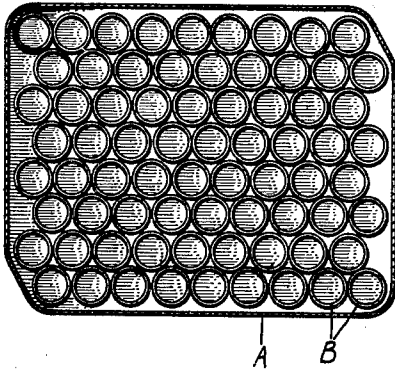


Fig. 3

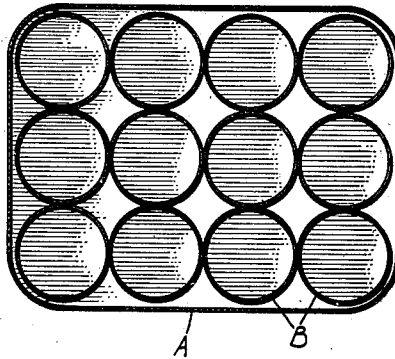


Fig. 1

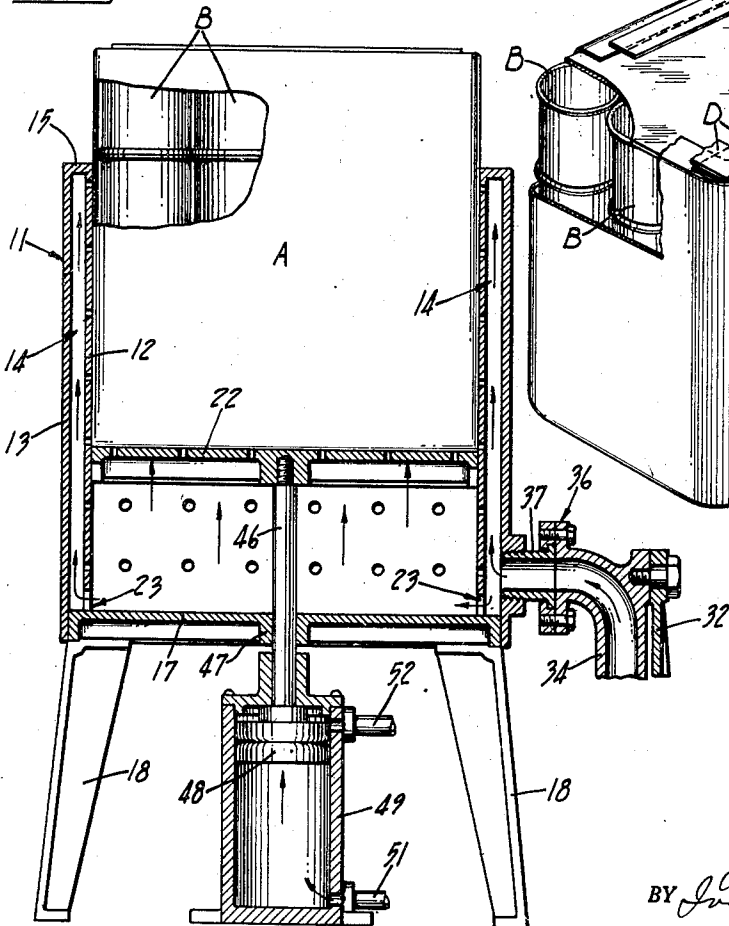
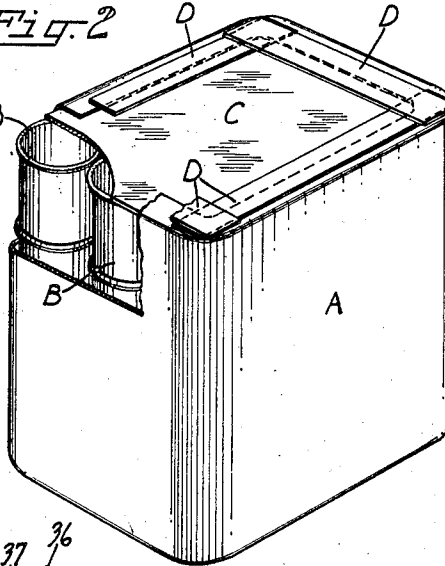


Fig. 2



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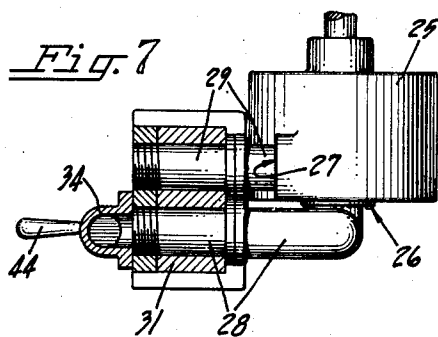
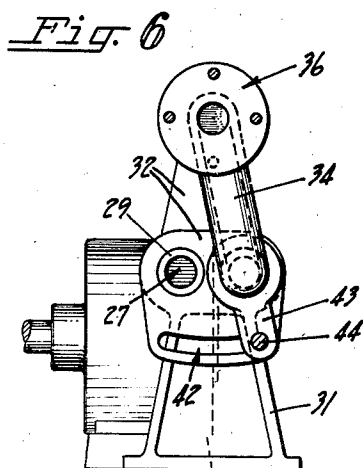
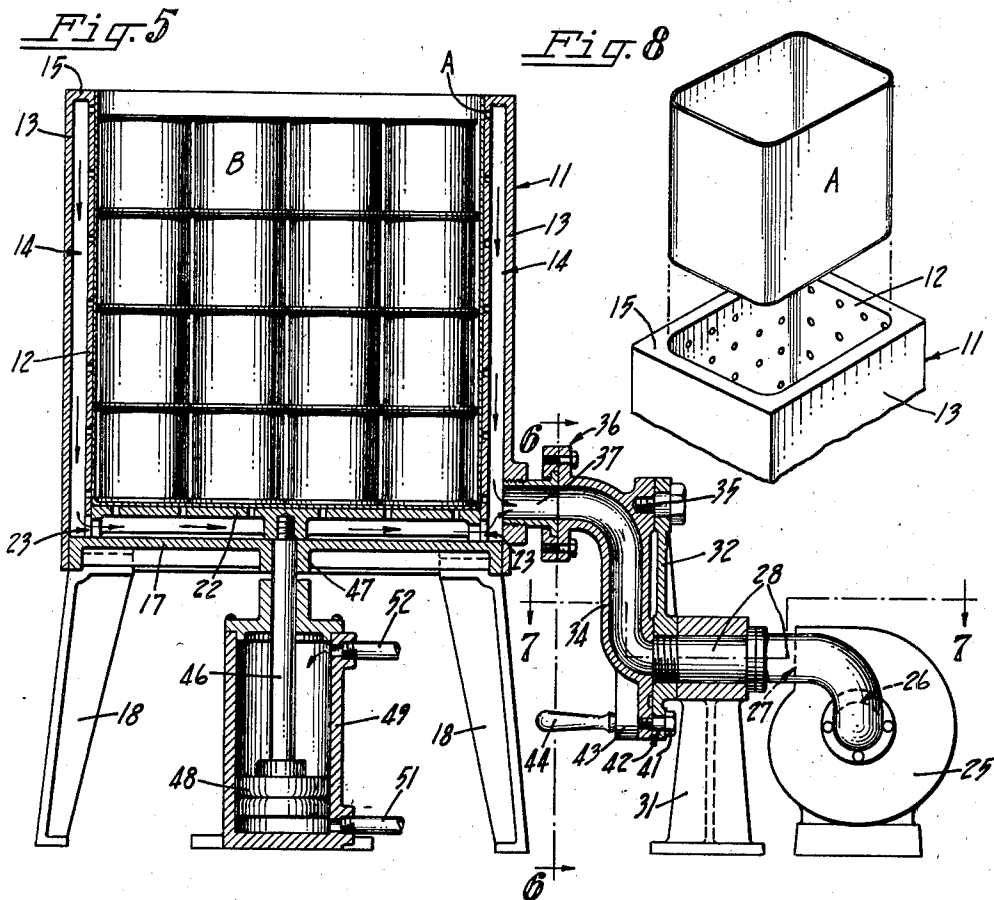
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2,418,142

BAG LOADING MACHINE

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Application September 10, 1942, Serial No. 457,877

6 Claims. (Cl. 226—47)

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The present invention relates to a machine for loading paper bags with containers or cans and has particular reference to holding the bag open by vacuum in such a manner as to permit insertion of a maximum number of cans into the bag in exact predetermined relation and with greater packing efficiency.

In the can making industry it is of utmost importance to keep the empty cans clean during shipment and storage. To this end empty cans to be shipped over long distances are sometimes packed in large paper bags which are sealed when filled to prevent contamination of the cans. The cans are usually packed into the bags by hand. To facilitate this hand packing procedure according to conventional methods, the bag must be made larger than the actual total volume of the can spaces require. This is necessary to get the cans in place but results in a loose packing of the cans and a package which is sometimes awkward and difficult to handle.

The present invention contemplates overcoming these difficulties by providing a machine which will hold the bag to a specific form so that cans may be packed in straight row or staggered row formation as desired such specific form being adapted to utilize a bag of the smallest size possible in which the total can volume is nearly equal to the volume of the bag so that the resulting filled package will be firm enough to handle easily without interfering with easy packing of the cans into the bag.

An object therefore of the invention is the provision of a machine which makes possible easy and efficient loading of paper bags with cans wherein the bag is held open on all sides and the bottom to a specific form so that the cans may be loaded into the bag in a predetermined desired pattern which permits of packing the greatest number of cans into a given bag space.

Another object is the provision of such a machine wherein use is made of the smallest size of bag to fit a given number of cans so that the resulting package will be firm and easily handled while permitting of the efficient placing of the cans into the bag.

Another object is the provision of a machine of this character wherein the bag is held in position by a vacuum pull on all of the walls of the bag and such vacuum is readily converted into a pressure for releasing the filled bag from the machine so that it may be readily removed therefrom.

Numerous other objects and advantages of the invention will be apparent as it is better under-

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stood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a vertical sectional view taken through a machine embodying the instant invention, the view showing a filled bag in place in the machine, parts of the machine and the bag being broken away;

Fig. 2 is a perspective view of a filled bag in sealed condition ready for shipment or storage, with a portion of the bag broken away to view cans packed therein;

Figs. 3 and 4 are respectively horizontal sectional views through two different forms of bags showing how they are used for cans packed in straight row formation and in a stagger row pattern;

Fig. 5 is a vertical sectional view similar to Fig. 1 with parts added and showing the movable parts of the machine in a different position;

Figs. 6 and 7 are sectional details taken substantially along the line 6—6 and the broken line 7—7 in Fig. 5, with parts broken away; and

Fig. 8 is a perspective view of the upper portion of the machine and an empty bag showing how the bag is initially placed in the machine, the view being drawn at a reduced scale.

As a preferred embodiment of the instant invention the drawings illustrate a machine for holding in place, large paper bags A (Figs. 1, 2 and 8) in which cans B are loaded for shipment and storage. Such a machine includes a generally rectangular stationary form or mold 11 in which an empty bag A is placed for a loading operation.

The mold 11 is formed with an inner perforated wall 12 and a surrounding outer imperforate jacket wall 13 disposed in spaced relation and setting off an air space or air and vacuum chamber 14 between the walls. The upper edges of the two walls are connected by a top wall 15. The mold is disposed in a vertical position with its top open end up so that the bag may be easily inserted into it and all of the walls of the bag will be surrounded by the perforated inner walls of the mold. This mold is mounted on a base plate 17 which is supported on legs 18.

The bag is placed within the mold manually and when in fully inserted position its bottom rests upon a perforated lifter plate 22 which is disposed within the mold and at such time rests upon and is spaced from the base plate 17 by a depending apertured peripheral flange (Figs. 1

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and 5). The space between the lifter plate and the base plate is in communication with the chamber 14 by way of apertures 23 formed in the inner walls 12 of the mold adjacent their bottom edges and communicating with the apertures in the said depending flange of the lifter plate 22.

After an empty bag is inserted in place in the mold 11 its sides and bottom are drawn into position tightly against the inner surfaces of the walls 12 and against the lifter plate 22 to hold the bag in a predetermined open position. This is brought about by drawing a vacuum in the chamber space 14 and between the bottom of the mold and the lifter plate.

The vacuum is created preferably by a suitable source of air movement such as a rotating fan enclosed in a casing 25 (Fig. 5) having a central air intake port 26 in the side thereof and an exhaust port 27 adjacent its periphery (see also Figs. 6 and 7). These ports communicate with respective intake and exhaust pipes 28, 29 which are secured in the casing. The outer ends of the pipes 28, 29 are supported in parallel and horizontal position in a bracket stand 31 and are threaded into a vertically disposed valve plate 32 located adjacent the stand.

The valve plate 32 carries an S-shaped conduit 34 which is mounted adjacent its upper end on a pivot stud 35 (Fig. 5). The stud extends through the valve plate and is threaded into the conduit. At its upper end the conduit is connected by way of a rotatable joint 36 to a flanged pipe nipple 37 which is threaded into the outer wall 13 of the mould 11 and communicates with the chamber space 14. The center of the rotatable joint 36 and the stud 35 are in the horizontal alignment and this provides spaced bearing or swing supports for the conduit.

The lower end of the conduit 34 is adjacent the outer open ends of the intake and exhaust pipes 28, 29 in the valve plate 32 and is retained in close contact with the face of the valve plate by a headed stud 41 which projects into an arcuate slot 42 formed in the valve plate. The stud extends through the slot and is threaded into a depending lug 43 formed on the lower end of the conduit. The lug also carries a handle 44 for manually shifting the lower end of the conduit laterally across the face of the valve plate 32. With this construction of valve device, the lower end of the conduit may be shifted into communication with one or the other of the intake or exhaust pipes 28, 29 as desired.

When the lower end of the conduit 34 is in register with the intake pipe 28 as shown in Figs. 5, 6 and 7, the chamber 14 of the mold 11 is in communication with the intake side of the fan in the casing 25 and thus air is withdrawn from the chamber to create the vacuum hereinbefore mentioned. It is this withdrawal of the air from the chamber and spaces surrounding the bag A that holds the bag open and causes it to conform exactly to the shape of the mold as previously described. It will be understood that with a given inner peripheral surface for the mold the bag periphery will be the same.

When the bag is thus held open in a predetermined shape, the cans may be readily loaded into it. When the bag is loaded a paper cover C (Fig. 2) is placed over the cans and the upper edges of the bag are folded down against the cover and are sealed with adhesive strips D. The filled bag then is ready for discharge from the machine.

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Before removing the filled bag from the machine its walls are released from the vacuum pull resulting from withdrawal of air from the mold jacket by the fan in the casing 25. This is brought about by shifting the lower end of the conduit 34 out of register with the intake pipe 28 and bringing it into communication with the exhaust pipe 29. In this position of the conduit, the fan in the casing 25 blows air under a slight pressure into the chamber 14 and into the space below the lifter plate 22 and thus breaks the vacuum therein. The air escapes from the chamber and up through the lifter plate 22 by way of the perforations in these parts and thus releases the filled bag for discharge.

Discharge of the filled bag is effected by raising the lifter plate 22, as best shown in Fig. 1. For this purpose the lifter plate is secured to a depending actuating stem 46 which extends down through a bearing 47 formed in the base plate 17. The lower end of the stem carries a reciprocable piston 48 which operates within an air cylinder 49.

Compressed air is introduced into the cylinder and is exhausted therefrom, above and below the piston by pipes 51, 52 threaded into the cylinder adjacent its ends. These pipes may extend from a source of supply of compressed air and a suitable valve mechanism which controls the direction of flow of compressed air against the piston to raise the lifter plate 22 when it is desired to remove the filled bag A and to again lower the lifter plate to its original position for the reception of a subsequent empty bag. Such piston control is well known and further details are considered unnecessary for the present purpose. This completes the loading operation.

With such a machine the empty bag A is held in place and to a predetermined shape or contour which corresponds correctly to a batch of cans which it is desired to package. Such a contour will vary according to the diameter and shape and size of cans and to their most efficient arrangement within the bag. It is believed that the two different patterns for round cans as arranged in the straight row or the stagger row formations shown in Figs. 3 and 4 will be illustrative of this important feature of the instant invention.

In such a method of holding the bag, the bag is actually smaller than could be used to receive a batch of cans in such formation where the bag is packed in the conventional manner. For example, when $2\frac{1}{4}$ inch cans are formed into a mass made up according to the stagger row type as shown in Fig. 4, the plan area or floor space occupied is 18.976 inches by 25.531 inches. According to the teachings of the present invention such a stack of cans requires a bag of only 18 inches by $24\frac{1}{2}$ inches. As far as overall dimensions are concerned it would appear that the cans could not be loaded into such a bag. However, when the bag is held to a predetermined contour as shown which is for this particular load of cans, the cans are placed easily and quickly within the bag and what is more important perhaps, the resulting package is firm and compact and easy to handle during shipment and storage. These same features also hold true for the straight row load of cans as shown in Fig. 3 and for other arrangements for cans having round parts.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent

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that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A machine for loading paper bags with containers arranged in a predetermined pattern to insure a maximum efficiency in packing space, comprising in combination, a mold casing including outer imperforate side and bottom walls and inner perforated side walls disposed in spaced relation to set off a chamber therebetween, said inner side walls forming a mold for enclosing the sides of an empty bag to be loaded, a vertically reciprocable perforated lifter plate normally disposed in the bottom of said casing and movable therein for engaging the bottom of the empty bag, means on said lifter plate for holding the same in spaced relation to the bottom wall of said casing to provide beneath said plate a continuation of said chamber, vacuum means connecting with said chamber for withdrawing air through the perforated inner walls of said mold including said lifter plate to draw the walls of the empty bag by atmospheric pressure into close contact with said walls and plate to shape the bag for maximum efficiency in the loading of containers therein, and air pressure means also connecting with said chamber for blowing air under pressure through the perforated walls of said mold including said lifter plate to force the walls of the filled bag away from said mold walls to facilitate removal of the bag from the mold.

2. A machine for loading bags with containers arranged in a predetermined pattern to insure maximum efficiency in packing space, comprising in combination, a mold having combined straight and curved vertically disposed side walls arranged to receive an empty bag of minimum dimensions to be loaded with a specific formation of cans in rows with a minimum of clearance space therebetween, said mold including perforated walls for surrounding the walls of said bag, means for withdrawing air through said perforated mold walls from between the bag and mold walls so that atmospheric pressure within the bag holds the walls of the latter tightly against the surrounding straight and curved mold walls and so that the bag walls assume substantially the shape of the mold to insure maximum efficiency in the insertion of the containers within the bag, means for blowing air under pressure through said perforated mold walls in the reverse direction to release the filled bag of containers as an incident to its removal from said mold, and means having a permanent communicable connection with said perforated mold walls for alternate connection with said air withdrawing means and said air blowing means for the purposes described.

3. A machine for loading paper bags with containers arranged in a predetermined pattern to insure a maximum efficiency in packing space, comprising a mold for receiving and fully enclosing the sides and bottom of an empty bag to be loaded, said mold having perforated walls surrounding the walls of a bag when placed therein, a source of air movement, and movable means having permanent communicable connection with said wall perforations and said source of air movement for passing air from said source of air movement through the perforations in opposite directions respectively when said movable

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means is disposed in different positions, whereby the air is first exhausted from between the bag walls and the said perforated mold walls when said movable means is in one position to insure atmospheric pressure holding the walls of the bag tightly against the surrounding perforated walls of said mold and thus causing the bag to assume substantially the shape of the mold to insure efficient loading of the held bag, said movable means being thereafter operable to admit air under pressure from said source of air movement through the perforated walls of said mold when said movable means is in another position to blow the walls of the filled bag inwardly away from the walls of said mold to release the loaded bag for removal from the mold.

4. A machine for loading paper bags with containers arranged in a predetermined pattern to insure a maximum efficiency in packing space, comprising a mold for receiving and fully enclosing the sides and bottom of an empty bag to be loaded, said mold having inner perforated walls surrounding the walls of a bag when placed therein, said perforated walls communicating with a surrounding air chamber, a movable conduit having a permanent communicable connection at one end with said chamber and selective communication at its opposite end with a source of air movement, whereby in one position of said movable conduit air is withdrawn by said source from the chamber to insure atmospheric pressure holding the walls of the bag tightly against the surrounding perforated walls of said mold and causing the bag to assume substantially the shape of the mold to insure efficient filling of cans into the held bag, said movable conduit when in another position admitting air under pressure from said source into said chamber to blow the walls of the filled bag inwardly away from the walls of said mold to release the filled bag for removal from the mold.

5. A machine for loading paper bags with containers arranged in a predetermined pattern to insure a maximum efficiency in packing space, comprising in combination, a mold for receiving and for fully enclosing the sides and bottom of an empty bag to be loaded, said mold having inner perforated walls surrounding the walls of a bag when placed therein, the perforations of said walls communicating with a surrounding air chamber defined by outer imperforate mold walls spaced from said inner perforated walls, a movable perforated lifter plate located in said mold for supporting the bag bottom, the perforation of the plate communicating with said chamber, a movable conduit connecting said chamber with a source of air movement, said conduit having a permanent communicable connection at one end with said chamber and selective communication at its opposite end with an air inlet connection and an air outlet connection on said source of air movement, whereby in one position of said conduit in communication with said air inlet connection air is withdrawn from said chamber to insure atmospheric pressure holding the walls of the bag tightly against the surrounding perforated walls of said mold and causing the bag to assume substantially the shape of the mold to facilitate efficient loading of the held bag, said conduit when in another position in communication with said air outlet connection admitting air under pressure from said source of air movement through said conduit and the perforated inner walls of said mold to blow the walls of the filled bag inwardly away from the walls of said

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mold, and means for raising said lifter plate when the filled bag is thus released to facilitate removal of the bag with its loaded and arranged contents.

6. A machine for loading paper bags with containers arranged in a predetermined pattern to insure a maximum efficiency in packing space, comprising in combination, a mold for receiving and for fully enclosing the sides and bottom of an empty bag to be loaded, said mold having inner perforated walls for surrounding the walls of a bag when placed therein, said perforated walls communicating with a surrounding air chamber, a pivotally mounted conduit connecting said chamber with a blower means having separate air intake and output connections, said conduit having at its pivoted end a permanent communicable connection with said chamber and being swingable on its said pivotal mounting into selective registry with said air intake and output connections of said blower means, whereby when the conduit is placed in registry with said intake connection air is exhausted from said chamber to insure atmospheric pressure holding the walls

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of the bag against the surrounding inner perforated walls of said mold to cause the bag to substantially assume the shape of the mold to insure efficient loading of the held bag, said conduit when placed in registry with said output connection of said blower means serving to admit air under pressure from said blower means through the perforated walls of said mold to release the filled bag from its held position in said mold.

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