United States Patent [19]

Tonus

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[54] **AIR CONTROL FOR BAG-STACKING MACHINE ARMS**

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[73] Assignee: **Richard Lee Joice**, Chatsworth, Calif.

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[21] Appl. No.: **429,894**

[52] **U.S. Cl.** ..... **214/1 BV**; 214/6 FS; 214/8

[51] **Int. Cl.²** **G65G 57/04**

[58] **Field of Search** . 214/1 BS, 1 BV, 1 BH, 147 T, 214/8.5 E, 1 BE, 6 FS, 8; 294/64 R

[56] **References Cited**

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[57] **ABSTRACT**

The arms of a bag-stacking machine have vacuum pickup ports by which they pick up bags from a bag-making machine and deliver the bags to the next point. The next point may be wickets or a tray. The arms are connected to a vacuum ports which turn the vacuum on and off and, to assure release of the bags, the arms are connected to receive a puff of pressurized air to release the bags.

7 Claims, 8 Drawing Figures

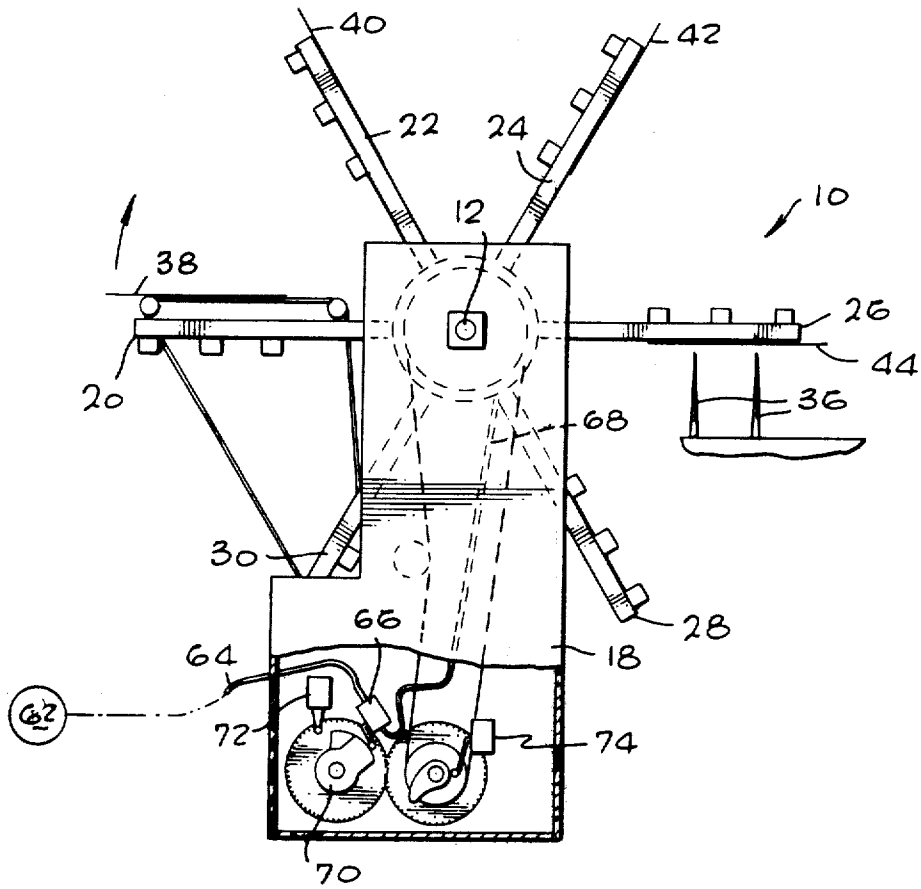


Fig. 1

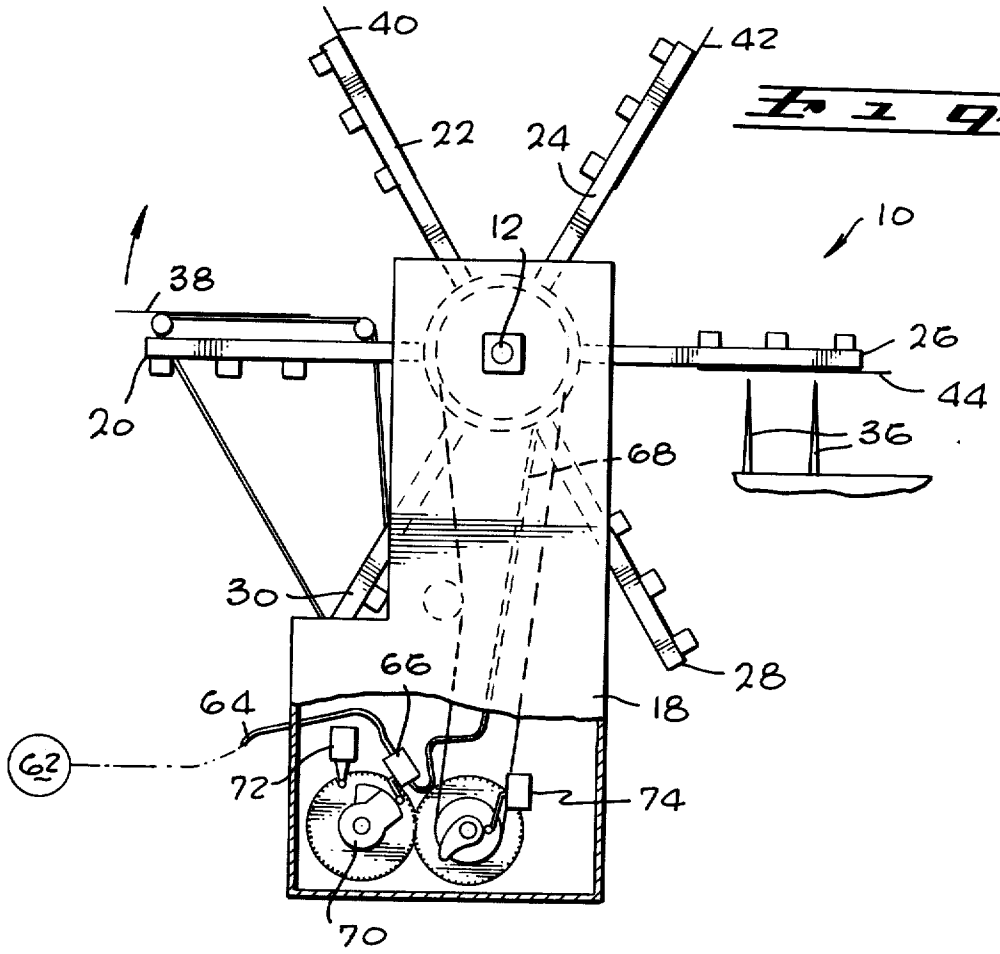

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Fig. 2

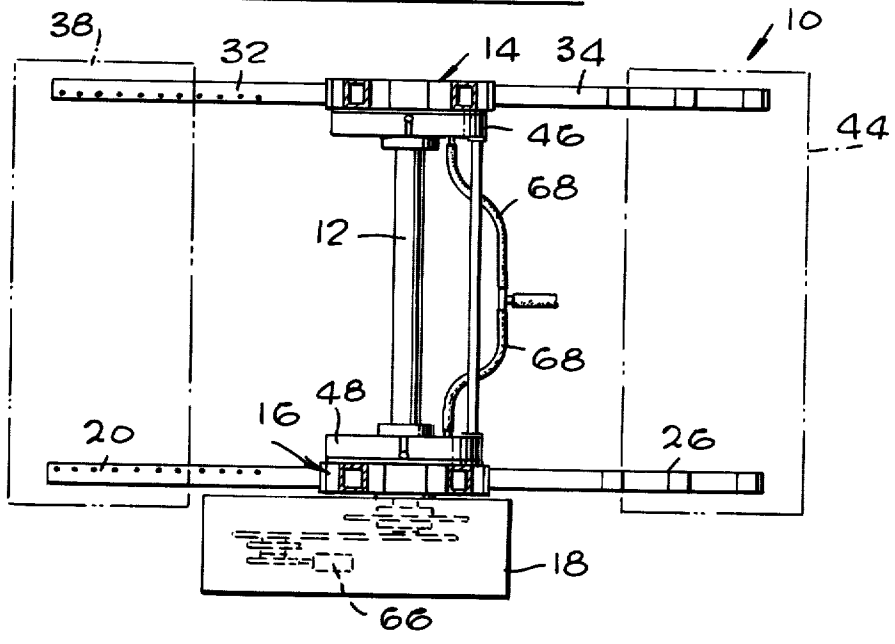

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Fig. 3

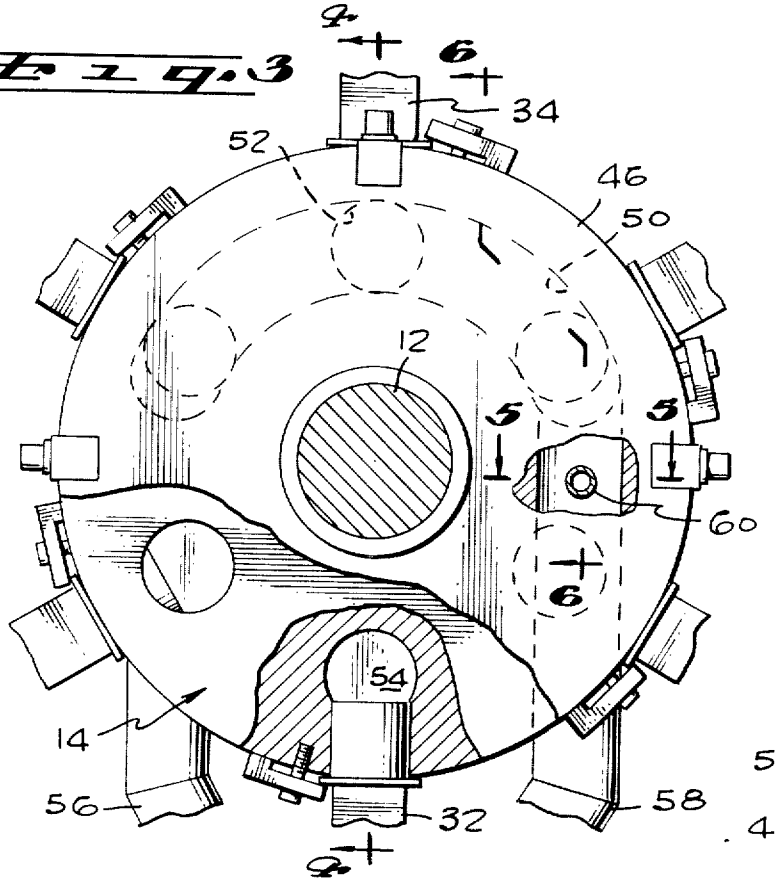


Fig. 5

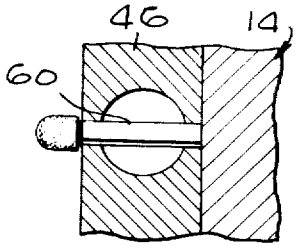


Fig. 6

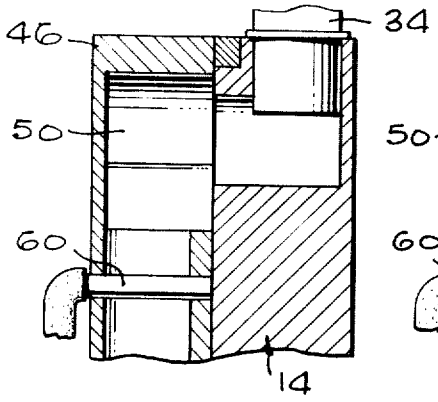


Fig. 7

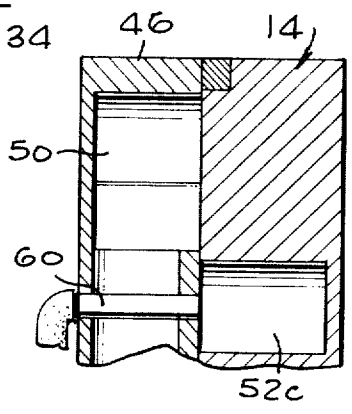


Fig. 4

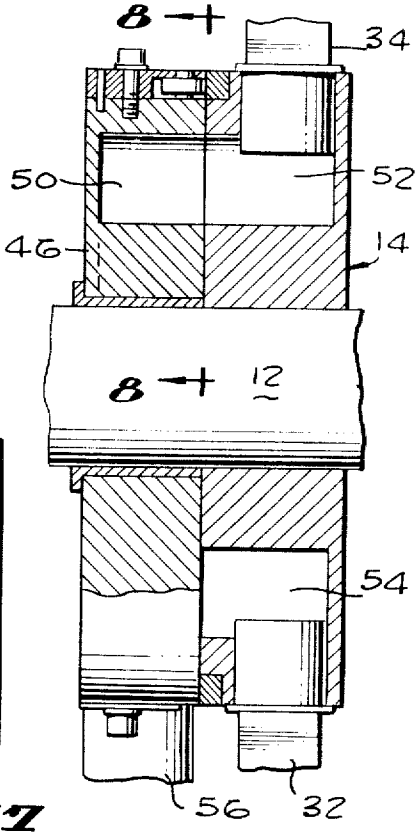
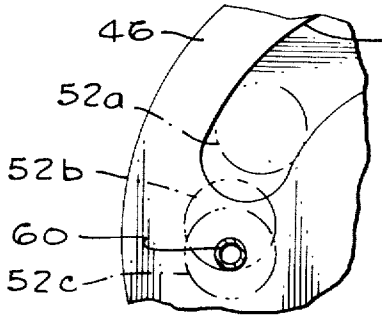


Fig. 8



AIR CONTROL FOR BAG-STACKING MACHINE ARMS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention is directed to an air control mechanism for controlling the air to bag-stacking machine arms.

2. Description of the Prior Art

Automatic plastic bag-making machines are well-known in the art. They receive polymer composition material film, such as polyethylene film, and perform the necessary operations on the film to produce a new bag. Often bag-making comprises folding the film and sealing several edges. Sometimes the bag has a plurality of accordion folds and, especially along the bottom of a complex bag, many layers of the film may be folded together.

In the handling of these bags from the bag-making machine, automatic wicketing equipment is known. Such wicketing equipment is very useful and convenient in the handling of such bags. This invention is directed to an improvement thereof.

SUMMARY OF THE INVENTION

In order to aid in the understanding of this invention, it can be stated in essentially summary form that it is directed to air control for bag-stacking machine arms. The air control includes first connecting the stacking machine arms to a source of vacuum so that bags can be picked up, then disconnecting the vacuum from the arm at the point of delivery, and then supplying air under pressure to the delivering arm to positively release the bag being delivered.

It is thus an object of this invention to provide for air control in a bag-stacking machine so that the arms first have vacuum during the holding portion of the arm cycle and have pressure thereafter for the positive release of a bag to be delivered. It is another object to provide an air pressure source which is selectably connectable to a bag delivering arm when it is in bag-delivering position. It is a further object to provide a manifold construction which permits an arm port to pass from a vacuum connection to the pressure connection so that the same arm port is used both for vacuum and pressure air service. It is another object to provide positive means for providing a puff of air under pressure to the bag-holding arms at the bag release point.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with further objects and advantages thereof, may be best understood by reference to the following description, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view, with parts broken away, showing a bag-stacking machine having air control for its arms, in accordance with this invention;

FIG. 2 is a top plan view thereof;

FIG. 3 is an enlarged section through one of the hubs which carry the arms;

FIG. 4 is a section taken generally along the line 4—4 of FIG. 3;

FIG. 5 is a section taken generally along the line 5—5 of FIG. 3;

FIG. 6 is a section taken generally along the line 6—6 of FIG. 3;

FIG. 7 is a section similar to FIG. 6, but showing the rotor in a different angular position; and

FIG. 8 is a partial section taken generally along the line 8—8 of FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 illustrates a stacking machine 10 in which the air control for the stacking machine arms is incorporated. Stacking machine 10 has the rotating central shaft 12 on which are carried hubs 14 and 16 to rotate therewith. Stacking machine 10 includes a base 18 by which the machine is mounted upon the floor and upon which the shaft 12 is rotatably mounted. Means is provided to drive the shaft in a clockwise direction, as is seen in FIG. 1. A plurality of arms is mounted in each of the hubs. As illustrated in FIG. 1, six arms 20, 22, 24, 26 28, and 30 are mounted in hub 16. Corresponding arms are mounted in hub 14, with two of the arms seen at 32 and 34 in FIG. 2. By means of the construction by which both hubs are fixed to the same shaft, the arms rotate with each other. They rotate from the position of arm 20 at a pickup point from a bag-making machine and they move in a clockwise direction to deliver bags to a tray or wickets. Wickets 36 are shown in FIG. 1. Bags 38, 40, 42, and 44 are being moved forward. Bag 38 is moved forward on a delivery conveyor to a point where arms 20 and 32 will pick it up, while bags 40, 42, and 44 are being advanced by the arms 22, 24, and 26 and their partners.

Manifolds 46 and 48 are connected together and are rotatably mounted on shaft 12, see FIG. 4. They are mounted so that they normally do not rotate, but small rotational adjustment is possible. Each of the manifolds has an arcuate kidney-shaped port therein, for example port 50 in manifold 46. Each of the arms is hollow, and the inner ends of the arms are connected to ports in the hub. Port 52 is in communication with arm 32, see FIGS. 3 and 4, and port 54 is in communication with arm 32. Hub 14 is shown in a different rotative position in FIG. 3 than in FIGS. 1 and 2. Ports 52 and 54 have the same radial dimension as the kidney-shaped port 50. Thus, as the hubs rotate, the ports in the rotating hubs move to a position where they are in connection with the kidney-shaped ports in the manifold. The kidney-shaped ports are connected to a source of vacuum, such as by pipes 56 and 58, so that vacuum is applied to the arms at the point of bag pickup, and vacuum is disconnected from the arms at a desired point of bag release. The structure described above is known construction and is a portion of the disclosure of patent application Ser. No. 268,494, now abandoned.

With bags of heavier gauge material and bags with more complex folds, a stronger vacuum often is necessary to hold the bag and positive release of the vacuum is required to positively release the bags. Thus, in accordance with this invention, pressure pipe 60, see FIGS. 3, 5, 6, 7, and 8 is provided.

A source of air under pressure, such as air compressor or pump 62, provides puffing air. Air line 64 delivers the air to cam controlled valve 66. When valve 66 is open, air is delivered through pipes 68 to the pressure pipe 60 in each of the manifolds. Cam 70 is driven by shaft 12 through a suitable timed drive, such as a toothed belt or the metal chain drive. Cam 70 makes

one revolution for every arm on shaft **12.** Thus, in the structure illustrated, it makes six revolutions for every revolution of shaft **12.** Cam **70** is timed to release a pulse of air under pressure from line **64** into line **68** and thus into pressure pipe **60** at the desired angular position of the bag-carrying arms. Cam operated switches **72** and **74** control other machine functions. Thus, cam **70** can be readily adjusted and set for time of on, duration and off relative to the other machine functions such as, for example, dwell time on the bag machine which are not of direct concern in this application. Pressure pipe **60** is positioned to discharge into the ports in the rotating hubs after they pass the kidney-shaped vacuum port in the manifold. The positioning of the pressure pipe outlet and the timing of the valve is best illustrated with respect to FIG. **8.** When port **52** is positioned opposite kidney-shaped port **50** in manifold **46,** it can be said to be in position **52***a* where the port is connected to the manifold vacuum and the arm has a vacuum therein. When port **52** is rotated to a relative angular position wherein it overlaps both vacuum port **50** and pressure port **60,** as shown at position **52***b* in FIG. **8,** cam **70** has not yet turned on valve **66.** However, when port **52** has moved to position **52***c* wherein it overlaps only pressure port **60,** then valve **66** is opened by cam **70** to permit passage of a pulse of air. This pulse of air comes from pressure port **60** into port **52** and pressurizes the interior of the arm to overcome the vacuum and actually puffs out of the vacuum-holding openings along the outer end of the arm. In this way, the bag is positively released. As soon as the arm is past the critical release point, valve **66** shuts off to prevent premature pressurizing of the next-approaching arm, as a primary purpose. The structure operates at a fairly rapid rate so that each bag must be positively controlled and accurately released at the proper position with absolute reliability, otherwise bags will be free and would cause malfunction.

As seen, particularly in FIGS. **5, 6,** and **7,** pressure pipe **60** passes through the vacuum connection line. Of course, vacuum can be connected in another way to that end of port **50** and thus a simpler connection structure for the pressure port could be accomplished.

This invention having been described in its preferred embodiment, it is clear that it is susceptible to numerous modifications and embodiments within the ability of those skilled in the art and without the exercise of the inventive faculty. Accordingly, the scope of this invention is defined by the scope of the following claims.

What is claimed is:

1. An air control for a bag-stacking machine having a continuously rotating hub and having a bag pickup arm on said rotating hub, said bag pickup arm having bag pickup openings therein, said bag pickup openings on said arm being connected to a port on said rotating hub, a relatively stationary manifold, a manifold port connected continuously to a source of vacuum, said hub port being in alignment with said manifold vacuum port in predetermined relative angular position between said rotating hub and said manifold so that said bag pickup openings can carry bags thereon, the improvement comprising:

an air pressure port in said manifold away from said vacuum port so that, as said arm and said hub rotate and said hub port passes away from said manifold vacuum port, said hub port passes into communication with said air pressure port for the delivery of air under pressure into said arm to overcome the previous vacuum in said arm to release a bag carried upon the openings in said arm.

2. The apparatus of claim **1** including:

a plurality of pairs of said arms, each of said plurality of pairs of arms being successively connected to said manifold vacuum port and subsequently to said manifold air pressure port as said rotating hub rotates.

3. The apparatus of claim **2** including:

two of said rotating hubs, said rotating hubs being connected together to rotate together, and

two of said manifolds, with each one of said manifolds being positioned in connection with a respective one of said hubs for the control of air thereto.

4. The apparatus of claim **1** wherein:

an air pressure line is connected to an air control valve and said control valve is connected to said air pressure port, and

means connected to said air control valve to turn on said air control valve when said arm is in a predetermined position.

5. The apparatus of claim **4** wherein:

said means for operating said air valve comprises a cam, said cam being rotatably driven to rotate with said rotating hub so that said cam operates said air valve in accordance with rotating hub position.

6. The apparatus of claim **5** wherein:

said air pressure port in said manifold is positioned sufficiently close to said vacuum port in said manifold that said port in said rotating hub overlaps both said pressure port and said vacuum port at the same angular position.

7. The apparatus of claim **6** wherein:

said valve is actuated to turn on air to said air pressure port when said hub port is positioned only over said air pressure port.

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