# United States Patent

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[54] SHEET MATERIAL DISPENSER
10 Claims, 4 Drawing Figs.


[52] U.S. Cl. ..... 271/26
[51] Int. Cl. ..... B65h 3/08
[50] Field of Search ..... 271/26



[56] References Cited
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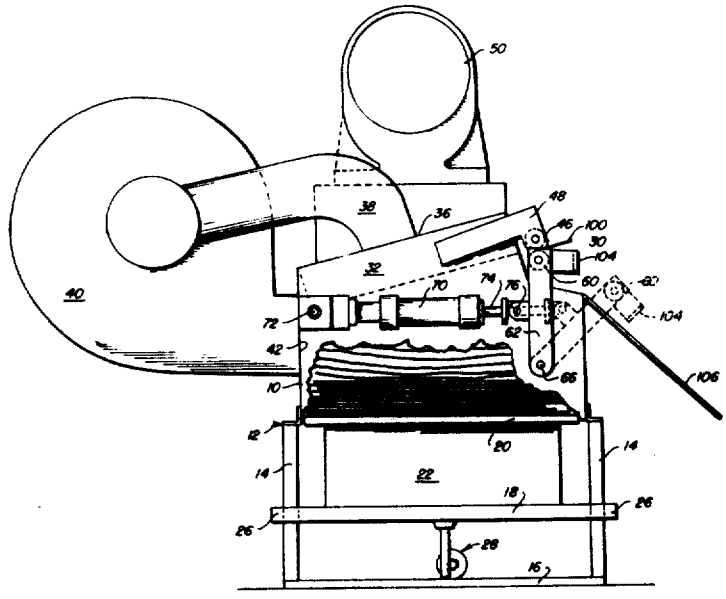
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**ABSTRACT:** A dispenser for single sheets of material from a stack of such sheets is provided in which an air blower flutters at least the top portion of such a stack until the top sheet thereof reaches the intake manifold of the fan thus serving as a valve to shut off the flow of air and stop the fluttering of the top portion of the stack. Upon removal of the sheet from the intake manifold, either manually or automatically, the cycle is repeated.

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2 Sheets-Sheet 1

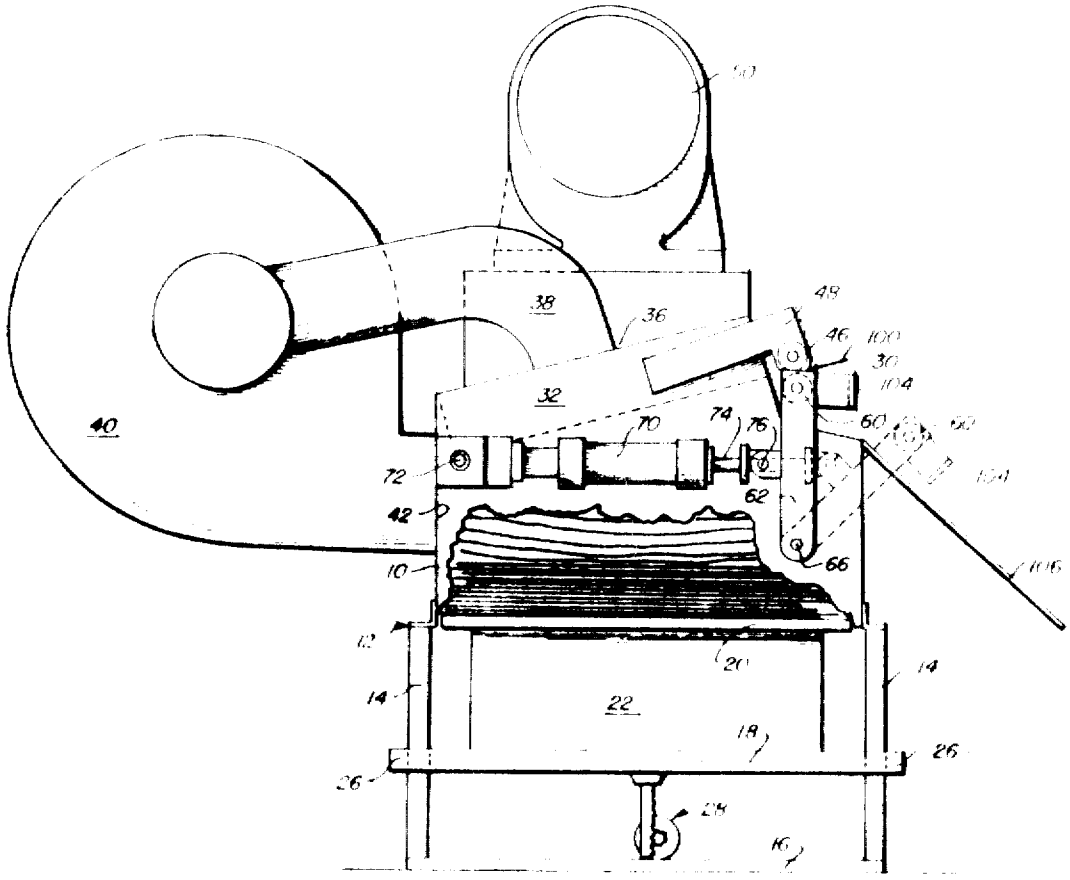



FIG. 1

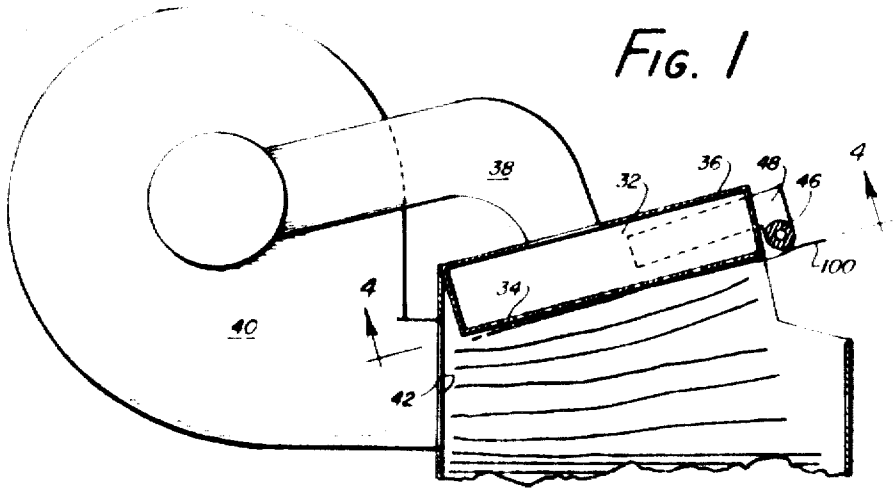



FIG. 3

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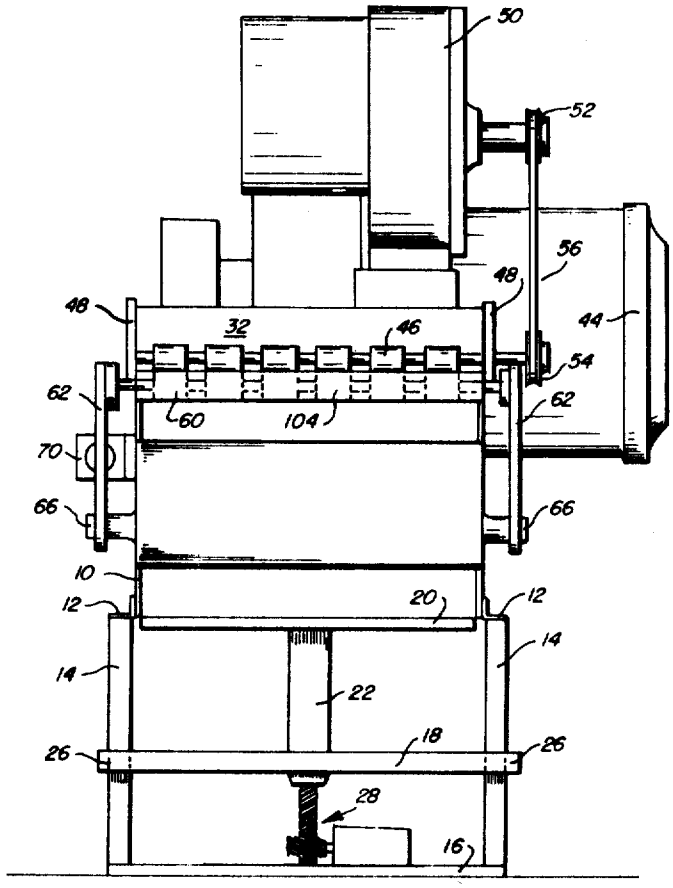



FIG. 2

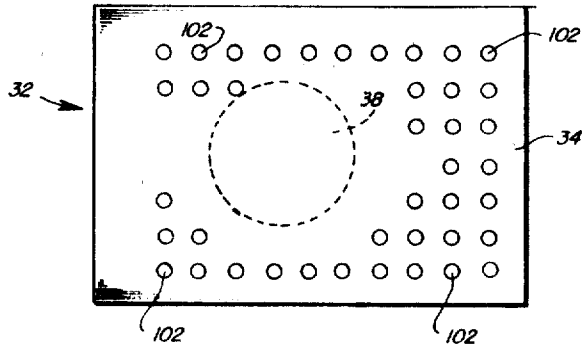



FIG. 4

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# SHEET MATERIAL DISPENSER

In many conventional dispensers for sheet material, there is the possibility of dispensing more than a single sheet at any given time because of wear of the parts such as rollers or for other reasons.

Additionally, in most such sheet dispensers there is a timing problem to time the mechanism to actuate and deactuate upon the dispensing of a sheet.

One object of this invention is to overcome these disadvantages of the prior art.

Still another object of the invention is to simplify the construction of sheet material dispensers while at the same time insuring that only a single sheet is dispensed.

These and other advantages of the instant invention will be apparent to those skilled in the art from the following specification and drawings in which:

FIG. 1 is a side elevation of the device of the invention with portions broken away,

FIG. 2 is a front view of the device of the invention,

FIG. 3 is a vertical cross section of a portion of the device of FIG. 1, and

FIG. 4 is a view taken along the lines 4–4 of FIG. 3.

As shown in FIG. 1 the device of the invention includes a container 10 suitably supported from a frame 12. The frame 12 includes four upstanding rods 14 secured at their bottom to a base 16.

The bottom of the container 10 comprises a flat platform 20 supported by a support 22 from a subframe 18. The four corners 26 of the subframe 18 are slidably received on the four upstanding rods 14 thus permitting the subframe 18 and the platform 20 of the container 10 to be moved upwardly and downwardly with respect to the frame 12—14. Such vertical movement of the platform 20 is accomplished by any suitable means such as the motor driven jackscrew generally indicated at 28. It will be understood that any suitable mechanism may be provided to accomplish this vertical movement of the platform 20.

Positioned at an angle above the open top 30 of the container 10 is a manifold 32 of somewhat lesser size than the dimensions of the container 10. The manifold 32 is boxlike in structure and has a perforated bottom 34 as shown in FIG. 4. The upper closed surface 36 of the manifold 32 is connected airtight to the intake 38 of a fan 40. The outlet 42 of the fan 40 is in one wall of the container 10 adjacent the top portion of a stack of sheets contained within the container. A suitable motor 44 is provided to drive the centrifugal blower or fan 40.

A shaft with rubber rollers 46 is supported at the front edge of the manifold 32 by suitable support arms 48 on each side of the manifold 32. This shaft with the plurality of rubber rollers 46 is suitably driven by a motor 50 through the pulleys 52 and 54 and a connecting belt 56. This shaft with rollers 46 is thus continuously driven in a counterclockwise direction as viewed in FIG. 1.

Pivoted to the opposite lateral sides of the container 10 are two arms 62 which support a roller shaft 60 in their upper ends. The roller shaft 60 is freely journaled in the arms 62. The arms 62 are pivoted at 66 to the opposite lateral walls of the container 10. An air piston 70 is pivoted at 72 to a fixed portion of the frame and contains a piston rod 74 which is pivoted at 76 to the upstanding rod 62 on one side of the device. Upon actuation of the cylinder and piston rod 70—74 the roller 60 will be moved from its solid line position as shown in FIG. 1 to its dotted line position.

## OPERATION

In operation the blower 40 is activated by the motor 44 to draw air through the intake manifold 32 and exhaust the same into the container 10 through the outlet 42. This outlet is positioned to be adjacent the edges of the stack of sheets contained within the container 10 and resting upon the platform 20. The blast of air from the blower 40 impinges upon the edges of the top sheets in the stack and causes the top sheets



to flutter and tend to be blown from the top of the container 10. This fluttering action causes the top sheets to raise up and the very top sheet will be attracted to the manifold 32 and ultimately be held thereagainst as indicated, for example, in FIG. 3 by the sheet 100. When the top sheet of the stack has reached the manifold face 34 it will close the openings 102 therein thus preventing any further blowing of air through the outlet 42 and against the stack of sheets. Accordingly, the stack of sheets will fall downwardly into a compact stack again. The single sheet that is left in contact with the face 34 of the manifold 32 will also bear against the continuously rotating roller shaft 46. Upon actuation of the piston cylinder 70—74 the pivoted roller arm 62 will be moved from its dotted line position shown in FIG. 1 to its solid line position, thus clasping the sheet 100 between the constantly rotating roller shaft 46 and the free roller shift 60. This, of course, will discharge the sheet 100 from the device over a guiding arm 104 arranged tranversely of the arms 62 adjacent the free roller shaft 60. This bar 104 helps to guide the sheet 100 into the discharge chute 106 (shown only in FIG. 1). The piston cylinder 70—74 then expands to move the free roller shaft 60 to the dotted line position shown in FIG. 1. Of course, as soon as the sheet 100 is removed from contact with the face 34 of the manifold 32, the openings 102 are again free to admit air to the blower 40 which then again flutters the upper sheets in the stack and the cycle is repeated.

The timing of the operation of the piston cylinder 70—74 may be accomplished in response to any desired timing need. For example, if cartons are passed beneath the outlet of the chute 106 a suitable sensing mechanism such as a solenoid switch or an electric eye can be operated by such movement to activate the piston cylinder 70—74 thus to eject a sheet. Depending upon the need the piston cylinder arrangement 70—74 can be made to respond to other sensing mechanism which in turn respond to any selected stimulus. The same source of activation can be used to activate the lifting mechanism 28 for the platform 20 in order to raise the platform a distance equivalent to the thickness of a given sheet of paper upon the ejection of each sheet. It will be noted that as long is the sheet 100 remains in contact with the face 34 of the manifold 32 thus covering the openings 102 the effect of the blower upon the stack is negated since no air can be drawn into the intake of the fan 40 for expulsion through the exhaust outlet 42. Accordingly, a sheet 100 is always in position for discharge.

I claim:

1. A sheet dispenser comprising a container for a stack of sheets to be dispensed, a blower having an outlet in said container positioned to impinge air against the edges of sheets in said stack, an inlet for said blower positioned above said container and said stack, and said dispenser being free of any valve means for controlling the air blown from said blower outlet other than the top sheet in said stack, whereby, during operation, the top sheet is moved into covering relationship with respect to said inlet and serves as the sole means for stopping the air being blown from said outlet.

2. A sheet dispenser comprising a container for a stack of sheets to be dispensed, a blower having an outlet in said container positioned to impinge air against the edges of sheets in said stack, an inlet for said blower positioned above said container and said stack, and said dispenser being free of any valve means for controlling the air drawn into said inlet other than the top sheet of said stack, whereby, during operation, the top sheet is moved into covering relationship with respect to said inlet and serves as the sole means for stopping the air being drawn into said inlet.

3. The device of claim 1 wherein said dispenser is also free of any valve means for controlling the air drawn into said inlet other than said top sheet, whereby, during operation, the top sheet when moved into covering relationship with respect to said inlet also serves as the sole means for stopping the air being drawn into said inlet.

4. A sheet dispenser comprising a container for a stack of sheets to be dispensed, a blower having an outlet in said container positioned to impinge air against the edges of sheets in said stack, said container having an open top, in air intake manifold positioned above said container and spaced above a stack of sheets in said container, at least one air intake opening in said manifold opening downwardly toward the open top of said container, said intake manifold being connected to the intake of said blower, and said dispenser being free of any valve means for controlling the air blown from said blower outlet other than the top sheet in said stack, whereby, during operation, the top sheet is moved into covering relationship with respect to said inlet and serves as the sole means for stopping the air being blown from said outlet.

5. A sheet dispenser comprising a container for a stack of sheets to be dispensed, a blower having an outlet in said container positioned to impinge air against the edges of sheets in said stack, said container having an open top, an air intake manifold positioned above said container and spaced above a stack of sheets in said container, at least one air intake opening in said manifold opening downwardly toward the open top of said container, said intake manifold being connected to the intake of said blower, and said dispenser being free of any valve means for controlling the air drawn into said inlet other than the top sheet of said stack, whereby, during operation, the top sheet is moved into covering relationship with respect to said inlet and serves as the sole means for stopping the air being drawn into said inlet.

6. The device of claim 4 wherein said dispenser is also free of any valve means for controlling the air drawn into said inlet other than said top sheet, whereby, during operation, the top sheet when moved into covering relationship with respect to said inlet also serves as the sole means for stopping the air being drawn into said inlet.

7. A sheet dispenser comprising a container for a stack of sheets to be dispensed, a blower having an outlet in said container positioned to impinge air against the edges of sheets in said stack, said container having an open top, an air intake manifold positioned above said container and spaced above a stack of sheets in said container, at least one air intake opening in said manifold opening downwardly toward the open top of said container, said intake manifold being connected to the intake of said blower, said intake manifold being fixed in position in a plane at an angle to the plane of the top of said stack, a first rotatable roller positioned adjacent said manifold in a position to be contacted by one side of a sheet held against said intake manifold, a second rotatable roller positioned to be moved from a first position removed from said first roller to a second position in which said second roller is in contact with said first roller with said sheet clasped between said rollers, means to move said second roller from said first position to said second position and back again, and means to rotate one of said rollers it least while said second roller is in said second position.

8. The device of claim 7 in which said dispenser is free of any valve means for controlling the air blown from said blower outlet other than the top sheet in said stack, whereby, during operation, the top sheet is moved into covering relationship with respect to said inlet and serves as the sole means for stopping the air being blown from said outlet.

9. The device of claim 7 in which said dispenser is free of any valve means for controlling the air drawn into said inlet other than the top sheet of said stack, whereby, during operation, the top sheet is moved into covering relationship with respect to said inlet and serves as the sole means for stopping the air being drawn into said inlet.

10. The device of claim 8 wherein said dispenser is also free of any valve means for controlling the air drawn into said inlet other than said top sheet, whereby, during operation, the top sheet when moved into covering relationship with respect to said inlet also serves as the sole means for stopping the air being drawn into said inlet.