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MEANS OF PRESENTING GAS PRESSURE TO A SURFACE

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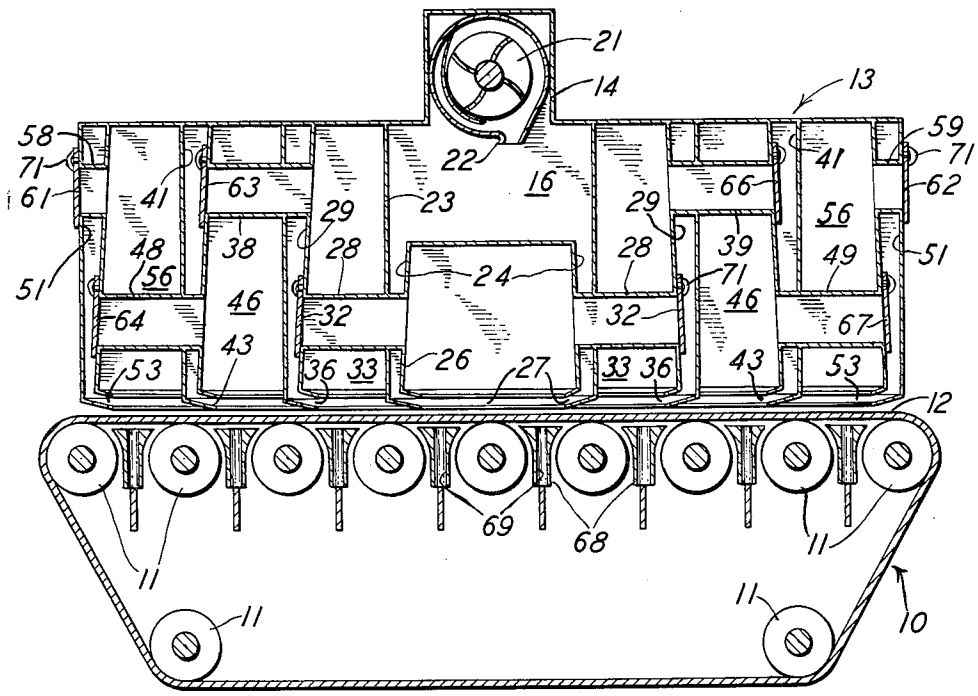


Fig. 1

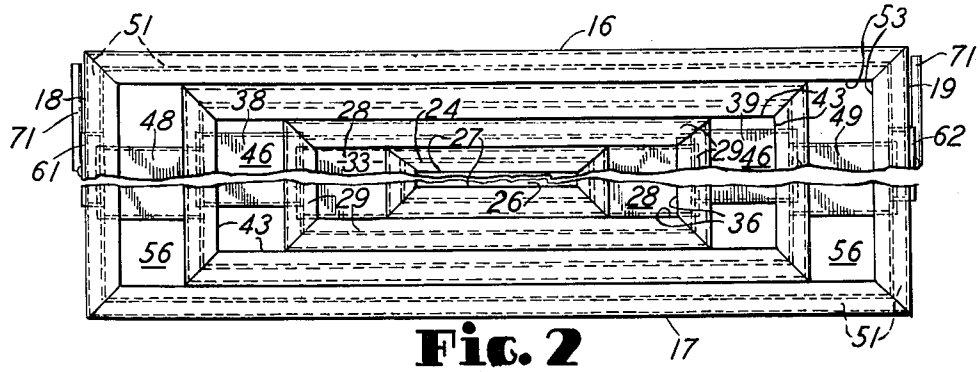


Fig. 2

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MEANS OF PRESENTING GAS PRESSURE TO A SURFACE

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This invention relates to a gas pressurized hood, and more particularly it relates to a hood or the like having one side thereof open and exposed to a surface and with that side being exposed for the purpose of presenting the pressure of the air or gas therein to the surface mentioned. Particularly, the invention relates to an improved process and means for dewatering paper stock on the screen of paper machines such as the Fourdrinier machines. This is a continuation-in-part of patent application, Serial No. 650,540, filed April 3, 1957, and now abandoned.

It is an object of this invention to provide an improved method and means of pressurizing a hood for exposing the pressure therein to a surface extending along one side of the hood.

A more specific object of this invention is to provide a pressurized air hood and method of pressurizing the hood, wherein the hood is utilized for removing the water from paper head stock on the conventional Fourdrinier type of paper-making machine. In accomplishing this particular object, the vacuum lined cups and like equipment can be eliminated from the Fourdrinier machine, and when changing the machine screen or other repairs are to be made, only the hood need be removed and there would be no need of loosening all the vacuum connections and removing the parts of the suction boxes, couch roll and their connections. Thus, repair, time and expense would be considerably less with the present process and apparatus.

Still another object is to provide an improved means and apparatus for obtaining air pressure differential on opposite sides of a Fourdrinier screen so that the paper being formed on the screen is formed in an improved manner as the lineup of the fibers in the stock are better presented.

Another object is to provide an improved method and means of making paper at a higher rate of speed than that presently used, and to do so with equipment which is less expensive, and therefore permit the consumer of paper to install his own paper mills and to do so at locations adjacent the pulp supply.

Other objects and advantages will become apparent upon reading the following description in light of the accompanying drawings, wherein:

FIG. 1 is a side elevational and sectional view of a preferred embodiment of this invention.

FIG. 2 is a bottom plan view of the hood of this invention shown in FIG. 1.

The same reference numerals refer to the same parts between the two views.

FIG. 1 shows a conventional Fourdrinier machine wire or screen **10** movably mounted on rollers **11**, which guide the screen therearound as paper stock is deposited on the top run **12** of the screen **10**, and this stock is then passed underneath the hood **13** for the purpose described hereinafter. It will be further understood that in a conventional type of Fourdrinier machine, the screen section **12** is subjected to a vacuum therebelow so that pressure differential exists above and below the screen section **12** and the water is thereby drawn or sucked through the paper stock on the screen section **12**, and thus the stock forms the thin sheet of paper in the conventional and well-known manner.

In the instant invention, the suction equipment and method are dispensed with and instead, an air pressure

hood **13** is employed to provide the pressure differential above and below the screen section **12**. In this manner, the machine is considerably simplified and less expensive, and the screen **10** can be run at a higher speed and the paper fibers are not placed in the parallel positions as they are on a conventional Fourdrinier machine, and which is somewhat undesirable in this respect.

The apparatus shown for carrying out the particular invention includes the shell or cover top **14**, opposite sides **16** and **17** and opposite ends **18** and **19** of the hood **13**. Thus, the hood **13** is enclosed on its top and four sides while the bottom is open in a manner and for a purpose described hereinafter. A blower **21** is shown arranged with the hood **13** to discharge thereinto through the blower outlet spout **22** so that the central and first hood chamber **23** is subjected to air under pressure. It has, of course, been understood that a prime mover (not shown) of any conventional type is employed to operate the blower **21**. This air travels through the four-sided channel **24** and is discharged into a chamber **26** through the four-sided outlet **27** located at the lower end of the channel **24**. An important feature of this construction is the fact that the outlets or spout **27** are directed at substantially horizontal angles to parallel the screen surface **12**, and thus to direct the air being discharged from the channels **24** into the chamber **26**, and this air leaving channels **24**, and like channels described later, is under pressure, which means its pressure is in excess of atmospheric or has a positive gage pressure. In this manner, the air entering the chamber **26** is directed against the pressure already in the chamber **26** and by this means the pressure within chamber **26** is maintained, though no mechanical seal of any type is provided between the hood **13** and the screen section **12**. Nevertheless, the desired air pressure in excess of atmospheric pressure is provided in the chamber **26** and is thus effective on the screen section **12** as desired.

A second significant feature of the construction shown herein is the provision of the air passageways **28**, which are in communication with and lead from the chamber **26** on opposite sides thereof and extend to and communicate with a four-sided channel **29**. It will be noted that flap valves **32** are provided on the outlet ends of the passageways **28** to control the air moving through the passageways as it escapes from the chamber **26**, which is under pressure, as mentioned. Thus, the air moves through the channel **29** and is directed into the second chamber **33** by being discharged thereinto through the four-sided outlet **36**, which is located at the lower ends of the channel **29**. Here, also the spout or outlet **36** is directed substantially horizontal or parallel to the screen sections **12** so that the discharging air is blown or directed into the chamber **33**, and thus the chamber remains under pressure, but only a minimum of airflow is created in the vicinity of the outlet **36**. Thus, with only a minimum of airflow, as mentioned, there is no disturbance of the material, such as the paper fibers which are on the screen section **12**.

From the chamber **33** the air passes through the passageways **38** and **39** and into the four-sided channel **41** from whence the air flows through the four-sided outlet **43** and into the chamber **46**.

Also, passageways **48** and **49** communicate with channel **46** and the air thus flows into the four-sided channel **51** and from there into the outlet **53** and thus into the chamber **56**. From here, the air can go through the passageways **58** and **59** and the respective flap valves **61** and **62** to be exhausted from the hood **13**.

In all instances it will be noted that the air is discharged into the respective chambers in substantially horizontal direction, so that there is a minimum of airflow in the

area of the outlets, such as **27**, **36**, **43** and **53**, but nevertheless, the air pressure is created in the respective chambers as desired. Also, it will be understood that the air is discharged into the chambers, such as the chamber **33**, on the four sides. It will be further understood that the respective flap valves, such as valves **32** on passageways **28** and valves **63** and **64** and **66** and **67** on passageways **38**, **48**, **39** and **49**, respectively, can be controlled to control the pressure in the various chambers so that the valves can be opened or closed as desired to thereby control the pressure.

Also, intermediate the rolls **11** along the screen section **12** are support bars **68** which are provided with openings **69**, which permit the passage of water through the openings to thereby dewater the stock on the screen section **12**, while the bars **68** support the screen section **12** as desired.

In this method and means, the pressure in the center chamber **26** can be maintained at 10 p.s.i., while the pressure in the first end chamber **33** can be maintained at 8 p.s.i., and the pressure in the second end chamber **46** can be maintained at 6 p.s.i., and the pressure in the last chamber **56** can be maintained at 4 p.s.i. These pressures are expressed in excess of atmospheric pressure.

The particular means for controlling the respective flap valves could be a rod **71** which is connected to the tops of the flap valves, as indicated, such that upon rotation of the rod **71**, the respective valves are pivoted or rotated to open or close with respect to the passageways on which they are mounted and thereby permit more or less of the air to escape past the valve.

Still another advantage of the provision of the air hood **13** as contrasted to the vacuum lines of the conventional machine is the fact that the air in the hood **13** can be heated so that it will be more effective in removing the water from the stock on the screen section **12**.

Of course, the blower **21** could be of the propeller type. Also the chambers could obviously be formed circular and nested that way instead of the rectangular shape and nesting shown. Further, since the hood is pressurized inside, there is an upward internal force applied on the hood. This force is created by the reaction of the air pressure against the surface **12**. Thus it will be apparent that the hood could be employed in air vehicles of the type supported by air. The advantages are a minimum of air blowing out around the outside edge of the hood, and a maximum efficiency results.

While a specific embodiment and a specific method of this invention has been shown and described, it should be obvious that certain changes could be made therein, and the invention should therefore be limited only by the scope of the appended claims.

1. A system of air chambers arranged to maintain compressed air therein, comprising a hood including partitions therein for defining a plurality of chambers arranged in nested relation and with said chambers being open along one common open end thereof for exposing the air therein to said open end, first air passage means in direct fluid communication with only the center one of said chambers and terminating in a discharge opening disposed around the periphery of said open end of said center one and being directed toward the projection of said open end of said center one of said chambers, an air blower in flow communication with said first air passage means for air pressurizing the latter, second air passage means disposed between every two adjacent chambers and extending through said partitions of each interiorly disposed chamber to said open end of each successive adjacent chamber and with said air passage means terminating in a discharge opening being directed to exhaust along the periphery of said open end of each said chamber in the direction toward the projection of said open end of the respective said adjacent chamber and toward the center line of said hood.

2. A system of air chambers arranged to maintain compressed air therein, comprising a hood including partitions therein for defining a plurality of chambers arranged in nested relation and with said chambers being open along one common open end thereof for exposing the air therein to said open end, first air passage means in direct fluid communication with only the center one of said chambers and terminating in a discharge opening disposed around the periphery of said open end of said center one and being directed toward the projection of said open end of said center one of said chambers, an air blower in flow communication with said first air passage means for air pressurizing the latter, second air passage means disposed between every two adjacent chambers and extending through said partitions of each interiorly disposed chamber to said open end of each successive adjacent chamber and with said air passage means terminating in a discharge opening being directed to exhaust along the periphery of said open end of each said chamber in the direction toward the projection of said open end of the respective said adjacent chamber and toward the center line of said hood and valve means disposed in said second air passage means for controlling air flow therethrough.

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