Nov. 30, 1926. 1,608,698

E. W. KOESER

ATTACHMENT FOR PAPER MACHINES

Filed Oct. 9, 1920 4 Sheets-Sheet 1

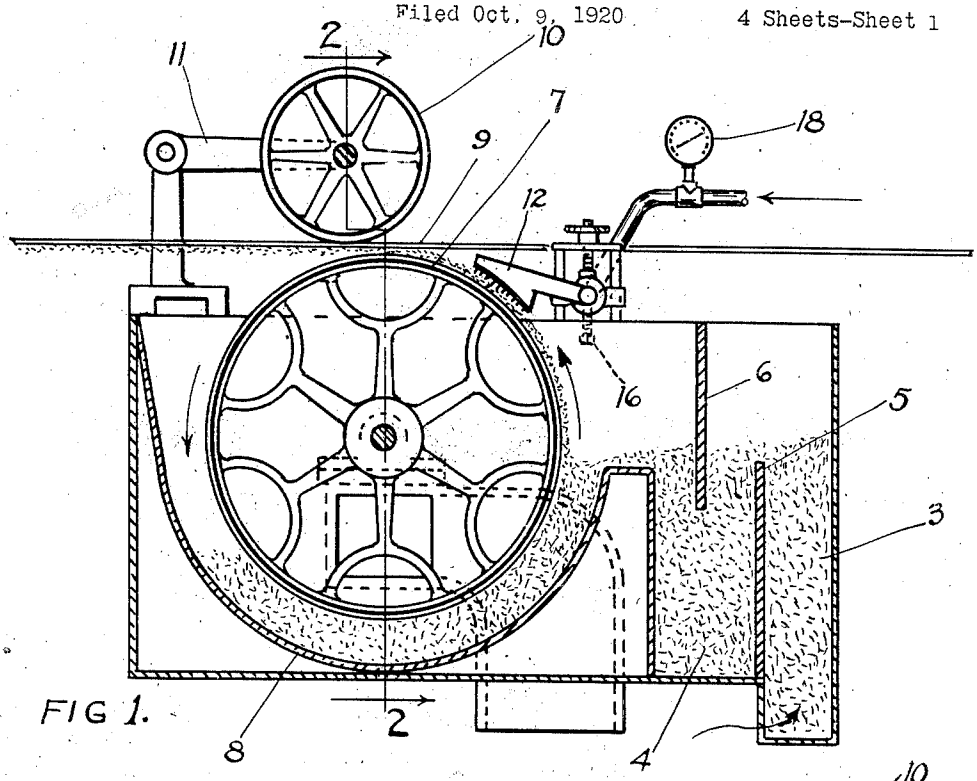


FIG 1.

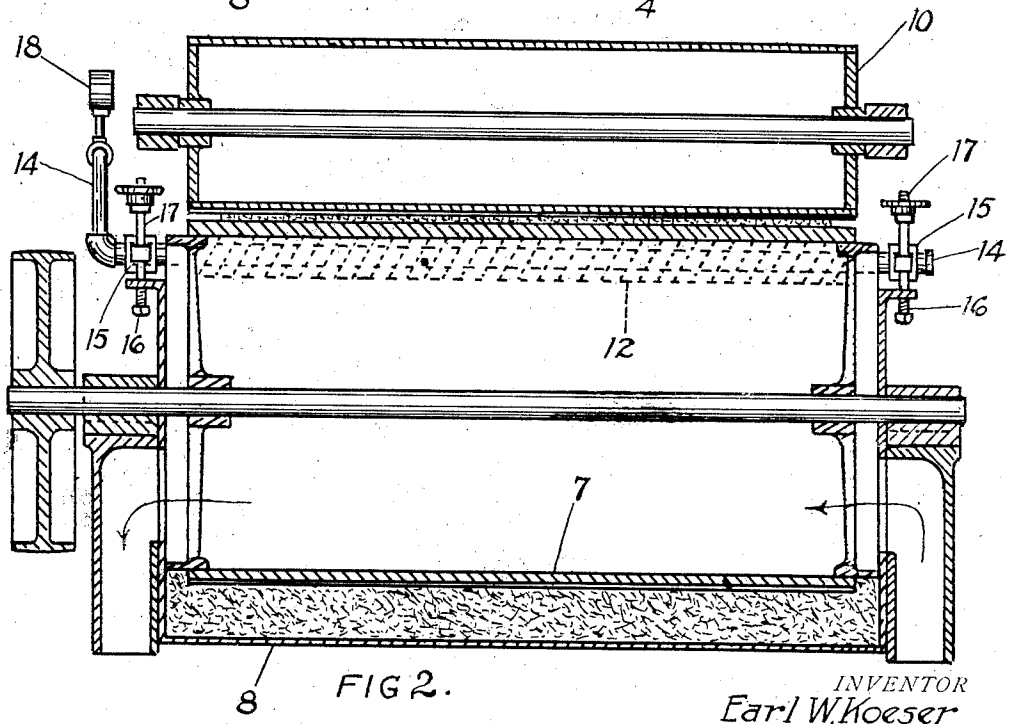


FIG 2.

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PHOTO-LITHO. by SACKETT & WILHELMS CORP. N.Y.

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ATTACHMENT FOR PAPER MACHINES

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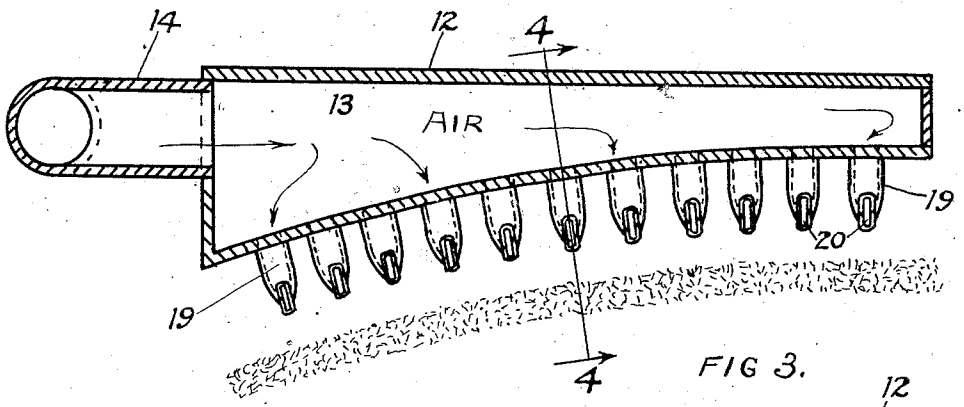


FIG 3.

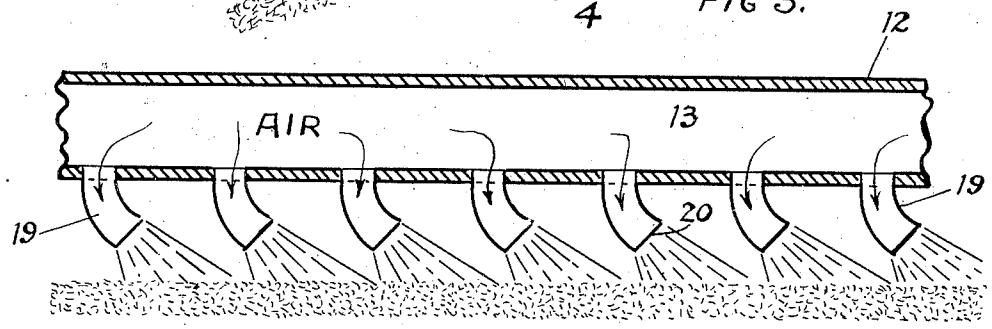


FIG. 4.

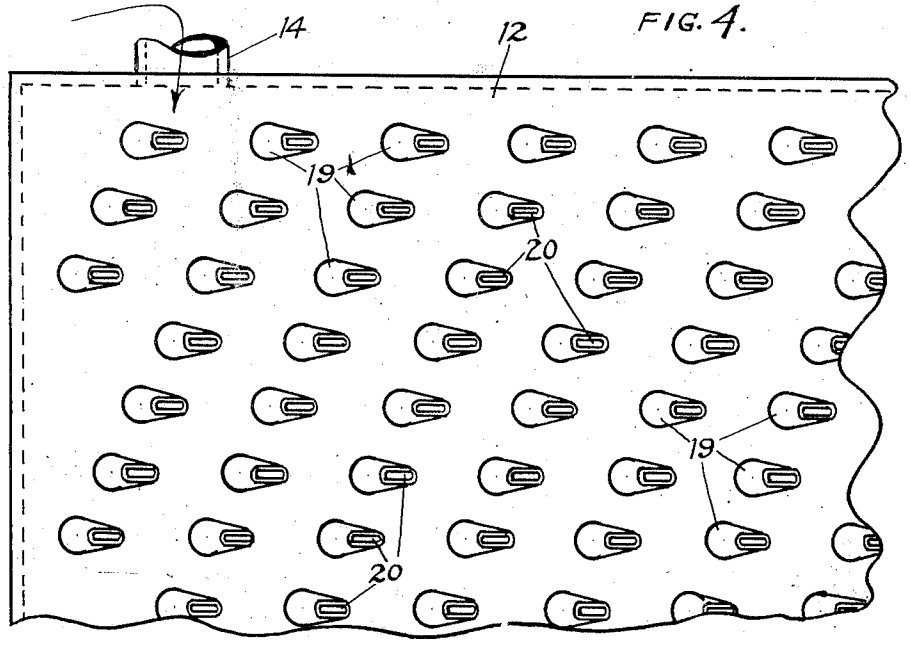


FIG. 5.

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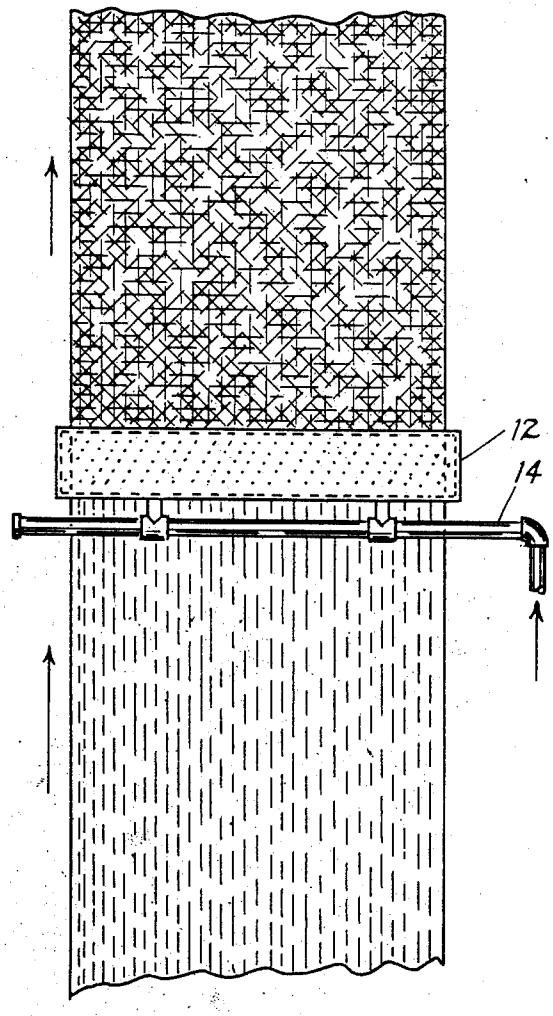


FIG 6.

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ATTACHMENT FOR PAPER MACHINES

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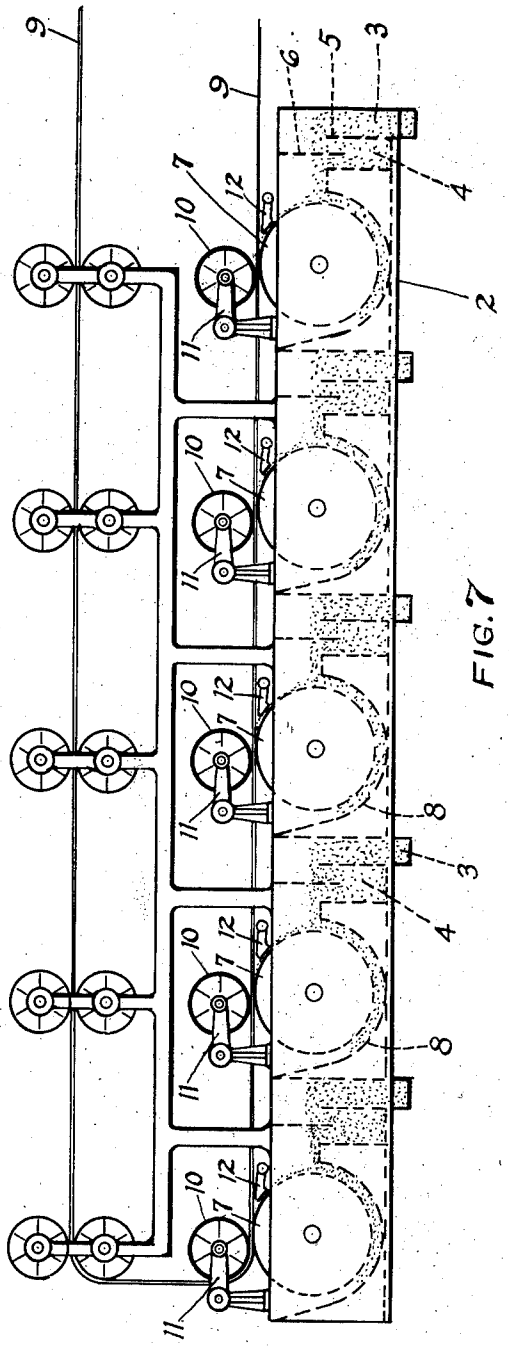


FIG. 7

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Patented Nov. 30, 1926. 1,608,698

UNITED STATES PATENT OFFICE.

EARL W. KOESER, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR OF ONE-HALF TO EDWIN G. STAUDE, OF MINNEAPOLIS, MINNESOTA.

ATTACHMENT FOR PAPER MACHINES.

Application filed October 9, 1920. Serial No. 415,833.

In the manufacture of paper for cartons and flexible containers or goods of various kinds, difficulty has been experienced in obtaining paper stock which will not tear easily or be easily broken or damaged when made up into manufactured articles. This difficulty is due to the fact that the fiber of the material used for making commercial paper stock of this kind is always in the direction of travel of the sheet through the machine and hence offers very little resistance to tearing strain in the direction of the grain.

The object, therefore, of my invention is to provide an attachment for a paper machine by means of which a part of the fibers are caused to assume a position crosswise of the sheet while it is in a pulp or semi-liquid form, so that when compressed to form the finished paper stock, a part of the fibers will lie crosswise to the ordinary grain of the stock and equalize the strength of the stock in any direction.

The invention consists generally in various constructions and combinations, all as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification,

Figure 1 is a detail sectional view, showing the application of my invention to one of the drums of a paper making machine,

Figure 2 is a sectional view on the line 2—2 of Figure 1,

Figure 3 is a detail sectional view of the device for applying air to the stream of paper pulp,

Figure 4 is a sectional view on the line 4—4 of Figures 3,

Figure 5 is a detail view, showing the air delivering nozzles,

Figure 6 is a view illustrating the steam of pulp before and after the application of the air thereto,

Figure 7 is a side view of a portion of a paper making machine, illustrating the application of my invention to a series of drums therein.

In the drawing, 2 represents a trough having pockets 3 and 4 formed by baffles 5 and 6. To these pockets the semi-liquid pulp is delivered in the usual manner. Drums 7 are mounted in the trough and spaced from a curved wall 8 therein in which space the pulp is delivered to be engaged and gathered up by the surface of the revolving drum. A belt 9, usually of flannel, is mounted to move above the drums, pressure being exerted on the upper side of the belt by means of suitable rollers 10 supported on pivoted arms 11. All this is ordinary construction in machines of this type.

I have found in making ordinary paper or carton stock that the tendency of the fiber, due to the movement of the web or sheet in a semi-liquid form through the machine, is to assume a position lengthwise of the web or sheet and hence will only resist a twisting or tearing strain when it is applied crosswise to these fibers. Obviously, in the manufacture of cartons or containers it is necessary in the economical use of the carton stock that it be cut so that a considerable portion of the strain will be lengthwise of the fibers, and I have found that when this is done, the container or carton will offer but little resistance to the strain of rough handling or usage, but will easily collapse, to the destruction or damage of the contents of the carton.

To avoid this difficulty, I provide a head 12 having an air chamber 13 therein communicating through a pipe 14 with a source of air supply. The pipe has a bearing at 15 with screws 16 and 17 by means of which the pipe may be locked and the head adjusted at any desired angle with respect to the surface of the drum, and the stream of pulp moving thereover. This adjustment will, of course, be very slight and will have no material effect on the position of the air delivering pipe. A suitable gauge 18 is connected with the pipe by means of which the air pressure may be determined. The wall of the head 12 is preferably curved, as shown in Figure 3, to conform substantially to the curvature of the drum and the stream of pulp and is provided with a series of nozzles 19 having comparatively narrow discharge slots 20 through which the air is discharged upon the surface of the pulp. These nozzles, as shown in Figure 4, are preferably inclined so that their discharge orifices are at an angle to the plane of the head, thereby directing the air currents obliquely upon the surface of the pulp.

The effect of the air currents is to cause the fibers flowing in the web or pulp lengthwise thereof and near the upper surface to be deflected and turned crosswise of the web

or diagonally thereof, as indicated in Figure 6, while the fiber in the underside of the web, not being affected by the jets of air, will continue in their lengthwise position, and when the web or sheet has flowed past the head, one surface will have fibers lying one way of the sheet and the other surface will have fibers lying the opposite way or diagonally, so that the web will have a veneered effect, with the grain running in different directions. The pressure of the air jets will be sufficient to affect the fibers on one side to a point near the transverse center of the web and the degree of the pressure may, of course, be varied to adapt the device to webs or sheets of different depth.

The size of the head may, of course, be varied to increase or decrease the area of the web affected by the fluid pressure.

I claim as my invention:

1. The combination with a trough adapted to contain a supply of semi-liquid pulp, of a drum mounted to revolve in said trough and having a surface for gathering up the pulp in a thin sheet, a belt above said drum in position to receive the pulp therefrom, a head mounted transversely of said drum between said trough and belt and having a series of nozzles for delivering fluid pressure upon the surface of pulp and turning the fibers thereof transversely or at an angle to the direction of movement of the pulp.

2. The combination, with a revolving drum and means for delivering paper pulp in semi-liquid form thereto, of a head having an air chamber therein communicating with a source of air under pressure mounted adjacent to said drum, said head having a plurality of nozzles provided with discharge orifices at an angle to the surface of the sheet of pulp and adjacent thereto for directing streams of air into the pulp for the purpose specified.

3. The combination with a trough adapted to contain a supply of pulp in semi-liquid form, of a drum mounted to revolve in said trough and having a surface for gathering up the pulp, a belt mounted to receive the semi-liquid pulp from said drum, a pipe extending transversely of said drum between said belt and trough, a head mounted thereon overhanging said drum and having a comparatively broad under surface, a series of nozzles provided in the under surface of said head, and said head having a chamber therein communicating through said pipe with a source of fluid pressure, said nozzles directing such pressure into the pulp and turning the fibers thereof in angular relation to the direction of movement of the pulp.

4. The combination with a revolving drum, and means for delivering paper pulp in semi-liquid form thereto, of a head having a fluid pressure chamber therein communicating with a source of fluid pressure, said head having an under surface provided with a plurality of nozzles arranged in rows extending diagonally of the surface of said head and projecting toward said drum at an angle to the sheet of pulp thereon, and adapted to direct streams of fluid pressure into the surface of the pulp, and a blanket whereto the pulp is delivered by said drum.

5. The combination with a series of troughs adapted to contain semi-liquid pulp, of drums operating in said troughs and having surfaces for gathering up the pulp, a belt having an under surface whereon the pulp is deposited by said drums, and means interposed between said belt and trough for directing streams of fluid pressure upon the surface of the pulp on said drum at an angle to the direction of movement of the pulp for turning the fibers thereof transversely or at an angle to such movement.

In witness whereof, I have hereunto set my hand this 4th day of September, 1920.

EARL W. KOESER.