

Aug. 20, 1957

W. E. K. TROTMAN
CYLINDER MACHINE MOLD

2,803,172

Filed Jan. 13, 1954

2 Sheets-Sheet 1

FIG. 1.

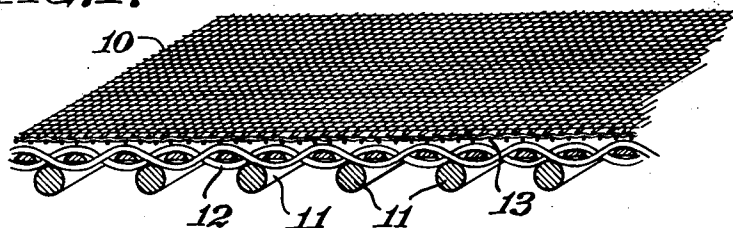


FIG. 2.

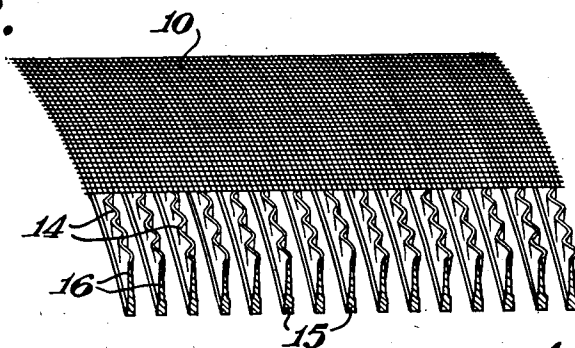


FIG. 5.

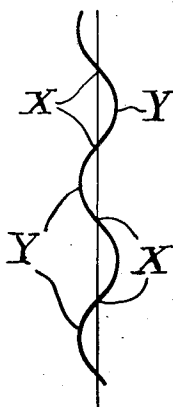


FIG. 3.

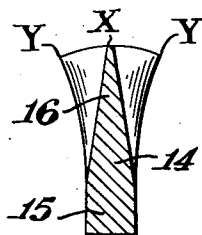


FIG. 4.

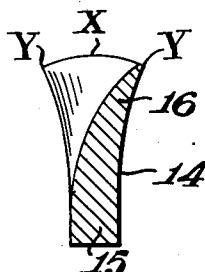
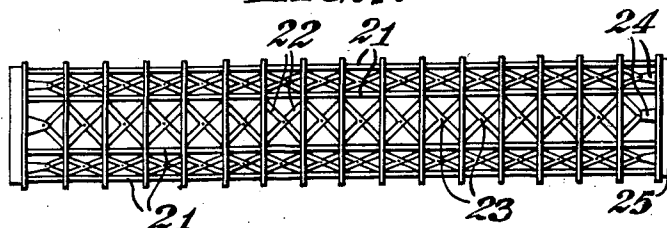


FIG. 7.



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FIG. 6.

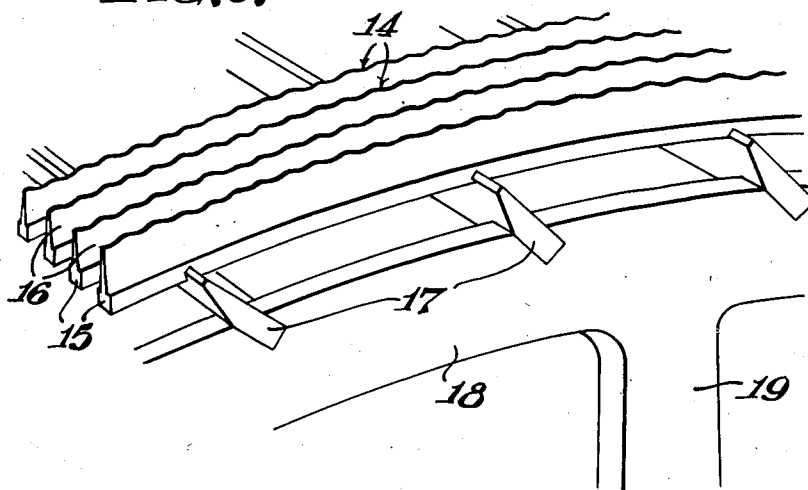


FIG. 8.

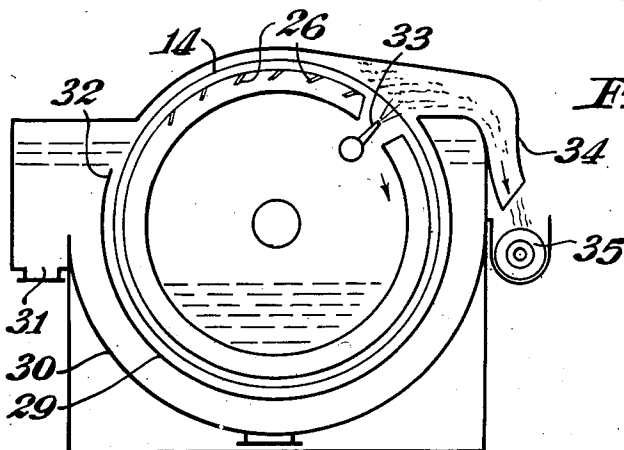


FIG. 10.

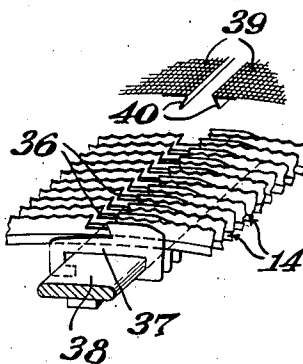
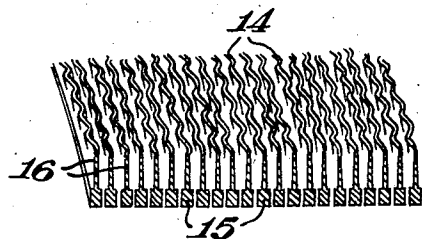


FIG. 9.



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CYLINDER MACHINE MOLD

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Application January 13, 1954, Serial No. 403,831

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3 Claims. (Cl. 92—43)

This invention relates to apparatus for the manufacture of boards and papers from fibrous pulp.

The principal object of the present invention is to dispense with the need for the wire mesh undercover and at the same time to provide an improved support for the outer cover in that it is more truly circular and maintains improved drainage beneath the outer cover. It is a further object of the invention to provide a form of support for the outer cover of a cylinder mould, said support being adapted to act also as a filter for thickening or concentrating fibrous suspensions.

According to the invention, a supporting structure for the outer mesh cover of a cylinder mould, comprises metal strip which is secured to and is radially disposed with respect to a cylindrical framework, the outer marginal portion at least of said metal strip being shaped to a wavy or sinuous form. By this means, the metal strip contacts the outer cover only on the knuckles of the weave, thereby affording a high drainage efficiency as distinct from plain or flat metal strip which falls into the warp of the weave, thereby hindering drainage and causing cement deposits to build up quickly. Furthermore, since the metal strip is at all positions at right angles to the outer cover, it offers no surface on which fine powder escaping into the interior of the cylinder can accumulate thereby increasing the life of the outer cover and enabling the machine to be kept at its maximum output.

The metal strip is advantageously in the form of a spirally wound metal band or ribbon, the convolutions of which are radially disposed with respect to the supporting framework, although it will be understood that a plurality of metal bands or ribbons parallel to the axis of the framework could be used.

It has been found that a supporting structure as above set forth also constitutes an excellent filter for thickening or concentrating fibrous suspensions, the convolutions of the spirally wound metal band or ribbon being more closely spaced than when used for supporting the outer cover of a cylinder mould.

The sinuous band or ribbon may be supported by transverse bars supported in turn by rings or wheels, and in this case, the upper part only of the band or ribbon may be of wavy or sinuous form, the lower part being flat to engage slots in the transverse bars.

According to a further feature of the invention, the sinuous band or ribbon may be supported by a framework consisting of a series of rings having web members extending on each side thereof, the web members being connected together to form a lattice surface upon which the sinuous band or ribbon may be secured. This arrangement dispenses with the need for a central shaft or for spoked wheels or rings, thereby further improving the drainage and avoiding turbulence in the fibre suspension in which the mould or filter is operating.

The invention will now be illustrated with reference to the accompanying drawings, in which:

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Figure 1 illustrates a conventional method of supporting the outer mesh cover of a cylinder mould.

Figure 2 illustrates the use of a support according to the invention.

Figures 3 to 5 are detail views on a larger scale illustrating the principle of the invention.

Figures 6 and 7 illustrate methods of supporting the spiral sinuous band.

Figure 8 illustrates diagrammatically a filter according to the invention.

Figure 9 illustrates the arrangement of the spiral sinuous band for use in a filter as shown in Figure 8, and

Figure 10 illustrates a method of securing the outer mesh cover of a cylinder mould to the support.

Referring first to Figure 1, the outer mesh cover 10 is supported by an arrangement comprising a spiral wire 11, which is wound around longitudinal bars (not shown), a coarse mesh undercover 12, and a finer mesh undercover 13. Such a method of supporting the outer mesh cover suffers from many disadvantages that are well understood in the art. Among these disadvantages, the following may be mentioned:

(a) The various mesh undercovers are expensive and skilled labour is required for their assembly and maintenance.

(b) The resulting surface of the cylinder mould has an irregular periphery which does not present a straight line to the felt roll which lifts the sheet from the mould, thus producing irregular sheets.

(c) The undercovers constitute a trap for the smaller fibres which escape through the top cover and lodge between the undercovers and "blind" them. This results in a heavy wastage of top and under-covers which cannot be cleaned but which are not otherwise damaged.

(d) Frequent shut-downs of expensive plant are necessary to service the undercovers, or alternatively spare cylinder moulds must be provided to avoid such shut-downs. There are often seven to eight cylinder moulds to one machine.

These disadvantages are avoided or reduced by supporting the outer mesh cover 10 by means of a metal ribbon 14 as illustrated in Figure 2, and in this connection it is pointed out that the scale of Figure 1 is approximately 4:1 with respect to life size, while that of Figure 2 is approximately 1:1. The ribbon 14 may be made of strip metal and as shown comprises in cross-section a comparatively thick base portion 15 and a tapered upper portion 16 which is shaped to the sinuous or wavy form shown in Figure 2. It will be seen from a consideration of Figures 3 and 4, which are cross-sections through the ribbon at different positions, and from the diagram in Figure 5, that the spirally wound sinuous ribbon provides a multi-point, as distinct from a linear, support for the outer cover. Thus, the points X, which correspond to the parts of the ribbon that are not deformed from the original plane of the ribbon, are higher than the points Y, which correspond to the deformed parts of the ribbon. In effect therefore, the outer cover 10 is supported at a large number of equispaced points X presented by the respective convolutions of the spirally wound sinuous ribbon. This arrangement also effects continuous lateral fluid diffusion or turbulence in the zone of the screen and prevents the flow of fibre-carrying water from dividing into straight channels which tend to streak the deposit.

As illustrated in Figure 6, the ribbon 14 may be supported by a conventional arrangement of slotted bars 17 and wheels or discs 18 having spokes 19 radiating from a hub (not shown) by which the wheels or discs are supported on a central shaft (not shown).

This arrangement is satisfactory in certain cases but at the higher speeds now being called for in the paper

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making industry, the bars 17 and the spokes 19 cause turbulence in the water which has drained through the outer cover, thereby producing a surge within the mould which tends to disturb and even to destroy the film of fibres formed on the surface of the mould. For this reason, a supporting structure as shown in Figure 7 is particularly advantageous for use at such high speeds. The structure shown therein comprises a plurality of rings 20, having no spokes, which are spaced apart by bars 21. The rings 20 are formed on each side with triangular webs 22 which are connected together at their apices as indicated at 23 to form a lattice framework. The webs 22 of the end rings are secured to lugs 24 provided on end plates 25. The sinuous ribbon 14 is then wound on to the lattice framework formed by the interconnected webs 22.

A supporting structure according to the invention is particularly suitable as a filter surface for thickening or concentrating suspensions such as those encountered in papermaking. Such thickening or concentrating is commonly effected by means of a rotating cylinder of the kind employed as a cylinder mould, except that the outer mesh cover is supported directly by the spiral wire. The solid matter which is deposited on the outer surface of the cover is not in the form of a coherent sheet, but in the form of an irregular layer of collections of solid matter which are removed from the cover by means of a felt covered roll, doctored off with a wooden blade, washed off with a spray, or blown off with an air blast, and collected in a trough or bin for conveyance to the next treating process. This thickening or concentrating process involves extremely hard wear on the outer cover which is frequently damaged and wears out quickly. The outer cover is also liable to tear or split so that the efficiency of the process is impaired, a fact which is not discovered until the process has been completed. Doctoring with a blade directly on to the cover also wears out the cover quickly and it is a common practice to bind the outside of the cover with thin wire in an effort to reduce such wear.

The use of a filtering surface according to the present invention avoids all these disadvantages and a concentrating or thickening device embodying such a filtering surface is diagrammatically illustrated in Figures 8 and 9. As shown in Figure 9, the convolutions of the sinuous band 14 are more closely spaced together than is the case when the band is providing support for an outer cover.

Referring to Figure 8, the band 14 is supported by longitudinal bars 26 secured to rings 27 mounted on a central shaft 28. The filter is arranged within an inner cylindrical casing 29 located within an outer casing 30, the suspension to be thickened or concentrated being admitted to the outer casing 30 via an inlet 31 and passing into the inner casing 29 over a weir 32. Solid matter collects on the filtering surface constituted by the sinuous band 14 and is blown off by means of compressed air blown against the under face of the filtering surface

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from jets 33, the filtrate collecting inside the filter from where it is drained off. The recovered solids are conveyed by a chute 34 into a conveyor 35 which, as shown, is a screw-feed conveyor.

A particularly effective method of securing the outer mesh cover to the sinuous band supporting surface is illustrated in Figure 10. The convolutions of the band 14 are formed with dove-tailed recesses 36, the ends of which constitute a fixed jaw, while corresponding jaw members 37 are mounted on an arm 28 which is operable to move the members 37 towards and away from the fixed jaw, so that the members 37 constitute in effect a movable jaw. The adjacent ends of the cover 39 are provided with edge clips 40 which engage the fixed and movable jaws respectively.

I claim:

1. A screen supporting member for cylinder moulds, comprising, a metal channel forming strips having its body disposed vertically edgewise to the screen, said body having an undeformed inner edge, an outer edge beneath the screen and deformed alternately to one side and the other of the transverse plane of the body to provide a continuous sinuous edge, the junctions of the deformations being higher than the medial portions of the deformations to provide a plurality of spaced screen supporting points with intermediate clearances therebetween, said clearances providing passage for fluid from the channel laterally beneath the screen.

2. A cylinder mould including, a framework, an outer screen, and means for supporting the screen on the framework, said means comprising a strip spirally wound on the framework with its laterally spaced adjacent convolutions forming a fluid channel, said strip having an undeformed inner edge portion engaging said framework, and also having its outer edge portion sinuously deformed to provide alternate laterally deflected portions whose outer marginal edges are of less height than the junctions of said deflected portions to form a plurality of equispaced points upon which the screen rests, the curved side walls of said deflected portions projecting into adjacent portions of the channel and imparting continuous lateral fluid diffusion beneath the screen.

3. A cylindrical mould according to claim 2, wherein the said framework comprises a shaft, a plurality of spider hoops mounted at their axes on said shaft, said hoops being in spaced relationship, and a set of bars carried by said hoops, said bars being parallel to said shaft and in spaced relationship to one another, said bars constituting a mounting for said spirally wound strip.

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