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I. L. LAIRD

SCREEN FOR PAPER MAKING

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Fig. 1

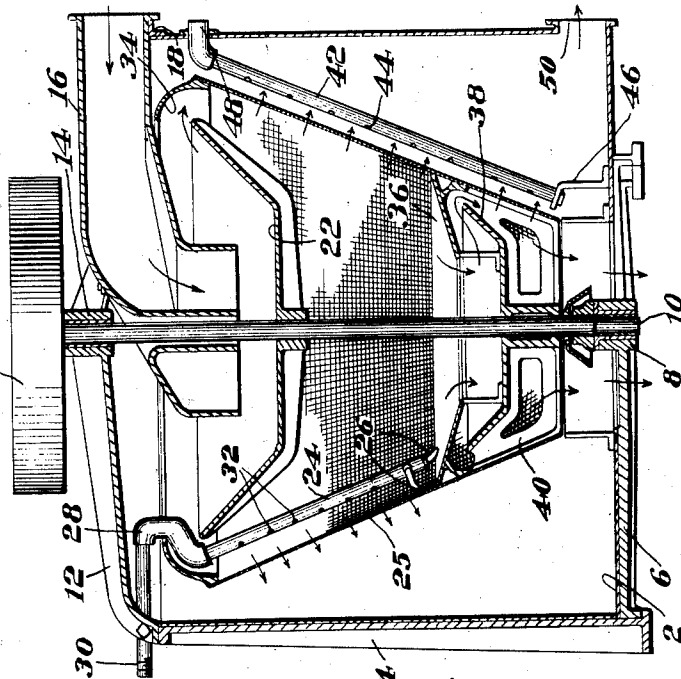
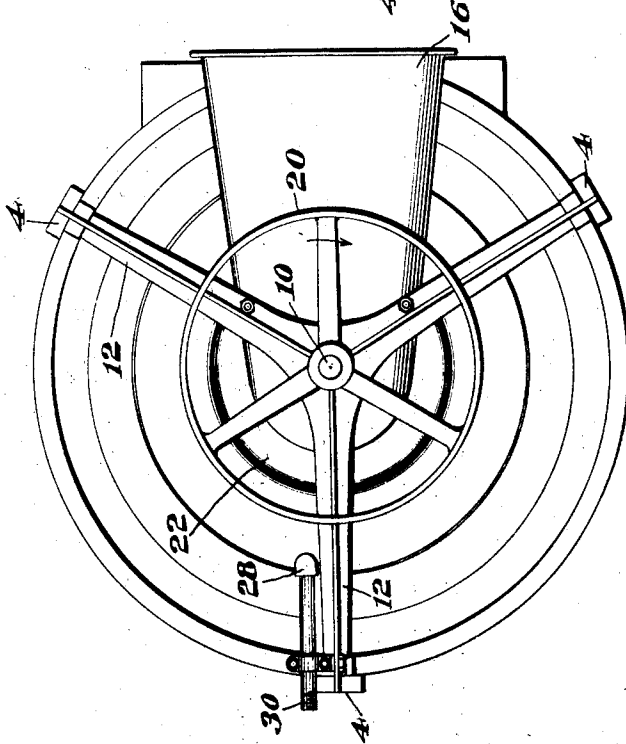


Fig. 2



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SCREEN FOR PAPER MAKING.

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This invention relates to screens for use primarily in paper making, and is designed more particularly for the coarse screening of material suspended in a liquid. For the purpose of this explanation of its construction and operation, it may be considered as a knotter or coarse screen for removing the knots, slivers, and larger particles from wood pulp.

The present invention has for its objects the provision of more efficient means for screening, and to improve upon knotters and screens in present use.

An embodiment of the invention is illustrated in the annexed drawings, wherein—

Fig. 1 is a vertical cross-section of the device, with various parts in elevation, such as the pulley, central shaft, and shower pipes; and

Fig. 2 is a top plan view of the device.

Referring to the drawings, the machine consists of a casing 2, made, for example, of sheet metal of suitable thickness supported by uprights 4 and a lower spider 6. The lower spider may, as here, have three arms each of which is bolted to an upright 4. This lower spider carries a step or thrust bearing 8 which serves to center and carry a rotating shaft 10. The uprights 4 are connected at their upper ends by the upper spider 12 which also has three arms and contains the upper bearing 14 which serves to center the shaft 10 and hold it in position for rotation. To the upper spider is attached by suitable means a stock inlet 16 which rests at its outer end upon the casing 2 and the angle 18 used to stiffen the casing. A drive pulley 20 is keyed or otherwise fastened to the shaft 10 so as to drive the same when the pulley is rotated. There is also affixed to the shaft 10 a distributing bowl 22 which is carried by and rotates with the shaft. A shower pipe 24 extends into the screen 25 from a point adjacent the bowl 22. This shower pipe is provided with suitable nozzles 26 and is fed through the gooseneck 28 and feed pipe 30 which is attached to one of the arms of the spider 12 as shown in the drawings. In addition to the nozzles 26 the shower pipe 24 may be provided with holes 32 for the purpose of projecting jets of water against the screen.

The screen 25 consists of plates of perforated sheet metal (indicated in the drawings as screen) suitably fastened together so

as to form an inverted truncated cone (the fastenings and joints of the plates in the screen not being shown) which is held and rotated as to turn with the distributing bowl 22 and other rotating parts of the screen. At the top of the screen is affixed a stock guide 34 which deflects downwardly the stock received from the distributing bowl 22. The tailing guide 36 is supported and rotated by the shaft 10 through the medium of a tailing distributing bowl 38 which is keyed directly to the shaft 10. The tailing distributing bowl has wing or spiderlike arms 40 which brace and hold the screen 25 as can be seen from Fig. 1 of the drawing. A shower pipe 42, placed parallel with the outside of the screen, contains a series of holes 44 adapted to project water against the screen. This shower pipe is supported by a bracket 46 and is fed through the elbow 48.

In the operation of the device, the shaft and all the units attached thereto are rotated at the proper speed which depends largely upon the nature of the wood pulp or material to be screened or knotted. This speed can readily be ascertained by experiment and as a practical matter the maximum speed is limited only by the tendency of the particles to felt or mat on the inside of the rotating screen. The stock to be screened enters through the inlet 16 and passes downwardly into the distributing bowl 22. After the bowl is sufficiently filled, centrifugal force throws off an evenly distributed sheet of stock from the periphery of the bowl. This sheet of stock strikes the stock guide 34 which is rotated by the screen. The guide 34 prevents the stock from splashing or escaping and guides it downwardly along the screen. Centrifugal force causes acceptable stock to pass through the perforations in the screen. A surplus of stock, with the help of the outside and inside showers, carries the knots and slivers downwardly and when they reach the tailing guide 36, only a comparatively small amount of good fibre is left. Tailing shower nozzles 26 wash the knots and slivers and the remaining good fibre down the slope of the tailing guide 36 toward and into its center opening where they drop through and into the tailing distributing bowl 38. The proper dilution of the mixture of knots, slivers and good fibres thus obtained obviates the necessity of an addi-

tional inside shower at this point, the outside shower 42 being sufficient, because of the decreased centrifugal force due to the smaller circumference of the cone at this section, and hence a lower rate of lineal speed. The outside shower alone gives satisfactory operation in many cases. The good fibre or accepted stock pass through the perforations in the screen and fall to the bottom of the casing 10 from which it flows out through a discharge opening 50. The outside shower with the aid of gravity forces the knots and slivers to drop through the openings between the arms of the tailing distributing bowl 38, through the opening in the floor of the casing 2 and thence out between the arms of the bottom spider 6.

In my use of the word "stock" in the following claims, I am using it to mean unscreened material suspended in a liquid, whether or not such material is strictly paper stock or paper making material, and the word "tailings" to mean simply coarser material in said "stock".

Having described my invention, what I wish to claim and secure by Letters Patent is:

1. In a centrifugal machine of the class described, having, in combination, a screen adapted to be rotated about an axis, means to distribute stock about the inside of the screen near one end, a shower adapted to clear clogged apertures in said screen, means to collect unscreened material and distribute it about the inside of a screening section, whereby said material is subjected to a second screening operation, and means to separately conduct the accepted stock and tailings from the screen.

2. A machine of the class described, having, in combination, a screen adapted to be rotated about a substantially vertical axis, means to distribute stock about the inside of the screen near one end, a shower adapted to clear clogged apertures in said screen, means to collect unscreened material and distribute it about the inside of a lower screening section, whereby said material is subjected to a second screening operation, and means to separately conduct the accepted stock and tailings from the screen.

3. A machine of the class described, having, in combination, a centrifugal screen of a substantially frusto-conical section adapted to be rotated about a substantially vertical axis, means to uniformly distribute stock about the inside of the screen near its upper end, a shower adapted to clear clogged apertures in said screen, means to collect unscreened material and distribute it about the inside of a lower screening section, whereby said material is subjected to a second screening operation, and means to conduct the accepted stock and tailings from the screen.

4. A machine of the class described, having, in combination, a screen member having as its screen surface a surface of revolution, means to distribute stock about the inside of the screen near one end of the same, a shower adapted to clear the apertures in said screen, means to collect the unscreened material and distribute said material about the inside of a lower screening section, whereby said material is subjected to a further screening operation, and means to separately conduct the accepted stock and tailings from the screen.

5. A machine of the class described, having, in combination, a screen member having as its screen surface a surface of revolution, means to distribute stock about the inside of the screen near one end of the same, a shower adapted to clear the apertures in said screen and direct the tailings downwardly, means to collect the unscreened material and distribute said material about the inside of a lower screening section, whereby said material is subjected to a further screening operation, and means to separately conduct the accepted stock and tailings from the screen.

6. A machine of the class described, having, in combination, a screen member adapted to be revolved about a substantially vertical axis, having as its screen surface a surface of revolution, means to distribute stock about the inside of the screen near the upper end of the same, means to collect the unscreened material and distribute said material about the inside of a lower portion of said screen member, whereby said material is subjected to a further screening operation, and means to separately conduct the accepted stock and tailings from the screen.

7. A machine of the class described, having, in combination, a screen member adapted to be revolved about a substantially vertical axis, revolving means to distribute the stock about the inside of the screen near the upper end of the same, and means to separately conduct the accepted stock and tailings from the screen.

8. A machine of the class described, having, in combination, a screen member adapted to be revolved about a substantially vertical axis, means to distribute the stock in a sheet about the inside of the screen near the upper end of the same, and means for separately conducting the accepted stock and tailings from the screen.

9. A machine of the class described, having, in combination, a screen member adapted to be revolved about a substantially vertical axis, and stock distributing bowl adapted to be revolved about the same axis so as to distribute stock about the inside of the screen near the upper end of the same, and means to separately conduct the accepted stock and tailings from the screen.

10. A machine of the class described, having, in combination, a screen member adapted to be revolved about a substantially vertical axis, and stock distributing bowl adapted to be revolved about the same axis so as to distribute stock about the inside of the screen near the upper end of the same, a shower adapted to clear the apertures in said screen, and means to separately conduct the accepted stock and tailings from the screen.

11. A machine of the class described, having, in combination, a screen member adapted to be revolved about a substantially vertical axis, means to distribute stock about the inside of the screen near the upper end of the same, means to collect the unscreened material and uniformly distribute said material about the inside of a lower screening section, whereby said material is subjected to a further screening operation, and means to separately conduct the accepted stock and tailings from the screen.

12. A machine of the class described, having, in combination, a screen member having as its screen surface a surface of revolution, means to revolve said screen member about its axis, means to conduct stock to the screen, means to direct the entering stock along the inside of the screen, means to clear clogged apertures in said screen member, means to collect the unscreened material and distribute the same in a diluted condition about the inside of a second screening section, whereby said material is subjected to a further screening operation, and means to separately conduct the accepted stock and tailings from the screen.

13. A machine of the class described, having, in combination, a screen member having as its screen surface a surface of revolution, means to revolve said screen member about its axis, means to conduct stock to the screen, an imperforate stock guide to direct the

entering stock along the inside of the screen, means to clear clogged apertures in said screen member, means to collect the unscreened material and distribute the same in a diluted condition about the inside of a second screening section, whereby said material is subjected to a further screening operation, and means to separately conduct the accepted stock and tailings from the screen.

14. A machine of the class described, having, in combination, a screen member having as its screen surface a surface of revolution, means to revolve said screen member about its axis, means to conduct stock to the screen, means carried by said revolving screen member to direct the entering stock along the inside of the screen, means to clear clogged apertures in said screen member, means to collect the unscreened material and distribute the same in a diluted condition about the inside of a second screening section, whereby said material is subjected to a further screening operation, and means to separately conduct the accepted stock and tailings from the screen.

15. A machine of the class described, having, in combination, a screen member having as its screen surface a surface of revolution, means to revolve said screen member about its axis, means to conduct stock to the screen, an imperforate stock guide, carried by said screen member, adapted to direct the entering stock along the inside of the screen, means to clear clogged apertures in said screen member, means to collect the unscreened material and distribute the same in a diluted condition about the inside of a second screening section, whereby said material is subjected to a further screening operation, and means to separately conduct the accepted stock and tailings from the screen.

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