March 19, 1929. J. DE WITT 1,705,908

DEINKING APPARATUS

Filed July 27, 1927 2 Sheets-Sheet 1

Fig 1

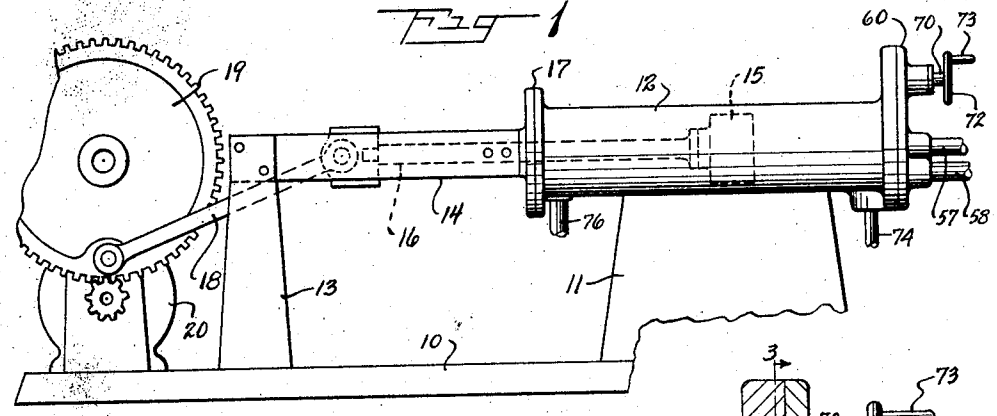


Fig 2

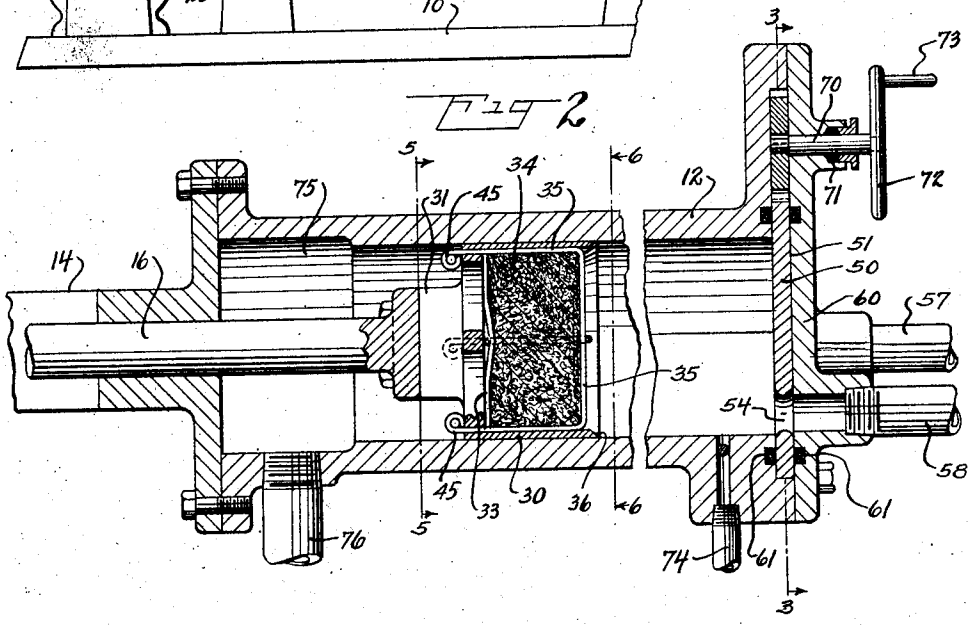
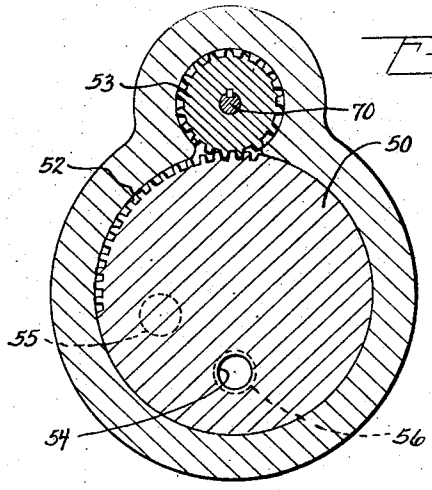


Fig 3



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DEINKING APPARATUS

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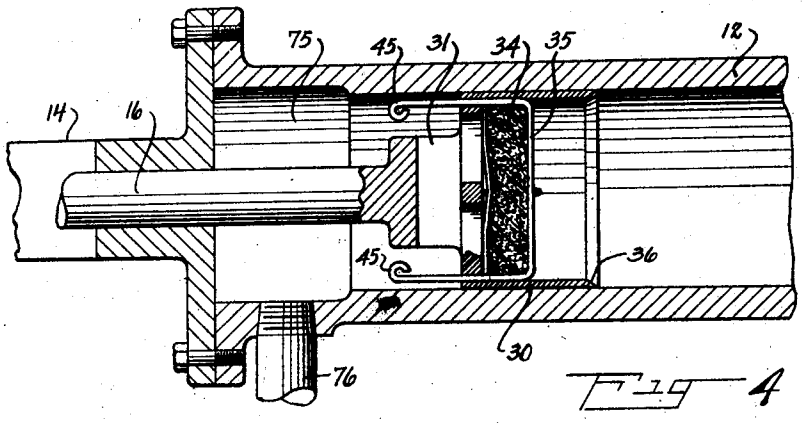


Fig 4

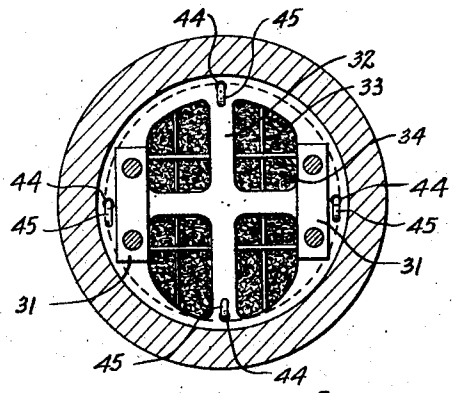


Fig 5

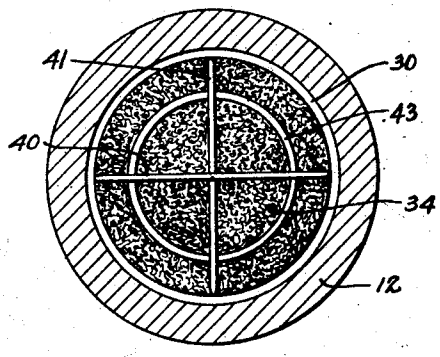
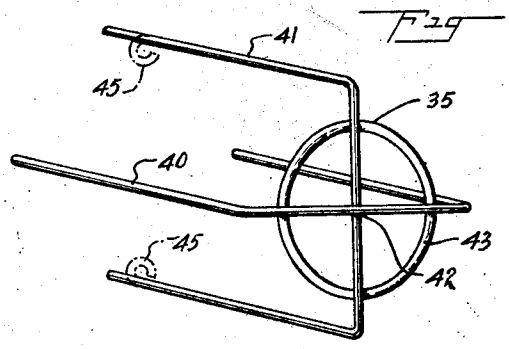


Fig 6

Fig 7



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Patented Mar. 19, 1929. 1,705,908

UNITED STATES PATENT OFFICE.

JENNINGS DE WITT, OF NEW YORK, N. Y.

DEINKING APPARATUS.

Application filed July 27, 1927. Serial No. 208,727.

This invention relates to improvements in deinking paper.

The invention has particular reference to an improved pump mechanism of the general type referred to in my co-pending application S. N. 205,608, filed July 14, 1927, of which this application is a continuation in part.

An object of the invention relates to improved means for dehydrating fibrous material to prepare the material for subsequent use in making paper.

An important feature of the invention is an improved piston including means for maintaining in position thereon, a mass of sponge rubber or like material, whereby the material may be alternately compressed and expanded so as to remove fluid.

Another important feature relates to the provision of means for effectively limiting the expansive movement of the sponge rubber. According to this feature the material being acted upon cannot clog the mechanism, and is positively ejected when sufficiently dehydrated for subsequent treatment.

Other objects will appear from the following description, taken in connection with the accompanying drawings, in which,

Fig. 1 is a side elevation of a pump mechanism embodying features of the invention;

Fig. 2 is a vertical sectional view of the cylinder of Fig. 1;

Fig. 3 is a section taken on the line 3—3 of Fig. 2;

Fig. 4 is a vertical sectional view similar to that of Fig. 2 but with the piston in compressed position;

Fig. 5 is a section taken on the line 5—5 of Fig. 2;

Fig. 6 is a section taken on the line 6—6 of Fig. 2; and

Fig. 7 is a perspective view of the maintaining means of Fig. 2.

Like reference characters denote like parts in the several figures of the drawing.

In the following description and claims, parts characteristic features and functions will be identified by specific means for convenience of expression, but they are intended to be as generic in their application to similar parts or equivalent construction as the art will permit.

Referring particularly to Fig. 1 there is shown a central pump mechanism mounted on a base 10, having a pedestal 11 thereon for supporting a cylinder 12. A support 13 is secured to the base 10 apart from the pedestal 11 for supporting a guideway 14 in alinement with the axis of the cylinder 12. A piston head shown generally at 15 is slidably mounted within the chamber of the cylinder 12 and is actuated by a piston rod 16 extending through the end wall, designated as at 17, of the cylinder 12. The outer end of the connecting rod 16 is pivotally connected to a pitman 18 and thus to a fly wheel 19 which is operatively connected in any suitable manner, as by a speed reduction gear to a source of power, preferably in the form of an electric motor 20.

The piston 15 is snugly fitted in the bore of the cylinder 12 and includes an annular portion 30 of relatively thin metal which terminates at one end in a pair of opposed lugs 31, 31 to which the piston rod 16 is connected, and which is provided with a spider 32 (see Fig. 5). A wire screen or grid 33, formed for example of ½ inch wire net or the like is positioned in contact with the inner face of the spider 32. A mass of compressible material 34, preferably of sponge rubber or fiber mat material is mounted within the annular wall 30, and is maintained in place adjacent the screen 33 by a cage 35 (see Fig. 7). The free edge of the wall portion 30 of the piston is bevelled as at 36 so as to scrape material from the inner wall of the cylinder.

The cage 35 comprises a pair of U shaped members 40, 41 secured as at 42 by a ring 43 fastened to the intermediate portions of the members 40, 41 in any desired manner as by spot welding. The free ends of the members 40, 41 are each inserted through apertures such as 44 in the spider 32. The piston is assembled by seating the sponge rubber 34 within the cage 35, applying the cage to the spider, and then bending the ends of the members 40, 41 as clearly indicated at 45 in Fig. 2. The bent ends 45 effectively limit the movement of the cage 35 with respect to the remainder of the piston.

The pump mechanism as illustrated includes a rotary valve comprising a disc 50 positioned in a valve chamber 51 in the free end wall of the cylinder 12. The disc 50 is provided with peripheral teeth 52 engaging a pinion 53. The disc 50 is apertured as at 54, the aperture being arranged to register in different positions of the disc with an inlet port 55, and an outlet port 56. The inlet port 55 communicates with a material feed pipe 57 through which material to be acted upon may be introduced into the cylinder. The outlet

port 56 is in communication with a material discharge pipe 58. A housing 60 is bolted to the end of the cylinder and there is preferably provided in annular recesses in the end of the cylinder and in the housing a pair of packing rings 61, 61 for effectively sealing the rotary valve against undesired leakage.

For operating the rotary valve the pinion 53 is secured to a shaft 70 extending through a packing box 71 and terminating at its outer end in a hand wheel 72 having a control handle 73. The interior of the cylinder 12 near the rotary valve is provided with a supply pipe 74 through which clean fluid may be injected into the cylinder. The other end of the cylinder is of relatively enlarged internal diameter as indicated at 75 and the chamber thus formed is in communication with an outlet pipe 76 for discharge of slush fluid.

In operation, the motor 20 having been started, the valve controller 73 is controlled to permit a measured quantity of material to be acted upon to be introduced into the interior of the cylinder 12. The piston 15 is drawn fully to the left of Fig. 2 and the cylinder is completely filled. The handle 73 is then operated so as to close both valve ports, 54, 55. The piston 15 is then moved to the right under control of the motor 20. During the movement of the piston towards the right, the sponge rubber 34 is compressed against the material being acted upon, and takes up the position shown in Fig. 5. It will be seen that the wire cage 35 is freely movable with respect to the annular portion and moves with the front face of the sponge rubber. The reciprocating action is repeated as many times as may be desired, the sponge rubber alternately being compressed and expanded. As the sponge rubber expands it soaks up fluid from the material, and releases this fluid near the left hand end of the cylinder. The released fluid flows out through the pipe 76. The characteristics of the sponge rubber are such that it does not take up the fibrous material being acted on. After several strokes of the piston 15 have been made a quantity of clean water may be introduced through the pipe 74. Before the commencement of the last right hand stroke of the piston the handle 73 is manipulated so as to open the discharge port 56, and the dehydrated mass of material is forced out through the pipe 58.

The invention upon which this application is based is broader than the specific embodiment shown and described for the purpose of illustrating at least one of the ways in which it may be employed. The scope of the invention is, therefore, to be understood as not being limited by the present specific description. I intend no limitations other than those imposed by the claims.

What is claimed is:—

1. Means for dehydrating a mixture, comprising a reciprocating piston, a mass of sponge material arranged for compression and expansion in contact with the material being treated, and means for limiting the expansive movement of said sponge material.

2. A dehydrating mechanism including a cylinder, means for introducing therein a mixture to be treated, a piston slidably mounted in said cylinder, means for reciprocating said piston, a mass of compressible material mounted on said piston, and means slidably mounted on the piston for maintaining said compressible material and for limiting the expansive movement thereof.

3. Means for dehydrating a mixture, comprising a reciprocating piston, a mass of sponge rubber positioned thereon to contact with mixture to be treated, and a wire cage slidably mounted on said piston for limiting the expansive movement of the sponge rubber.

4. Means for dehydrating a mixture, comprising a piston having an annular portion of relatively thin metal, means operatively connected to one end of said piston for reciprocating the same, a mass of sponge rubber positioned within said annular portion and arranged for compression and expansion in contact with the mixture being treated, and an open network slidably mounted on said piston for limiting the expansive movement of the sponge rubber.

5. A dehydrating mechanism including a cylinder, means for introducing therein a mixture to be treated, a piston slidably mounted in said cylinder, said piston being open at both ends, a mass of sponge rubber mounted within said piston and arranged for compression and expansion in contact with the mixture, and means slidably mounted on the piston for limiting the expansive movement of the rubber.

6. Means for dehydrating a mixture, comprising a reciprocating piston, a mass of porous compressible material positioned thereon to contact with mixture to be treated, and a wire cage slidably mounted on said piston for limiting the expansive movement of the compressible material.

7. Means for dehydrating a mixture, comprising a member having an annular portion of relatively thin metal, means operatively connected thereto for reciprocating the member, a mass of porous compressible material positioned within said annular portion and arranged for compression and expansion in contact with the mixture being treated, and a wire net work slidably mounted on said member for limiting the expansive movement of the compressible material.

8. A dehydrating mechanism including a cylinder, means for introducing therein a mixture to be treated, a sleeve slidably mounted in said cylinder, said sleeve being open at both ends, a mass of porous compressible material mounted within said sleeve and arranged for compression and expansion in

contact with the mixture, and means slidably mounted on the piston for limiting the expansive movement of the compressible material.

9. Means for dehydrating a mixture comprising a reciprocating holder, and a mass of sponge rubber held thereby arranged for compression and expansion in contact with the material being treated.

10. Means for dehydrating a mixture comprising a reciprocating piston, a mass of sponge rubber arranged for compression and expansion in contact with the material being treated, and a screen for maintaining the sponge rubber on the piston.

Signed at New York in the county of New York and State of New York.

JENNINGS DE WITT.