March 20, 1934. P. BROWN ET AL 1,951,748

SPOOL

Filed Nov. 13, 1931

Fig. 1.

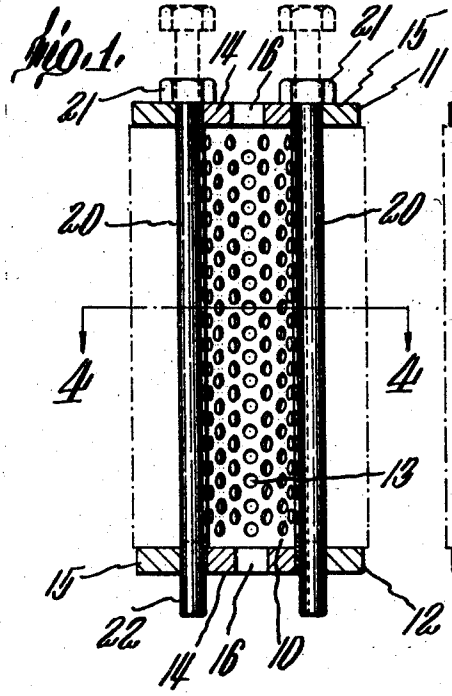


Fig. 2.

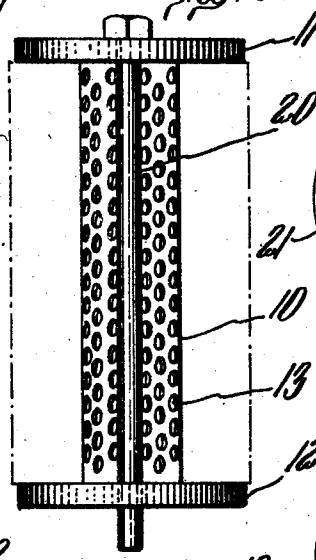


Fig. 3.

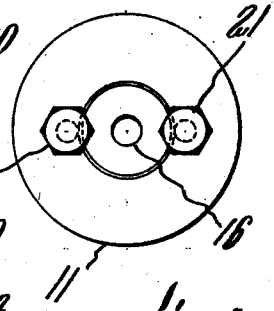


Fig. 4

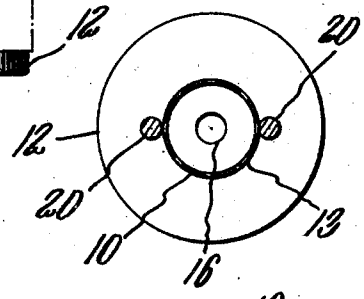


Fig. 5.

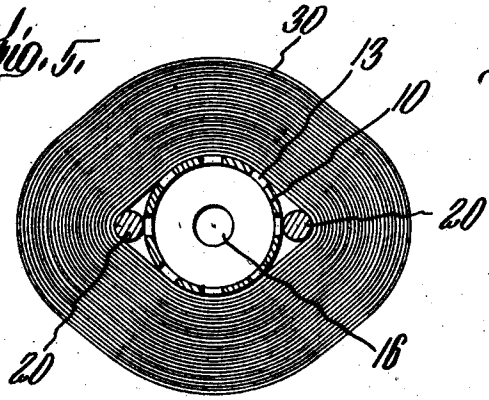


Fig. 6.

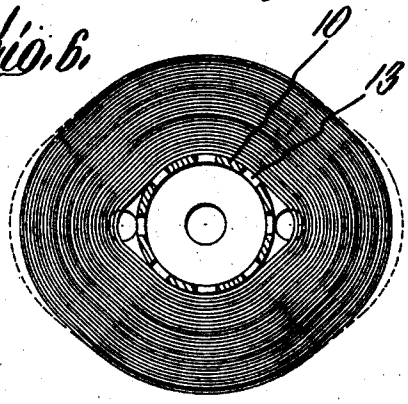
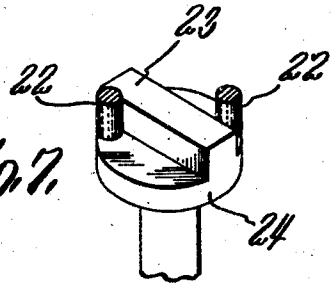


Fig. 7.



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UNITED STATES PATENT OFFICE

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SPOOL

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Application November 13, 1931, Serial No. 574,748

4 Claims. (Cl. 242—118)

This invention relates to a spool on which a thread or other strand may be wound for liquid treatment. While the use of the spool is not limited to any particular type of material or strand, the embodiment of the invention herein illustrated and more particularly described is especially adapted for use in the manufacture of twine or twisted rovings of wood pulp.

In the manufacture of wood pulp twine, thin ribbons of wet pulp may be formed on a suitable screen, each of these ribbons while wet being furled or rolled into cylindrical or rod-like form. These strands are then dried and may, if desired, be given a slight twist. In order to form twine of substantial diameter and strength, two or more of the individual rovings may be twisted together by suitable mechanism for the purpose, the twisted twine then being wound on a spool for softening treatment since untreated pulp twine is naturally somewhat stiff and hard. The softening treatment may be effected conveniently by forcing a soap solution or other softening agent through thread bodies wound on spools. In order to permit the softening solution to pass readily through the thread body, it is important that the thread body be loosely wound on the spool. According to this invention, a spool is provided having a hollow perforated core. Means are also provided for temporarily increasing the effective diameter of the core while the twine is being wound on the spool. Such means may consist of a pair of rods or pins extending through the heads of the spool outside of the core. The removal of these rods or pins after the thread body has been wound on the spool relieves the tension necessarily produced by the winding, so that when softening liquid is introduced into the core of the spool under pressure, it readily seeps through loosened turns of the thread body on the spool. The rods or pins which extend through the heads of the spool during the winding operation preferably project below the bottom of the spool so as to cooperate with the key on the winding head to cause the spool to rotate with the winding head when the twine is being wound thereon. When these rods are removed from the spool, they leave the upper and lower ends of the spool free from projections so that these ends can fit against suitable gaskets in the liquid-treating apparatus and facilitate the introduction of softening liquid into the core under pressure. For a more complete understanding of the invention, reference may be had to the description of an embodiment thereof which follows hereinafter, and to the illustration of the invention on the drawing, of which,—

Figure 1 shows in vertical section, a spool embodying the invention.

Figure 2 is a side elevation of the same.

Figure 3 is a top plan view of the same.

Figure 4 is a section on the line 4—4 of Figure 1.

Figure 5 is a similar section showing a thread body on the spool.

Figure 6 is a similar section with the rods or pins removed from the spool.

Figure 7 is a fragmentary perspective view of a winding head with a spool thereon.

The spool illustrated on the drawing comprises essentially a hollow cylindrical perforated core 10, at the ends of which are fixed a pair of spool heads 11 and 12. The material or materials of which the spool is constructed will depend upon the kind of liquids which will be forced through the core. For the softening of thread bodies of pulp, twine or the like, the core 10 and heads 11 and 12 may be of any suitable metal, such as aluminum. It is obvious that if the spool is to be used with corrosive fluids, non-corroding materials may be employed, such as special metals, wood, bakelite, rubber-coated metal, or any other materials or combinations of materials. The core 10 is preferably made with a multiplicity of small lateral perforations 13 through which liquid may pass from the interior of the core to the exterior thereof. As shown on the drawing, each of the heads 11 and 12 may be made of two pieces, an inner ring 14 which is welded inside an end portion of the core 10, and an outer ring 15 which is welded about the end portion of the core 10, the faces of the inner and outer rings 14 and 15 being flush so that these rings form a substantially integral head permanently attached to the end of the core. Each head has a central perforation 16 to receive a spindle for support and to permit the introduction of liquids, etc., into the interior of the core 10. Each of the heads 11 and 12 are also perforated to receive one or more rods or pins 20, two such rods being illustrated on the drawing. These rods are of sufficient diameter to resist the lateral stresses imposed thereon by the tension of thread bodies wound thereon. Each of the rods 20 may be provided with a head 21 or equivalent device to engage the upper surface of the head 11 so as to support the rod in place. Each rod 20 also has a lower portion 22 projecting below the lower head 12 of the spool. These lower projecting portions 22 cooperate with the key 23 of a winding head 24 when the spool is rotated on the winding head, as shown in Figure 7. The

rods 20, being radially outside of the core 10, increase the effective circumference of the core so that each turn of thread in the thread body which is wound on the spool has a greater length than it would have had if wound directly on the core 10. The thread body wound on the spool thus takes a form similar to that illustrated at 30 in Figure 5. In winding a thread or twine on a spool, there is inevitably a certain amount of tension on the strand, so that each turn is laid on the spool under tension. Even if this tension be relatively slight, the combined tension of a large number of turns is considerable so that the pins 20 must be substantial and rigid. The winding tension of the strand also results in a relatively dense thread body on the spool which prevents or retards the free circulation of treating liquor therethrough. By removal of the rods 20, as shown in Figure 6, this tension of the turns of thread on the spool is relieved so that liquid can more readily penetrate through the thread body. The removal of these rods furthermore leaves plane end faces on the spool so that the spool ends are readily fitted against suitable gaskets (not shown) to seal the ends preparatory to the introduction of liquid into the interior of the core 10 under pressure for treatment of the thread body 30. The removal of the rods 20 also permits a certain amount of shrinkage on the part of the thread when undergoing liquid treatment, if the material of the thread is subject to shrinkage.

It is obvious that the invention herein described and illustrated is subject to modifications and changes in structure without departing from the spirit or scope thereof as defined by the following claims.

We claim:—

1. A spool comprising a hollow perforated core, heads on the ends of said core having aligned perforations adjacent to and radially outward of said core, and a removable rod extending through said perforations in the heads; said rod having a portion projecting beyond one of said heads.

2. A spool comprising a hollow cylindrical core having a multiplicity of relatively small lateral perforations, a pair of disk-like heads mounted on the ends of said core, each said head having a central perforation, and a pair of removable rods extending loosely through said heads and radially outside of said core, each said rod having a portion projecting beyond one of said heads.

3. A spool comprising a hollow perforated core, centrally perforated heads mounted on the ends of said core and a pair of rods extending loosely through both heads and projecting down below the lower head, said rods being radially outside of said core.

4. A spool comprising a hollow perforated core, centrally perforated heads mounted on the ends of said core, and a pair of pins each extending loosely through both of said heads, each said pin having a head at its upper end resting on the upper surface of the upper spool head, each said pin having a portion projecting below the lower spool head, both said pins being radially outside of and parallel to said core.

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