Aug. 21, 1956 K. P. WILLIAMS 2,759,609

CENTRIFUGAL HYDROEXTRACTOR

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FIG. 1.

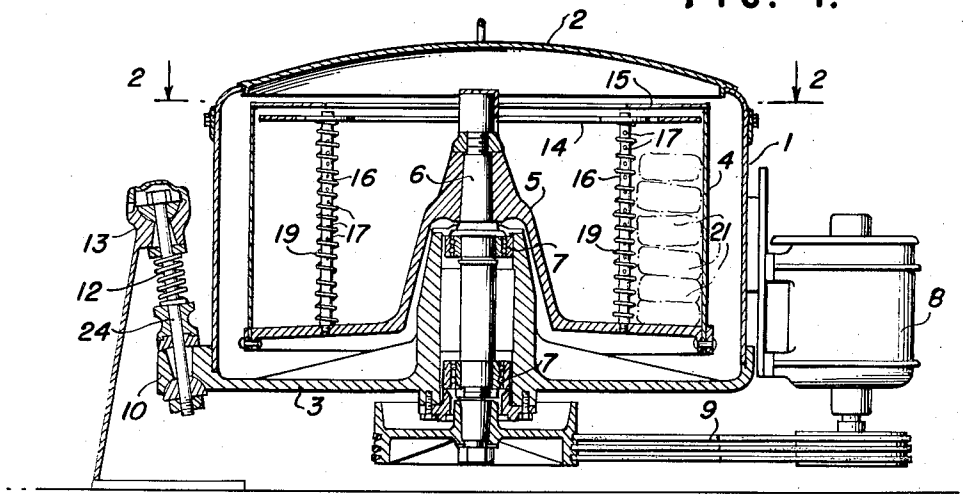
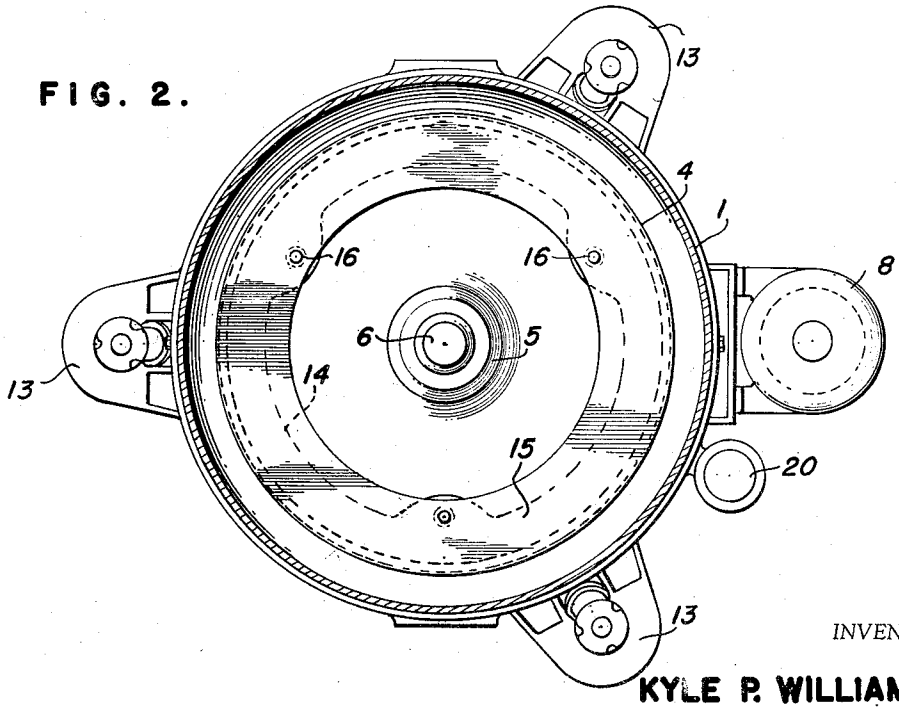


FIG. 2.



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FIG. 3.

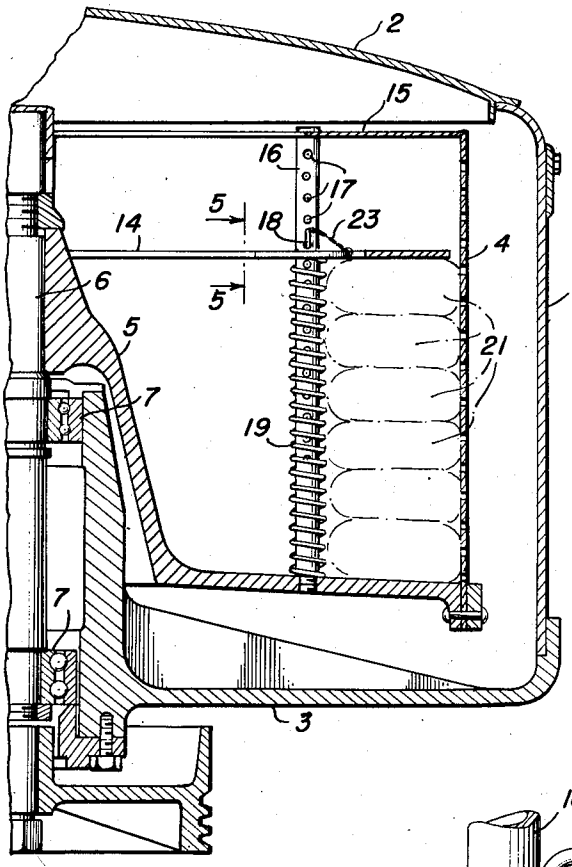
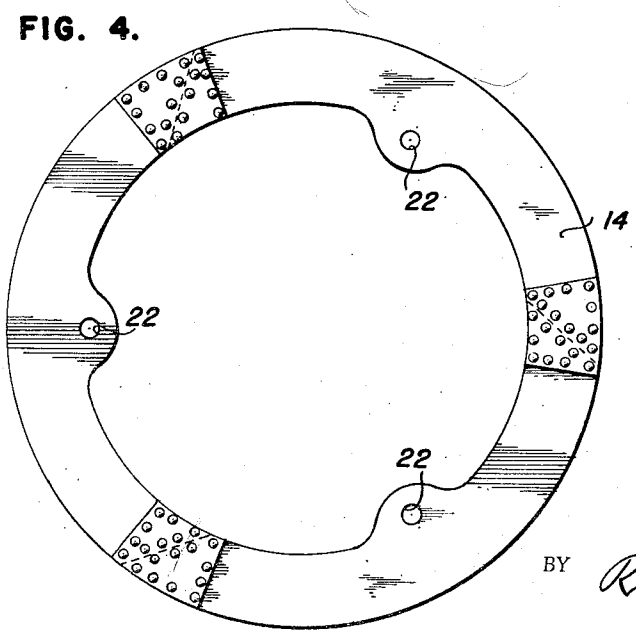


FIG. 4.



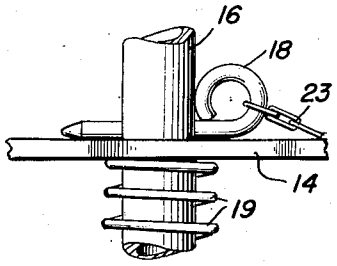


FIG. 5

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CENTRIFUGAL HYDROEXTRACTOR

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Application September 27, 1951, Serial No. 248,587

5 Claims. (Cl. 210—76)

This invention relates to improvements in centrifugal extractors used for the treatment of textile material.

The invention relates particularly to an arrangement for restraining movement of packages of textile material being treated in a centrifugal extractor.

When cakes, skeins, cheeses, or the like, of textile yarn or thread are treated in a centrifugal extractor, it is customary to pile the packages of textile material, uniformly distributed, in annular piles, generally adjacent to the inside of the perforated sidewall of the basket of the centrifugal extractor.

When an extractor so loaded is rotated at high speed to remove water or other liquid from the packages of textile material, the centrifugal force tends to cause the textile material to move toward the sidewall of the perforated basket. As a result the dimensions of the packages ppendicular to the sidewall of the perforated basket tends to become reduced, which in turn causes the other dimensions of the packages to become correspondingly increased. As a further result, the packages of textile material, especially the topmost, tend to turn so as to bring their smaller dimension perpendicular to the sidewall of the perforated basket.

This deformation and shifting of the pacakages of textile material tends to disarrange the thread structure of the packages to such an extent that when the thread is wound off instead of running smoothly it tends to pluck and break at the disarranged places.

It is therefore an object of this invention to provide a device to be placed over the annular piles of packages of textile material being treated in a centrifugal extractor to restrain movement of the individual packages.

It is a further object of the invention to provide guide means for the package restraining device and adjustable means whereby the restraining device may be held in engagement with the tops of the annular piles of packages of textile material.

It is a still further object of the invention to provide means for raising the device adapted to restrain movement of packages of textile material in a centrifugal extractor so as to permit inserting or removing the packages of textile material piled in the perforated basket.

A device of the type contemplated by this invention is shown in the drawings, in which:

Fig. 1 is a vertical section of an improved centrifugal extractor, partly loaded with packages of textile material, with the package restraining device raised so as to permit inserting or removing the packages;

Fig. 2 is a plan view along the line 2—2;

Fig. 3 is a fragmentary vertical section similar to Fig. 1 showing the restraining device held in engagement with the top of the annular pile of packages;

Fig. 4 is a plan view of a package restraining device; and

Fig. 5 is a fragmentary vertical section along the line 5—5 showing means for holding the package restraining device in engagement with the tops of the annular piles of packages.

The centrifugal extractor shown in the drawings consists of a curb or casing 1 provided with a hinged cover 2 adapted to close the top opening thereof, and a bottom portion 3. Adapted to rotate within the curb or casing 1 is a perforated basket 4, the bottom of which has a conically shaped portion 5 secured to the shaft 6 which rotates in the bearings 7 provided in the bottom 3.

A motor 8, attached to the curb or casing 1 by suitable means, is connected with the shaft 6 by means of a belt 9. The curb or casing 1 is provided with supporting lugs 10 to which are attached suspension rods 24 and springs 12 which are adapted to minimize vibration when the centrifugal extractor is running. The rods 24 are in turn attached to supporting standards 13 spaced about the curb or casing. The liquid removed from the textile material treated in the centrifugal extractor may be drawn off through the drain 20 attached to the bottom of the casing 1.

The perforated basket 4 in which the packages of textile material 21 are treated is provided with a flat generally annular device 14, which may be made of stainless steel or other suitable material, of such size that it will almost completely cover the annular piles of packages of textile material 21 in said perforated basket, while still leaving the center of the basket open and relatively unobstructed for the insertion and removal of said packages. If the perforated basket is provided with a lip 15, it will be necessary that the flat generally annular device 14 be made in two or more parts and assembled by riveting or other suitable means (as shown in Fig. 4) after it is placed in position in the perforated basket.

The flat generally annular device 14 is mounted on a plurality of guide rods 16 which pass through the holes 22 in the device 14, and are attached to the lip 15 and to the bottom of the perforated basket 4. The guide rods 16 are threaded at one end in order that they may be screwed into threaded holes in the bottom of the perforated basket 4, and are of such length that when passed through the openings in the lip 15 and screwed into the bottom of the perforated basket 4, their upper ends will extend slightly above the lip. This simple method of mounting the guide rods facilitates assembly of the device and provides firm support for the rods.

The guide rods 16 are provided with a plurality of holes 17 through which pins 18 may be passed to limit the upward movement of the flat generally annular device 14, as shown in detail in the fragmentary vertical section in Fig. 5. The pins 18 are secured loosely to the flat generally annular device 14 by chains 23 so as to avoid loss or misplacement of the pins.

The vertical guide rods 16 may be provided with coil springs 19 of sufficient strength to cause the flat generally annular device 14, when not restrained by the pins 18, to move upwardly so as to permit inserting and removing packages of textile material 21 through the annular device 14. The upward movement of the flat generally annular device 14 is limited by lip 15 of the perforated basket 4.

In operation the hinged cover 2 is swung to the open position and the pins 18 are removed from the holes 17 in the vertical guide rods 16 so as to permit the coil springs 19 to lift the flat generally annular device 14 along the vertical guide rods 16 towards lip 15 of the perforated basket 4. The centrifugal extractor is now ready to be loaded, which is accomplished by placing adjacent to the inside of the perforated wall of the basket, as uniformly as possible about the wall, one or more annular piles of cakes, skeins, or the like, of textile material. Fig. 1 shows a centrifugal extractor, with the flat generally annular device 14 raised by coil springs 19, partly loaded with packages of textile material.

After the centrifugal extractor is loaded with packages

of textile material the flat generally annular device **14** is forced down against the tops of the piles of packages of textile material **21** by hand or by means of a suitable lever and the pins **18** are placed in the holes **17** in the vertical guide rods **16** so as to hold the flat generally annular device **14** firmly against the tops of the annular piles of packages of textile material **21**.

When the motor **8**, acting through the belt **9**, causes the perforated basket **4** to rotate rapidly so as to remove water or other liquid from the packages of textile material, the flat generally annular device **14** restrains the packages of textile material so that they do not move about or become deformed. As a result the thread structure of the package is not deranged and the later winding off of the thread is facilitated. Damage to the thread, caused during winding off when a deranged package structure suddenly increases the tension on the thread, is avoided.

After the hydro extraction of the textile material has been completed, the motor **8** has been stopped, and the perforated basket **4** has come to a complete stop, the hinged cover **2** is swung to the open position and the pins **18** are removed from the holes **17** in the vertical guide rods **16**. The coil springs **19** thereupon cause the flat generally annular device **14** to move upwardly along the vertical guide rods **16**. The packages of textile material may be removed from the perforated basket **4** through the opening in the flat generally annular device **14**.

It will be obvious that the package restraining arrangement of this invention may be adapted to the various types of centrifugal extractors known to the art and to the treatment of the various types of packages of textile materials.

For example, if a perforated basket has no lip, or if the lip is not of sufficient width to support the vertical guide rods in the desired position, suitable brackets may be provided to support the vertical guide rods at points beyond the lip. On the other hand, in such a centrifugal extractor, it may be desired to have the vertical guide rods supported only at the bottom. In such case, if the perforated basket has no lip, it will be possible to make the flat generally annular restraining device in one piece. If the vertical guide rods are not supported at their tops, the coil springs will obviously be adapted to move the flat generally annular device upwardly only to a point somewhat below the tops of the vertical guide rods.

The coil springs on the vertical guide rods may be omitted and the package restraining device raised by hand. If the coil springs are omitted it will be necessary to provide some means, such as hooks engaging the top of the basket for holding the package restraining device in a raised position while loading and unloading the extractor basket.

The package restraining device is shown in the form of a flat generally annular structure. The size and shape of this device may be varied as long as it will almost completely cover the annular piles of textile material in the extractor, while still permitting ready access for insertion and removal of the packages. The package restraining device will obviously be sufficiently rigid so that it will not become deformed while in use.

Centrifuges provided with the package restraining device may also be used for the wet treatment of yarn packages. The package restraining device will serve to prevent displacement or other disturbance of the yarn packages by the treating liquid, or by the spray, if such is used, as well as to compact the packages into a uniform mass adapted to be rapidly and uniformly penetrated by the treating liquid. While the basket **4** has been illustrated in the drawing as a perforated basket, it may be made without perforations. Instead, the side walls of the basket **4** may be made of sheet metal having small vertically extending corrugations, so as to provide small vertically extending channels which will not be sealed by the cakes and which will readily remove the liquid out of the cakes **21** by centrifugal action. If desired, the diameter of the top of the basket may be made somewhat greater than the diameter of the bottom of the basket so as to facilitate draining of the liquids from the basket by centrifugal action. It is of course obvious that suitable vertically extending grooves may be provided to the inside walls of the basket **4** in place of the corrugations for the same purpose. Furthermore, suitable holes must be provided around the top peripheral edge of the basket **4** at the top ends of the corrugations or grooves so that the liquid extracted from the cakes may be ejected from the basket during rotation thereof.

Other modifications of the invention will be obvious to those skilled in the art and it is not desired to limit this invention to the exact detailed structure described and illustrated except as defined by the claims.

What I claim is as follows:

1. A centrifugal extractor for treating annular piles of packages of textile material comprising a casing, a substantially cylindrical basket rotatable within said casing, said basket being adapted to receive annular piles of packages of textile material adjacent to the inside wall thereof, a plane ring within said basket for engaging the tops of said annular piles of packages and for restraining movement of individual packages, said plane ring being shaped to permit access to said basket for the insertion of the packages of textile material thereinto below said plane ring or for the removal of the packages piled therein, said plane ring having spaced holes formed therein near the inner edge thereof, vertical guide rods positioned in the holes formed in said plane ring for guiding said plane ring, an annular member attached to the top edge of said basket and extending toward the center of said basket a distance approximating the radial width of said annular piles of textile packages, the top ends of said guide rods being attached to said annular member adjacent to the inner edge thereof, the bottom ends of said guide rods being attached to the bottom of said basket, means positioned between the bottom of said basket and said plane ring adapted to urge said plane ring upwardly along said vertical guide rods, and adjustable means adapted to hold said plane ring in engagement with the tops of said annular piles of packages of textile material.

2. A centrifugal extractor for treating annular piles of packages of textile material comprising a casing, a substantially cylindrical basket rotatable within said casing, said basket being adapted to receive annular piles of packages of textile material adjacent to the inside wall thereof, a plane ring within said basket for engaging the tops of said annular piles of packages and for restraining movement of the individual packages, said plane ring being shaped to permit access to said basket for the insertion of the packages of textile material thereinto below said plane ring or for removal of the packages piled therein, said plane ring having spaced holes formed therein near the inner edge thereof, vertical guide rods positioned in the holes formed in said plane ring for guiding said plane ring, an annular member attached to the top edge of said basket and extending toward the center of said basket a distance approximating the radial width of said annular piles of textile packages, the top ends of said guide rods being attached to said annular member adjacent to the inner edge thereof, the bottom ends of said guide rods being attached to the bottom of said basket, springs encircling said rods between the bottom of said basket and said plane ring adapted to urge said plane ring upwardly along the vertical guide rods, and adjustable means adapted to hold said plane ring in engagement with the tops of said annular piles of packages of textile material.

3. A centrifugal extractor for treating annular piles of packages of textile material comprising a casing, a substantially cylindrical basket rotatable within said casing, said basket being adapted to receive annular piles of packages of textile material adjacent to the inside wall

thereof, a plane ring within said basket for engaging the tops of said annular piles of packages and for restraining movement of individual packages, said plane ring being shaped to permit access to said basket for the insertion of the packages of textile material thereinto below said plane ring or for removal of the packages piled therein, said plane ring having spaced holes formed therein near the inner edge thereof, vertical guide rods positioned in the holes formed in said plane ring for guiding said plane ring, an annular member attached to the top edge of said basket and extending toward the center of said basket a distance approximating the radial width of said annular piles of textile packages, the top ends of said guide rods being attached to said annular member adjacent to the inner edge thereof, the bottom ends of said guide rods being attached to the bottom of said basket, means for urging said plane ring upwardly along said vertical guide rods, and adjustable means adapted to hold said plane ring clamped against the tops of said annular piles of packages of textile material.

4. A centrifugal extractor for treating annular piles of packages of textile material comprising a casing, a substantially cylindrical basket rotatable within said casing, said basket being adapted to receive annular piles of packages of textile material adjacent to the inside wall thereof, a plane ring within said basket for engaging the tops of said annular piles of packages and for restraining movement of individual packages, said plane ring having a large opening through which the packages of textile material may be placed into said basket or removed therefrom, said plane ring having spaced holes formed therein near the inner edge thereof, vertical guide rods positioned in the holes formed in said plane ring for guiding said plane ring, means attached to the top edge of said basket and extending toward the center of said basket a distance approximating the radial width of said annular piles of textile packages, the top ends of said guide rods being attached to said last mentioned means and the bottom ends of said guide rods being attached to the bottom of said basket so that said guide rods are held erect in said basket spaced from the inner side wall thereof whereby the packages of textile material may be piled between said guide rods and the inner surface of the side wall of said basket, means positioned between the bottom of said basket and said plane ring adapted to urge said plane ring upwardly along said vertical guide rods, and adjustable means adapted to hold said plane ring in engagement with the tops of said annular piles of packages of textile material.

5. A centrifugal extractor for treating annular piles of packages of textile material comprising a frame member, a casing, said frame member forming the bottom of said casing, a substantially cylindrical basket rotatable within said casing, said basket having hollow upright conical member formed integral with the bottom of said basket, a shaft passing through said hollow conical member and attached thereto for supporting said basket in said casing, bearings for said shaft, a rigid tubular member attached to said frame member, said bearings being supported in said rigid tubular member, said basket being adapted to receive annular piles of packages of textile material adjacent to the inside wall thereof, a plane ring within said basket for engaging the tops of said annular piles of packages and for restraining movement of individual packages, said plane ring being shaped to permit access to said basket for inserting or removing the packages of textile material piled therein below said plane ring, said plane ring having spaced holes formed therein near the inner edge thereof, vertical guide rods positioned in the holes formed in said plane ring for guiding said plane ring, an annular member attached to the top edge of said basket and extending toward the center of said basket a distance approximating the radial width of said annular piles of textile packages, the top ends of said guide rods being attached to said annular member adjacent to the inner edge thereof, the bottom ends of said guide rods being attached to the bottom of said basket, means positioned between the bottom of said basket and said plane ring adapted to urge said plane ring upwardly along said vertical guide rods, and adjustable means adapted to hold said plane ring in engagement with the tops of said annular piles of packages of textile material.

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