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CENTRIFUGAL SEPARATOR.

APPLICATION FILED SEPT. 21, 1915.

1,246,035. **Patented Nov. 13, 1917.**

Fig. I.

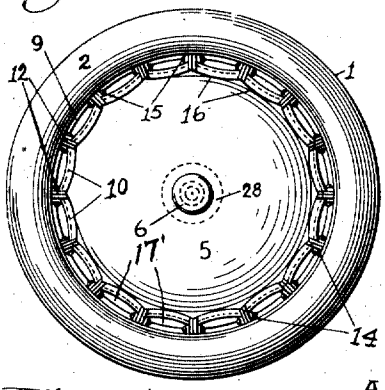


Fig. III.

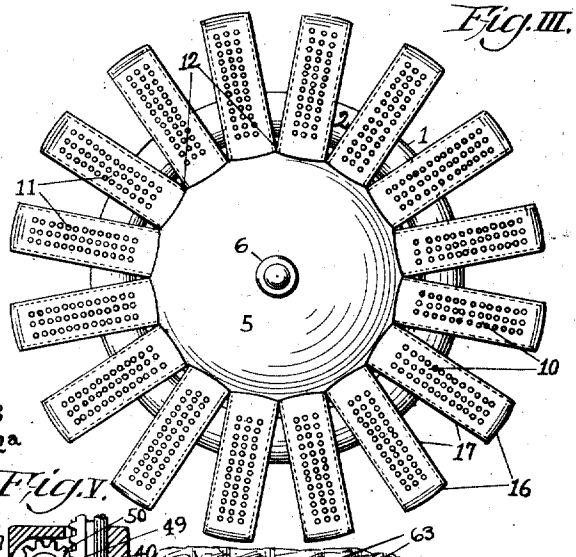


Fig. II.

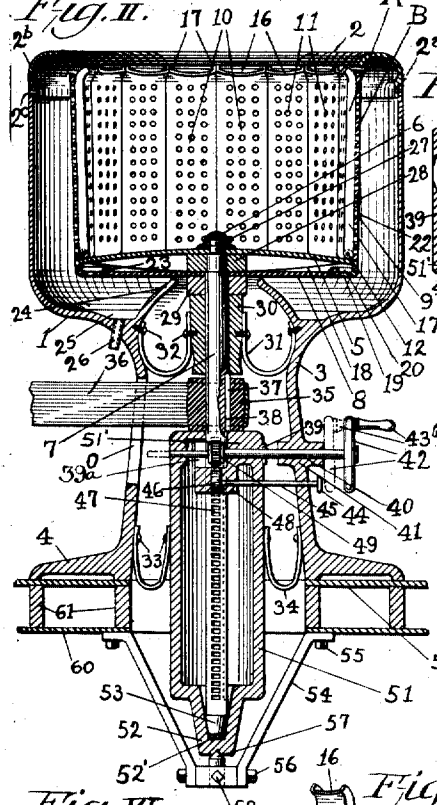


Fig. V.

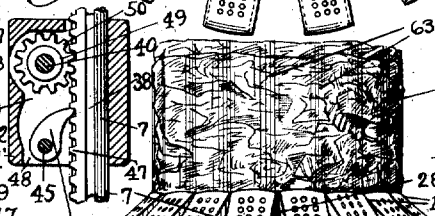


Fig. IV.

Fig. VI.

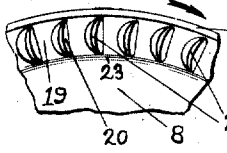
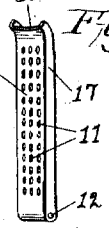


Fig. VII.



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CENTRIFUGAL SEPARATOR.

1,246,035. Specification of Letters Patent. Patented Nov. 13, 1917.

Application filed September 21, 1915. Serial No. 51,374.

To all whom it may concern:

Be it known that I, JOSEPH H. BAIR, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Centrifugal Separators, of which the following is a specification.

The main object of my invention is to provide more practical means for removing, in bulk, and without digging and tearing, wash, lint, waste, and fabrics of all kinds, from centrifugal separators into which they have been introduced to extract, water, oil, vitriol or other liquid with which they are saturated. A charge of any such material, when it has been dried in a centrifugal fluid extractor, is packed and caked very densely around the periphery of the revolving tub. Digging it out is laborious as well as injurious, particularly to delicate fabrics, old clothing being rent and laces being ripped off, and in fact more damage being done in removing washed materials from the wringer than in the washing or bleaching operations. It is the practise, where centrifugal tubs are used in laundry drying, to dig and pull out the pieces from the tub, in unloading. The resistance offered in removing a piece is similar to that offered in pulling a hard full of hay from a bale of hay. Moreover much inconvenience and annoyance are experienced in the customary method of conveying the dried wash from the drier tub to the next operation, as it is removed, by throwing it either on a truck or into a hamper, where instead of occupying only the small space of its compact position in the tub, it lies loose on the truck and becomes a large unmanageable mass, rolling off and coming into contact with soiled surfaces, or requiring extra time and care in returning it in its new position.

With my improvement, when a charge of clothes is dry, the tub comes to a standstill, and by suitable means, such for instance, as a rack and pinion, all inner tub is raised free of a surrounding or hoop tub and presented above the shell, so that its staves which are hinged at bottom, drop away from the mass of compressed clothing within, and leave it free on the base. The attendant removes it readily, like a bale, to the truck and conveys it to its destination without any danger of loose pieces falling off or falling upon the soiled floor. The emptied tub is quickly lowered into its hoop tub within the shell and is ready for another operation.

Another object of my invention is to minimize the danger of a tub, carelessly and unsymmetrically loaded, from swinging out of while rotating and striking the shell. Tubs at present in use, require an expert to load them, the pieces being individually rolled into a round compact ball and set into the tub in rows and layers, the primary object being to get the tub uniformly loaded and balanced. This method of loading is obviously also necessary to admit of removal (by the prevailing method) of the dried wash without digging it out and tearing it. My invention permits much time to be gained in both loading and unloading.

A third object of my invention is to keep the room in which the drying is done, free from vapor and steam which ordinarily rises from the tub while the extracting operation is taking place. This I accomplish by means of a turbine arrangement having the effect of inducing an inward current of air through the drying and out through the water discharge.

In the accompanying drawings in which one embodiment of the several features of my invention is disclosed by way of illustration;

Figure 1 is a plan view and

Fig. 2, a sectional elevation of the apparatus with the parts in position for drying;

Fig. 3 is a plan view and Fig. 4, a side elevation of the apparatus, with the inner tub raised and its hinged staves laid back, Fig. 4 showing the dried charge ready to be removed *en masse*;

Fig. 5 is an enlarged detail of a part of the shaft, showing its keyway and the rack thereon, and the coacting pinion and pawl;

Fig. 6 is a sectional portion of the periphery of the bottom of the hoop-tub, showing the form and arrangement of turbine cups;

Fig. 7 is a detail view of one of the inner tub staves.

1 is the outer casing or shell, 3 its pedestal and 4 its flared base. 2 is a removable circular flange which has an offset 2^a seating into the upper rim of the shell 1, forming a seam 2^b and removably secured by screws 2^c.

The pedestal 3 has a necessary opening O forming clearance for the driving belt to be described.

Inside the shell 1, are two tubs A and B, both slightly flaring upward, mounted on vertical shaft 7. The inner tub A is fastened at its bottom 5 to the upper end of shaft 7, by means of hub 28 thereon, and thread 27 on the shaft, receiving a nut 6. The hoop tub B is held in its relation to the shaft by means of a hub 29 on the center of its bottom 8 through which shaft 7 extends and in which said shaft slides upward when the inner tub A is lifted.

Tub A has its sides made up of staves 10 pivoted to the bottom 5, by perforating the lower ends of the flanges 17, to receive pins 15 that pass through similarly perforated ears 14 on said bottom. Staves 10 are inturned somewhat, at their upper free ends 16, to form a mouth in the formed-up tub. In its formed-up position (Figs. 1 and 2) tub A sets snugly in tub B, which constitutes a casing or hoop 9 for the staves 10. This hoop may be reinforced to any extent required for safety, by suitable horizontal band (not shown in drawings). Through means of their radial flanges 17, the staves 10 are in contact from top to bottom, with the cylindrical wall 9 of outer tub B, and this prevents them from bulging, whatever be the speed or load. The hoop provided by cylindrical wall 9 of tub 13 is slightly flared upward so as to permit the easy lifting of tub A out of it when it is desirable to unload. Tub B while free to start upward with the inner tub A, is promptly arrested and is prevented from continuing upward and out of the shell, by abutting against the inner ring of flange 2, which is in the upward path of said tub B. Since the inner tub A contacts with the outer tub B only along the line of the flanges 17 of its staves 10, only a slight upward movement, in dismembering the inner tub A is required to free it from its hoop 9 provided by the sides of tub B, because the flanges 17 conform with the flare of this band 9. When the tub A is lifted by means of shaft 7, said shaft slides up through bearing hub 29, fast to the bottom 8 of tub B. This shaft 7 is pushed up (and tub A with it) by means of a rack 47 thereon. A pinion 49 normally out of actuating position on crank shaft 40, having a wheel 42 and handle 43 thereon, is pulled out through its bearings 39 and 41 until the pinion 49 is in line and in mesh with the rack 47 on the spindle 7. By means of handle 43, the tub is lifted to the limit of the rack when holding pawl 46, normally out of mesh with the rack, is thrown forward into mesh by means of button 44 on connecting bearing rod 45 and the load is then allowed to rest on it. This is the position shown in Figs. 3 and 4 and the bundle of wash 62 can be lifted off or tumbled off in any direction, the inclined staves 10 serving as chutes. Fig. 5 shows the pinion 49 with its teeth 50 and holding pawl 46 both in mesh with the rack 47. Tub A is lowered by throwing pawl 46 back and reversing the movement of crank 42—43. The radially extending staves 10 will be raised at the free end 16, the top 2 of the outer shell 1 serving as a cam. The staves 17 will all be pulled into enveloping hoop 9 and with their flanges 17 contacting it snugly and adjacent staves 10 contacting with each other snugly and lining up by means of their flanges 17. The staves 10 may have perforations 11 and the enveloping hoop or band 9 may have perforations 22, through which water is withdrawn from the wet contents of tub A during the extracting operation. But accessory means are also provided which distinguish this construction from that of other driers. The staves 10 may be straight or slightly concaved inwardly (as shown in Fig. 1). The perpendicular edges of the staves 10 where their adjacent flanges 17 contact, are farther from the center of the tub A than their concaved (and perforated) centers and consequently the liquid will escape at these edges, more readily than through the auxiliary perforations 11.

Along the margin of the bottom 8 of tub B is a circular flange 23 which is to prevent the extracted water from flowing inwardly into the bearings and machinery. Between this flange and the hoop part 9 of tub B, forming a complete circle 19 immediately under the space between band 9 of tub B and staves 10 of inner tub A forming a series of perpendicular spaces 17′ around the tub A separated from each other by the radial flanges 17, is a series of suction cups 21 with openings 20 (see Figs. 2 and 6) which, when the tub is revolving in the direction shown by arrow Fig. 6, violently draws the air and consequently the vapor in it down through the spaces between the two tubs. This will also produce a strong downward current in the outer chamber between tub B and shell 1.

25 is a trough formed by the shell 1 and a circular rim 24. The water extracted is discharged by a spout 26. This spout will preferably be much enlarged and led outside so as to permit water and vapor-charged air, driven downward by the turbine buckets 20 to be conveyed away and from the room. Thus the drier room can be kept sanitary to a maximum degree.

The shaft 7 is positioned by and rotates in its bearing parts 30 and 51. The upper bearing is held by several springs 31 secured by screws 32, in somewhat yielding relation to the framework 3. The lower bearing part 51 sets on a pivot 57 removably held by screws 56 and 58 and positioned by staves 54

and bolts 55. Bearing part 51 is held yieldingly central by means of several springs 34 fastened by screws 33. It will thus be seen that one of the bearings (30) is a floating bearing capable of not only yielding laterally but of changing its axial alinement, whereas the other bearing (51) is a stepped bearing fixed at one point in the line of its axis and permitted to have only an oscillating movement. This combination of bearings insures more accurate response to deviations in the axis of rotation of the basket due to unbalance or other causes. A cut-out through which the part below the base may project, can be made in the floor 59 and ceiling 60, and the base 4 set on the joists 61, as shown, or a well can be made in the cement floor of the drying room and the stays 54 fastened directly to the base 4 which is preferable to the plan shown in the drawing Fig. 2.

The pulley 35 is held slidably but non-rotatably on the shaft, by means of a key 37 and keyway 38. The lower part of shaft 53 sets in a bronze bushing 52 with a steel end-bearing 52'. The upper part of bearing member 51 forms a bearing 51' for shaft 7. In this bearing is a cut-out 39a for pinion 49 to slide, laterally, in and out of mesh with the rack 47 on the shaft. Here also is the pivot part 48 for pawl 46 on shaft 45.

The tub A is positively rotated by means of belt 36 and pulley 37. The outer tub B is carried by inner tub serving as a friction clutch.

Minor details of construction can be varied from those disclosed without departing from the principles of the invention.

I claim:—

1. In a rotary drier, a sectional tub having its parts mounted to separate outward, and a confining member for said parts adapted to hold them in assembled position; said tub and confining member being adapted for separation by relative axial movement to free the members of the sectional tub.

2. In a rotary drier, a sectional tub having its parts mounted to separate outward, and a confining member for said parts adapted to hold them in assembled position; said tub and confining member being adapted for separation by relative axial movement to free the members of the sectional tub; the separable parts of the tub comprising staves hinged at one end to the tub structure.

3. In a rotary drier, a sectional tub having its parts mounted to separate outward, and a confining member for said parts adapted to hold them in assembled position; said tub and confining member being adapted for separation by relative axial movement to free the members of the sectional tub; the separable parts of the tub comprising staves hinged at one end to the tub structure, and said confining member comprising an annular wall surrounding said staves when in assembled position.

4. In a rotary drier, a sectional tub having its parts mounted to separate outward, and a confining member for said parts adapted to hold them in assembled position; said tub and confining member being adapted for separation by relative axial movement to free the members of the sectional tub; the separable parts of the tub comprising staves hinged at one end to the tub structure, and said confining member comprising an annular wall surrounding said staves when in assembled position; said staves having radially presented longitudinal flanges through which they bear against said confining member.

5. In a rotary drier, a sectional tub having its parts mounted to separate outward, and a confining member for said parts adapted to hold them in assembled position; said tub and confining member being adapted for separation by relative axial movement to free the members of the sectional tub; the separable parts of the tub comprising staves hinged at one end to the tub structure, and said confining member comprising an annular wall surrounding said staves when in assembled position; said staves having radially presented longitudinal flanges through which they bear against said confining member and being hinged through the medium of said flanges.

6. In a rotary drier, a sectional tub having its parts mounted to separate outward, and a confining member for said parts adapted to hold them in assembled position; said tub and confining member being adapted for separation by relative axial movement to free the members of the sectional tub; a casing or shell being provided around the tub and its confining member, and the tub being displaced axially in relation thereto, in moving to separate its parts, and said parts being adapted to lie upon the casing or shell when in separated position.

7. In a centrifugal drier, the combination of a tub comprising a base, separable staves hinged at one end upon said base, a confining hoop surrounding said staves, a mounting for said hoop concentric with the tub, and a casing or shell surrounding said hoop, constructed to engage the same to limit its axial movement, but permitting axial movement of the tub to a position out of the hoop and said casing.

8. In a centrifugal drier, the combination of a tub comprising a base, separable staves hinged at one end upon said base, a confining hoop surrounding said staves, a mounting for said hoop concentric with the tub, and a casing or shell surrounding said hoop, constructed to engage the same to limit its axial movement, but permitting axial move-

ment of the tub to a position out of the hoop and said casing; said casing being constructed to support the parts of the tub in radial positions, to expose the contents of the tub, when the tub is in its last-named position.

9. In a centrifugal drier, the combination of a rotary shaft, a hoop structure mounted upon and rotating with said shaft, and a tub structure mounted upon and rotating with said shaft and hoop structure; said shaft being movable axially relatively to the hoop structure to present the tub above the hoop structure; and said tub being constructed of separable parts which open outward when the tub is in its last-named position.

The foregoing specification signed at Washington, District of Columbia, this 14th day of September, 1915.

JOSEPH H. BAIR.