

Dec. 27, 1955

H. J. McDERMOTT

2,728,186

PNEUMATIC CAKE LIFTER FOR SPINNING BUCKETS

Filed March 31, 1953

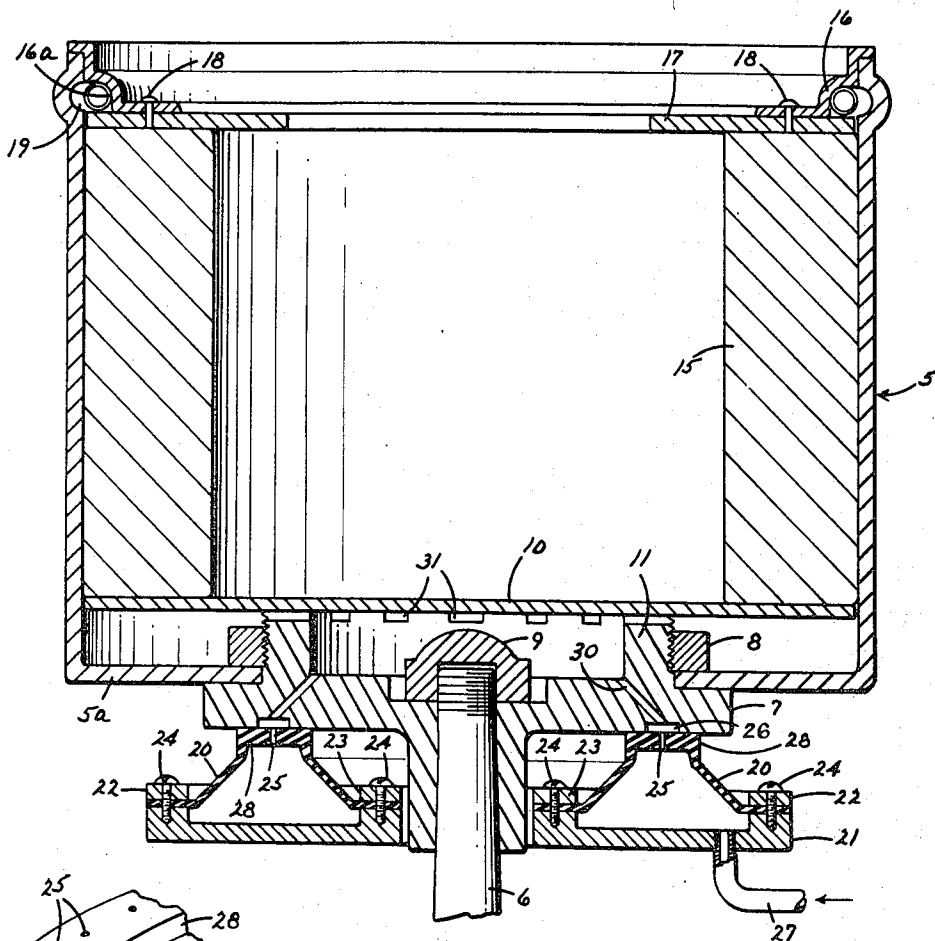


Fig. 1

Fig. 3

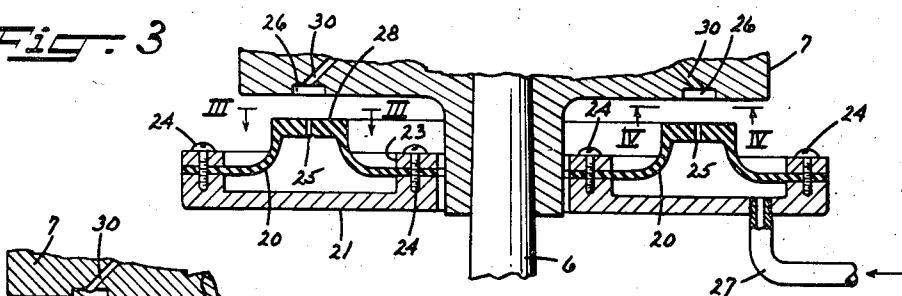
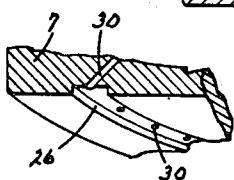


Fig. 2

Fig. 4



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PNEUMATIC CAKE LIFTER FOR SPINNING BUCKETS

Henry J. McDermott, Collingdale, Pa., assignor to American Viscose Corporation, Philadelphia, Pa., a corporation of Delaware

Application March 31, 1953, Serial No. 345,999

6 Claims. (Cl. 57-76)

This invention relates to yarn-spinning buckets in which a cake or package of yarn is formed by centrifugal force in the production of synthetic textile fibers, and more particularly to means for pneumatically removing the yarn cake from the spinning bucket.

The conventional spinning bucket in which a cake of textile yarn is formed by centrifugal force may be equipped with a removable false bottom in order to facilitate extracting the finished cake from the bucket. Many devices have been proposed for removing yarn cakes from the spinning bucket in the shortest time and without damaging the cake in any way. Such devices have proved objectionable for one reason or another. Principally, the successful removal of the cake from the spinning bucket without damage requires some skill on the part of the operator. Conventional procedure has been to insert a cake-lifting tool into the bore of the cake when it is in the bucket, and this tool extracts the cake either by grasping the bore of the cake or by removing the false bottom of the bucket and the cake as a unit. The present invention enables the cake to be removed entirely from the bucket without the use of any form of cake-lifting tool whatsoever.

The primary object of the present invention therefore is to provide means for elevating the false bottom in a spinning bucket without the necessity for inserting any cake-removing tool into the bucket.

A further object of the invention is to provide means for pneumatically elevating the false bottom in a spinning bucket when the bucket is at rest.

A still further object of the invention is to provide an inflatable pneumatic connection for the bottom of a spinning bucket which in turn introduces fluid under pressure to the space beneath a false bottom in the spinning bucket whereby the bottom and the yarn cake are elevated in the bucket.

Further objects will be apparent from the specification and drawing in which

Figure 1 is a longitudinal section through a spinning bucket assembly incorporating the present invention;

Figure 2 is a fragmentary sectional view showing a part of the structure of Figure 1 with the parts in moved position shown when the yarn is being spun into the bucket;

Figure 3 is a fragmentary perspective detail as seen at III—III of Figure 2; and

Figure 4 is a fragmentary perspective detail as seen at IV—IV of Figure 2.

The invention comprises essentially the provision of an annular diaphragm which surrounds the driving spindle of a yarn-spinning bucket beneath the bucket, said diaphragm being inflatable from a contracted position out of contact with the spinning bucket to an inflated position in which an annular perforated surface on the diaphragm is forced into sealing contact with the bottom of the spinning bucket so that the perforations are in registry with an

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annular groove around the base of the bucket. Suitable passages connect the annular groove with a chamber formed between the false bottom of the bucket and the bottom of the bucket proper. This chamber is substantially air or fluid-tight so that fluid pressure communicated to the chamber elevates the false bottom together with the cake which rests thereon. In the thus elevated position the operator can readily grasp the cake and remove it from the bucket.

Referring now to the drawing, a spinning bucket 5 is connected to a driving spindle 6 by means of a coupling 7 and an internally threaded collar 8. Coupling 7 is retained on spindle 6 by means of a nut 9. A false bottom 10 is provided with a close-sliding fit in the bore of the bucket 5 and when in the position shown in Figure 1 rests upon an annular castellated flange 11 forming an upper extension of coupling 7. False bottom 10 serves as a support on which the yarn cake 15 rests as it is spun by centrifugal force against the sides of bucket 5. As shown in Figure 1, a lid 16 for the bucket is provided with an annular groove 16a formed between a recess in the upper part of the lid and an annular plate 17 which is secured to the lid by means of rivets 18, 18. A centrifugal lock 19 is retained in the groove 16a so that when the spinning bucket is brought up to speed the lid is securely locked in place, but when the bucket is stationary the lock is radially contracted to permit the lid to be removed or installed. This construction of the lid forms no part of the present invention.

In order to elevate the false bottom and the cake sufficiently far to permit the ready removal of the cake from the bucket, I provide an inflatable annular diaphragm 20 clamped between a housing 21 and a pair of annular clamping rings 22 and 23 by means of bolts or screws 24, 24. The cross-section of diaphragm 20 is generally of inverted U or V shape, the apex of which is substantially thickened and, if desired, may be provided with a facing of relatively non-flexible material, such as leather. The diaphragm itself may be of a resilient expandable material, such as rubber, or, if desired, may be of the bellows type. In any event, I provide a plurality of perforations 25, 25 in the upper surface of the diaphragm which communicate with the interior thereof. These perforations are also in registry with an annular groove 26 around the under-surface of coupling 7 so that when the diaphragm is inflated by means of air or other fluid introduced through connection 27 the perforations provide fluid communication between the interior of the diaphragm and groove 26, while the substantially flat sealing face 23 of the diaphragm prevents undesired leakage. Coupling 7 is drilled at 30, 30 to provide fluid passages between annular groove 26 and the space or chamber between the bottom 5a of the bucket and the false bottom 10. The apertures 31, 31 forming the castellations on flange 11 likewise provide fluid communication throughout the entire chamber thus formed.

When the bucket is rotating at speed during the spinning process, the diaphragm 20 is deflated as shown in Figure 2 so that there is substantial clearance between the upper face 28 of the diaphragm and coupling 7. When the yarn cake has been completely spun, the bucket is brought to rest in the usual manner. The operator then inflates diaphragm 20 so that the face 28 of the diaphragm is urged upwardly and sealed against the bottom of coupling 70. Continued or additional introduction of air or fluid into conduit 27 may be so controlled that the cake 15 is elevated wholly or partially out of the bucket. This action elevates lid 16 as well as the false bottom 10.

After the cake has been removed completely from the

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bucket, the operator replaces false bottom 10 and passages 30, 30 provide ample venting for this operation. Likewise, the lid 16 is reinstalled whereupon the apparatus is ready for the spinning of the next cake. Fluid pressure may be released from the diaphragm 20 as soon as the cake is elevated to a position from which it may be readily grasped by the operator.

It will thus be understood that I have provided an efficient mechanism for removing a yarn cake from a spinning bucket without the necessity of employing any cake-lifting device whatsoever. This enables the cakes to be removed from the bucket with a minimum of damage to the yarn.

Having thus described my invention, I claim:

1. A yarn-spinning bucket assembly comprising a spinning bucket, a driving spindle on which said bucket is mounted, a false bottom in said bucket, an inflatable member positioned underneath the bucket and in normal spaced relation to the under-surface of the bucket during the spinning operation, means for introducing fluid to said inflatable member to expand the member into contact with the under-surface of the bucket, and walls defining fluid passages connecting the interior of the inflatable member with the interior of the bucket below the false bottom whereby the false bottom is elevated when fluid under pressure is introduced to the bucket through said passages.

2. Apparatus as defined in claim 1 having means for holding the false bottom in elevated spaced relation with respect to the bottom of the bucket.

3. Apparatus as defined in claim 1 in which the upper surface of the inflatable member is an annular substantially flat seal provided with a plurality of perforations.

4. Apparatus in accordance with claim 3 in which the

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bottom of the bucket is provided with an annular groove in registry with the perforations in the inflatable member and a plurality of passages affording communication between the groove and the interior of the bucket.

5. A yarn-spinning bucket assembly comprising a yarn-spinning bucket, a driving coupling to which said bucket is secured, a shaft drivingly connected to said coupling, an annular castellated flange on said coupling extending upwardly into the interior of the bucket, a false bottom in the bucket supported upon said flange above the bottom of the bucket to form a space therebetween, said false bottom being removable from the bucket and having a close-sliding fit with the inside of the bucket, walls defining at least one fluid passage in the coupling, said fluid passage providing communication from the exterior of the bucket to a chamber defined by the space between the bottom of the bucket and the false bottom, and means for selectively introducing fluid into said chamber to elevate the false bottom.

6. Apparatus in accordance with claim 5 in which the fluid introducing means comprises an annular inflatable member positioned below the bucket and having fluid passages in registry with the fluid passages in the coupling.

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