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SPINNING BUCKET

Vincent Panoff, Belfort, France, assignor to General Electric Company, a corporation of New York

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The present invention relates to spinning buckets such as those used in the manufacture of rayon.

It is the present practice in the manufacture of rayon to remove the spinning bucket in which a cake of spun rayon has been formed entirely from the driving shaft on which it is mounted in order to remove the cake. To facilitate manufacturing, it is necessary that the buckets be so mounted on the shaft that they can be quickly and easily removed. The usual methods now employed are either to slide the bucket over the end of the shaft using only a tight fit or to use a rubber ring between the bucket and the shaft. It has been found that there is considerable slippage between the buckets and the shafts, especially when starting and stopping. This slipping tends to wear the connection as does the constant removal and replacement of the buckets. The wearing of the connecting parts between the bucket and the shaft is an accumulating evil as the more the parts wear, the greater is their tendency to wear. As the connection between the buckets and shaft becomes loose, vibration is set up in the shaft. This vibration is transmitted down the shaft to the driving means and there likewise causes a considerable wearing of parts. As the buckets are driven at a high speed, often around 9000 R. P. M., the necessity of a tight connection between the bucket and the shaft is of prime importance. It is therefore necessary to replace parts quite frequently and at considerable cost to the manufacturer.

The object of the present invention is to provide a means whereby the above referred to disadvantages are overcome.

In the drawing, Fig. 1 is a cross sectional view of an embodiment of the invention; Fig. 2 shows a portion of Fig. 1 having an auxiliary part in place; Fig. 3 is a perspective view of a modification, and Fig. 4 is a view of a further modification.

Referring to Fig. 1 of the drawing, 5 indicates a bucket made of acid resisting material, such as artificial resin. The bucket 5 is mounted on a driving shaft 6, which may be driven by an electric motor or other suitable means. The motive means for driving the shaft 6 is not shown.

A pin 7 is provided to positively connect the shaft 6 to the bucket 5. The pin 7 passes through an opening 8 in the bottom of the bucket 5 and screws into a threaded opening 9 in the top of the shaft. Formed integral with

the pin 7 just above the threaded portion, is a nut 10 which rests in a well 11 in the bottom of the bucket 5. As the pin 7 is screwed into the opening 9, the bottom of the nut 10 exerts force against the bottom of the well 11. The top of the shaft 6 is beveled and fits into a correspondingly beveled sleeve 12. The sleeve 12 is held in place by a downwardly extending flange 13 which is formed integral with the bucket, the sleeve forming a lining for flange 13. Therefore, as the pin 7 is screwed into the opening 9, the nut 10 rests on the bottom of the well 11 and pulls the shaft up into the beveled sleeve. This affords a positive connection between the bucket and the shaft. The sleeve 12 is provided with a downwardly extending shield 14 which protects the shaft 6 from the acid used in manufacturing rayon.

A false bottom 15 comprising a thin circular disk made of the same material as the bucket rests on a shoulder 16 in the bottom of the bucket 5. To effect turning of the false bottom with the bucket, the pin 7 extends upward through an elongated opening 17 in the false bottom until flush with the top of the false bottom. Two fingers 18a formed integral with the top of the pin extend outward from opposite sides of the pin and fit in the opening 17.

A cover 18 is provided for the bucket which is held in place by an elastic ring 20. It is between the cover 18 and the false bottom 15 that the rayon cake 19 is formed. In order to remove the rayon cake after it has been formed in the bucket 5, a lifting device 21, Fig. 2, is provided which comprises a handle 22, a shaft 23, a hook shaped end 24, and a cross pin 24a. The false bottom is provided with slots 25 which accommodate the hook 24 of the lifting device 21. Although one opening 25 is all that is needed, two radially opposite ones are provided to maintain the balance of the disk. The false bottom is pulled upward with the lifting device 21 and the rayon cake 19 is thus removed from the bucket 5. The inside of the bucket is highly polished so that the cake can be removed with comparative ease.

Two modifications of the lifting device are shown in Figs. 3 and 4. The lifting device 26 shown in Fig. 3 comprises a handle 27, a shaft 28 and three arms 29 which extend outward 120° apart from the bottom of the shaft 28. On the end of each arm is a right angle finger 30. In order to accommodate these fingers, the false bottom is provided with three right angle slots 31. The fingers 30 are inserted in the slots 31

and then the whole lifting device is given a slight twist. This shifts the fingers so that they will bear against the under side of the false bottom when an upward force is exerted on the lifting device. In this modification an opening in disk 15 corresponding to opening 17 in Figs. 1 and 2 is omitted as the upper end of the pin which interlocks with the bottom 15 may be omitted if desired.

10 The modification of the lifting device shown in Fig. 4 comprises a handle 32, a shaft 33 and a rubber suction cup 34. With this device no holes are necessary in the false bottom. The suction cup is pressed against the bottom until a suction 15 is formed in the cup. The handle is then moved upward, pulling the false bottom and silk cake with it.

When the bucket 5 is being installed, the shaft 6 is fitted in the opening of the sleeve 12. The pin 7 is inserted through the opening 8 in the bottom of the bucket 5 and screwed into the threaded opening 9 in the top of the shaft 6. As the end of the shaft 6 and the opening in the sleeve 12 are both beveled, the pin 7 is screwed down until 25 the nut 10 pulls the bucket 5 down far enough to provide a tight fit between the shaft 6 and the sleeve 12. The bucket 5 and the shaft 6 are now positively connected and no slippage can take place. The false bottom is then placed in position 30 resting on the shoulder 16 in the bottom of the bucket and the fingers 18a in the elongated slot 17. The cover 18 is placed in position and held there by the rubber ring 20.

The bucket 5 is now ready for use and a cake 35 of rayon is spun in the bucket between the false bottom and the cover. When the cake is completely spun to the required size, the machine is stopped and the cover is removed. The lifting device 21 is inserted in one of the slots 25 and is moved edgewise to bring hook shaped end 24 beneath the bottom, pins 24a resting on top of the bottom. The false bottom 15 is then pulled upward, thus removing the rayon cake. A new false bottom is placed in the bottom of the bucket 45 and the cover replaced. The bucket is now ready to be used again.

As can be seen from the above description, there is no need to remove the bucket from the shaft after it has been once installed. This eliminates 50 all chances for the bucket to work loose on the shaft and cause wearing or vibration. Also to remove just the cake is much less cumbersome than removing the bucket as is done at present.

The improved arrangement has several advantages 55 over the old arrangements. Due to the positive connection between the shaft and the bucket, wear and vibration are eliminated and the number and cost of replacement parts is greatly reduced. Since the bucket is fastened directly to the shaft and the same bucket is used 60 repeatedly, the number of buckets it is necessary to have on hand is greatly reduced, thus reducing the capital investment. The positive connection between the bucket and the shaft also permits the bucket to be driven at a higher speed 65 than is permissible using the old method. This is particularly desirable to the manufacturers of rayon as a much finer silk is spun at higher speeds.

70 What I claim as new and desire to secure by Letters Patent of the United States is:

1. A spinning spindle comprising a driven shaft,

a spinning bucket, means for positively fastening the bucket to the shaft, and a removable false bottom adapted to fit in said bucket for removing the cake which forms on the side walls of the bucket without disconnecting the bucket from the 5 shaft.

2. A spinning spindle comprising a driven shaft, a spinning bucket, a pin passing through the bottom of said bucket for fastening the bucket to the shaft, and a removable false bottom adapted to fit in said bucket for removing the cake which forms on the side walls of the bucket without disconnecting the bucket from the shaft. 10

3. A spinning spindle comprising a driven shaft, a spinning bucket, a pin passing through the bottom of said bucket for positively fastening the bucket to the shaft, a removable false bottom adapted to fit in the bottom of said bucket for removing the cake which forms on the side walls 20 of the bucket without disconnecting the bucket from the shaft, and means for interlocking the false bottom and the bucket.

4. A spinning spindle comprising a driven shaft, a spinning bucket, means for positively fastening the bucket to the shaft, and a removable false bottom adapted to fit in said bucket for removing the cake which forms on the side walls of the bucket without disconnecting the bucket from the shaft, said false bottom resting on 30 a shoulder in the bottom of the bucket.

5. A spinning spindle comprising a driven shaft, a spinning bucket, a pin passing through the bottom of said bucket for fastening the bucket to the shaft, and a removable false bottom adapted to fit in said bucket for removing the cake which forms on the side walls of the bucket without disconnecting the bucket from the shaft, said false bottom having openings adapted to receive 40 a lifting device.

6. A spinning spindle comprising a driven shaft, a spinning bucket, a pin passing through the bottom of said bucket for positively fastening the bucket to the shaft, a removable false bottom adapted to fit in the bottom of said bucket 45 for removing the cake which forms on the side walls of the bucket without disconnecting the bucket from the shaft, and means for interlocking said false bottom and a wall of the bucket.

7. A spinning spindle comprising a driven shaft, a spinning bucket having a downwardly extending flange, a sleeve held in place by said flange, said sleeve being adapted to receive the end of the driving shaft, means for fastening the sleeve positively to the driving shaft, and a removable false bottom adapted to fit in said bucket 55 for removing the cake which forms on the side walls of the bucket without disconnecting the bucket from the shaft.

8. A spinning spindle comprising a driven shaft, a spinning bucket having a downwardly extending flange, a sleeve held in place by said flange, said sleeve being adapted to receive the end of the driving shaft, means for fastening the sleeve positively to the driving shaft, a removable false bottom adapted to fit in said bucket 65 for removing the cake which forms on the side walls of the bucket without disconnecting the bucket from the shaft, and means for interlocking said false bottom and the bucket. 70

VINCENT PANOFF.