

Sept. 14, 1943.

R. E. WEAVER

2,329,499

SPINNING BOX

Filed March 18, 1942

3 Sheets-Sheet 1

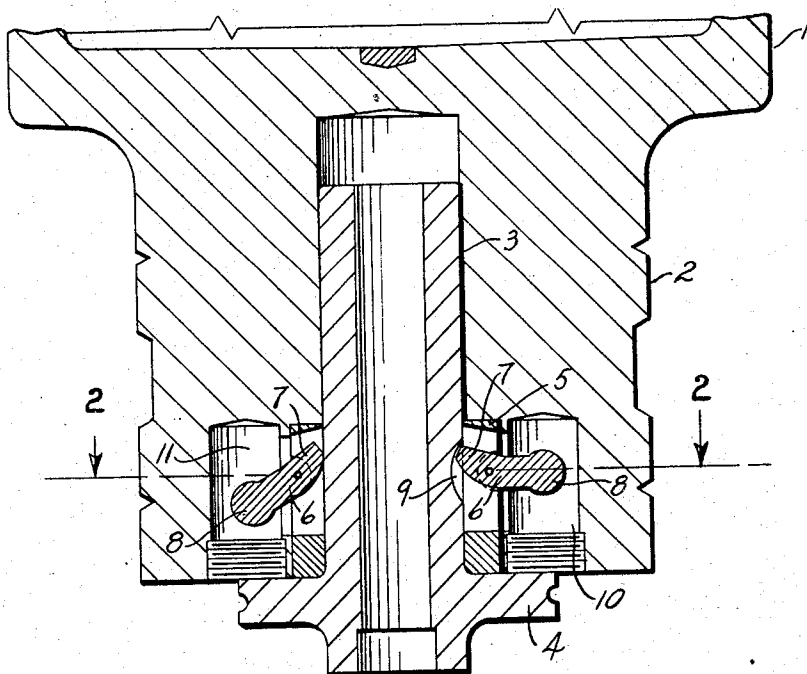


Fig. 1.

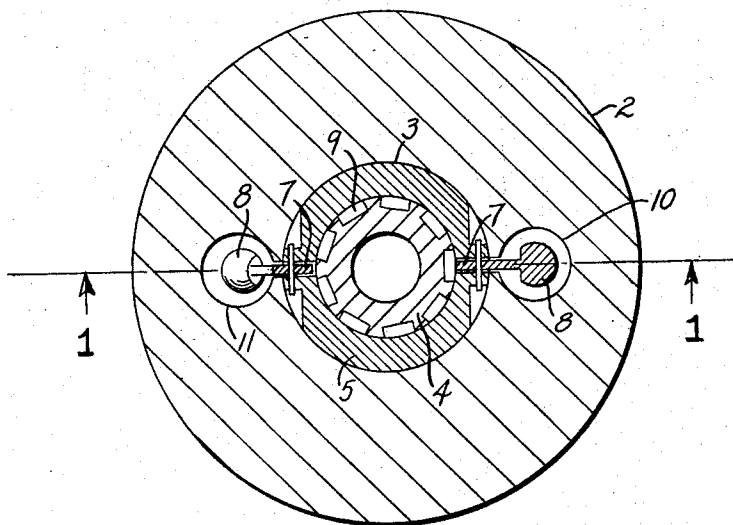


Fig. 2.

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3 Sheets-Sheet 2

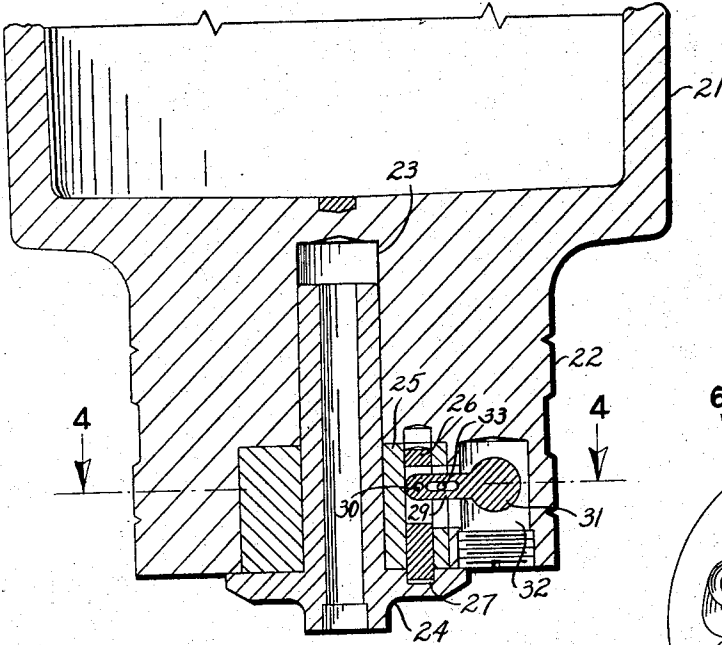


Fig. 3.

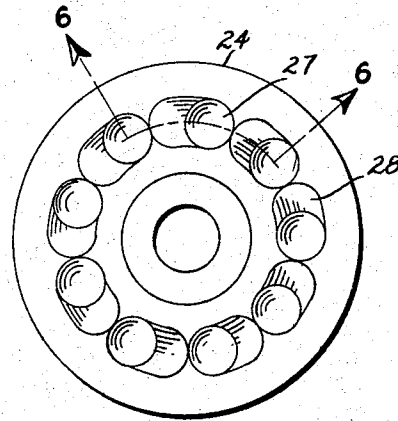


Fig. 5.

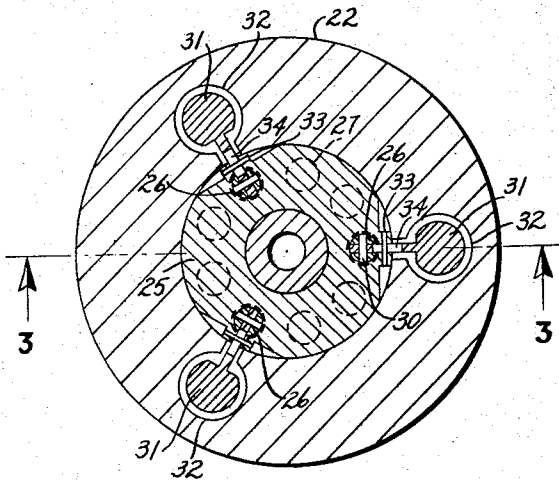


Fig. 4.

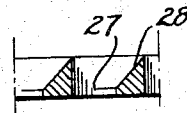


Fig. 6.

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3 Sheets-Sheet 3

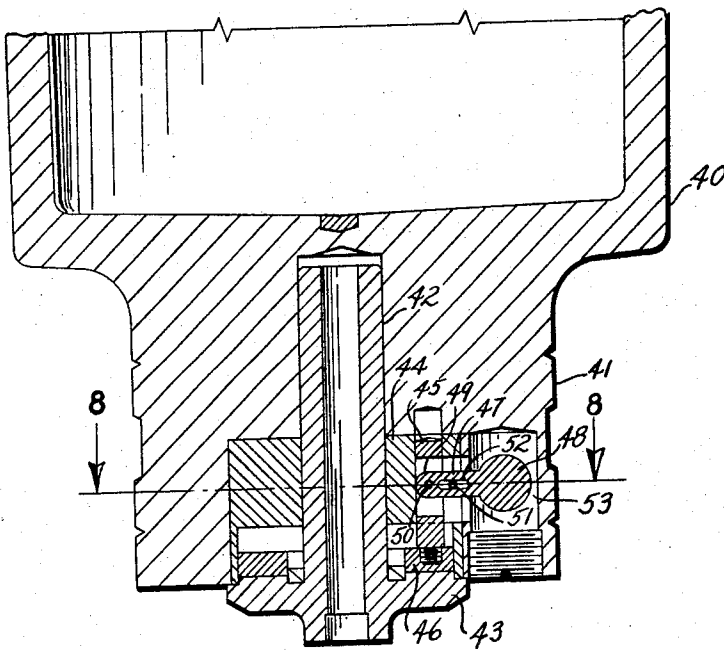


Fig. 7.

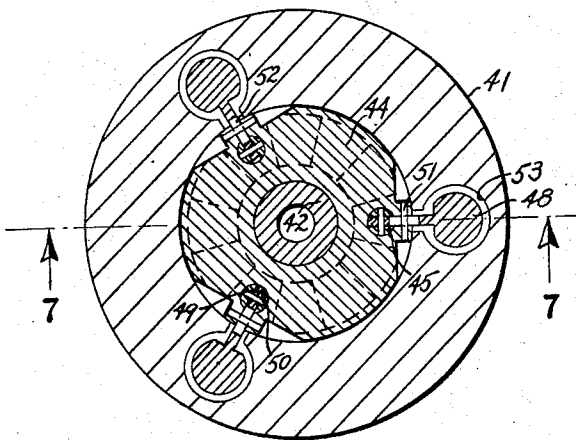


Fig. 8.

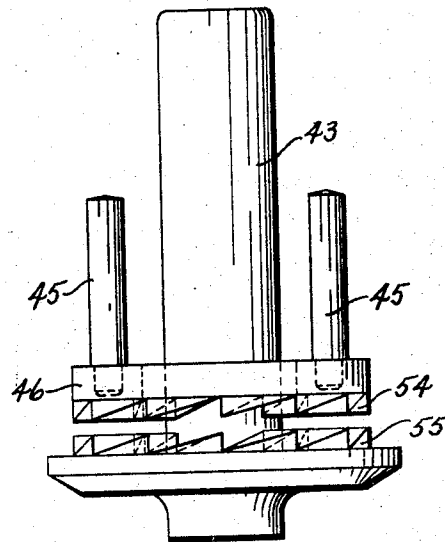


Fig. 9.

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## UNITED STATES PATENT OFFICE

2,329,499

## SPINNING BOX

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Application March 18, 1942, Serial No. 435,145

7 Claims. (Cl. 57-77)

This invention relates to improvements in spinning boxes such as used in the manufacture of rayon and the like. More particularly, this invention relates to improvements in means for coupling a spinning box to a drive shaft or spindle.

In the manufacture of rayon and the like the thread or yarn is collected in a spinning box that is rotated at high speed by a drive shaft or motor spindle. It is the customary practice to remove spinning boxes from their drive spindles, also to replace them, while the drive spindles are rotating at high speed. It is therefore necessary that the spinning boxes be readily removable from the drive spindles. It is also necessary that the spinning box have only a minimum amount of slip on its drive spindle during the spinning operation.

This invention has for its principal object to provide improvements in means for coupling a spinning box to a drive spindle which will permit the spinning box to be readily removed from the drive spindle and also to be readily replaced thereon.

Another object of the invention is to provide improvements in means for coupling a spinning box to a drive spindle which will permit the spinning box to be placed on the drive spindle while the spindle is rotating at high speed without subjecting the spindle motor to excessive strain.

A further object of the invention is to provide improvements in means for positively coupling a spinning box to a drive spindle which will permit the spinning box to be placed on a drive spindle rotating at high speed without subjecting the spindle motor to excessive strain.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawings.

In the drawings,

Figure 1 is a sectional view with parts broken away of a spinning box embodying the invention, taken on the line 1-1 in Fig. 2.

Figure 2 is a sectional view taken on the line 2-2 in Figure 1.

Figure 3 is a sectional view of a spinning box with parts broken away, embodying another form of the invention taken on the line 3-3 in Figure 4.

Figure 4 is a sectional view taken on the line 4-4 in Figure 3.

Figure 5 is a plan view of the spindle bushing shown in Figure 3.

Figure 6 is a sectional view taken on the line 6-6 in Figure 5.

Figure 7 is a sectional view of a spinning box with parts broken away embodying a further form of the invention taken on the line 7-7 in Figure 8.

Figure 8 is a sectional view taken on the line 8-8 in Figure 7.

Figure 9 is an elevational view of the spindle bushing and annular bushing engaging means shown in Figures 7 and 8.

Referring to Figures 1 and 2 of the drawings, reference character 1 indicates generally a spinning box having a hub portion 2 provided with a central bore 3. The spinning box, when in operative position, is mounted on the bushing 4 which is rigidly attached to a motor spindle not shown. While the bushing closely fits the central bore, sufficient clearance is provided to enable the spinning box to be readily removed and replaced on the bushing. Means for coupling the spinning box to the bushing comprising the annular member 5 pressed into an annular recess surrounding the central bore are fixed to the hub portion. Engaging members 6 are pivotally mounted in the annular member and have end portions 7 which are adapted to engage the bushing and weighted end portions 8 of greater mass which are adapted to be extended outwardly by centrifugal force. The hub portion is recessed at 10 and 11 to accommodate the end portions 8. The bushing is provided with axially extending slots or grooves 9 which receive the end portions 7 when the weighted end portions 8 are extended outwardly by centrifugal force. The slots are generally arranged in pairs diametrically opposite each other, but may be arranged as shown in Figure 2 with the slots in staggered relation. With the latter arrangement, the annular member need rotate only a small amount relative to the bushing before the end portion of one of the engaging members may enter a slot thereby coupling the spinning box to the bushing which is fixed to a drive means.

In the operation of this embodiment of the invention the spinning box is placed on the bushing which is rotating at high speed. Due to the inertia of the spinning box, a certain amount of slippage takes place between the box and the bushing at first and the box gradually assumes the speed of the bushing. After the box has reached a sufficient speed, the centrifugal force acting on the engaging members extends the weighted ends outwardly causing the other ends to extend inwardly into at least one of the slots

in the bushing and into engagement with one of the walls thereof and thereby positively coupling the spinning box to the bushing.

Referring to Figures 3 to 6 of the drawings in which another embodiment of the invention is shown, reference character 21 indicates generally a spinning box having a hub portion 22 provided with a central bore 23. The spinning-box, when in operative position, is mounted on the bushing 24 which is rigidly attached to a motor spindle not shown. While the bushing closely fits the central bore, sufficient clearance is provided to enable the spinning box to be readily removed and replaced on the bushing. Means for coupling the spinning box to the bushing comprising the annular member 25 pressed into an annular recess surrounding the central bore is fixed to the hub portion. A plurality of engaging members 26 are slidably mounted in the annular member and are adapted to enter the recesses 27 in the bushing 24. A portion of the bushing adjacent one side of each of the recesses is beveled as shown by reference character 28 to permit the engaging members to readily enter the recesses and engage the walls thereof. Means are provided for actuating the engaging members comprising members 29 pivotally supported between their ends on the pins 33 in the annular member 25 passing through the elongated openings or slots 34 in the actuating members which permit the actuating members to slide as well as pivot on the pins 33. The actuating members are pivotally connected at one end 30 to the engaging members and the free ends 31 are weighted or are of greater mass and are adapted to be extended outwardly by centrifugal force. The hub portion of the spinning box is recessed at 32 to accommodate the weighted ends 31 of the actuating members.

In the operation of this form of the invention the spinning box is placed on the bushing which is rotating at high speed and the spinning box gradually assumes the speed of the bushing. After the box has reached sufficient speed the weighted ends of the actuating members are extended outwardly by centrifugal force causing them to raise and pivot about their pivotal support. At the same time the other ends are lowered moving the engaging members into recesses in the bushing and thereby positively coupling the spinning box to the bushing.

Referring to Figures 7 to 9 of the drawings in which a further embodiment of the invention is shown, reference character 40 indicates generally a spinning box having a hub portion 41 provided with a central bore 42. The spinning box, when in operative position, is mounted on the bushing 43 which is rigidly attached to a motor spindle not shown. While the bushing closely fits the central bore, sufficient clearance is provided to enable the spinning box to be readily removed and replaced on the bushing. Means for coupling the spinning box to the bushing comprising the annular member 44 pressed into an annular recess surrounding the central bore is fixed to the hub portion. A plurality of pin members 45 are slidably mounted in the annular member and carry the annular bushing engaging means 46. The bushing engaging means and the bushing are provided with tooth-shaped portions 54 and 55 having inclined and upright surfaces. Means are provided for actuating the bushing engaging members comprising the members 47 pivotally supported between their ends on the pins 51 in the annular member 44 passing through the

elongated openings or slots 52 in the actuating members which permit the actuating members to slide as well as pivot on the pins 51. The actuating members are pivotally connected at 50 to the slidable pin members 45 and the free ends 48 are weighted or of greater mass and are adapted to be extended outwardly by centrifugal force. The hub portion of the spinning box is recessed at 53 to accommodate the weighted ends 48 of the actuating members.

In the operation of this form of the invention the spinning box is placed on the bushing while it is rotating at high speed and the spinning box gradually assumes the speed of the bushing. After the box has reached sufficient speed the weighted ends of the actuating members are extended outwardly by centrifugal force causing them to raise and pivot about their pivotal support at the same time the other ends are lowered moving the bushing engaging members downwardly with its teeth in engagement with the teeth on the bushing, thereby positively coupling the spinning box to the bushing.

While preferred embodiments of the invention have been shown, it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined in the appended claims.

What I claim is:

1. A spinning box comprising a hub portion having a central bore, means for positively coupling the spinning box to a drive member comprising a member carried by the hub portion pivotally mounted between its ends, one end of which is arranged to be actuated by centrifugal force to move the other end into engagement with the drive member.

2. A spinning box comprising a hub portion having a central bore, means for positively coupling the spinning box to a drive member comprising an annular member carried by the hub portion surrounding the central bore, a member pivotally mounted in the annular member between its ends having a weighted end portion adapted to be actuated by centrifugal force to move the other end portion into engagement with the drive member.

3. A spinning box comprising a hub portion having a central bore, means for positively coupling the spinning box to a drive member comprising means slidably mounted in the hub portion and means actuated by centrifugal force to move the slidable means into engagement with the drive member.

4. A spinning box comprising a hub portion having a central bore, means for positively coupling the spinning box to a drive member comprising a plurality of means slidably mounted in the hub portion and a plurality of means actuated by centrifugal force to move the slidable means into engagement with the drive member.

5. A spinning box comprising a hub portion having a central bore, means for positively coupling the spinning box to a drive member comprising an annular member carried by the hub portion surrounding the central bore, means slidably mounted in the annular member and means pivotally mounted in the annular member adapted to be actuated by centrifugal force to move the slidable means into engagement with the drive member.

6. A spinning box comprising a hub portion having a central bore, means for positively coupling the spinning box to a drive member com-

prising an annular member carried by the hub portion surrounding the central bore, a plurality of means slidably mounted in the annular member and a plurality of means pivotally mounted in the annular member adapted to be actuated by centrifugal force to move the slidable means into engagement with the drive member.

7. A spinning box comprising a hub portion having a central bore, means for positively coupling the spinning box to a drive member com- 10

prising an annular member carried by the hub portion surrounding the central bore, an annular bushing engaging means slidably mounted in the annular member and means pivotally mounted in the annular member adapted to be actuated by centrifugal force to move the annular bushing engaging means into engagement with the drive member.

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