

UNITED STATES PATENT OFFICE

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RETAINING RING FOR SPINNING-BOX LIDS

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This invention relates to a device for holding a lid in position on a spinning box such as is used in the manufacture of rayon and the like.

5 The simplest and the preferred form of lid for a spinning box is one which rests on a ledge on the inner wall of the box near its upper open end. The cover is then easily put in place and is equally easily removed, thus saving time in filling and emptying the box. While the box is being rotated, it is necessary to hold the lid securely in place. While many lid retaining devices are known, none has been found which is unaffected, in its function of holding the lid securely in place, by the centrifugal forces developed by the rotation of the box. The importance of this factor will be appreciated when it is considered that these boxes are turned at 10 from six to nine or more thousand revolutions per minute and that at such speeds the effect of centrifugal force must be considered even with reference to parts whose mass is slight.

The object of this invention is to provide 15 a device which will hold the lid on the box at high speeds of the order indicated, and whose effectiveness will not be impaired by the centrifugal force incident to such speeds. It is an object as well to provide a device 20 such as that just mentioned, which also may be manipulated to secure and to release the lid with great ease and without material loss of time.

A preferred embodiment of the invention 25 is described hereinafter and is illustrated in the accompanying drawing. In the drawings,

Figure 1 is a top plan view of a spinning box showing the securing-device in position 30 to hold the lid on the box.

Figure 2 is a view in elevation of the same box with a part shown in section, the section being taken on the line 2—2 of Figure 1.

The spinning box 10 may be of any suitable design. On the inner wall and near the open end of the box is a ledge 11 extending fully around the box. The lid 12 which is a flat annulus rests on the ledge 11. Just above the ledge is a groove 13, approximately 35 semi-circular in cross section, extending

around the box and lying radially outward from the circle of the ledge 11. The lower rim 14 of the groove is flush with the upper surface of the cover or in other words it is spaced from the ledge 11 the thickness of the lid. 55

To secure the lid in place on the ledge, I provide a split ring 15 formed from a piece of spring metal, circular in cross section, whose total length is not less than the length 60 of the shortest circumference of the groove 13. In the form shown, this shortest circumference is that of the rim 14 where the groove meets the inner wall of the box.

The spring has portions which rest in the 65 groove 13 and other portions which rest on the cover 12 holding it securely on the ledge. The ring is corrugated, being made up of a number of curves or arches which are preferably rather sharp at the portions 16 which 70 engage the groove. These curves not only take up the excess length, permitting the ring to fit in the groove, but they also provide the laterally extending portions 17 which rest on the lid. 75

While the ring as a whole is described as being of spring metal, short lengths of it are rigid and thus there is no tendency on the part of the lateral portions 17 to bend out of a plane substantially parallel to the lid. 80 The engagement of the portions 16 in the grooves and the consequent reaction of the lateral portions 17 against the lid is ample to hold the lid in place.

The split in the ring is made at a groove 85 engaging portion and the ends of the ring piece are extended toward each other as at 18 so that they have a good engagement with the groove. The spring of the material is only such as to give a tendency for the adjacent ends 18 to separate thus putting the whole ring under compression when it is in place. The expansive tendency then serves to maintain the portions 16 in engagement 90 with the groove. 95

When the box is rotated at the speeds customarily used for spinning the rayon, there is a considerable centrifugal force created by reason of even the small mass of the ring. The effect of this force is that the ring tends 100

to assume the form of a true circle. The parts that are bent toward the center tend to move out radially and their force on the outwardly bent portions is one tending to bring all portions to a common circle.

An important thought underlying the construction shown is that the effective length of the ring piece 15 is greater than the smallest circumference of the groove. As a corollary of this, the circle which the ring tends to conform to, under the influence of the centrifugal force at high speed, has a circumference greater than the smallest circumference of the groove. Stated differently, the effective length of rod in any arcuate portion of the ring exceeds the length of the corresponding arc of the groove 13, by which is meant the arcuate length of groove engaged by the ring portion in question. The result upon the device itself is that the ring engages the groove more tightly as the speed increases than when the box is at rest. The groove resists the tendency of the ring to become a true circle in form and so it maintains the lateral portions of the ring which rest over the lid.

This construction of ring is found to be particularly satisfactory in that its effectiveness becomes greater as the speed increases and also in that the ring is very easily removed to release the lid by simply moving one ring end toward the center until enough of the ring is free of the groove to permit it to be lifted away from the box. To facilitate the removal of the ring, the inwardly bent arch 15 near the split is bent upwardly from the lid and therefore it may be grasped more readily than if it rested on the lid. The upwardly bent portion for this purpose is a known expedient, having been used with certain forms of four-corner rings. While I am not aware that it has ever been the fact, it is conceivable that such an upward loop with a four corner or similar ring might be large enough to make the total length of rod forming the ring greater than the size of the groove, yet neither the underlying thought here nor the result attained by this invention would be present. I therefore use the expression "the effective length of the ring" to denote the length that must not be less than the circumference of the groove. In the form shown here it is the length of the projection of the ring in the plane of the groove since the projected length is not affected by curvature away from that plane.

It will be observed that the inwardly directed arches 19 are of such curvature and of such number that they offer good resistance to the tendency of the ring portions to conform to a common circle. When the number of such arches is about twelve as shown here the span of each one is slight and hence each is more rigid. Under these conditions, the length of the ring may be substantially

equal to the smallest circumference of the groove since the relative rigidity of the short arches is such that the ring can not become a true circle at the speeds here concerned. The preferred construction however is one based on the concept that the effective length of the ring be greater than the circumference of the wall at the ring engaging region, for then the number of curves is not material.

I wish to include within the scope of the protection given me all novel features disclosed herein and all such variations of the disclosed embodiment as come within the fair scope of the following claims.

I claim—

1. In a spinning box for rayon or the like having an open end, a ledge on the inner periphery of the box wall near said open end, a lid resting on said ledge, a shallow circular groove in the inner periphery of the box wall above said lid, and a split ring resting over said lid and having portions engaging in said groove, said ring having an effective length not less than the length of the smallest circumference of the groove.

2. A split retaining ring adapted to rest over the lid of a spinning box and to engage the wall of said box, said ring having a number of curves forming groove engaging portions and lateral portions for resting over the lid, said ring having an effective length not less than the length of the circumference of the box wall at the ring engaging region.

3. A split retaining ring adapted to rest over the lid of a spinning box and to engage the wall of said box, said ring having relatively rigid inwardly directed arches to the number of about twelve, the effective length of said ring being not less than substantially equal to the circumference of said box at the ring engaging region.

4. A corrugated split retaining ring for a spinning box, said ring having an effective length exceeding the circumference of the part of the box wall engaged by the ring.

5. A corrugated split retaining ring for a spinning box, the effective length of rod in any arcuate portion of the said ring exceeding the length of the corresponding arc of the box wall engaged by the ring.

In testimony whereof I have signed my name to this specification.

IVAR MEURLING.