No. 792,141. PATENTED JUNE 13, 1905.

A. A. LOVEJOY.

SPINNING RING.

APPLICATION FILED SEPT. 10, 1903.

Fig-1-

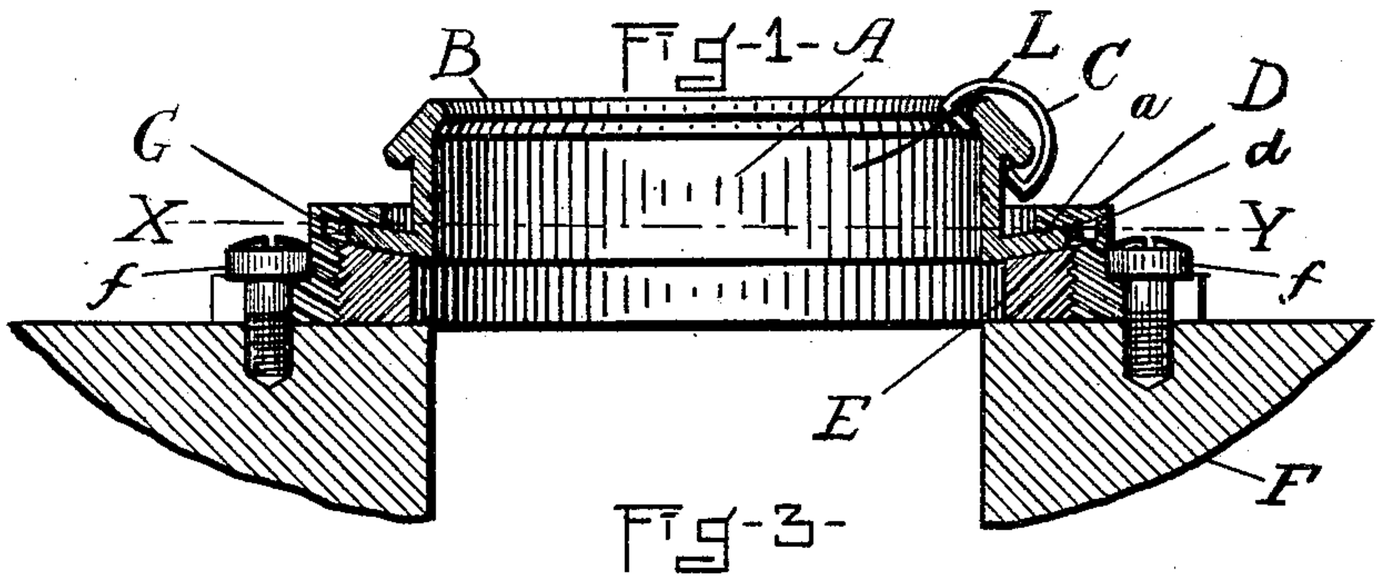


Fig-3-

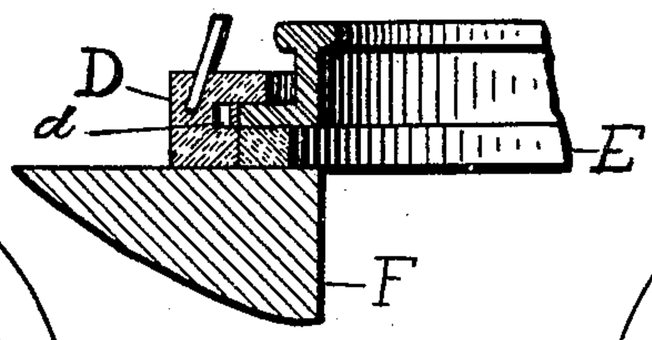


Fig-2-

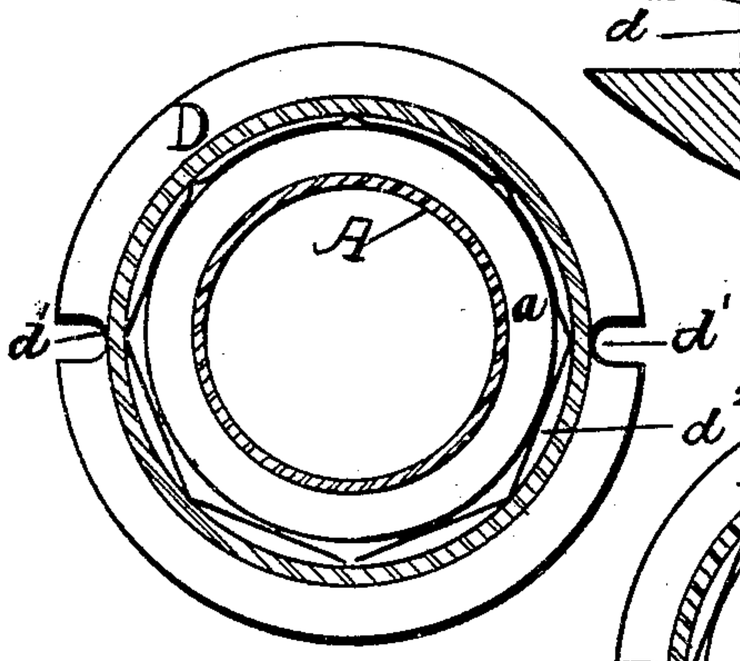


Fig-4-

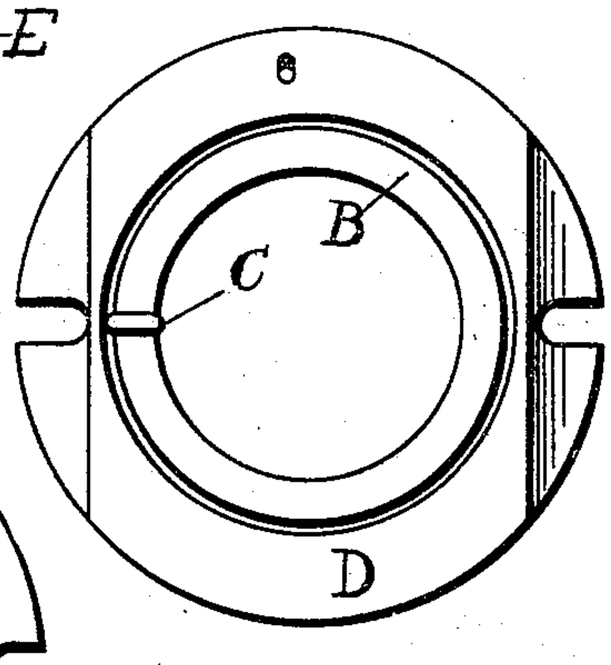


Fig-5-

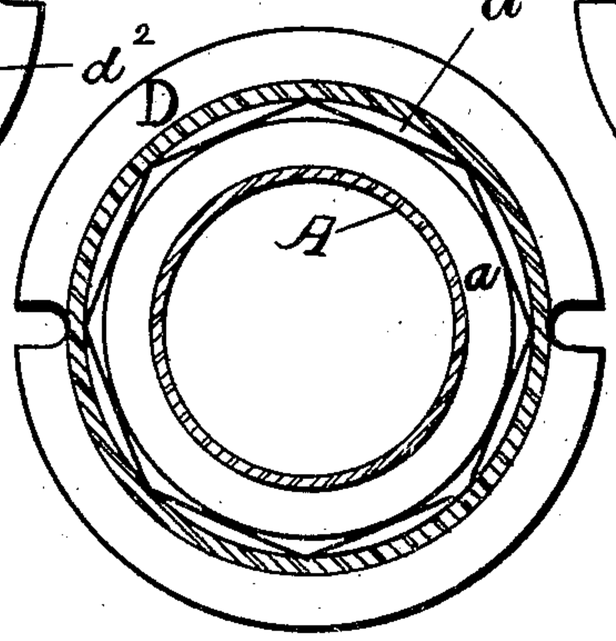


Fig-7-

Fig-8-

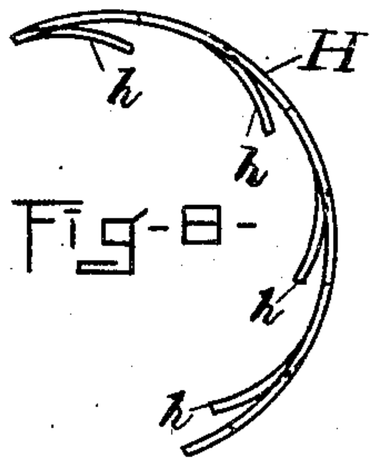
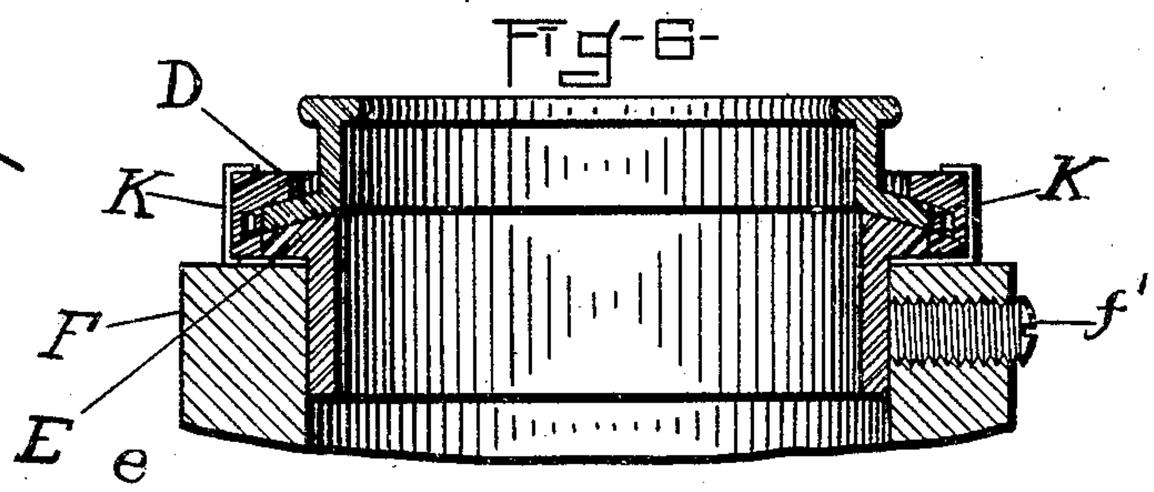


Fig-6-



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No. 792,141. Patented June 13, 1905.

UNITED STATES PATENT OFFICE.

ALFRED A. LOVEJOY, OF LOWELL, MASSACHUSETTS.

SPINNING-RING.

SPECIFICATION forming part of Letters Patent No. 792,141, dated June 13, 1905.

Application filed September 10, 1903. Serial No. 172,655.

To all whom it may concern:

Be it known that I, ALFRED A. LOVEJOY, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Spinning-Rings, of which the following is a specification.

This invention relates to spinning-rings for spinning yarn and of the class known as "rotary" rings. Its objects are to provide a ring which will enable spinning-frames to be run at a high rate of speed with less strain upon the yarn, less wear upon the parts, and fewer broken "ends," one which will more quickly center itself when thrown off its center by reason of bunches in the yarn or uneven strains, and one which will yield to any sudden strains and quickly regain its proper position. These objects I accomplished to a great extent in the invention of my Patent No. 733,495, dated July 14, 1903, and my present invention is an improvement thereon and is also applicable to forms of rings not shown therein.

The new objects of my present invention are to expedite the self-centering of the ring, to soften the gyrating of the ring, and to prevent the ring vibrating back and forth within its guides, as sometimes happens with my old device.

My present device is also adapted to take up sudden strains upon the yarn or sliver caused by bunches or other unevenness.

It appears by experience that a rotary ring works better if it is not allowed to rotate too rapidly or to run away, and I find that the slight friction or braking of my present device tends to keep the rotation of the ring more uniform and so produces more even work.

In the drawings, Figure 1 shows the preferred form of my present invention in sectional elevation. Fig. 2 shows a plan view of Fig. 1 on the line X Y and shows the shape the spring-buffer assumes when there is a strain on the yarn or the ring gets off of center. Fig. 3 shows another form of the device in section. Fig. 4 shows a plan view of Fig. 1. Fig. 5 shows a cross-section of Fig. 1 on the line X Y with the ring in the center of the casing. Fig. 6 shows another form of the device in section. Fig. 7 shows a portion of the spring-buffer, which is the principal feature of my device, as it appears when removed from its place and allowed to resume its normal shape. Fig. 8 shows another form of buffer which may be used.

The patent to Belanger, No. 640,525, dated January 2, 1900, and that to Edwards, No. 660,631, dated October 30, 1900, each shows a rotary ring which is so arranged that it may move radially and axially with reference to the spindle, but not in a clearly-defined path. Both might be described as "floating" rings.

My invention requires that the ring should be adapted to rotate in bearings or channels which allow a certain amount of lateral play or rocking, but always within and along a given plane or spherical surface.

The ring A of my invention is provided with a race B, which may be arranged at an angle or horizontally. About this race B the traveler C runs.

Ring A is provided with an annular flange *a*. This flange *a* is adapted to rest in an annular channel formed by an annular groove *d* in the ring-casing D, together with the upper surface of the retaining-ring E. This retaining-ring may be screw-threaded to fit corresponding interior threads in casing D, as shown in Fig. 1, or it may be driven or pressed into place and held in place by its position upon ring-rail F, between ring-rail F and casing D, as shown in Fig. 3. The ring and casing may be held in place upon ring-rail F by screws *f f* passing through apertures *d' d'* or, as shown in the modified form, Fig. 6, by the set-screw *f'*.

In Figs. 1 and 6 the upper and lower bearing-surfaces between flange *a*, groove *d*, and the top of ring E lie in concentric spherical surfaces whose centers would be the same and respectively above or below the ring and somewhere along the axis of the spindle. I leave a space d^2, Fig. 2, outside the flange *a*, which is practically the depth of groove *d*, wherein the ring may rock or move about to a limited extent in an annular path upon said spherical surfaces. One or more of these bearing-surfaces may be smooth and the others ribbed, as shown in my patent above referred to.

In practice it has been found that with the freedom of movement which it has within its guiding-channels the ring sometimes starts to vibrate or rebound from side to side or to assume a jerky motion, which is undesirable. To overcome this tendency and to steady the motion of the ring, I interpose between flange *a* and casing D in groove *d* the flat spring G, which is bent at points uniformly distant one from the other into elbows, as shown in Fig. 7. When this spring is inserted in the groove *d*, it assumes the form shown in Fig. 5—that is, each of its straight parts bears lightly against flange *a*, while the elbows bear against the casing. The result of this is that if the ring is carried over on one side it compresses the intervening sections of the spring, as shown in Fig. 2, and their resiliency tends to recenter the ring and to neutralize the tendency to vibrate. The spring G, in fact, serves as an elastic cushion, which, while not preventing the rotation or leveling or centering of ring A, softens all those tendencies and prevents jerking or jumping. Another form of spring which may be used instead of G is shown in Fig. 8. In this construction the band-spring H, which must be capable of being bent into a circle to fit into groove *d*, has strips cut lengthwise at regular intervals in such a way that one end is free and the other integral with H, thus forming a series of elastic fingers adapted to be in contact with flange *a* and to serve the same purpose as the spring of the form shown in Fig. 7. Any other suitable form of spring may be used for the same purpose.

The preferred form of my invention is shown in Fig. 1, wherein the center of the spherical surfaces of flange *a* is above the ring A. In this construction the natural tendency is for the ring to even itself by the law of gravity parallel with the earth's surface, as a marble dropped into a bowl rolls to the lowest point. This tendency keeps each ring centered properly and keeps all the rings on a frame at all times in a plane parallel with the earth's surface. In fact, the ring and traveler, being more or less rotated or shifted about by the rapidly-moving yarn and the friction of the traveler, in this construction act in a manner similar to a plummet or pendulum, always seeking to rest at the lowest point within its guides. Another advantage of this construction is that by reason of the ballooning of the yarn L any strain caused by bunches or unevenness is exerted in a direction nearly parallel to the path in which the ring is movable, as shown in Fig. 1, and that is the direction in which the ring gives most readily, and breaks are thereby much avoided.

Fig. 6 shows the same style of spherical bearing illustrated in Fig. 1 of my patent dated July 14, 1903, No. 733,495—that is, it has the center of the bearing-surfaces below the ring—but in Fig. 6 the casing D and retaining-ring E are held together by brackets or ears K K, and retaining-ring E is extended downward, forming an integral ring *e*, adapted to pass through a hole in the rail F, and is bound thereto by set-screw *f'*.

Fig. 3 shows the application of my spring or buffer to a spinning-ring wherein the upper and lower surfaces of flange *a* and the corresponding surfaces of groove *d* and retaining-ring E are flat and lie in planes parallel with each other, with the race B, and at right angles to the axis of the spindle. This construction allows of a radial but no axial movement with reference to the spindle. In this construction there is no leveling tendency; but the spring-buffer tends to keep the ring centered and yieldingly takes up any sudden strains on the yarn.

The casing D and retaining-ring E, or either of them, may be made of paper, fiber, lignum-vitæ, or of any other suitable material besides metal and will work equally well.

What I claim, and desire to secure by Letters Patent, is—

1. A spinning-ring provided with a race for the traveler, a casing therefor, annular guides for said ring adapted to permit a limited movement of the ring along a single plane or spherical surface, combined with a spring-buffer interposed between said ring and casing whereby the movements of the ring are cushioned.

2. A spinning-ring provided with a race for the traveler, a casing therefor, annular guides for said ring adapted to permit a limited movement of the ring along a single plane or spherical surface, combined with a polygonal band-spring interposed between said ring and said casing whereby the movements of the ring are cushioned.

3. A spinning-ring provided with a race for the traveler, a casing therefor provided with an annular groove, an annular flange upon said ring adapted to fit said groove in such a way as to permit a limited lateral movement of said ring upon a single plane or spherical surface, combined with a polygonal band-spring interposed in said groove between said flange and the casing.

4. A spinning-ring provided with a race for the traveler, a casing therefor provided with an annular groove, an annular flange upon said ring adapted to fit said groove in such a way as to permit a limited lateral movement of said ring upon a single plane or spherical surface, combined with a spring-buffer interposed in said groove between said flange and the casing.

5. A spinning-ring provided with a race for the traveler and an annular guiding-flange, a casing therefor provided with an annular channel adapted to receive and guide said flange but of somewhat greater diameter, com-

bined with a polygonal band-spring interposed in said channel between said flange and the casing.

6. A spinning-ring provided with a race for the traveler and an annular guiding-flange, a casing therefor provided with an annular channel adapted to receive and guide said flange but of somewhat greater diameter, a retaining-ring adapted to serve as a guide for said flange and to hold said ring in place, combined with a peripheral spring interposed in said channel between said flange and the casing and adapted to cushion the radial movements of said flange and ring.

7. A spinning-ring provided with a race for the traveler and an annular concavo-convex flange the center of curvature of which is above the ring, a casing therefor provided with an annular channel of somewhat greater diameter than said flange and with convex-concave guiding-surfaces corresponding oppositely to the concavo-convex surfaces of said flange, combined with a polygonal band-spring interposed in said channel between said flange and the casing, as described.

8. An elastic buffer for rotary spinning-rings consisting of a substantially straight band-spring bent at substantially regular intervals to form obtuse angles combined with a spinning-ring, a casing, and suitable guides for the spring between said ring and casing.

9. A spinning-ring provided with a race for the traveler, a casing therefor provided with a circular orifice large enough to permit the passage of said race, an annular flange integral with said ring and larger than the first-named orifice in the casing, a second orifice extending partly through the casing and large enough to permit the passage of said flange, a groove in said casing into which said flange fits but of a somewhat greater diameter, a retaining-ring adapted to fit said second orifice, whereby the parts form a bearing for said ring which lies in a spherical surface whose center is above said ring, combined with means of attaching the casing to the ring-rail, a traveler, and a polygonal band-spring interposed in said groove between said flange and the casing as described.

10. A spinning-ring provided with a race for the traveler and an annular concavo-convex guiding-flange, a casing therefor provided with an annular channel whose top guiding-surface is convex, a retaining-ring whose top surface is concave and serves as a guide for said flange and adapted to hold the spinning-ring in place, whereby said ring may move along the surface of a sphere whose center is above said ring, combined with a spring-buffer interposed in said groove between said flange and the casing.

11. A spinning-ring provided with a race for the traveler and an annular concavo-convex guiding-flange the center of curvature of which is above the ring, a casing therefor provided with an annular channel of somewhat greater diameter than said flange which annular channel has convex-concavo guiding-surfaces corresponding oppositely to the concavo-convex surfaces of said flange, combined with a spring-buffer interposed in said channel between said flange and the casing as described.

12. A spinning-ring provided with a race for the traveler and an annular concavo-convex guiding-flange, a casing therefor provided with an annular concavo-convex guiding-channel adapted to receive said flange but of somewhat greater diameter whereby said ring may be moved along a spherical surface to which the general direction and pull of the ballooning-yarn is substantially tangential when the machine is in motion, combined with a spring-buffer inserted in said channel between the flange and casing as described.

13. A spinning-ring provided with a race for the traveler, a casing therefor provided with an annular groove, an annular flange upon said ring adapted to fit said groove in such a way as to permit a limited lateral movement of said ring upon a single plane or spherical surface, combined with a circumferential spring interposed in said groove between said flange and the casing and adapted to cushion said flange in every direction of its limited movement.

In testimony whereof I have affixed my signature in presence of two witnesses.

ALFRED A. LOVEJOY.

Witnesses:

JOHN J. DEVINE,

JAMES F. MCCARTY, Jr.