Apr. 3, 1923. 1,450,568

J. B. WENZEL

PACKING RING AND METHOD OF MAKING THE SAME

Filed Nov. 19, 1920

Fig. 1.

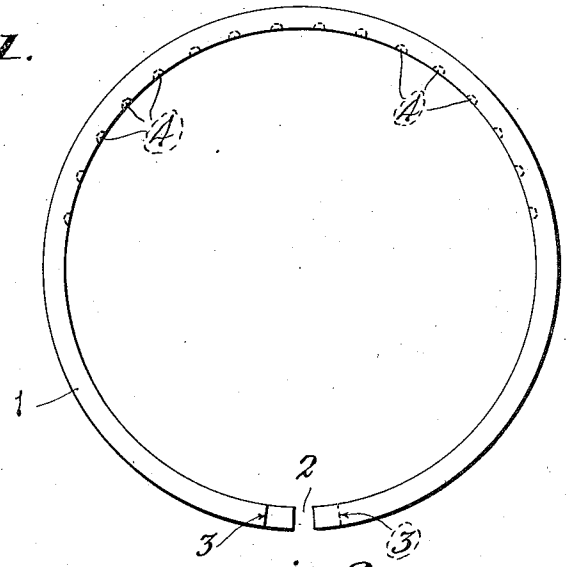


Fig. 2.

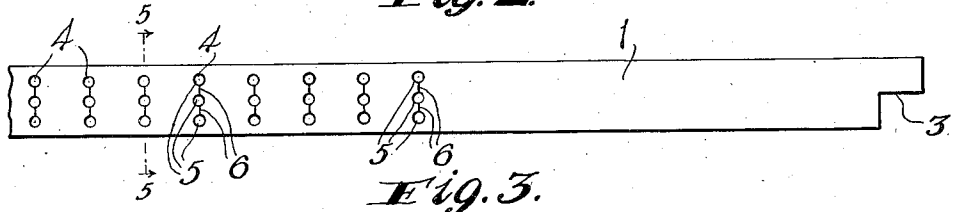


Fig. 3.

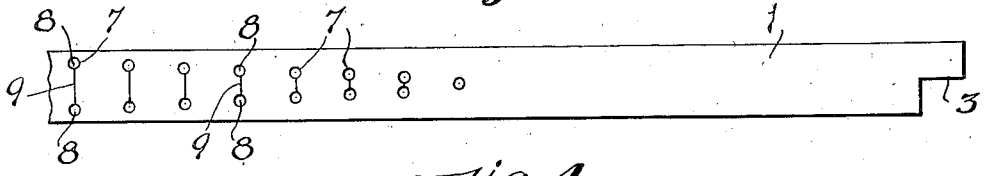


Fig. 4.

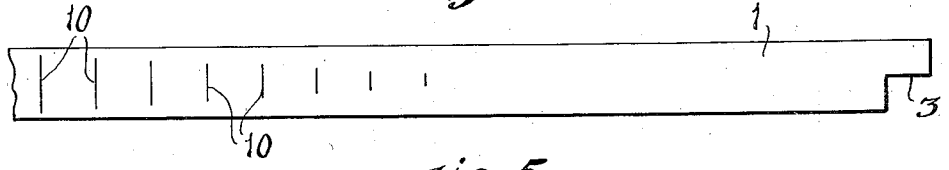


Fig. 5.

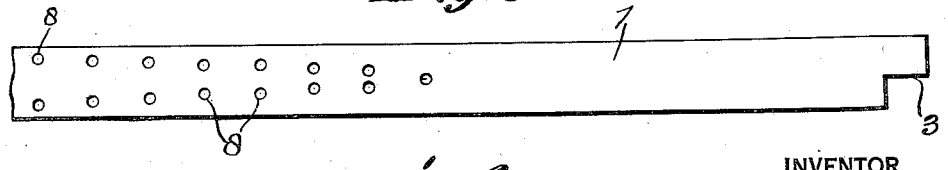
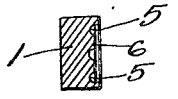


Fig. 6



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UNITED STATES PATENT OFFICE.

JACOB B. WENZEL, OF BLOOM, COLORADO.

PACKING RING AND METHOD OF MAKING THE SAME.

Application filed November 19, 1920. Serial No. 425,095.

To all whom it may concern:

Be it known that I, JACOB B. WENZEL, a citizen of the United States, and a resident of Bloom, in the county of Otero and State of Colorado, have invented new and useful Improvements in Packing Rings and Methods of Making the Same, of which the following is a specification.

This invention relates to split packing rings of the type having substantially uniform cross-sectional dimensions.

The objects of the invention are to provide an improved packing ring of the character described having a substantially uniform tension or resiliency throughout its entire circumference; to produce such uniform tension by an improved method of densifying the material of which the ring is composed; to produce said tension by the formation of indentations having irregular outlines or configurations different portions of which densify the material in different lines; to form said indentations with portions thereof enlarged and projecting laterally upon opposite sides of the portions between said enlargements; to tension the ring by ball-point indentations connected by line indentations; to form the indentations of varying sizes by gradually decreasing them in length transversely of the ring from the point opposite the split of the ring toward the ends of the ring; and to obtain other results and advantages as may be brought out by the following description.

Referring to the accompanying drawings, in which like numerals of reference indicate the same parts throughout the several views,

Figure 1 is a plan view of a packing ring embodying my invention;

Figure 2 is an enlarged development of one-half of the interior surface of the ring;

Figure 3 is a view similar to Figure 2 showing a modified form and arrangement of the indentations;

Figure 4 is a similar view of another modification of the indentations;

Figure 5 is a similar view of a further modified indenting, and

Figure 6 is a transverse sectional view taken on the line 5—5 of Figure 2.

In the embodiment of the invention illustrated by Figures 1 and 2 of the drawings, the numeral 1 designates a ring body which is of substantially uniform cross-sectional area throughout, said ring being split at 2 to allow expansion and contraction of the ring, and the ends of the ring being recessed or cut away at 3, 3 to make an overlapping joint as is common in blanks for piston rings.

To produce a uniform tension in the ring so that the ring will remain circular upon any change in the diameter thereof, and so that tendency to return to normal size will be uniform all around the ring, the material of which the ring is formed is distorted or its density variably changed by the forming of a plurality of indentations 4 in a surface of the ring. The indentations shown in Figures 1 and 2 comprise enlarged ball point or spot portions 5 connected by narrower or line portions 6, all portions of the indentations being confined within the edges of the ring. In the present instance a ball point portion 5 is shown at each end of the indentations and one in the center, so that the line portions do not intersect the edges of the ring. These indentations may be formed by any suitable means, and the variations in the density of the material may be produced by varying the intensity of the blow forming the indentations or varying the depth of the indentations, or by spacing the indentations different distances apart. The indentations 4 are disposed along the middle portion of the length of the ring, that is equally upon opposite sides of a diametric line through the split 2, and I have found these indentations have the effective characteristics of both the usual line indentations and ball point indentations. Furthermore, these indentations 4 terminate short of the edges of the ring so that the liability to cracking or breaking of the ring is reduced. The tendency of the ball point or spot indentations is to densify the material in directions radial to the center of the indentations, while the tendency of the line indentations is to densify the material in lines substantially parallel to the indentations. My improved method of densification thus produces a through and uniform densification of the material throughout the cross sectional area of the ring.

The densifying effect of a ball point or spot indentations, spaced from one another as heretofore in the art, is greatly lessened by the undensified portions of the ring surface between the ball point or spot indentations, and it has therefore been necessary to make them correspondingly close together,

although if they were too close or ran into one another the ring was likely to break. I have found that by connecting ball point or spot indentations by line indentations, the densifying effect of a continuous indentation is secured, and yet without increasing liability of breakage. The ball point or spot indentations of my improved ring may therefore be far apart, as for example near the center of the ring shown in Figure 3, the portion of the surface between said indentations being also densified, but more narrowly in a direction longitudinally of the ring; the combined effect of the broad and narrow indentations seems to be to secure the necessary densifying without the tendency to breakage which occurs with an indentation of uniform width.

A modified form of the invention is shown by Figure 3 of the drawings, in which the material of the ring is variably densified from a point diametrically opposite the split toward the ends of the ring by improved means. The indentations 7 may be formed by any suitable means and are all similar in shape and equidistantly spaced. Each of the indentations comprises a ball point portion 8 at each end, the said portions 8 being preferably connected by a line indentation 9, all portions of the indentations being confined within the edges of the ring. The indentations 7 decrease in length from the point diametrically opposite the split of the ring toward the ends thereof, so that each succeeding indentation toward the ends of the ring covers a smaller area of the surface of the ring in which the indentations are formed. In the present instance it will be noted that the lengths of the indentations are varied by bringing the ball point portions 8 closer together, thereby shortening the line indentations 9. It will thus be seen that inasmuch as the areas covered by the indentations 7 vary toward the ends of the ring, the amount of densification of the material caused by each of the indentations will gradually vary so as to provide the proper tension in the ring to cause it to remain circular upon changes in its diameter, and so that the tendency to return to its normal size will be uniform throughout the circumference of the ring.

A further modification of my invention is shown in Figure 4 of the drawing in which the indentations 10 are line indentations, the ball point portions above described being omitted, and the ends of the indentations terminating short of the edges of the ring. The indentations 10 gradually decrease in length from the point opposite the split and are preferably equidistantly spaced, the said indentations being centrally disposed in the surface of the ring in which they are formed. This form of the invention produces substantially the same results as the construction shown in Figure 3, with the exception that the effect of the ball point portion 8 is eliminated. Similarly, the line indentations of Figure 3 could be omitted and the ball point or spot indentations approach more and more closely, such a construction being illustrated in Figure 5 of the drawings.

It will be obvious that my improved method of manufacture may be applied to the ring by any suitable means, and it will be understood that my invention is applicable to all packing rings without regard to the direction in which the tension acts, and I do not desire to be limited in the use and application of my invention except as required by the following claims when construed in the light of the prior art.

Having thus described the invention, what I claim as new is:—

1. A method of tensioning packing rings, consisting in densifying the material by line indentations intersected by spot indentations.

2. A method of tensioning packing rings, consisting in densifying the material by cooperating line indentations and spot indentations.

3. A method of tensioning packing rings, consisting in densifying the material by transverse series of line indentations and spot indentations.

4. A method of tensioning packing rings, consisting in densifying the material by line indentations each having spot indentations at its ends.

5. A method of tensioning packing rings, consisting in forming indentations of irregular outline in a surface of said ring.

6. A method of tensioning packing rings, consisting in forming in a surface of the ring indentations each having varying dimensions.

7. A method of tensioning packing rings, consisting in forming in a surface of the ring indentations each comprising a plurality of spot indentations connected by line indentations.

8. A packing ring having at its surface a transversely alined spot indentation and line indentation.

9. A packing ring having in its surface a longitudinal series of equally spaced transverse indentations varying in length.

10. A method of tensioning packing rings consisting in forming in a surface of the ring a series of transverse indentations equally spaced and varying in length longitudinally of the ring.

11. A method of tensioning packing rings consisting in forming in a surface in the ring indentations of varying lengths transversely of the ring.

12. A method of tensioning packing rings consisting in forming in a surface in the

ring indentations transverse to the ring with their lengths gradually varying longitudinally of the ring.

13. A method of tensioning packing rings consisting in forming in a surface in the ring indentations gradually decreasing in length from a point diametrically opposite the split in the ring toward its ends.

14. A packing ring having the material of which it is formed densified in areas of irregular configuration.

15. A packing ring having the material of which it is formed densified in areas having varying dimensions.

16. A packing ring having the material of which it is formed densified in areas various portions of which are of different dimensions.

17. A packing ring having formed in a surface thereof opposite its split a plurality of indentations each of which comprises a line indentation intersected by a spot indentation.

18. A packing ring having formed in a surface thereof opposite its split a plurality of indentations of various lengths.

19. A packing ring having formed in a surface thereof intermediate its ends a plurality of indentations gradually decreasing in length from a point diametrically opposite the split toward the ends of the ring.

20. A packing ring having formed in a surface thereof intermediate its ends a plurality of indentations gradually decreasing in length transversely of the ring.

21. A packing ring having a series of indentations each comprising ball point portions connected by line portions.

JACOB B. WENZEL.