

G. CHRISTENSON.
 LOOSE SPRING PISTON PACKING EXPANDER.
 APPLICATION FILED JULY 26, 1911.

1,023,813.

Patented Apr. 23, 1912.

Fig. 1.

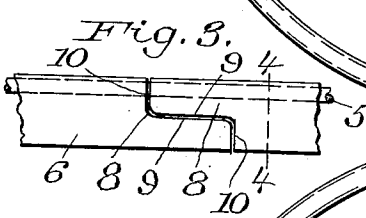
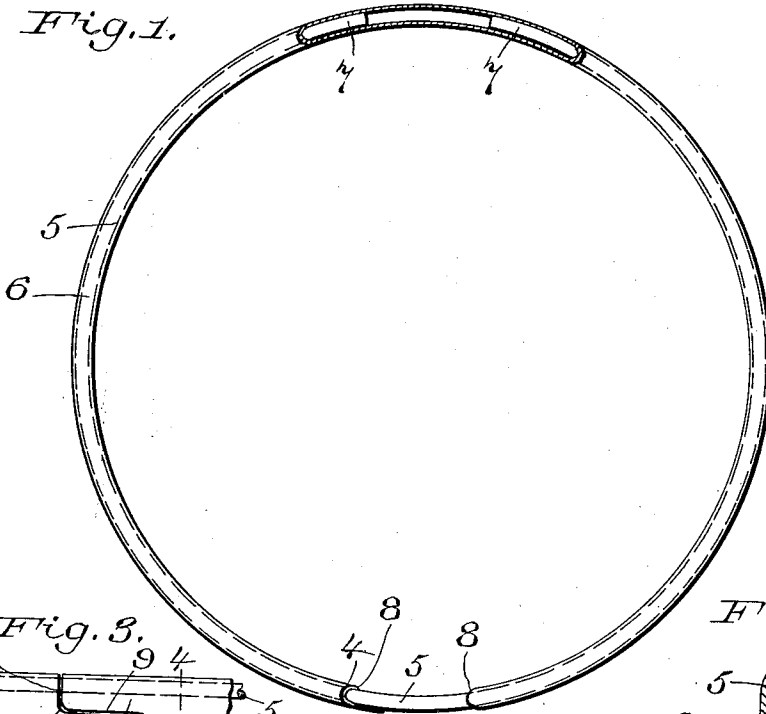


Fig. 4.

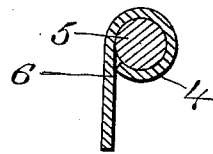
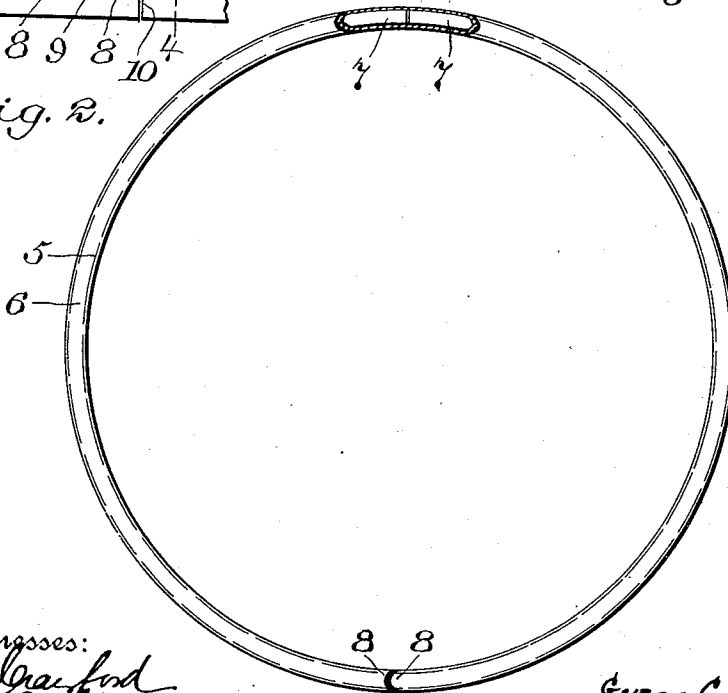


Fig. 2.



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UNITED STATES PATENT OFFICE.

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LOOSE-SPRING PISTON-PACKING EXPANDER.

1,023,813.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE CHRISTENSON, a citizen of the United States of America, residing at Jamaica, city of New York, county of Queens, State of New York, have invented certain new and useful Improvements in Loose-Spring Piston-Packing Expanders, of which the following is a specification.

My invention relates to packing expanders for pistons and comprises an improvement on apparatus shown and described in Patent No. 984,888 granted February 21, 1911, upon my application. In the special form of piston packing expander contemplated in said patent, and heretofore manufactured thereunder, the envelop of thin sheet metal surrounding the spring metal ring, which gives the structure elasticity, has always fitted so tightly to the said ring as to render any slipping of one over the other impossible. The two portions,—ring and envelop—have been fixed relatively one to the other, the spring ring being completely covered by the sheet metal ring, and the point or abutting ends of the two portions of the structure being located at approximately the same point in the circle, and fixed in that location. Certain disadvantages have resulted from this feature of construction, as follows: With the form of expander ring shown in my said patent, and in all other forms of packing expander rings so far known to me, it has been possible by roughly handling the same to produce a distortion of form such as will produce a permanent "set" in the elastic materials composing the ring and result in the abutting ends not exactly meeting when the ring is placed in position for use, or in otherwise preventing the structure from assuming the form of a perfect circle which is necessary in order to make a perfect piston packing expander. I have discovered that by reversing the arrangement of the spring ring and sheet metal envelop therefor employed in composite expander rings so that the two will break joints and giving one a loose sliding fit in the other, the maintenance of shape of the complete ring in use is assured no matter what its previous handling had been.

The best form of apparatus embodying my invention at present known to me is illustrated in the accompanying sheet of drawings, in which,

Figure 1 is a plan view of an apparatus embodying my invention with parts broken away, the ring being shown in expanded position. Fig. 2 is a similar view with the ring being sprung into the position which it approximates in use. Fig. 3 is a detail view of one form of abutting ends for the outer envelop of the ring and Fig. 4 is an enlarged cross section on line 4—4 of Fig. 3.

Throughout the drawings like reference characters indicate like parts.

5 is a ring of highly tempered steel or highly elastic material, preferably of circular cross section which may be formed by cutting the required length from a steel rod of the proper size and bending the same into ring form with the ends slightly separated.

6 is a strip of thin sheet material such as mild steel cut from an ordinary sheet of such material, and also bent into ring shaped form with the ends separated by a distance equal to that which separates the ends of the ring 5. This strip 6 is loosely attached to the ring 5 in any convenient way, as by curling one edge of the strip 6 around the ring 5, as best shown in Fig. 4. This curled portion of the strip 6 forming the outer envelop is given an internal diameter such that the ring 5 has a loose sliding fit therein, and this envelop 4 and ring 5 are arranged as shown in Fig. 1 so as to break joints, the ends 7, 7, of the elastic ring 5 coming at one side of the ring within the envelop and the abutting ends 8, 8, of the strip 6 coming at the other side of the ring. When the diameter of the composite ring so produced is reduced, as by external pressure the ends of the spring 5 and strip 6 meet, as shown in Fig. 2, but whenever the pressure is released the ring tends to spring back into the position shown in Fig. 1. The abutting ends of strip 6 may be given any mutually corresponding shape to produce a complete closure when they are forced together, but I prefer to have them cut on lines 9, 9, which are parallel and lines 10, 10, which are at right angles to the circumference of the ring, as shown in Fig. 3, so as to form mutually overlapping portions.

In use the main body of the strip 6 which is arranged at right angles to the plane of the ring is forced against the interior of the usual cup leather packing by the expansion of the spring ring 5. The parts are so de-

signed that the mutually overlapping portions of the abutting ends of the strip 6 will never be entirely separated in use and consequently no portion of the packing will be devoid of full spring pressure.

The advantages of my invention comprise the beneficial action of the spring ring 5 telescoping into the curved portions of the abutting ends of the strip 6 forming its envelop, so that no matter how far apart said ends are pulled by rough handling, they will always be maintained in perfect alinement and upon compression of the ring as a whole will meet again to form a perfect ring, and also the fact that the maintenance of such perfect alinement permits the shaping of the abutting ends of the strip 6 to form mutually overlapping portions, as shown in Fig. 3 without the danger of said overlapping portions getting one behind the other, and thereby interfering with the free action of the ring in use and forming a slight inequality in the surface of the ring, which will leave a portion of the packing free from full spring pressure and thereby tend to produce leaks.

Of course other means of producing the loose attachment of the spring ring to the sheet metal strip might be substituted for that shown and other forms of ring and strip employed without departing from the principle of my invention. The relative arrangement of the ring 5 and its envelop 4 might also be varied so long as the two break joints, but the best results and the most efficient spring action are secured by the arrangement shown in Figs. 1 and 2.

When the spring ring and its loosely fitting envelop are arranged to break joints the expansive force of the spring ring is transmitted evenly to every point of the envelop, and an equal outward pressure is developed radially of the ring at every point of the entire circumference, while in the old form of ring cut at one point in the circumference, different radial pressures develop at different points and uneven wear of the packing leather results.

Having, therefore, described my invention, I claim:

1. A piston packing expander having in combination a ring of elastic metal and a thin strip of sheet material loosely fastened to the ring and forming a flange thereon, extending at right angles to the plane of the ring.

2. A piston packing expander having in combination a ring of elastic metal and a thin strip of sheet material loosely wrapped around the ring and projecting at right angles to the plane of the ring to form a flange thereon.

3. A composite piston packing expander formed of a ring of steel of high temper, and a strip of sheet metal of low temper and

high ductility loosely fastened to the ring and forming a flange thereon, extending at right angles to the plane of the ring.

4. A composite piston packing expander formed of a ring of steel of high temper, and a strip of sheet metal of low temper and high ductility loosely bent around the ring and projecting at right angles to the plane of the ring to form a flange from the outer side of the ring.

5. A piston packing expander comprising in combination a ring of highly elastic material having abutting ends, and a ring shaped hollow envelop for said ring, also having abutting ends, the ring and its envelop being arranged to break joints.

6. A piston packing expander comprising in combination a ring of highly elastic material having abutting ends, and a ring shaped hollow envelop for said ring, also having abutting ends, the ring and its envelop being arranged to break joints, said envelop being provided with a thin projecting flange.

7. A piston packing expander comprising in combination a ring of highly elastic material having abutting ends, and a ring shaped hollow envelop for said ring, also having abutting ends, the ring and its envelop being arranged to break joints, said envelop being provided with a thin flange projecting at right angles to the body of the ring and from the outside thereof.

8. A piston packing expander having in combination a ring of highly elastic material with abutting ends, a strip of thin material also bent into a ring with abutting ends and having one edge loosely attached to the first mentioned ring, the two rings being arranged to break joints.

9. A piston packing expander having in combination a ring of highly elastic material with abutting ends, a strip of thin material also bent into a ring with abutting ends and having one edge loosely curled around the first mentioned ring, the two rings being arranged to break joints.

10. A piston packing expander having in combination a ring of highly elastic material with abutting ends, a strip of thin material also bent into a ring with abutting ends and having one edge loosely curled around the first mentioned ring, the two rings being arranged to break joints, the main portion of the strip being arranged at right angles to the plane of the ring.

11. A piston packing expander having in combination a ring of highly elastic material with abutting ends, a strip of thin material also bent into a ring with abutting ends and having one edge loosely attached to the first mentioned ring, the two rings being arranged to break joints, the abutting ends of the strip being cut away to form mutually overlapping portions.

12. A piston packing expander having in combination a ring of highly elastic material with abutting ends, a strip of thin material also bent into a ring with abutting ends and having one edge loosely curled around the first mentioned ring, the two rings being arranged to break joints, the abutting ends of the strip being cut on lines parallel or at right angles to the circumference of the ring to form mutually overlapping portions. 10

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."