

G. CHRISTENSON.
 PISTON PACKING EXPANDER.
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1,023,814.

Patented Apr. 23, 1912.

Fig. 1.

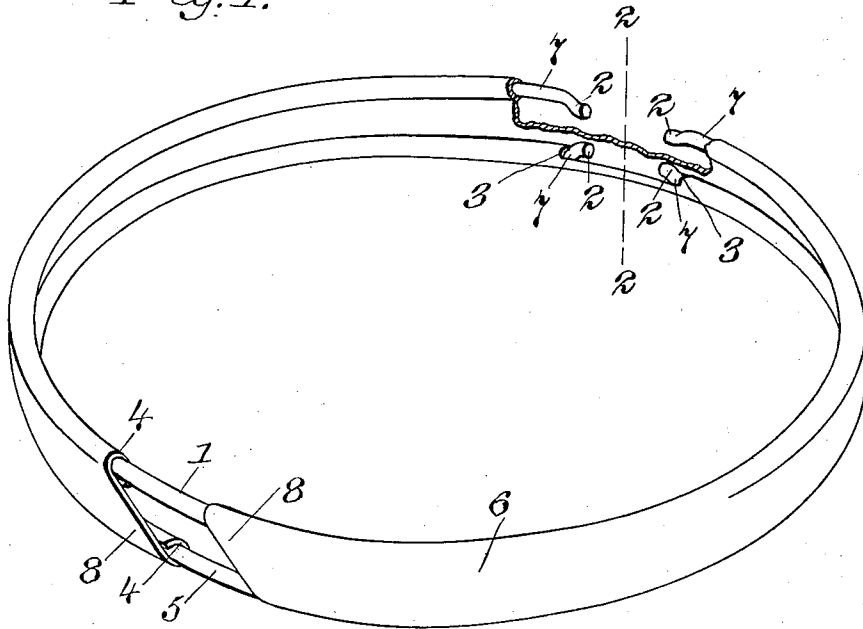
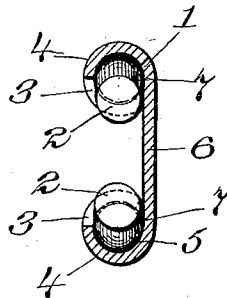


Fig. 2.



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UNITED STATES PATENT OFFICE.

GEORGE CHRISTENSON, OF NEW YORK, N. Y., ASSIGNOR TO H. W. JOHNS-MANVILLE COMPANY, A CORPORATION OF NEW YORK.

PISTON-PACKING EXPANDER.

1,023,814.

Specification of Letters Patent.

Patented Apr. 23, 1912.

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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, New York city, county of Queens, and State of New York, have invented certain new and useful Improvements in 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. 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. Moreover when it is a question of making a packing expander for a large piston there is not always room enough under the piston follower in which to place a spring of the necessary size and consequent expansive force to produce an airtight contact between the packing and the cylinder walls. Also the strip of thin sheet metal is not always strong enough to transmit the full pressure of such a powerful spring out to its edge portion which bears against the outer edge of the cup leather packing where pressure forcing the leather against the cylinder wall will do the most good. To better adapt this general type of construction to use on such large pistons I have invented the special form shown in the accompanying sheet of drawings in which,

Figure 1 is a perspective view of an apparatus embodying my invention with parts

broken away, the ring being shown in expanded position. Fig. 2 is a cross section on line 2—2 of Fig. 1, of a complete ring.

Throughout the drawings like reference characters indicate like parts.

1 and 5 are rings of highly tempered steel or highly elastic material, preferably of circular cross section, which may be formed by cutting the required lengths 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 or less than that which separates the ends of the rings 1 and 5. This strip 6 is loosely attached to the rings 1 and 5 in any convenient way, as by curling its edge around the rings 1 and 5, as shown. These curled portions of the strip 6 forming the outer envelop are given an internal diameter such that the rings 1 and 5 have a loose sliding fit therein, and this envelop 4 and rings 1 and 5 are arranged as shown in Fig. 1 so as to break joints, the ends 7, 7, of the elastic rings 1 and 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 springs 1 and 5 and strip 6 meet, but whenever the pressure is released the ring tends to spring back into the position shown in Fig. 1.

The abutting ends of the 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 diagonally as shown in Fig. 1.

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 rings 1 and 5. One or both of the spring rings are provided with offsets or projections 2, 2, or other means cooperating with a cutaway portion 3 of each curled over portion of the strip 6, or other recesses, and interlock therewith to prevent the completed expander ring from being stretched to a diameter in excess of a

predetermined limit. Thus it is impossible to distort the ring by pulling it out to a larger diameter sufficient to give it a permanent set. Preferably these interlocking portions are at the ends of the spring rings 1 and 5, as shown, but this particular location is not absolutely necessary.

Of course other means of producing the loose attachment of the spring rings 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 rings 1 and 5 and their 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 Fig. 1. One of the spring rings may be dispensed with, if the other is strong enough to do the work.

When the spring rings and their loosely fitting envelop are arranged to break joints the expansive force of the spring rings 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 entirely through 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 thin strip of sheet material bent into a ring with abutting ends, and two rings of elastic material located within said first mentioned ring, the rings of elastic material being arranged to break joints with the ring of sheet material at their abutting ends.

2. A piston packing expander having in combination a thin strip of sheet material bent into a ring with abutting ends, and two rings of elastic material located within said first mentioned ring, one edge of said strip being bent around one of the rings, the rings of elastic material being arranged to break joints with the ring of sheet material at their abutting ends.

3. A piston packing expander having in combination a thin strip of sheet material bent into a ring with abutting ends, and two rings of elastic material located within said first mentioned ring, one edge of said strip being bent around one of the rings and the other edge of the strip being bent around the other ring, the rings of elastic material being arranged to break joints with the ring of sheet material at their abutting ends.

4. A piston packing expander having in combination a thin strip of sheet material bent into a ring with abutting ends, and two rings of elastic material located within said first mentioned ring, one edge of said strip being attached to one ring, the rings

of elastic material being arranged to break joints with the ring of sheet material at their abutting ends.

5. A piston packing expander having in combination a thin strip of sheet material bent into a ring with abutting ends, and two rings of elastic material located within said first mentioned ring, one edge of said strip being attached to one ring and the other edge of the strip being attached to the other ring, the rings of elastic material being arranged to break joints with the ring of sheet material at their abutting ends.

6. A piston packing expander having in combination a thin strip of sheet material bent into a ring with abutting ends, and two rings of elastic material located within said first mentioned ring, the main portion of the strip being arranged at right angles to the plane of the ring, the rings of elastic material being arranged to break joints with the ring of sheet material at their abutting ends.

7. A piston packing expander having in combination a thin strip of sheet material bent into a ring with abutting ends, and two rings of elastic material located within said first mentioned ring, one edge of said strip being bent around one of the rings and the other edge of the strip being bent around the other ring, the main portion of the strip being arranged at right angles to the plane of the ring, the rings of elastic material being arranged to break joints with the ring of sheet material at their abutting ends.

8. A piston packing expander having in combination a thin strip of sheet material bent into a ring with abutting ends, and two rings of elastic material located within said first mentioned ring, the said elastic rings also having abutting ends, but arranged to break joints with the strip at their abutting ends, and having a sliding fit therewith.

9. A piston packing expander having in combination a thin strip of sheet material bent into a ring with abutting ends, and two rings of elastic material located within said first mentioned ring, one edge of said strip being bent around one of the rings and the other edge of the strip being bent around the other ring, the said elastic rings also having abutting ends, but arranged to break joints with the strip at their abutting ends, and having a sliding fit therewith.

10. A piston packing expander having in combination a thin strip of sheet material bent into a ring with abutting ends, and two rings of elastic material located within said first mentioned ring, the said elastic rings also having abutting ends, but arranged to break joints with the strip at their abutting ends, and having a sliding fit therewith, 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 thin strip of sheet material

bent into a ring with abutting ends, and two rings of elastic material located within said first mentioned ring, one edge of said strip being bent around one of the rings and the other edge of the strip being bent around the other ring, the said elastic rings also having abutting ends, but arranged to break joints with the strip at their abutting ends, and having a sliding fit therewith, the main portion of the strip being arranged at right angles to the plane of the ring.

12. 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, the ring and its envelop being arranged to break joints and being provided with interlocking portions the engagement of which preserves the relative positions of ring and envelop within limits.

13. 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, the ring and its envelop being arranged to break joints and being provided with interlocking portions the engagement of which preserves the relative positions of ring and envelop within limits, said envelop being provided with a thin projecting flange.

14. 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, the ring and its envelop being arranged to break joints and being provided with interlocking portions the engagement of which preserves the relative positions of ring and envelop within limits, said envelop being provided with a thin projecting flange extending at right angles to the plane of the ring.

15. 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, and provided with interlocking portions adapted to preserve their relative positions within limits.

16. 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 curled portion being cut away at points and the inclosed ring having lateral projections extending through the openings so formed.

17. 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, and the curled portion being cut away at points and the inclosed ring having lateral projections extending through the openings so formed.

18. A piston packing expander having in combination a ring of highly elastic material with abutting ends bent slightly out of the plane of the ring, and a strip of thin material also bent into a ring and having one edge loosely curled around the first mentioned ring, the curled portion being cut away to form a space through which the bent ends of said first mentioned ring project.

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Witnesses:

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