(No Model.)

S. H. MOSHER & C. L. ANDERSON.

METALLIC PACKING.

No. 471,185. Patented Mar. 22, 1892.

Fig. 1.

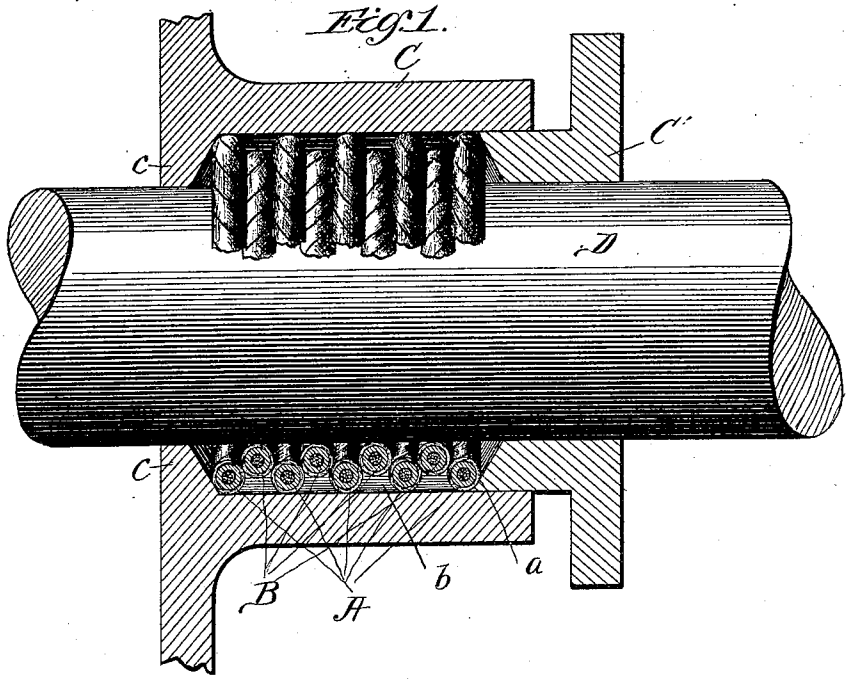


Fig. 2.

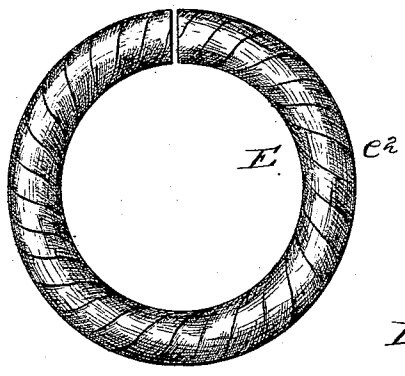


Fig. 3.

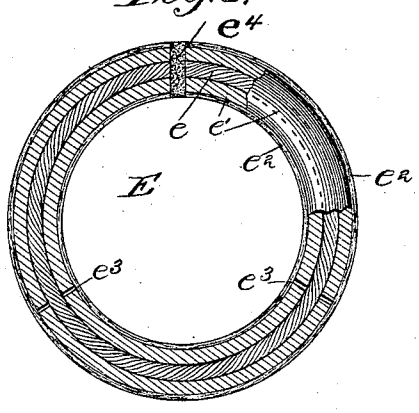
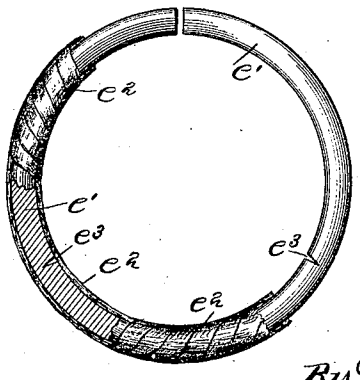


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

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METALLIC PACKING.

SPECIFICATION forming part of Letters Patent No. 471,185, dated March 22, 1892.

Application filed October 12, 1891. Serial No. 408,435. (No model.)

To all whom it may concern:

Be it known that we, SILAS H. MOSHER and CHARLES L. ANDERSON, both of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Metallic Packings; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The object of this invention is to provide an improved packing for the piston-rods of steam engines and pumps which will be durable and insure steam-tight joints.

To this end the invention consists in the matters which will be particularly described in the following specification and claimed in the clauses at the close thereof.

In the accompanying drawings, Figure 1 is a sectional view showing the improved packing in its relation to a piston-rod and its stuffing-box. Fig. 2 is a plan view of one of the packing-rings. Fig. 3 is a section of the same. Fig. 4 is a plan view, partly in section, illustrating a modified form of the packing-ring.

A device embodying our invention embodies two or more series A and B of independent packing-rings arranged alternately within the stuffing-box C, one series A of rings being of a diameter to snugly fit the base of the stuffing-box, and the other series B of rings being of less diameter and adapted to closely fit upon the piston-rod D.

As shown in Figs. 1 to 3, the rings E are composed of a core *e*, of fibrous material, a tube of soft or anti-friction metal surrounding the same, and an envelope e^2, of fibrous material impregnated or saturated with a lubricating substance.

In the manufacture of these packing-rings a long rope, cord, or strand of flexible or fibrous material constituting the core *e* is passed through a suitable machine or apparatus, by which it is incased by a metal tube *e'* of the desired thickness, the core when formed by a rope or cord being usually compressed into a solid mass by the metal which surrounds it. A length or blank so constructed is tightly coiled upon a mandrel of a diameter equal to that of the piston-rod D with which the packing is to be used, and the coils are severed in a line coincident with the longitudinal axis of the mandrel, thus forming a number of rings E, that will fit snugly upon said piston-rod. Another length or blank is coiled upon a larger mandrel of a diameter equal to the internal diameter of the stuffing-box C, less the thickness of the blank, thus forming a number of rings E, which will fit snugly within the stuffing-box C, but will not be in contact with the piston-rod D, arranged centrally therein. In other words, supposing the piston-rod D to be two inches in diameter and the interior diameter of the stuffing-box to be three and one-half inches, there will be a clearance of three-quarters of an inch between the piston-rod and the stuffing-box. If then the packing-rings be one-half inch in thickness there will remain a space of one-quarter of an inch between the outer surfaces of the rings of the inner or smaller series B and the inner wall of the stuffing-box, and an equal space between rings of the outer series A and the piston-rod. It is preferred to maintain substantially the above proportions with stuffing-boxes and piston-rods of different diameters—that is to say, where the material of the inner and outer series of rings B and A is of the same thickness each series may desirably occupy about two-thirds of the space between the piston-rod and the walls of the stuffing-box. The rings E thus constructed are partially severed by cuts or notches e^3, extending through the metal tube, but leaving the central cone or stand intact. Such partial severing of the ring permits of the same being opened for application to a rod without changing the curve of the uncut parts thereof. Commonly the smaller rings B will be partially cut through at two places to allow the same to be easily opened for placing them upon the rod, while the larger outer rings A will need to be severed at one point, as their larger size will admit of their ends being opened to a greater distance apart without undue flexure at the points of partial separation. The rings are then tightly wrapped with a fibrous material, which may be applied in the form of a ribbon wound

spirally upon the ring, the ends being confined by sewing, or being tightly bound with a fine thread, or by any other known or suitable means. The rings, with their fibrous envelopes e^2, are immersed in a bath of hot lubricating material or compound, preferably tallow and plumbago, and allowed to remain until the envelope e^2 is thoroughly saturated with the compound, after which it is removed from the bath, and the surface of the envelope is treated with a coating or coatings of plumbago thoroughly rubbed in. The rings E of the series of rings B, which are to be applied to the piston-rod C, are preferably dressed on their inner sides to form a flattened surface adjacent to the rod, and this is done, preferbly, before the notches e^3 are formed, as the rings are at that time more rigid and better adapted for the action of the dressing-tool. Such flattening of the inner surface of the rings tends to insure a more perfect steam-tight joint when the packing is first inserted and put in operation, as less compression or adjustment of the rings is then required to afford the necessary close bearing of the inner rings against the rod.

In the modification illustrated in Fig. 4 the construction is identical with that already described, except that the fibrous core c' is omitted and the cuts or notches e^3 do not extend entirely through the ring or part of the metal being left continuous in order to retain the ring in its circular form while weakening it at certain points, so that it may be easily bent in placing the ring upon the rod. This form of packing-ring is more especially designed for use where the space between the piston-rod D and the inner walls of the stuffing-box C is quite limited, thus necessitating the use of a packing-ring of small diameter in order that the requisite space between the series A of rings and the piston-rod and between the series B of rings and the walls of the stuffing-box may be maintained. The action of bending or "skewing" these packing-rings to apply them to a piston-rod will frequently result in entirely severing the metal of the ring at the notches e^3; but this is unobjectionable, as the respective parts of the rings are maintained in their relative positions by the fibrous envelope or cover e^2 while being placed in position within the stuffing-box.

In applying this packing a ring E of one of the series—say the outer series A—is bent or opened to pass over the piston-rod D and then again closed and forced to the farther or closed end c of the stuffing-box C. A ring of the other series is then applied in the same manner and this continues, the rings of the two series being arranged alternately, as in Fig. 1, until sufficient packing has been inserted in the stuffing-box C to admit of the gland C exerting the necessary pressure upon them. The gland C is then inserted in the end of the stuffing-box and forced inward by the usual bolts or other appliances commonly used for that purpose. Owing to the described construction and arrangements of the parts the pressure of the gland C causes a wedging action to be exerted by the rings of each series upon the rings of the other series, the rings of the outer series A being thrust outward and seated tightly against the walls of the stuffing-box, while the rings of the inner series B will be forced inward tightly against the piston-rod D. The gland is then removed and additional rings of the two series are inserted to fill the stuffing-box, when the gland is again applied and forced inward, as before, to complete the packing.

It is not essential that the rings E of the inner and outer series be of the same thickness, as there may be considerable variation in size between the two series, and the series of thicker rings may be arranged in contact with either the piston-rod or the stuffing-box, as preferred.

In use that part of the cover or envelope e^2 which is in contact with the piston-rod will be soon worn through, leaving the metal e' of the rings of the inner series in direct contact with the rod. The worn edges of the saturated envelope will remain in contact with the rod, however, and continue to distribute the lubricant upon said rod. The rings E of the inner series do not completely encircle the piston-rod, there being a little space left between their ends to allow for adjustment as the rings become worn from use, and this space preferably filled or packed with fibrous material, as seen at e^4, Fig. 3, to lessen the liability of steam to escape. The packing-rings of both series are also preferably arranged to break joints for a like reason.

In constructing rings having a fibrous core e we prefer to use a core saturated with a lubricating material, which renders the core more solid, while at the same time tending to preserve its flexibilty and integrity under heat and pressure.

It will be noted that in a packing arranged as described there will be a series of annular spaces or grooves a between the inner sides of the rings of the larger series A and the piston-rod, and another similar series of spaces b between the outer sides of the rings of the smaller series B and the walls of the stuffing-box. In use steam escaping from the cylinder (not shown) becomes condensed in these spaces, and, commingling with oil used for lubricating purposes, effectually prevents the passage or escape of steam, while at the same time the water and oil thus accumulating in said grooves aid in lubricating the parts in contact.

The notching or partial severing of the packing-rings, as above described, not only serves to weaken the ring, so that it may be easily opened in placing it upon the rod, but, what is perhaps more important, affords a considerable degree of flexibilty at the points where the parts or segments comprising the ring are joined, by which the same may read-

ily adjust themselves to irregularities in the rod—as, for instance, in the case of old rods which have been worn to an irregular shape, the parts or segments of the rings thus notched or severed will adjust themselves automatically to the form of the rod without the use of great pressure on the packing to effect this end.

The solid form of packing-ring shown in Fig. 4 will not only be of value for use in small or narrow stuffing-boxes, but will be of great benefit in cases where an exceptionally-tight packing is required to withstand the heavy pressure.

In the use of the form of ring shown in Fig. 4, when a solid rod is used to form the ring the parts of the ring are liable to become entirely detached or severed when flexing the ring to place it upon the rod; but this is of no disadvantage, because the exterior wrapping or envelope serves to hold together the detached parts while inserting the ring in the stuffing-box and thereafter. The abutting ends of the rings will be left open or spread apart, as shown, so as to allow a desired degree of contraction in the ring before its ends come together. The abutting ends of the parts or segments of the tubular ring are also adapted to be brought or forced together by reason of the spaces formed between said parts in severing the tube, and the fact that the flexible core will usually be compressible endwise to some degree, so that an additional degree of contractibility is afforded by so severing the tubular ring.

We claim as our invention—

1. A packing-ring for stuffing-boxes comprising a metallic ring notched or partially severed at one or more points and a packing or filling inserted between the abutting ends of the ring.

2. A packing-ring for stuffing-boxes comprising a cylindric metal tube inclosing a flexible strand or core and bent into circular form, with its abutting ends separated to allow contraction thereof, the tube being entirely severed at one or more points between its ends, while the flexible strand or core is left continuous, whereby the ring is made both flexible and contractible, substantially as described.

3. A packing-ring for stuffing-boxes comprising a cylindric metal tube inclosing a flexible strand or core and bent into circular form, with its abutting ends separated to allow contraction thereof, the tube being entirely severed at one or more points between its ends, while the flexible strand or core is left continuous, and a wrapping or envelope of fibrous material surrounding the tube, substantially as described.

4. A piston-rod packing consisting of a series of rings of a diameter to fit the rod and a second series of rings of greater diameter than the first, the rings of one series being arranged in alternation with those of the other series and each of said rings consisting of a cylindric tube provided with a flexible or fibrous core open or entirely severed at one point, with its abutting ends separated to allow contraction of the ring, and entirely severed at one or more points between its ends to permit flexing of the ring, substantially as described.

5. A piston-rod packing consisting of a series of rings of a diameter to fit the rod and a second series of rings of greater diameter than the first, the rings of one series being arranged in alternation with those of the other series and each of said rings being of cylindric form and open or entirely severed at one point and having its abutting ends separated to allow contraction of the ring and being partially severed at one or more points between its abutting ends to permit flexing of the ring, and an envelope of fibrous material covering the ring from end to end, substantially as described.

6. A piston-rod packing consisting of a series of rings of a diameter to fit the rod and a second series of rings of greater diameter than the first, the rings of one series being arranged in alternation with those of the other series and each of said rings consisting of a cylindric tube provided with a flexible or fibrous core open or entirely severed at one point, with its abutting ends separated to allow contraction of the ring and entirely severed at one or more points between its ends to permit flexing of the ring, and a fibrous covering or envelope extending from end to end of the ring, substantially as described.

7. A piston-rod packing consisting of a series of rings of a diameter to fit the rod and a second series of rings of greater diameter than the first, the rings of one series being arranged in alternation with those of the other series and each of the said rings consisting of a metal tube provided with a fibrous core and notched or severed at one or more points, a packing or filling inserted between the abutting ends of the tube, and an envelope or cover of fibrous material, such as described.

In testimony that we claim the foregoing as our invention we affix our signatures in presence of two witnesses.

SILAS H. MOSHER.
CHARLES L. ANDERSON.

Witnesses:
C. CLARENCE POOLE,
GEORGE W. HIGGINS, Jr.