

P. W. RICHARDS.

Stuffing-Boxes for Piston-Rods, &c.

No. 135,589.

Patented Feb. 4, 1873.

FIG. 1.

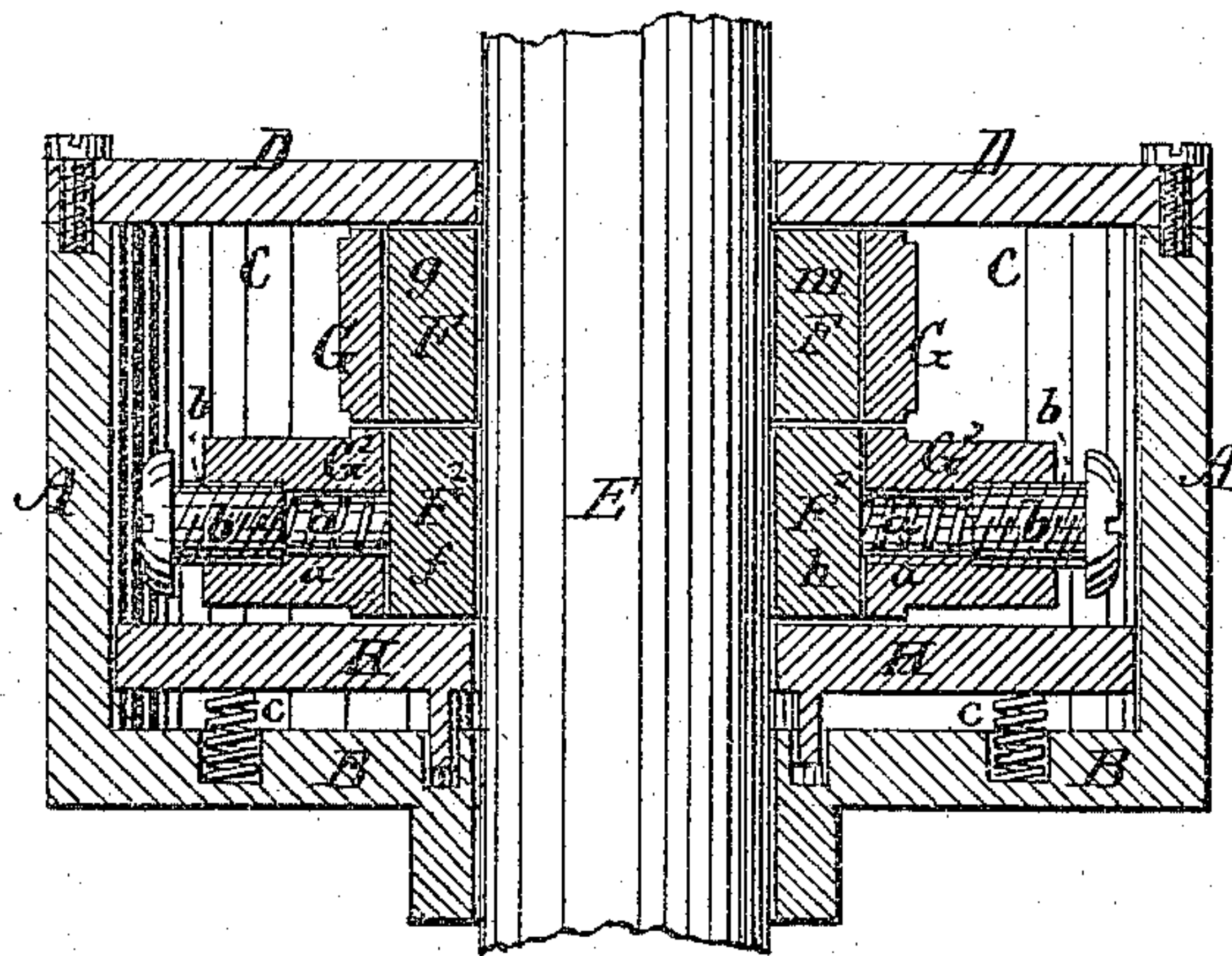
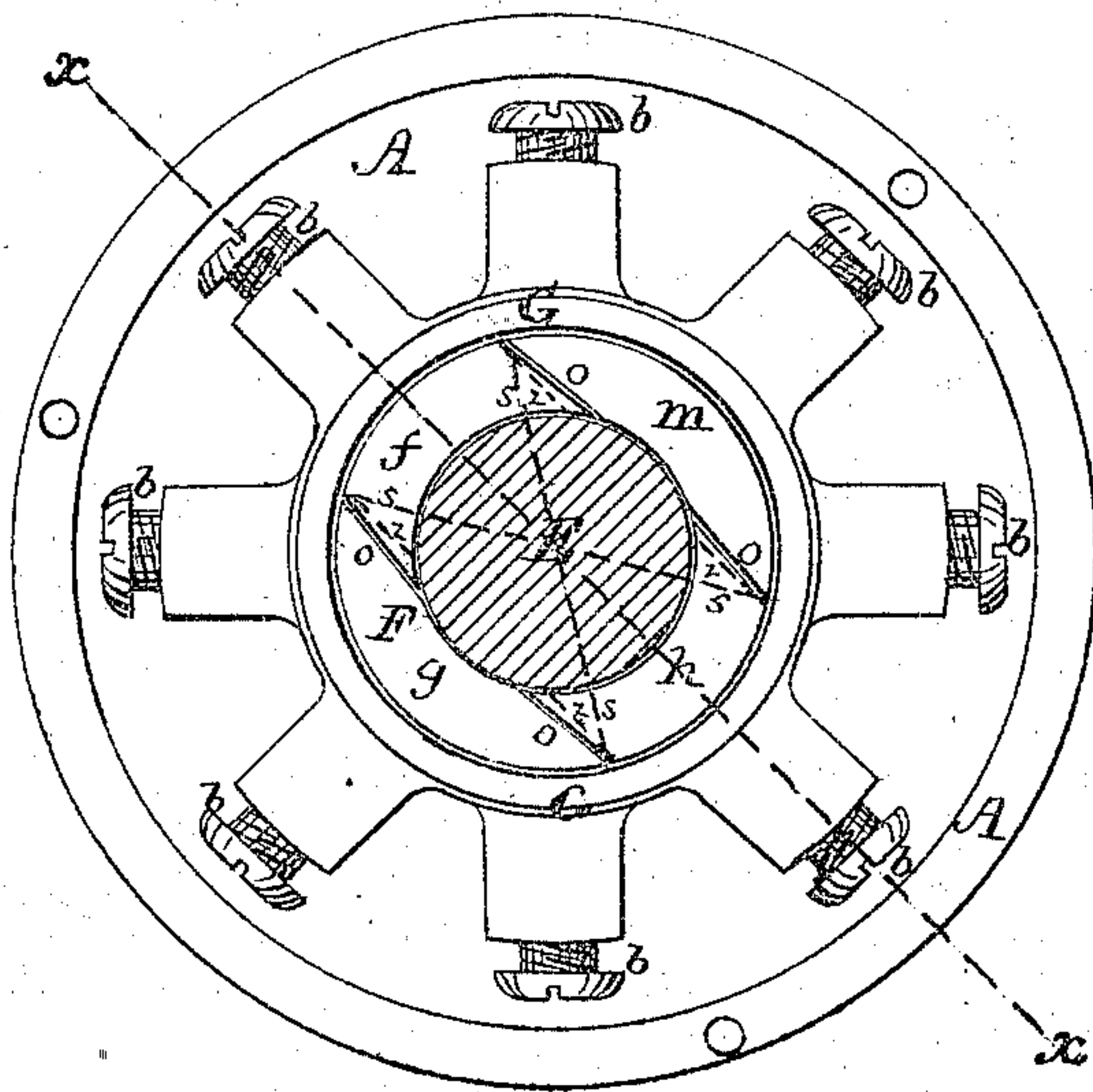


FIG. 2.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN STUFFING-BOXES FOR PISTON-RODS, &c.

Specification forming part of Letters Patent No. **135,589**, dated February 4, 1873.

*To all whom it may concern:*

Be it known that I, PHILLIP W. RICHARDS, of Boston Highlands, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improvement in Sectional Rings for Stuffing-Boxes of Steam-Engines, &c.; and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing.

This invention relates more particularly to that class of packing for the piston and valve rods, &c., of steam and other engines, pumps, &c., in which sectional rings are employed to surround or incase the rod in its stuffing-box, said rings being held in close and self-adjustable contact upon the rod by means of springs arranged to suitably act thereon. The invention especially relates to the construction of the sectional rings; and it consists of a ring that is divided into sections across its width and through its thickness by lines or seams running at an acute angle to a radial line drawn from the outer starting-points of such dividing lines or seams to the center of the ring. Each portion of the ring, inclosing two lines of radiuses drawn from the outer end of each of the two lines of seam or split, and making said portion into a section, is of a wedge shape, more or less defined, according as the said angles of split or seam are more or less acute relative to the said radial lines of the rings.

The particular and important advantage of this construction of a sectional ring will be hereinafter stated.

In the accompanying plate of drawing the present invention is illustrated.

Figure 1 is a central transverse vertical section of a stuffing-box to the piston-rod of a steam-engine, showing the use of two sectional rings constructed according to this invention, the plane of section of this figure being on line *xx*, Fig. 2, which is a plan view of the interior of the stuffing-box with the closing head-plate removed.

In the drawing my present invention is shown in connection with improvements in stuffing-boxes for which I have already made application for Letters Patent of the United States; but it can be used also in connection with the construction of parts embraced in two separate Letters Patent heretofore issued to

me, respectively bearing date the 8th of August, and numbered 117,927 and 117,928, and Letters Patent dated December 12, 1871, No. 127,897, and also in connection with many, if not all, modes of applying sectional rings for the purposes of a stuffing to piston and other rods; and, although in the following detail description of my present invention it will be described in connection with the improvements embraced in the aforesaid application for Letters Patent, it is not intended to limit its application to any one particular form or construction of the stuffing-box and its contents outside of the within invention.

A in the drawing represents the stuffing-box or case proper, adapted by one end, B, to be secured in position, and by its other end, C, to be opened and closed by a head-plate, D; E, the piston-rod passing through center of box A; F F<sup>2</sup>, two rings divided into sections, as will be hereinafter described; and G G<sup>2</sup>, two solid rings, each inclosing a sectional ring, F or F<sup>2</sup>, respectively. The sectional rings F F<sup>2</sup> are of similar internal and external diameter; so, also, the solid rings G G<sup>2</sup>, their internal diameter being equal to or in excess of the external diameter of the sectional rings F F<sup>2</sup>, and the internal diameter of the sectional rings F F<sup>2</sup> being equal to the diameter of the piston-rod E. The solid rings G G<sup>2</sup> are each similarly constructed at suitable points for the reception of spiral springs *a* and set or adjusting screws *b* to produce pressure upon the external periphery of the sectional rings, so as to force them toward and hold them against the piston-rod. A spring, *a*, and set-screw *b* are provided for each section of each ring. H, a circular plate or disk surrounding piston-rod E, and resting, through spiral springs *c*, on the closed head or end B to box A. On this plate H the sectional and solid rings rest, as shown in Fig. 1.

The construction and operation of the several parts hereinbefore referred to, except as to the construction of the sectional rings, are substantially the same as has been described in the application hereinbefore cited, and therefore it is not deemed necessary to herein further describe or refer to the same.

Both sectional rings F F<sup>2</sup> are similarly constructed, and this construction is as follows: *f g h m*, four sections of each ring; the four



sections make the whole ring, and the two  $f$  and  $h$  correspond in form and size, as also the two  $g$  and  $m$ ;  $o$ , the lines of seam or split. These splits are through the thickness of the rings, extending from the outer to the inner periphery, and in direction are at an acute angle to a radial line of the rings drawn from the outer end of each split. The dotted lines  $s$  represent the radial lines aforesaid. The points in the external periphery of the rings at which the lines of splits terminate or begin are each side of the two ends of a diametrical line of the rings, and are located equidistant from each side of said diametrical lines, said distances being in all cases less than the radius of the ring. From each of these points a line of split is drawn by running said line at an acute angle to a radial line of the ring drawn from such points, but at such an acute angle that it will strike the internal periphery of the rings, and so strike it as to leave between the inner termination of each line of split and the inner termination of the next line of split a portion of the arc of the inner periphery to the ring intact, and for the portion of the ring between two such lines of split, embracing the lines of radiuses aforesaid, to have a wedge shape, with the large base or end at the inner periphery, and the narrower base or end at the outer periphery. The dotted lines  $z z$  in Fig. 2 of the drawing indicate the extent of wedge made by the lines of splits shown.

A division of a ring into sections, as above described, is fully shown in Fig. 2 of the drawing; and it is self-apparent that the degree of wedge in the direction stated will depend upon the relative width of the inner and outer ends of the portions of the ring to which a wedge shape is given by splits made as aforesaid.

By a formation of rings in sections, substantially as above described, the following result is effected, viz: Close seams or splits can be used, and at the same time allow the several sections of the rings to follow up, compensating for wear. The explanation of this effect is apparent when this fact is considered—namely, that the wedge portions, wearing, decrease in width at their inner ends, and thus render the distance less by which they hold apart the portions of the rings lying between the two wedge portions.

Having thus described my invention, I shall state my claim as follows:

A ring for stuffing-boxes formed in sections  $f g h m$ , adjusted by set-screws  $b$ , as herein shown, and arranged to operate in connection with an outside ring substantially as and for the purpose specified.

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Witnesses:

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