

(No Model.)

2 Sheets—Sheet 1.

F. P. & J. T. MARTIN.
ROD PACKING.

No. 470,305.

Patented Mar. 8, 1892.

Fig. 1.

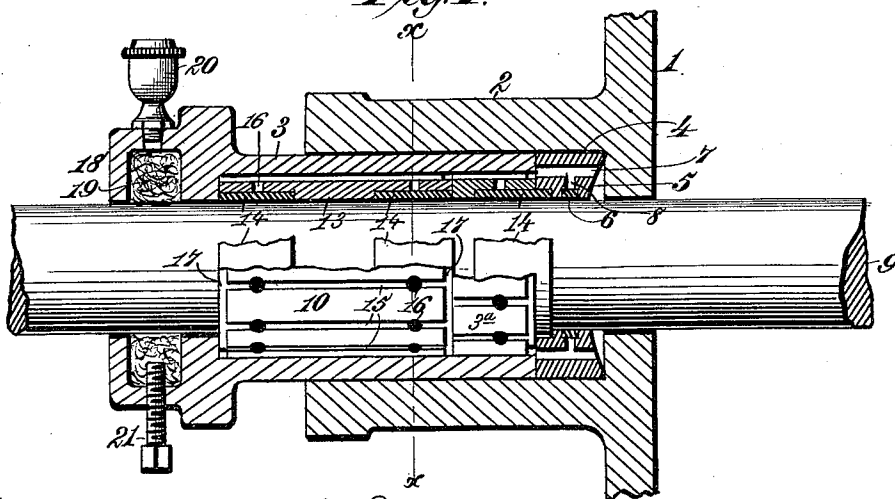


Fig. 2.

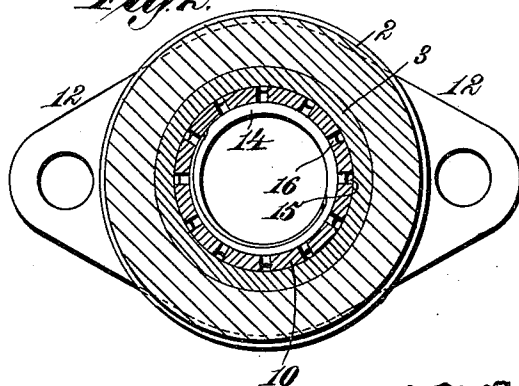
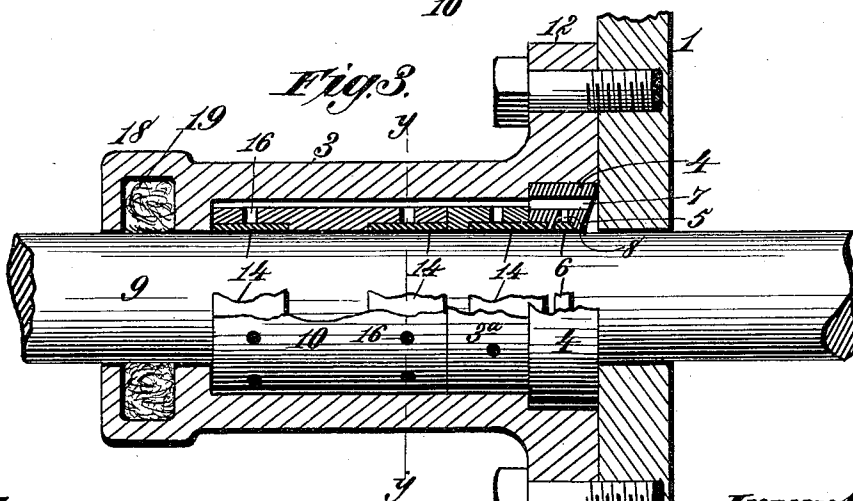


Fig. 3.



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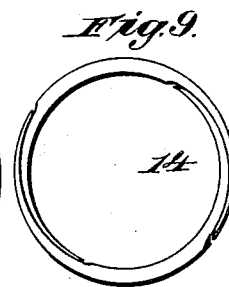
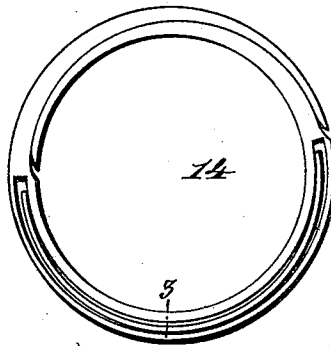
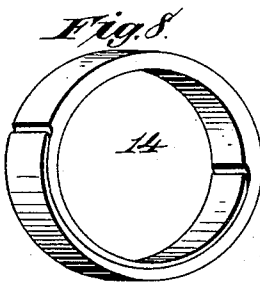
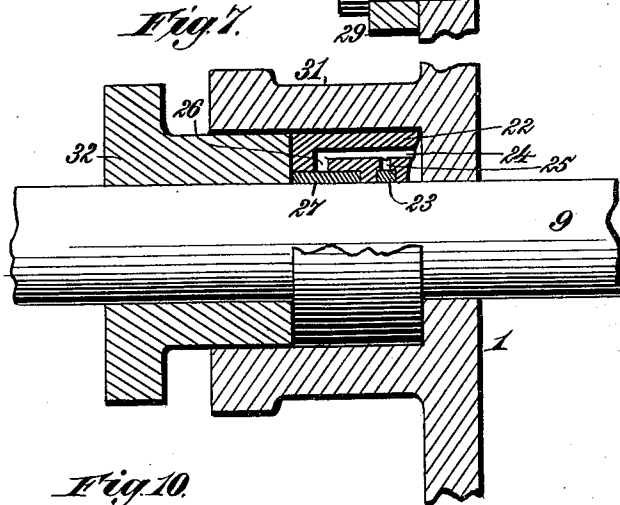
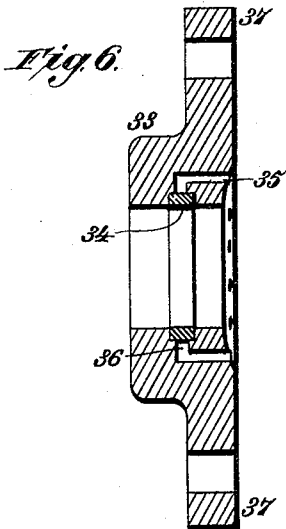
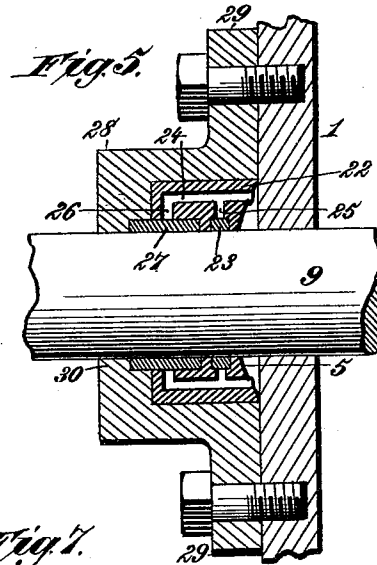
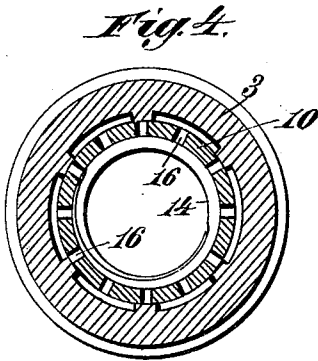
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2 Sheets—Sheet 2.

F. P. & J. T. MARTIN.
ROD PACKING.

No. 470,305.

Patented Mar. 8, 1892.



Witnesses.
Robert E. Watt,
Dennis S. Sully.



Inventors.
Francis P. Martin.
John T. Martin.
By James L. Norris.
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UNITED STATES PATENT OFFICE.

FRANCIS P. MARTIN, OF EASTON, AND JOHN T. MARTIN, OF SCRANTON,
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ROD-PACKING.

SPECIFICATION forming part of Letters Patent No. 470,305, dated March 8, 1892.

Application filed March 11, 1890. Renewed December 19, 1890. Again renewed June 30, 1891. Again renewed January 12, 1892.
Serial No. 417,843. (No model.)

To all whom it may concern:

Be it known that we, FRANCIS P. MARTIN, residing at Easton, in the county of Northampton, and JOHN T. MARTIN, residing at Scranton, in the county of Lackawanna, State of Pennsylvania, both citizens of the United States, have invented new and useful Improvements in Rod-Packing, of which the following is a specification.

10 Our invention relates to that class of rod-packing shown and described in the United States Letters Patent granted to Francis P. Martin, dated the 7th day of January, 1890, No. 418,802.

15 It is the purpose of our invention to provide a packing for the piston-rods and valve-stems of steam-engines and other similar mechanism having such construction that the packing ring or rings will be compressed upon such rod or stem by the force of the steam thrown in upon the same side of the piston and said compression relieved when said force of steam is exhausted, whereby the frictional or packing contact is relieved during the whole of the back-stroke of the piston-rod and the wear of the parts materially economized.

20 It is a further purpose of our invention to provide a rod-packing whereby the necessity of the stuffing-boxes ordinarily employed shall be wholly avoided, and which may be applied either to novel constructions organized with special view to the features of the device or adapted to the old form of cylinder or valve-chest heretofore used, a perfectly-tight steam-packing being produced in all cases and under all pressures, with a marked reduction in friction and with a material economy in wear and in the construction of lubricating material.

25 It is our purpose, also, to provide a novel construction of metallic packing-rings whereby said rings may be made in one or more parts and may be contracted or closed upon the rod or stem by an elastic force comprised or contained within the ring itself, which force may be utilized either separately or in conjunction with the compression of steam acting upon the outer face of said ring or rings.

30 It is our purpose, also, to provide a novel

and simple construction and combination of parts whereby a new and improved system of packing may be applied to rods or stems of any length and upon glands of any known or novel form without material change in organization.

This invention consists to these ends in the several novel features of construction and new combinations of parts hereinafter fully described, and then definitely pointed out in the claims which follow this specification.

In order to enable others skilled in the art to practice our said invention, we will proceed to describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is an axial section showing our invention as applied to a known or old form of cylinder or valve-chest. Fig. 2 is a transverse section of Fig. 1 on the line *xx* in said figure. Fig. 3 is a sectional view taken in the axial line of the rod or stem and showing the application of the invention to cylinders or chests especially constructed therefor. Fig. 4 is a transverse section in the line *yy* of Fig. 3. Fig. 5 is a sectional view of a modified construction. Fig. 6 is a sectional view showing a further modification. Fig. 7 is a similar view showing a further change in construction. Figs. 8, 9, and 10 are plan views of packing-rings, showing various constructions whereby the ring may be compressed to give a close packing either by the force of the steam or by the power of an independent spring or similar elastic agent located in the body of the ring and operating thereon either separately or in conjunction with the compressing force of the steam. Fig. 11 is a transverse section of the ring and its contained spring, said section being taken upon the line *zz* in Fig. 10.

In the said drawings, the reference-numeral 1 designates the cylinder-head or wall of the valve-chest or pressure-chamber, as the case may be, it being noted that in ordinary or known constructions a gland is formed upon the exterior of the chamber-head or valve-chest, which will be sufficiently indicated by the reference-numeral 2, Fig. 2. Within this gland 2 is inserted a cylindrical shell 3, fit-

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ting with reasonable accuracy therein and having its inserted end preferably seated upon a ring 4, having its face which lies next the head 1 dressed off to give an annular concave recess 5 adjacent to the head. This ring is internally grooved for the reception of a packing-ring 6, the said ring having the peculiar construction hereinafter described.

Through the ring 4, at suitable intervals and parallel with the axis of the rod, are drilled steam-openings 7, which communicate with radial passages 8, opening behind the packing-ring 6, whereby the steam-pressure will force the ring, which is cleft for such purpose, closely against the outer face of the rod or stem 9, which may be either a piston-rod or valve-stem or other rod passing into a pressure-chamber. When the gland is of the length ordinarily used, we may employ an auxiliary internal ring or sleeve 10, consisting of a cylindrical metallic shell having such length that its end projects outward beyond the end of the gland, and which is surrounded by the shell 3, which is provided upon opposite sides with lugs or ears 12, (shown in Fig. 2,) through which bolts are passed and tapped into the head or chest 1. Preferably this ring or sleeve is provided upon its interior with a central annulus of metal 13, embodying the rod; but upon each side thereof is formed a seat for a packing-ring 14, and in the exterior face of said sleeve are formed longitudinal grooves 15, by which steam is conveyed to a double series of radial openings 16, piercing the wall of the sleeve in rear of each packing-ring, whereby each of said rings is pressed against the rod with a force proportioned to the steam-pressure exerted. Inasmuch, however, as the sleeve may have a rotary movement in which the sectional ring 4 does not partake, and whereby the longitudinal channels of the one may break joints with the exterior grooves of the other, we form in the edge of the sleeve, at its lower end, a beveling-groove 17, whereby communication between the passages of the one member and the grooves of the other is maintained under all relative arrangements.

Upon the outer end of the sleeve or shell 3 is formed an extension or enlargement 18, having an annular chamber 19, which closely surrounds the rod, and upon the upper side of this extension is mounted an oil-cup 20, by which the rod or stem is lubricated, while below or upon the opposite side or at such point that it may not interfere with said oil-cup is a set-screw 21. This set-screw, as will readily be seen, may be turned up against the rod or stem 9 to lock the same in position should the necessity therefor arise. For example, should an engine break down or become disabled it may be necessary to cover the ports and to lock the valve-stem in such position as to keep said ports covered, and the construction set forth enables us to accomplish this result.

We may dispense with certain parts of the

construction described in order to accommodate the same to different lengths and varying constructions of the rod or stem to which they are applied. For example, we may use a ring 22, which is in many respects similar to the ring 4. (Shown in Fig. 1.) It differs therefrom, however, in the following particulars: The ring 22 is of a greater length in an axial direction and is not only grooved internally to provide a seat for a packing-ring 23, similar to the ring 6, but is also provided with steam-passages 24 parallel to the axis and communicating with radial steamways 25, which enter the grooved seat for the ring 23 immediately behind said ring. The steam-passages 24 are prolonged, however, to communicate with a separate series of steamways 26, which open into a seat containing a packing-ring or collar 27 of considerably greater width, which lies partly in the seat of the single sectional ring 22 and partly in an annular recess formed in the head of the gland 28, which is in this case simply a shell or casing having lugs 29 by which it is attached to the cylinder or valve-chest, and provided with an upwardly-turned flange 30, which closely surrounds the stem or rod. The collar or ring 27 extends to the inner face of this inwardly-turned flange.

Substantially the same construction may be applied to old forms of construction in the manner shown in Fig. 7, wherein the sectional ring has substantially the same construction shown in Fig. 5, the principal difference being that the packing-ring 27 terminates at the outer edge or end of the sectional ring instead of extending beyond the same. The ordinary form of chest or cylinder now in use is usually supplied with a cylindrical shell or casing 31, forming part of the stuffing-box, and within this shell the sectional ring is introduced, its concave or countersunk edge resting upon the head or wall of the valve-chest or cylinder, said ring being held in place by a gland 32, inserted within the shell 31 and held by bolts passing through lugs on the gland and tapped into the head of the chest.

In some cases, also, we may substitute for the construction described that shown in Fig. 6, in which a ring or casing 33 of comparatively narrow width is substituted for the shell, casing, or gland 28. The interior of this ring or casing is grooved to provide a seat for a packing-ring 34, similar to that shown in the sectional ring in Figs. 1, 2, 5, and 7, and steam-passages 35 are provided, having communication with radial ways 36, opening behind the ring. In this modification the sectional ring is dispensed with, its parts being essentially embodied in the ring or casing 33. Lugs 37 are provided, whereby the ring may be secured upon the head of the cylinder or chest by means of bolts similar to those shown in Fig. 5.

Where the gland or box is of unusual length, we may insert an additional sleeve or ring 3^a,

having a seat for a packing-ring, which may partly enter the end of the ring 4; but this additional ring is not essential, being simply used to extend the packing to accommodate various lengths. When used, it is provided with radial steamways communicating with the horizontal steam-channels, whereby steam is thrown into the ring-seat behind the ring, as in the other forms shown.

10 The packing-ring 14 may be constructed in either of the ways shown in Figs. 8, 9, and 10, so that it will be capable of compression to produce a close packing either by the force of steam or by the power of an independent 15 spring located in the body of the ring and acting thereon either alone or in conjunction with the compressing force of the steam. By providing these rings with long overlapping portions, as shown, the usual difficulty of 20 breaking joints to prevent leaking is avoided, and we can put the rings in at random, because the long laps of each ring will always form a perfect joint and cause the rings to act substantially as solid rings, so far as preventing 25 leaking through the joints is concerned, even when the force of the steam is extended behind the rings.

We prefer to make the small ring 6 of some material more flexible or pliable than metal— 30 such, for instance, as asbestos—and, if desired, we may use vulcabeston for the larger seats.

What we claim as our invention is—

1. In a rod-packing, the combination, with 35 a cylinder, valve-chest, or other pressure-chamber, of a shell or casing surrounding the rod or stem and a sectional ring surrounding said rod and provided with a concave end seating upon the chest around the rod or stem 40 and forming a chamber for the steam leaking around the rod, said ring being provided with an annular seat for a cleft packing-ring surrounding the rod and having longitudinal steam-passages communicating with said 45 chamber and with radial passages opening behind said packing-ring, substantially as described.

2. In a rod-packing, the combination, with

a cylinder having an exterior shell or casing 50 surrounding the rod or stem, of a sectional ring inserted therein around the rod and having an annular seat for a cleft packing-ring, said sectional ring being provided with steam-passages communicating with a steam-chamber formed in the end of the ring which seats 55 on the head of the chest and also with a series of radial steam-passages opening behind said cleft packing-ring, a sleeve or gland entering said casing and having its open end seating on the sectional ring, and one or more 60 sleeve-rings contained within said sleeve, each having one or more separated seats for cleft packing-rings and provided also with steam-passages between the rings and the sleeve, which have communication with radial steam- 65 passages opening behind the packing-rings, substantially as described.

3. The combination, with the valve-chest 1 and a shell supported thereby, of the ring 4, held between the valve-chest and the shell 7c and having the concave recess 5, the annular groove in its inner surface, the steam-openings 7, and the radial steam-passages 8, opening into the groove, the cleft ring 6, located in said annular groove, and the cleft ring 14, 75 encircling the rod 9, having overlapping extremities and bearing against the ring 4 at the side opposite the concave recess and collapsed by steam passing behind it through the steam-passages 7, substantially as described. 80

4. In a rod-packing, the combination, with a valve-chest or pressure-chamber, of a shell or casing formed or mounted thereon, a packing-ring contained within a suitable seat 85 therein and cleft throughout half or nearly half its circumference, and a spring located within a recess in the solid portion of said ring and exerting its tension to close the same, substantially as described.

In testimony whereof we have affixed our 90 signatures in presence of two witnesses.

FRANCIS P. MARTIN.
JOHN T. MARTIN.

Witnesses:

THOS. J. DOLLARD,
FRANCIS C. CUMMINGS.