(Model.)

E. P. MONROE.

PACKING FOR PISTON RODS.

No. 246,185. Patented Aug. 23, 1881.

FIG. 1.

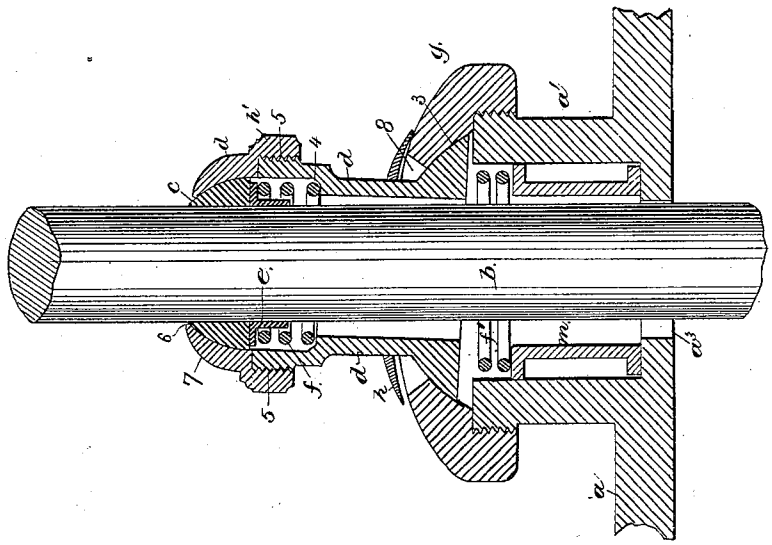
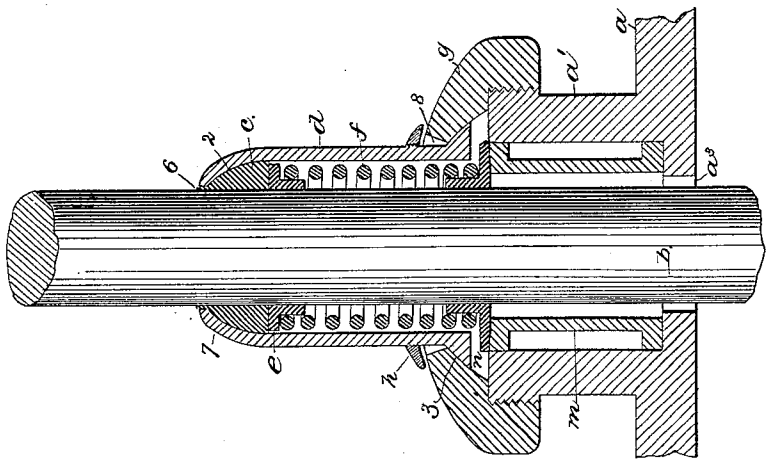


FIG. 2.



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UNITED STATES PATENT OFFICE.

EDWIN P. MONROE, OF NEW YORK, N. Y.

PACKING FOR PISTON-RODS.

SPECIFICATION forming part of Letters Patent No. 246,185, dated August 23, 1881.

Application filed March 9, 1881. (Model.)

To all whom it may concern:

Be it known that I, EDWIN P. MONROE, of New York, county of New York, State of New York, have invented Improvements in Packing for Piston-Rods, of which the following description, in connection with the accompanying drawings, is a specification.

My invention relates to a packing for a piston-rod or similar article, and certain features render it specially adapted to be used in connection with the air-pumps employed on locomotives for compressing air to operate the automatic train-brakes now commonly used. This packing renders the operation of such pumps, under certain circumstances, more certain and effective than when provided with ordinary stuffing-boxes in the usual manner.

The invention is intended as an improvement on a former application filed by me, February 11, 1881, and contains certain features of the said application, to which reference may be had. In the said application packing-rings of suitable metal were shown, having a spherical bearing-surface in a packing-receptacle connected with the cylinder-head or other partition, through which the rod to be packed passed. Owing to the spherical shape of the bearing-surface of the packing-ring, it is free to rock in its receptacle to compensate for angular displacement of the said rod; and in order to compensate for lateral displacement thereof the packing-receptacle was so connected with the cylinder-head or partition as to have a free lateral movement therein, which, in connection with the rocking movement of the packing in the receptacle, provided a universal adjusting movement to accommodate any displacement that would take place in the said rod.

In my present invention the packing-receptacle, where connected with the cylinder-head, is provided with a spherical bearing admitting of a universal rocking movement, the said bearing-surface having a different center of motion from the bearing-surface of the packing in the said receptacle, so that by means of these two spherical bearings or ball-joints a similar universal adjustment is accomplished, for both lateral and angular deviations of the rod, to that which was formerly accomplished by one ball and one plane joint giving a rocking and sliding movement.

In the air-pumps before mentioned, which are used in connection with the well-known Westinghouse compressed-air brakes, the air-compressing cylinder is usually placed vertically beneath the steam-cylinder, and a single piston-rod forms the direct connection between the pistons in the said two cylinders. By this arrangement the lower cylinder, employed for pumping the surrounding atmosphere into a receiver, follows the changes of temperature of the atmosphere, and in cold weather the steam which leaks or escapes from the upper cylinder condenses and runs down as water upon the piston-rod, whence it finds its way, when an ordinary stuffing-box is used, into the fibrous packing thereof, and sometimes passes into the air-cylinder, and as soon as the pump is at rest, if the weather be very cold, the water will freeze in the said air-cylinder and stuffing-box, and thus prevent the proper action of the air-pump and put it in danger of being broken or injured in its subsequent operation.

The packing-ring employed in my present invention fits so closely to the piston-rod that any water which may run down the said rod will be caused to pass over the outside of the said packing, instead of between it and the rod. I have so shaped the packing-receptacle and the union or coupling by which it is connected with the cylinder-head that the said water shall always have a free passage over the outside of the said parts and be prevented from entering at any point within the cylinder or any joint between the working parts.

Figure 1 is a longitudinal section of a portion of a cylinder-head or other similar partition and a rod entering therein provided with packing constructed in accordance with my invention, the receptacle being shown as thrown out of its normal position by lateral displacement of the rod; Fig. 2, a similar view, showing a modified form of packing in the position assumed when the said rod is in the center of its aperture—its normal position.

The partition *a* may be the cylinder-head of a steam engine or pump, or the end of a steam-chest or any similar receptacle into which it is

desired that the rod *b* shall enter through an air or steam tight joint.

The packing-ring *c*, having a spherical bearing-surface, 2, in the packing-receptacle *d*, is provided with a follower, *e*, and spring *f*, to press it up to a firm bearing in the receptacle *d*, and causes it to be wedged thereby closely upon the surface of the rod *b*, as in my former application, hereinbefore referred to. The packing-receptacle *d* itself has a spherical bearing-surface, 3, in the union or coupling *g*, (shown as a screw-threaded ring,) by which the said receptacle *d* is connected with the partition *a* or a tubular projection, *a'*, therefrom. This spherical bearing-surface 3 of the packing-receptacle *d* permits it to have a free rocking movement in all directions, and in the said movement the packing-ring *c* is moved bodily from its position in line with the axis of the tubular projection *a'* and the rod *b*, when in its normal position, so that when the said rod is bodily moved from its central position in the opening a^3 and passage *a'* into the partition *a*, as shown in Fig. 1, it rocks the packing-receptacle on the bearing 3, as shown, while the packing *c* rocks in its receptacle *d* to admit of the angular deviation of the latter or the angular displacement of the rod *b*, which may take place independently of or in connection with its lateral displacement.

In the form shown in Fig. 2 the spring *f* reacts between the follower *e* and the partition *a*, to which its force is transmitted through the bushing *m* and bearing-ring *n* of the said spring, which thus holds both the packing *c* up to its bearing in the receptacle *d* and the latter up to its bearing in the coupling or union *g*; but in the construction shown in Fig. 1 an independent spring, *f'*, is employed to hold the packing-receptacle up to its bearing in the coupling *g*. In this construction the said packing-receptacle *d* is provided with a shoulder, 4, to receive the spring *f*, and the portion of the said receptacle which contains the packing is made detachable from the portion having its bearing on the coupling *g*, the two portions being shown as screwed together at 5.

When the packing is employed in the air-pump cylinder of a Westinghouse brake apparatus, water of condensation from the steam-cylinder above will sometimes run down the rod *b*; but the packing *c* is pressed so tightly upon the said rod that the said water will not pass between the rod and packing, but will flow over the outside of the said packing at the point 6. In order to prevent this water from collecting upon the upper portion of the packing-receptacle or the coupling *g*, by which the said receptacle is connected with the partition *a*, as it would be likely to do if the parts were constructed as in my former application, hereinbefore referred to, the outer surface of the packing-receptacle is made curved or inclined, as shown at 7, to cause the said water to flow off at once; and in order to prevent this water from entering the space at 8, between the packing-receptacle and the coupling *g*, an annular hood or shield, *h*, is placed around the receptacle *d*, above the said space 8, so that the water flowing down over the outer surface of the receptacle *d* falls over upon the upper surface of the coupling *g*, which is also curved or inclined, as shown, to shed the water, so that it falls upon the upper surface of the partition *a*, where it can do no harm, and whence it may be led, if necessary, by any suitable passage or channel.

In the construction shown in Fig. 1 the screw-threaded flange *h'* of the upper portion of the packing-receptacle *d* may be made to overhang the space 8, so as to perform the function of the hood or shield *h* in preventing the water from entering the said space 8, where it might freeze and interfere with the working of the parts.

When the coupling *g* is employed the shield *h* or bearing portion 3 will have to be made detachable from the receptacle *d*. The said shield may be made in two semicircular portions, clamped together tightly on the receptacle *d*, which may have a shallow annular groove therefor; or, in the construction shown in Fig. 2, the shield *h* may be made as an annular ring and fitted tightly or screwed upon the said receptacle.

It is obvious that the packing-receptacle *d* might have its spherical bearing in the partition *a*, suitably constructed therefor, and the coupling *g* would in such construction be dispensed with.

I claim—

1. In a packing for piston-rods and similar articles, a packing-receptacle connected with the cylinder-head or other partition by a ball-joint or spherical bearing-surface, combined with packing having a universal rocking movement in the said receptacle, as described, whereby the said receptacle is permitted to rock to accommodate lateral deviations of the packed rod, and the packing to rock to accommodate angular deviations of the said rod and receptacle relative to one another, substantially as described.

2. The packing-receptacle connected with the cylinder-head and having a curved or inclined outer surface, as described, combined with the vertical piston-rod, and the metallic packing located in the end of the said receptacle, and wedged into close connection with the outside of the rod and the inside of the receptacle, whereby water flowing along the packed rod is prevented from passing between the rod and packing or entering the receptacle, substantially as and for the purpose described.

3. The packing and its receptacle, combined with the coupling to attach the said receptacle to the cylinder-head, and an overhanging portion or shield to cover and protect the joint between the said receptacle and its coupling, substantially as and for the purpose described.

4. The rod, its packing, and the receptacle therefor, and the spring *f* to press the said packing to its seat or bearing, combined with the independent spring *f'* to press the recepta-

cle to its bearing in the partition that the packed rod is to enter, substantially as described.

5. The packing provided with a spherical bearing-surface and the receptacle therefor, combined with the coupling for the said receptacle, the said coupling and receptacle having a spherical bearing-surface, as described, whereby the said packing may have a universal movement, to enable it to accompany and properly fit the packed rod in its deviations from a true rectilinear movement, substantially as described.

6. The packing and its receptacle, connected, as described, with the partition through which the packed rod enters by a joint permitting movement of the said receptacle relative to the partition, combined with the shield *h*, to cover and protect the said joint, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWIN P. MONROE.

Witnesses:
HULBERT PECK,
DAVID L. RAYMOND.