(No Model.)

A. N. MATTHEWS.

PACKING VALVE STEMS FOR STEAM AND OTHER ENGINES.

No. 252,957. Patented Jan. 31, 1882.

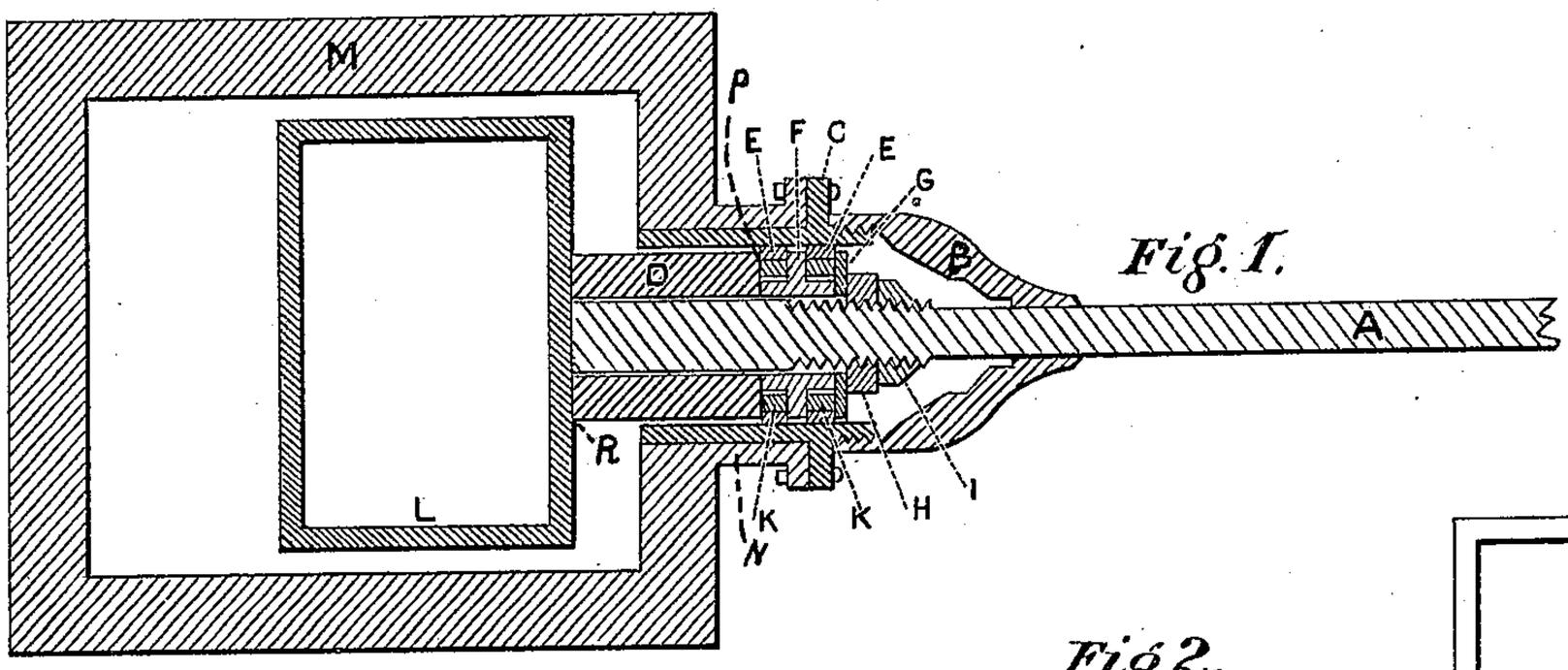

Fig. 1.

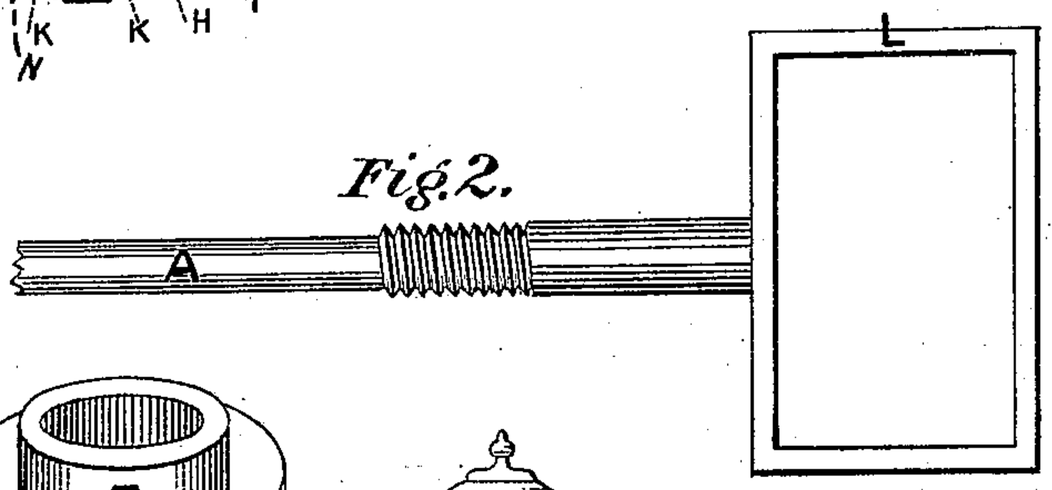

Fig. 2.

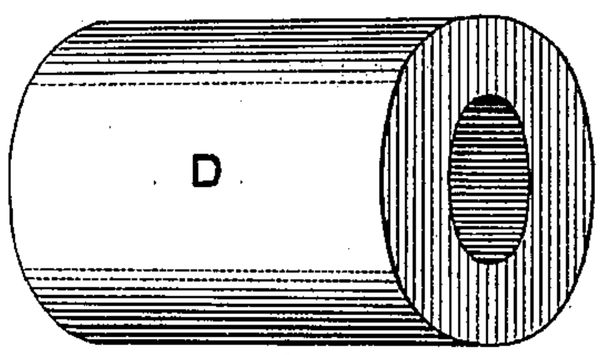

Fig. 3.

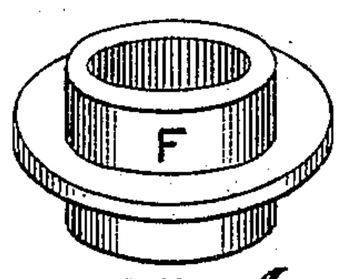

Fig. 4.

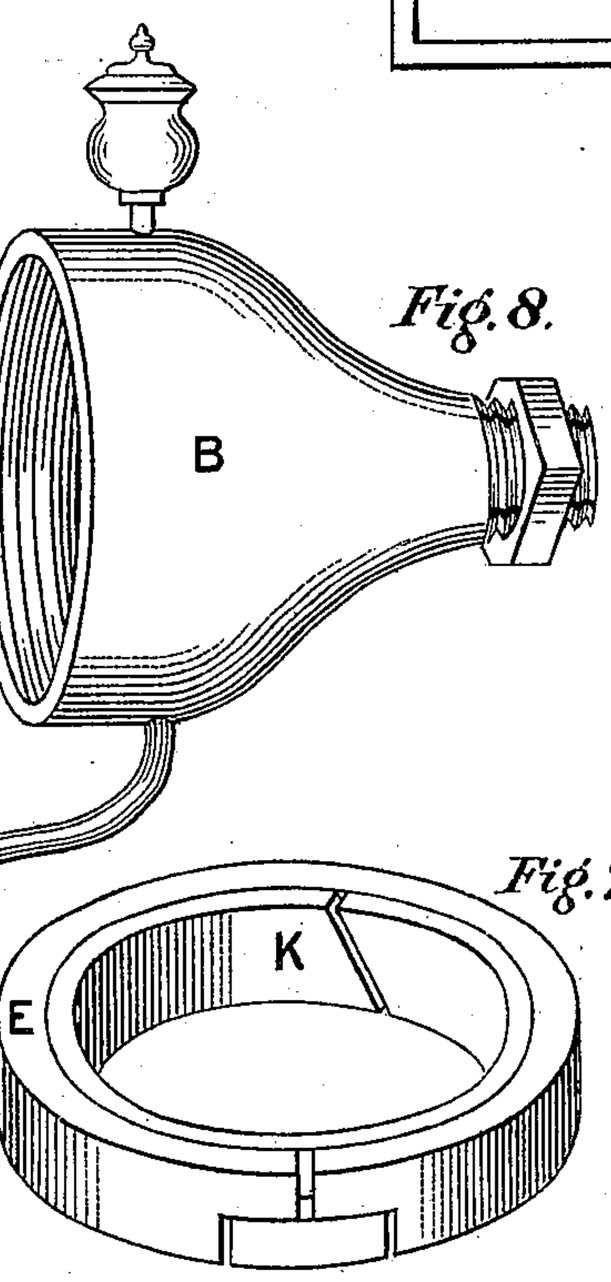

Fig. 8.

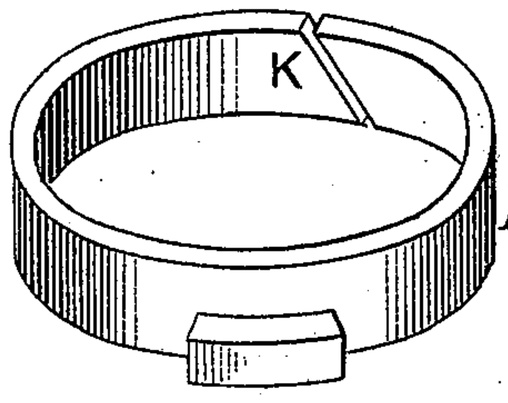

Fig. 5.

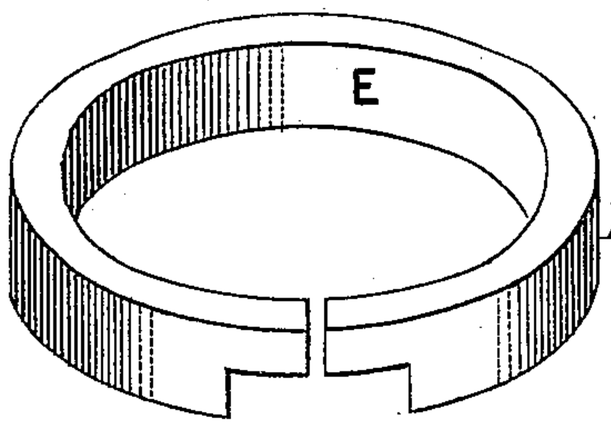

Fig. 6.

Fig. 7.

WITNESSES:

J. R. Nottingham

Geo. E. Boyden

INVENTOR:

Abram N. Matthews

by

Millard Clark

atty.

UNITED STATES PATENT OFFICE.

ABRAM N. MATTHEWS, OF NORWOOD, MASSACHUSETTS, ASSIGNOR TO THE MATTHEWS STEAM SPRING PACKING COMPANY, OF NASHUA, NEW HAMPSHIRE, AND BOSTON, MASSACHUSETTS.

PACKING VALVE-STEMS FOR STEAM AND OTHER ENGINES.

SPECIFICATION forming part of Letters Patent No. 252,957, dated January 31, 1882.

Application filed July 20, 1881. (No model.)

To all whom it may concern:

Be it known that I, ABRAM N. MATTHEWS, a citizen of St. John, New Brunswick, residing at Norwood, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Packing for Valve-Stems for Steam and other Enginery; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters or figures of reference marked thereon, which form a part of this specification.

The same letters will indicate like parts in all the figures.

My invention relates to the packing of valve-stems for steam and other engines, and may be applied to the piston-rods of steam-engines.

The object of this invention is to lessen the friction due to the forward and backward motion of the valve-stems or piston-rods; also, to guide the rod in a true line and prevent it from wabbling when the rock-shaft or other valve-stem connection is out of line, particularly in locomotives and oscillating engines; also, to obviate the necessity of stuffing-boxes and their packing, and consequently the wear of the valve-stem or piston-rod, and their consequent trouble, time, and expense.

My invention consists in the combination, with the stem of a valve or piston-rod, of a detachable thimble or cylinder having a hole centrally through it, which snugly fits the rod, said thimble having its ends made to fit the valve-yoke on one end and the riding-ring on the other, the latter forming a ground or tight joint, serving in the place of the usual follower, and also to so nearly fit its inclosed cylinder as to prevent the valve-stem from wabbling when it is overstrained or getting out of line from any external cause; also, in the combination and arrangement of a riding-ring with the packing-rings, constructed with break-joints in such a manner that they are prevented from turning on each other—that is to say, that the inner ring is provided with an outer projection and the outer ring with a corresponding recess, the projection being equal in thickness to that of the outer ring, by which a smooth joint is formed. The rings fit over the riding-ring, which has on one side a usual follower, the other side abutting against the end of the thimble aforesaid, thus forming a double space or double recess, in which said packing-rings are secured.

Referring more particularly to the accompanying drawings, and to the letters of reference marked thereon, Figure 1 represents a plan view of a steam-chest having a cylindrical projection, in and on which are located my improvements, the detachable thimble, riding-ring, packing-rings, cylindrical cover or dust-cap, with oil cup and waste-pipe, being in horizontal section. Fig. 2 shows the valve-stem and yoke. Fig. 3 shows the detachable thimble. Fig. 4 shows the riding-ring detached. Fig. 5 is a perspective view of the inside packing-ring, showing the outward projection. Fig. 6 is a perspective view of the outside ring, showing the recess into which the projection on the inner ring fits. Fig. 7 is a perspective view of the two packing-rings put together, using one set for each side of the riding-ring. Fig. 8 shows the cylindrical cover or dust-cap, with oil-cup and waste-pipe attached.

M is the steam-chest; L, the valve-yoke; N, the cylinder-projection, in which my improved guide or detachable thimble riding-ring and packing-rings operate.

D is the thimble; F, the riding-ring, and K E packing-rings. The length of the thimble is governed by the length of the stroke of the valve, but must in all cases be such that the riding-ring and packing-rings will not extend outside of the cylindrical projection of the valve-chest, and must project inwardly far enough to prevent the valve or valve-yoke from touching the walls of the steam-chest.

A shows the valve stem or rod; K E, the packing-rings; F, the riding-ring.

P is the thimble end which forms the follower, and R the end abutting against the valve-yoke. The diameter of the thimble is a little less than the bore of the cylinder. The annular opening thus made between them forms the steam-space. The steam in this space balances perfectly the outer sides of the thimble,

which so nearly fills the cylinder that very little of the face of the packing or riding ring is exposed to the pressure of the steam in the chest. Thus it will be seen that the thimble and packing-rings or riding-ring have but little resistance from the steam in their forward and backward movements.

The operation is as follows: The cylindrical projection of the valve-chest being properly bored, the valve and valve-yoke are then placed in position. The yoke and thimble are then properly joined at R. The other end of the thimble is turned true, and also the inner end of the riding-ring. This part of the riding-ring and the thimble end are ground together or made otherwise steam-tight, as shown at H I. A screw-nut or other fastening is secured to the rod and against the usual follower, rigidly securing all the parts together, when it is ready for operation.

It will be observed that the parts are easily removed and replaced, that the construction is simple, cheap, and durable, the danger of the valve-stem getting out of line is entirely obviated, and therefore the true working of the valve is thereby secured.

I am aware that it is not new to attach a cylindrical projection to the valve-chest, and to pack the valve-stem by means of a piston and rings; but I am not aware that a detachable thimble nearly equal in diameter to the bore of the cylinder and interposed between a riding ring and valve-yoke, one end of said thimble forming the follower to the riding-ring, and so arranged that but little surface is exposed to the steam-pressure, thereby lessening the friction on the working bearings, was ever before used. I am also not aware that a riding-ring, as herein shown and described, was ever used in a cylindrical projection to the valve-chest.

It is obvious that the above-described packing is applicable to all kinds of engines, and particularly to hot-air and gas engines, wherein it is costly to keep the rods packed from the extraordinary heat and dryness. In this invention the metal composing the working cylinder and packing is cast-iron, and when the parts become glazed the friction is almost obviated, and by their working contact become almost a perfect lubricity, requiring very little lubricant.

What I therefore claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in packing for valve-stems, of the stem A, a detachable thimble, D, nearly filling the cylinder and abutting against the yoke at end R and against the riding-ring at end P, the latter serving the purpose of the usual follower, and the packing-rings K E, all constructed and arranged to operate in the cylindrical projection of the steam-chest N in the manner shown and described.

2. The combination, with the steam-chest provided with the cylindrical projection N, of the guide-thimble D, one end of which forms the follower, the other end projecting into and beyond the walls of said chest, thereby lessening the resistance of the steam-pressure, a riding-ring, F, provided with the usual follower, by which a double recess is formed between said follower and thimble for the reception of the packing-rings, and the valve-stem and gland, all arranged to operate as shown and described.

3. The combination, with the steam-chest and the cylindrical projection N, of a detachable cylindrical cover or dust-cap, B, one end fitting with steam-tight joint on the cylindrical projection N at C, and the other end slit in several places and provided with a thread and nut, enabling the stem to be firmly held from operating as necessity may require, an oil-cup on the upper side passing through the cylindrical cover B, and a waste or water pipe on the under side of the cylindrical cover, all arranged to operate as shown and described.

4. The combination, in valve-stem or piston-rod packing, of the working-cylinder C, thimble D, and the metallic packing, constructed and arranged to operate in the manner shown and described.

5. The combination, in valve-stem or piston-rod packing, of the cylinder C, thimble D, and the metallic packing, said cylinder having on its outer end a screw for the reception of the dust-cap, and its inner edge adapted to fit the gland of a stuffing-box, in the manner shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

ABRAM N. MATTHEWS.

Witnesses:
H. M. MONTGOMERY,
HOWARD S. WHEELOCK.