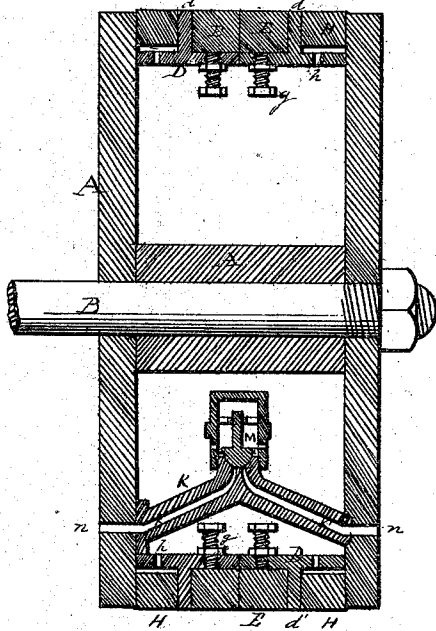


*O. Kelsey,*  
*Piston Packing.*

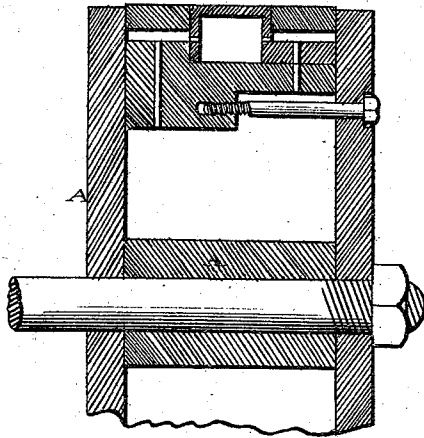
*No. 103343.*

*Patented May 24, 1870.*

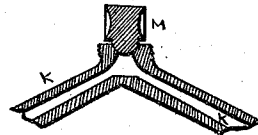
**Fig. 1.**



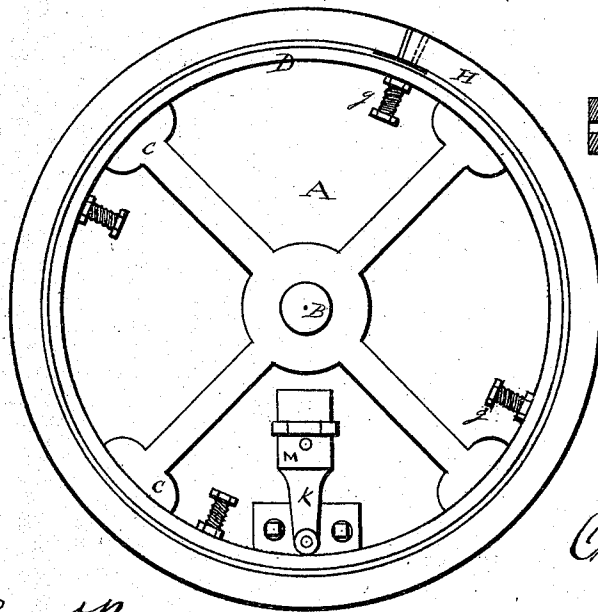
**Fig. 2.**



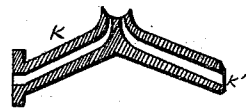
**Fig. 4.**



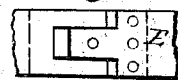
**Fig. 3.**



**Fig. 5.**



**Fig. 6.**



*O. Kelsey.*

*Edw. Brown*  
*Witnesses { Jos. Raby*

# United States Patent Office.

ORLANDO KELSEY, OF WORCESTER, MASSACHUSETTS.

Letters Patent No. 103,343, dated May 24, 1870.

## IMPROVEMENT IN PISTON-PACKING.

The Schedule referred to in these Letters Patent and making part of the same.

I, ORLANDO KELSEY, of Worcester, in the State of Massachusetts, have invented certain "Improvements in the Pistons of Steam-Engines," of which the following is a specification.

My invention relates to the arrangement and construction of bearing and packing-rings of a steam-packed piston, and in the form of a cylindrical shell for supporting the same; and also in a device for regulating the amount of pressure within the piston.

To enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

Figure 1 is a section through the piston.

Figure 2 shows another arrangement of packing-rings.

Figure 3 is an end view of the piston.

Figures 4 and 5 are variations in the construction of the pressure-adjustment.

Figure 6 shows the mode of tonguing the rings.

Referring to fig. 1—

A is the body of the piston.

B, the piston-rod.

C, the spider, cast to the body of piston, and to which the follower is generally bolted.

D is a cylindrical shell, fitting upon the spider, and having upon it the ribs *d'*, turned to the diameter of the cylinder.

The shell D is made in one piece or divided centrally, as shown in fig. 1, for greater convenience of putting on the ring or rings or segments E.

By thus dividing the shell D, as shown, laterally between the flanges *d'*, the supporting-ring or rings E may be put in place without straining, or the risk of breaking, incidental to a solid shell; and, also, the rings H may be put on in the same manner without springing, by using the flanges *d'* as a support on one side, and the piston or follower on the other.

The advantage of this will be understood when we consider that the springing of the rings is certain to alter and destroy their circular form, and they can never fit the cylinder as accurately as when turned to the proper size and adjusted, without springing. These, as they become worn, are set out by the set-screws *g*, so as to center the piston, and keep it moderately tight, even when no steam is admitted.

These rings E are held in position and prevented from crowding upon the expansion-rings H by the flanges *d'*, or an equivalent device.

H H are expansible rings, fitted between the flanges *d'* and the piston-head, on one side, and the follower on the other.

There is sufficient space between them and shell D to permit the free circulation of the steam which is admitted through the shell by holes *h*.

Both the centering-rings and the packing-rings are tongued and lapped, so as to prevent the steam from escaping outward from the piston, and also from the steam to the exhaust side, as in fig. 6.

I will now describe the device for admitting the steam and regulating the pressure within the piston.

K is a brass casting, bolted at one side to the piston-head, and tapering on the other side, to fit the follower, making a tight joint.

This casting K has two steam-ways K' K', cast in it, tapering rather smaller toward the center, where they nearly join each other with an upward deflection, beneath the valve M.

Holes *n* are drilled through the piston-head and follower, so as to connect passages K' with the exterior of the piston.

By thus connecting the exhaust and the steam end of the cylinder beneath the valve M, I obtain a mean pressure between the two, so that valve M only opens when the pressure is less in the piston than beneath the valve.

By thus reducing the pressure within the piston, the packing-rings will not bind so hard against the cylinder, and the piston will work much easier under a great head of steam, as in the case of a locomotive going up grade, with full pressure of steam and slow speed.

This object may be partially accomplished when the two ports K' K' are connected by a chamber, as in fig. 4, in which case more steam would pass from the steam to the exhaust side.

In certain conditions, where the valve is likely to be clogged with sediment, it may be dispensed with, as in fig. 5, with nearly as good a result.

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

1. The cylindrical shell D, having flanges for the support of the bearing-rings E or packing-rings H, and divided laterally between the flanges, for the purpose herein described.

2. The cylindrical shell D, divided laterally and constructed as shown, with openings *n* for the passage of steam, in combination with an adjustable supporting-ring, E, and packing-rings H, as herein described.

3. The steam-ways K' K', connecting the steam and exhaust ends of the cylinder with the interior of the piston, either with or without the valve M, for the purpose herein described.

ORLANDO KELSEY.

Witnesses:

EDWD. BROWN,  
JOS. RABY.