(No Model.)

J. C. HALE.

PISTON.

No. 254,960. Patented Mar. 14, 1882.

Fig. 1.

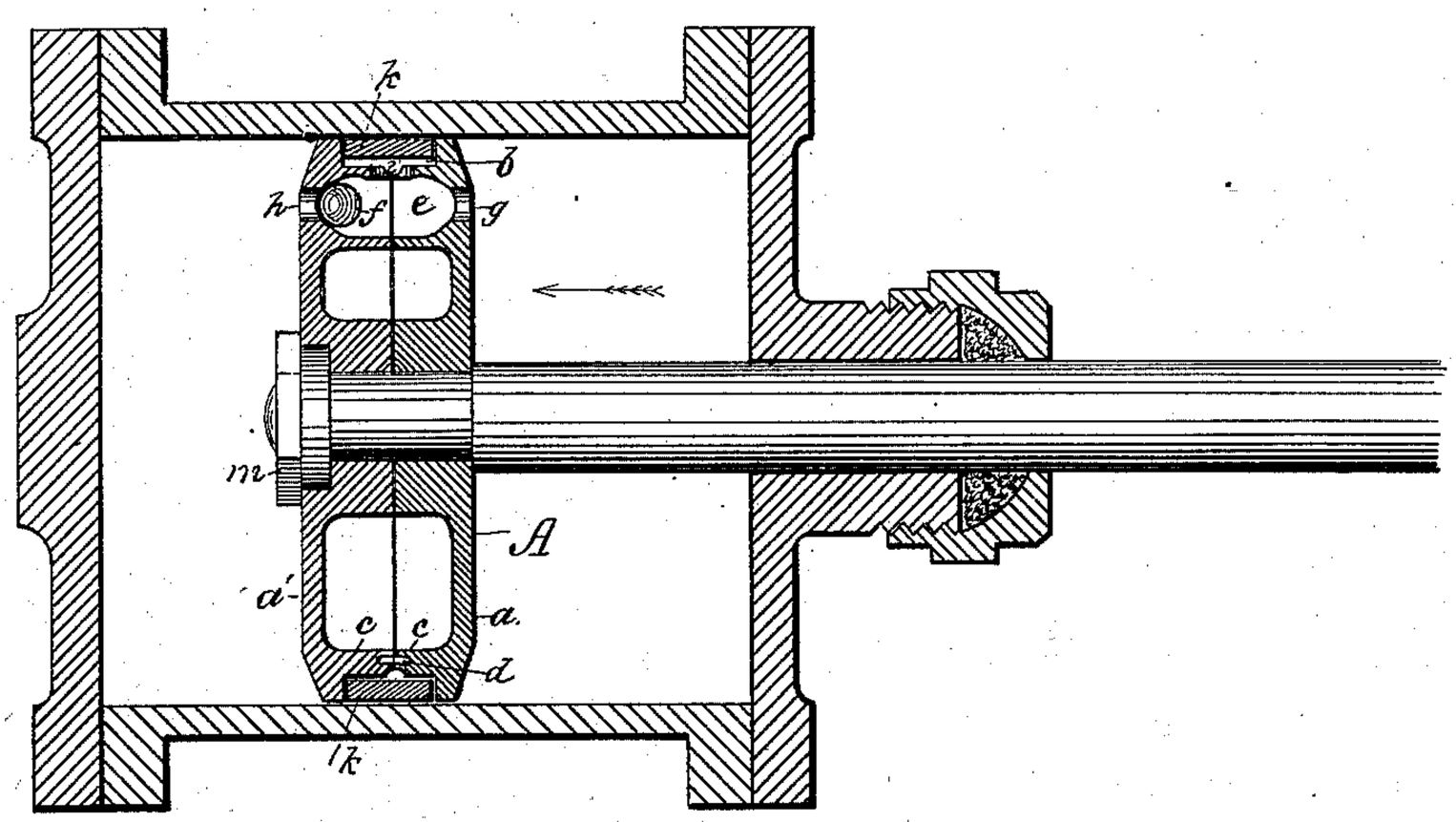


Fig. 2.

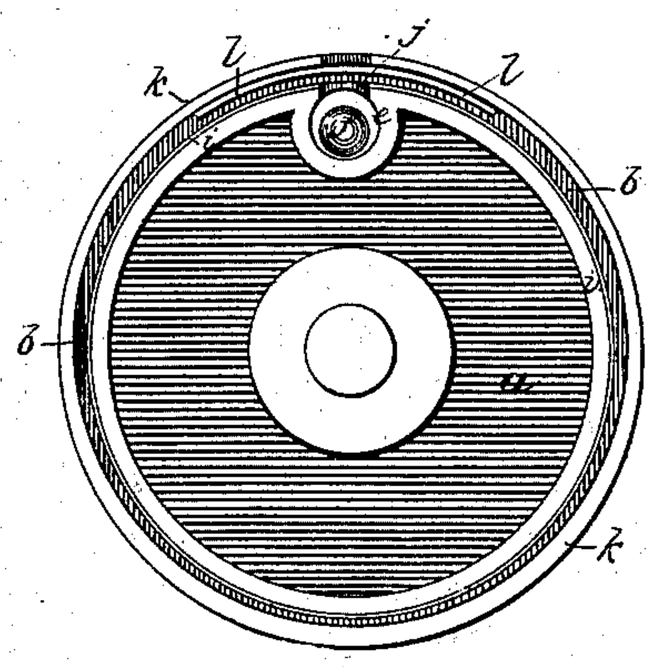
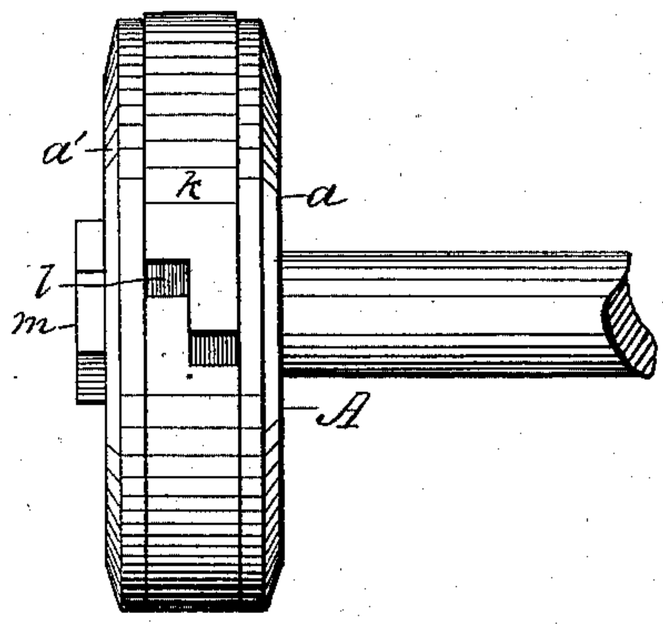


Fig. 3.



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PISTON.

SPECIFICATION forming part of Letters Patent No. 254,960, dated March 14, 1882.

Application filed October 4, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOHN CARTER HALE, of Stephens City, in the county of Frederick and State of Virginia, have invented a new and useful Improvement in Pistons, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, forming part of this specification.

The object of my invention is an improvement in the class of pistons which are formed of two disks or heads inclosing a vacant space between them, in which a valve or valves are arranged to automatically open and close passages leading into said space.

The improvement is embodied in the construction and combination of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical section of a cylinder and piston, showing my improvement. Fig. 2 is an end view of the piston and packing, one of the heads of the piston being removed; and Fig. 3 is a side elevation of the piston, showing the joint in the packing.

The piston A is composed of two cast-iron heads, *a a'*, of equal size, having a peripheral recess, *b*, formed in a lateral annular rim, *c*, near the circumference, and adapted to be fitted together, so as to make a steam-tight joint between the two rims. A lug, *d*, in one of the rims fits into a corresponding recess in the other rim, and at a point opposite thereto the rims are curved inward, to form the ball-cage *e*, which is provided with a ball, *f*, and ports *g* and *h*, leading through the piston-heads, respectively, and a third port, *j*, leading through the rims *c* at the point of juncture. A groove, *i*, is formed near the edges of the rims *c*, so as to form a continuous channel in the bottom of the recess *b*, when the heads are secured together. With this construction a hollow closed space is formed in the piston, rendering it lighter than a solid piston without sacrificing any essential element of strength.

The steam-packing *k* consists of a single band or ring, which is cut at a given point, and has its two ends recessed on opposite sides, so as to allow the ends to overlap each other laterally. To make the joint thus formed steam-tight, a lining, *l*, is secured to the inner surface of one of the ends, so as to project beyond the joint, and to counteract the effects of increased thickness at this point the band is made correspondingly thick at the opposite side.

It is designed that the packing *k* shall not act as a spring, but shall be expanded solely by the action of the steam. The packing thus constructed is to be placed in the recess *b* by first removing the follower *a'* of the piston, when the ball may also be placed in its cage, and then adjusting the head *a'* and screwing the nut *m* on the projecting end of the piston-rod.

It will be observed that when steam is admitted into the cylinder at either side of the piston a portion of it will enter through one of the ports *g h* into the cage *e*, and thence through the port *j* into the groove *i*, until the packing *k* is expanded against the walls of the piston-chamber. The expansion of the packing will thus vary according to the amount of steam-pressure exerted, and the packing will always relieve itself of strain as soon as the steam is shut off. With this construction the piston will consist of only four simple parts, which may be easily detached from each other and put together again perfectly by almost any one, since the packing is self-adjustable, and owing to the lightness of the piston and the equal distribution of friction the expense of boring out worn cylinders will in great measure be obviated. It it designed that the ball and packing shall be made of the best refined soft brass, and the seat and joints ground to make them steam-tight.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The combination of the heads *a a'*, having a hollow space inclosed between them, a recess, *b*, formed in their adjacent peripheries, and provided with a groove, *i*, in its bottom, a ball-cage, *e*, communicating with the said recess and groove through the port *j*, and with opposite ends of the cylinder through ports *g* and *h*, the ball *f*, and the packing *k*, having its ends recessed and overlapped laterally, and provided with a lining, *l*, secured to one end and underlying the said joint, substantially as shown and described, and for the purposes set forth.

JOHN CARTER HALE.

Witnesses:

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