# G. F. BLAKE.

## PISTON.

No. 185,887. Patented Jan. 2, 1877.

Fig. 1

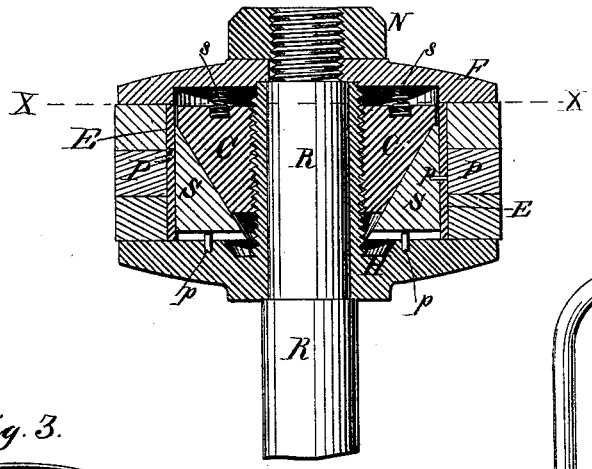



Fig. 4.

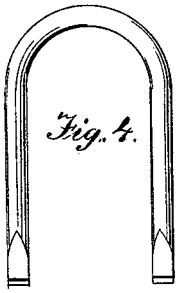


Fig. 3.

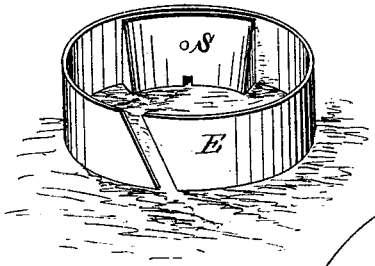



Fig. 2

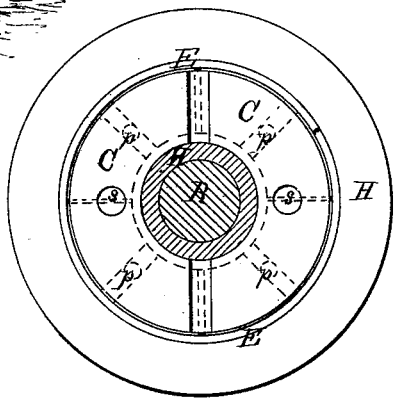
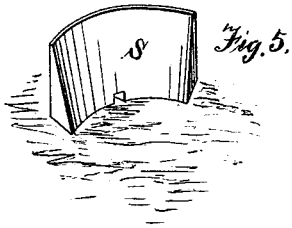



Fig. 5.




Witnesses
Granville Lewis
Harry King

Inventor
George F. Blake,
By his Attorneys,
Stansbury & Munn.

# UNITED STATES PATENT OFFICE.

GEORGE F. BLAKE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO GEORGE F. BLAKE MANUFACTURING COMPANY, OF SAME PLACE.

## IMPROVEMENT IN PISTONS.

Specification forming part of Letters Patent No. **185,887**, dated January 2, 1877; application filed December 28, 1876.

*To all whom it may concern:*

Be it known that I, GEORGE F. BLAKE, of Boston, in the State of Massachusetts, have invented a new and Improved Expanding Piston; and I do hereby declare the following to be a full and correct description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical central section of the expanding piston, the piston-rod being shown in view. Fig. 2 is a horizontal section on line *x x* of Fig. 1. Fig. 3 is a perspective view of the expansion-ring with a segment attached. Fig. 4 is a view of the U-wrench, and Fig. 5 is a separate view of one of the segments.

Similar parts are marked by similar letters.

My invention consists of improvements in the construction of expanding pistons, whereby the expansion-ring, which sets out the packing, is actuated by a uniform force acting radially from the center of the piston, and giving the same increment of diameter simultaneously to all portions of the packing, thus preserving the accuracy of centering of the piston, and preventing an uneven bearing of the piston-rod on the gland of the cylinder-head. It further consists of devices for holding the conical expander and segments in place, and for preventing the lapping or interference of the ends of the expansion-ring, all as hereinafter more particularly set forth.

The invention is clearly illustrated in the drawings, in which R marks the piston-rod, which is turned down near the end to a conoidal form for the reception of the hub H, and is threaded at the end to receive the screw-nut N. The hub consists of a wide flange or disk with a central hollow cylinder projecting from it, which is threaded on the outside to receive a conical expander, C. This expander is screwed down upon the threaded hub H by means of a U-wrench. (Shown in Fig. 4.) Holes countersunk in the base of the cone C receive the spiral springs *s s*, which project from them and bear against the inner face of a follower, F, which rests upon them, and is forced on the piston-rod as far as may be required by means of the screw-nut N. Four segments, S, cylindrical on their outer surface and conoidal within, rest upon the flange of hub H. They have each a notch in the base, which rests upon a pin, *p*, which serves as a guide for the radial movement, and prevents lateral movement of the segment. One of the segments is attached to the inside of the expansion ring E, which surrounds the segments, and is cut open, as shown in Fig. 3. Outside of the expansion-ring is placed the packing P, which may be of any kind preferred.

Such being the construction of the parts, they are assembled as follows: The hub is placed on the conical end of the piston-rod, resting upon the shoulder formed by turning down the end. Upon the flange of the hub are set the segments S upon their respective pins *p*, the location of the segments relatively to the ends of the expansion-ring being governed by the position of the segment which is attached to the inside of the ring. The segment thus attached is so placed that the ends of the ring will lie upon the middle of one of the segments, so that as the ring expands or contracts the ends will not lap or interfere. The cone C is now screwed down upon the threaded portion of the hub, and the outer surface of the cone is brought to bear against the inner surfaces of the segments S, the effect of the downward movement of the cone being to drive the segments outward in a radial direction and expand the ring E. The follower F is placed above the base of cone C, the spiral springs *s s* reacting against its inner side to prevent the cone from riding up on the hub. The follower is confined by the screw-nut N. When it is desired to expand the packing the nut N and follower F are removed, and the wrench applied to the cone C, which is screwed down until the desired amount of expansion is imparted to the packing.

It is the necessary result of the construction of the parts that when the cone C is screwed down the segments should be simultaneously and equally forced outward radially from the center of the piston, and impart to the packing an equal amount of expansion on all parts of its periphery. The advantage of this result is obvious, for were the packing unequally expanded the piston would be no longer accu-

rately centered, and the piston-rod would necessarily bear unequally upon the gland of the cylinder-head.

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

1. The combination, with the threaded hub H, of the threaded cone C, segments S, expansion-ring E, and packing P, all constructed and arranged substantially as and for the purpose specified.

2. In combination with the hub H and ring E, the segments S, one being attached to the ring, and all provided with notches for the reception of the guide-pins *p*, as and for the purpose set forth.

3. The combination of the threaded hub H, cone C, springs *s s*, follower F, and nut N, in the manner and for the purpose described.

The above specification of my said invention signed and witnessed, at Washington, this 15th day of May, A. D. 1876.

GEO. F. BLAKE.

Witnesses:

HARRY KING,

CHAS. F. STANSBURY.