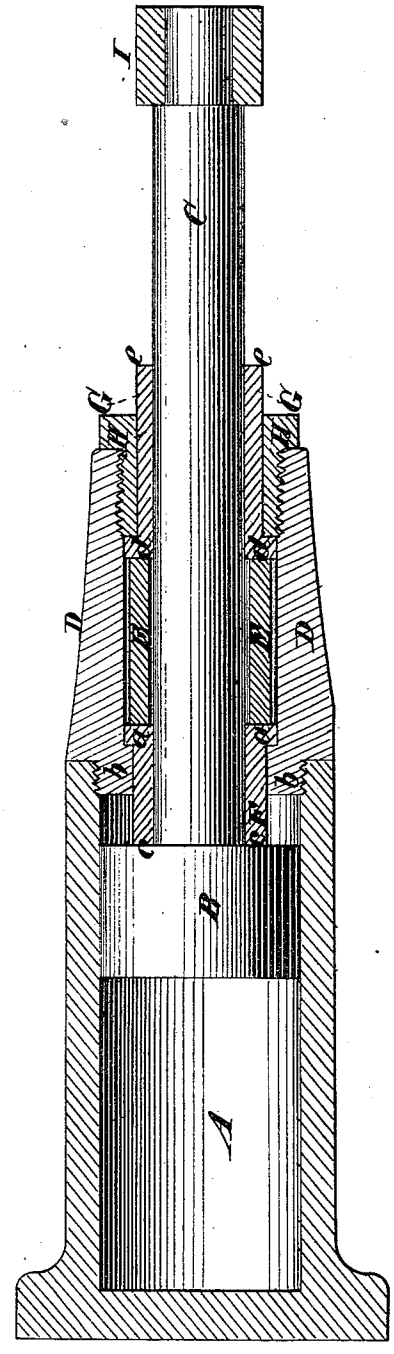
# G. H. REYNOLDS.

## Cushion for Pistons of Steam-Engines.

No. 162,192. Patented April 20, 1875.




Witnesses
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THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

# UNITED STATES PATENT OFFICE.

GEORGE H. REYNOLDS, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF HIS RIGHT TO CORNELIUS H. DELAMATER AND GEORGE H. ROBINSON, OF SAME PLACE.

## IMPROVEMENT IN CUSHIONS FOR PISTONS OF STEAM-ENGINES.

Specification forming part of Letters Patent No. **162,192**, dated April 20, 1875; application filed March 4, 1875.

*To all whom it may concern:*

Be it known that I, GEORGE H. REYNOLDS, of the city, county, and State of New York, have invented a new and useful Improvement in Cushions for the Pistons of Steam, Air, and other Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification:

This invention, although applicable to steam-pumps and other direct-acting engines, is mainly designed to be applied to rock-drills using either steam or air, and steam-hammers, in which the piston, if not arrested by a cushion of india-rubber or other elastic substance, is liable to strike the cylinder heads or ends.

The invention, as applied to a rock-drill or steam-hammer, consists in a combination, with the stuffing-box formed in the cylinder-head, through which the drill or tool carrying portion of the piston-rod passes, of duplicate sliding bushings arranged to project from said stuffing-box at opposite ends thereof, and an interposed india-rubber or other elastic packing around the piston rod, to provide for the piston, either directly or through the intervention of a projection on its rod, striking alternately on the two bushings to effect the cushioning in both directions of the piston's travel. In connection with these duplicate bushings and the interposed elastic packing, it is proposed to combine a follower, arranged so as to press against the outer bushing, for the purpose of adjusting the compression of the elastic packing, and affording facility for removal or renewal of the same.

By this construction and combinations of devices relating to the cushioning of the piston, the cushion in nowise adds to the length of the cylinder or materially increases the weight of the engine or machine, which is very important in rock-drills. Furthermore, in the application of the invention to rock-drills by arranging the cushion at the drill-carrying end of the cylinder or portion of the piston-rod passing therethrough, the drill-chuck does all that is necessary in the back stroke of the piston, thus dispensing with a special stop. The cushion, too, being in the stuffing-box, all counterboring of the cylinder for reception of the cushion is avoided, and by the use of the follower, in connection with the duplicate bushings and the interposed elastic packing, the latter is kept in order by the ordinary and mere attention of keeping the stuffing-box tight.

The accompanying drawing represents in longitudinal section the application of my invention to the piston of a rock-drill, which serves, as well as any other engine, to illustrate my invention.

A is the cylinder; B, the piston, and C the piston-rod. D is the stuffing-box, which may be somewhat longer or deeper than usual. This stuffing-box is formed in that cylinder-head through which the drill-carrying portion of the piston-rod passes. E is the india-rubber or elastic packing. F and G are the bushings, and H is the gland or follower. The inner bushing F has a collar, *a*, which is seated against a shoulder, *b*, at the bottom of the stuffing-box, and its inner end projects through the stuffing-box into the cylinder, as shown at *c*. The outer bushing G has a collar, *d*, against which the band or follower H presses to compress the packing around the rod, and its outer end projects through the follower, as shown at *e*.

If the piston B strikes the bushing F it drives the said bushing back against the packing E, which thus serves as a cushion to the piston in its outward stroke. If the drill-chuck I strikes the bushing G it drives the said bushing forward against the packing E, which thus serves as a cushion to the piston in its inward stroke. The hammer-head of a steam-hammer, or any collar or projection on the piston-rod, will have the same effect as the chuck I.

I claim—

1. The combination with the stuffing-box D, formed on the cylinder-head, through which the drill or tool-carrying portion of the piston-rod passes, of the duplicate sliding bush-

ings F G and the interposed india-rubber or other elastic packing E around the piston-rod, substantially as specified.

2. In combination with the elastic packing E and the sliding bushings F G, the follower H, applied to press against the outer bushing for the purpose of adjusting the compression of the packing, and affording facility for removal or renewal thereof, substantially as described.

GEO. H. REYNOLDS.

Witnesses:

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