E. A. Raymond.

Steam Hammer.

No. 51,267. Fig. 1. Patented Nov. 28, 1865.

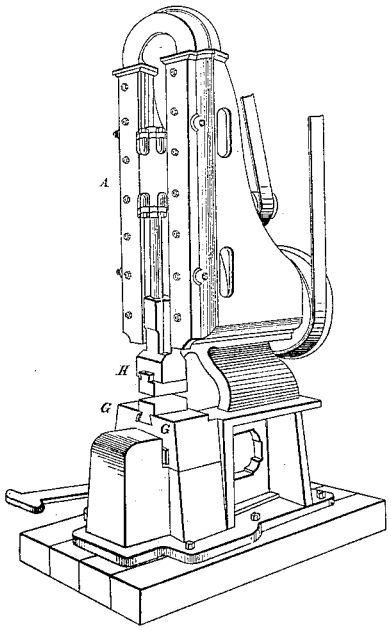
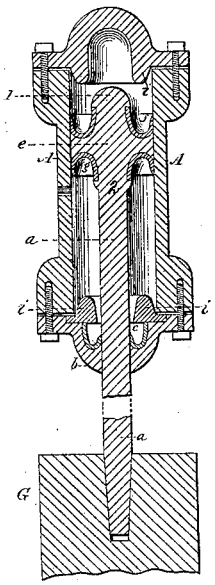


Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

EDWD. A. RAYMOND, OF BROOKLYN, ASSIGNOR TO HIMSELF AND CHAS. MERRILL & SONS, OF NEW YORK, N. Y.

IMPROVEMENT IN FORGING APPARATUS.

Specification forming part of Letters Patent No. **51,267**, dated November 28, 1865.

To all whom it may concern:

Be it known that I, EDWARD A. RAYMOND, of Brooklyn, in the county of Kings and State of New York, have invented, made, and applied to use a certain new and useful Improvement in Atmospheric Hammers; and I do hereby declare the following to be a full, clear, and exact description of my said invention, reference being had to the annexed drawing, making part of this specification, wherein—

Figure 1 is a perspective view of the hammer complete, and Fig. 2 is a vertical section of the air-cylinder employed in said hammer.

Atmospheric hammers have heretofore been constructed in which an air-cylinder is moved up and down in slides by means of a pitman to a crank, said cylinder having a piston the rod of which is connected to the hammer, as may be seen by reference to Letters Patent granted June 14, 1859, to B. Hotchkiss.

In hammers of this character heretofore constructed the piston-rod has been packed with an ordinary elastic packing, which produced so much friction that the air in the cylinder becomes almost inoperative in giving an elastic movement to the hammer, because the friction is sufficient, or nearly so, to lift the hammer, and this character of packing quickly becomes leaky and useless in consequence of the heat and particles of dirt that adhere to the piston-rod. The piston itself has been formed with cup-shaped leathers; but the cup-leathers, if the movement is such that they touch either end of the cylinder, are forced out of shape and the hammer rendered inoperative. The hammer of the character referred to must be durable and not subject to derangement, because they are generally in the hands of blacksmiths, who would not understand their repair in case of their becoming out of order.

My invention obviates all the foregoing difficulties, and consists in a cup-shaped packing for the piston-rod, secured in place by a movable ring that is kept in position by the end of the cylinder, so that the simple act of placing the head upon the cylinder secures the cup-packing.

At the ends of the cylinder I form annular ribs that act as packing-expanders for shaping the edge of the cup-leathers to the interior surface of the cylinder, and also as buffers for the piston to strike against at the ends of the cylinder should any circumstance cause the cylinder-head and piston to come in contact. By these devices the hammer is rendered permanent in its action and adapted to the circumstances under which it is used. The hammer has heretofore been connected to the piston-rod by the latter passing into a straight hole in the hammer, and the piston-rod has been enlarged to give additional strength. The concussion causes the rod to bind so firmly in the hammer that they are separated with great difficulty if it becomes necessary for repairs. I obviate this trouble by making the end of the piston-rod tapering and the hole in the hammer of the same form, and I find that the friction is sufficient to hold the parts together; but they may be easily separated if required.

In the perspective view, Fig. 1, I have represented the anvil G, hammer H, cylinder A. These operating jointly, as in the hammers heretofore constructed, do not require further description, my improvement relating to the construction of the air-cylinder A and the attachment of the piston-rod to the hammer.

In Fig. 2, *a* is the piston-rod to the hammer, passing through the head *b*, which head is formed as a basin to receive the cup-leather *c*, which is shaped as represented, and forms the packing to the piston-rod at this point. The cup-leather *c* is held in place by the ring *d*, that sets into a recess in the head *b*, and is a little larger in diameter than the interior of the cylinder A, hence is secured in place by the end of the cylinder when the head is attached to the latter. The piston *e* is formed with the rod *a*, as are also the buttons or collars 1 and 2, above and below the piston. The surfaces of the piston are adapted to the reception of the cup-leathers *f* and *g*, which are pressed up out of a flat piece of leather into the shape shown, and are forced over the collars 1 and 2, and the leather contracts into the recesses or shoulders between the collars and piston, so that said cup-leathers become permanently connected to the piston. Around the cavities formed in the heads at each end of the cylinder are annular ribs *i i*, of a shape corresponding to the inside surfaces of the cup-leathers,

so that the said cup-leathers, if brought in contact with said annular ribs, are expanded and pressed up to their proper shape, and the leather composing such cup-leathers intervenes between the metal parts to prevent injury in case the piston comes with a concussion against the head.

By this device, if the piston accidentally takes the end of the cylinder, no injury ensues to the packing; on the contrary, it is benefited, and when the packing becomes leaky all that is necessary is to cause the piston to take the ends of the cylinder by any convenient mode, such as blocking the hammer either up or down.

The lower end of the piston-rod is tapering, as seen in Fig. 2, and enters a similarly-shaped hole in the hammer. The friction between the surfaces causes the hammer to remain connected to the piston-rod while in work, because the concussion tends to drive the rod more firmly into the hole; but the taper allows the parts to be easily separated if required.

I am aware that cup-leathers set back to back have been secured to the piston and employed in pumps of various kinds; and I am also aware that hydraulic rams have been packed with a leather ring.

I do not claim a cup-leather packing, nor the concave recesses of the piston, nor the device of offsets, on the piston-rod to retain the cup-leathers, when the same are applied upon the pistons of atmospheric cylinders in hammers, ore-crushers, or similar machines.

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

1. A cup-leather packing for the piston-rod of atmospheric hammers, applied as and for the purposes specified.

2. Securing the cup-leather within the basin in the cylinder-head by the movable ring, as and for the purposes specified.

3. The annular packing-expanders, applied at one or both ends of the cylinder for pressing the cup-leathers of the piston to shape, as set forth.

In witness whereof I have hereunto set my signature.

EDWD. A. RAYMOND.

Witnesses:
THOS. GEO. HAROLD,
CHAS. H. SMITH.