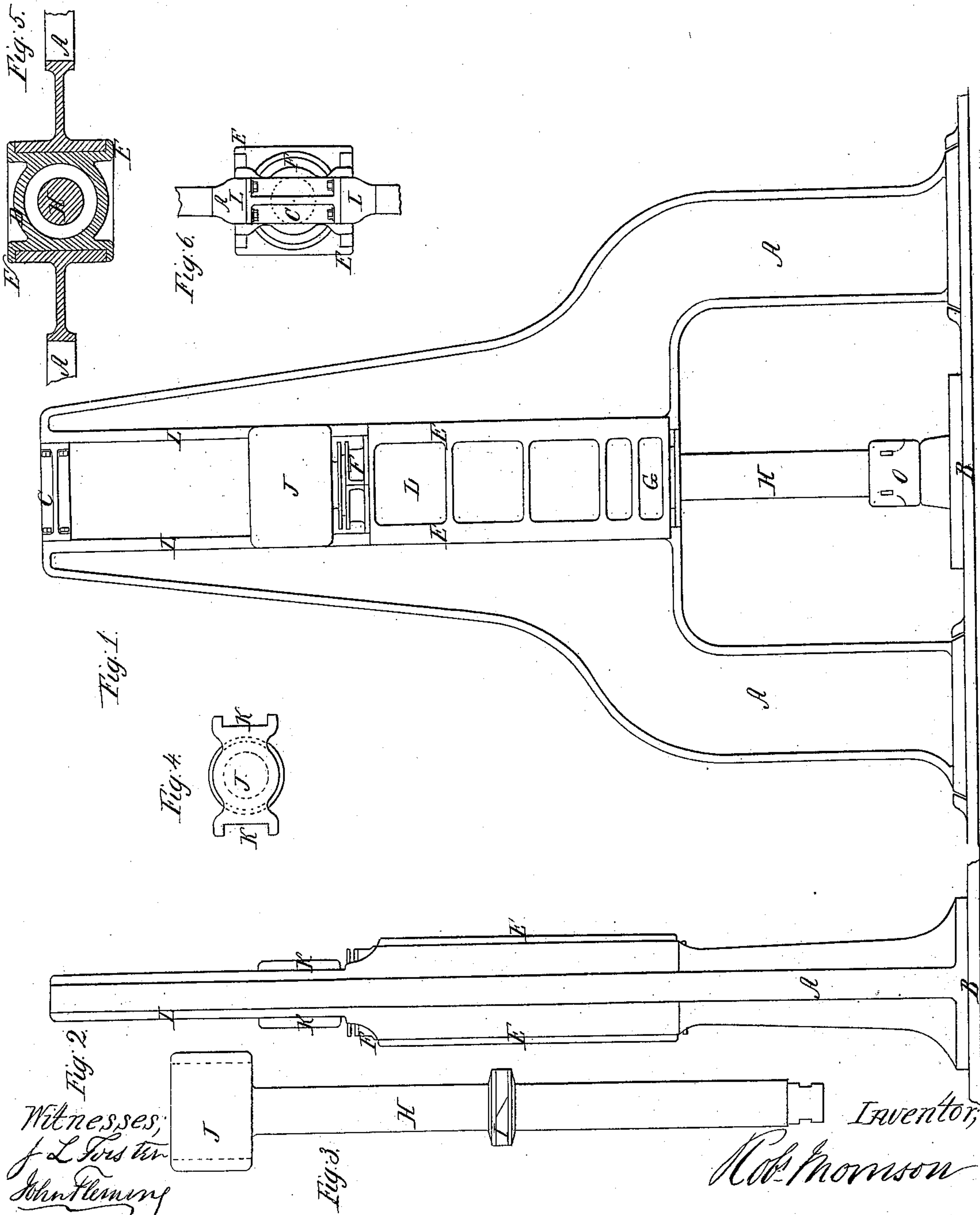


R. Morrison.

Power Hammer.

N^o 34,587.

Patented Mar. 4, 1862.



UNITED STATES PATENT OFFICE.

ROBERT MORRISON, OF NEWCASTLE, ENGLAND.

IMPROVEMENT IN APPARATUS FOR FORGING AND CRUSHING IRON.

Specification forming part of Letters Patent No. 34,587, dated March 4, 1862; patented in England August 16, 1853.

To all whom it may concern:

Be it known that I, ROBERT MORRISON, of the town and county of Newcastle-upon-Tyne, in the Kingdom of Great Britain, have invented new and useful Improvements in Apparatus for Forging, Shaping, and Crushing Iron and other materials, for which a patent dated 6th August, 1853, was granted me in the Kingdom of Great Britain; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the figures and letters of reference marked thereon.

The object of my invention is to arrange mechanism of the steam-hammer class so that it may work much more effectively than at present, while the wear and tear are greatly reduced. Instead of the existing hammer-block, piston, and piston-rod commonly used in forge-hammers, a cylindrical bar of metal is used. This forms the acting hammer, and on it are formed the piston and guides for the hammer movement.

The steam-cylinder is carried in standards resembling those of the present construction, and the cylindrical hammer-bar works through long stuffing boxes at the top and bottom of the cylinder. For puddling purposes the standards need not be continued higher up than the level of the top of the steam-cylinder; but for general forging these standards are carried considerably higher up, and a deep T-piece formed on the upper end of the hammer-bar, which, being provided with longitudinal slides on its opposite sides, fitted into corresponding slides in the standards, may serve as additional guides for the hammer-stroke. In this way, the piston, rod, and hammer being all in one solid mass, the tool will work with far less repair and delay than the common hammers; and, the cylinder being firmly bolted between the two standards of the framing at the junction of the arch immediately above the anvil, it forms a strong stay, securing the frames in their proper position; and in order that my said invention may be fully understood, I will now proceed more particularly to describe its construction and operation, referring to the drawing, forming part of this specification, in which the same letters of reference allude to similar parts throughout the several views, and in which—

Figure 1 is a front elevation of one modification of my improved steam-hammer, as arranged for puddling or forging iron. Fig. 2 is a corresponding elevation of the hammer at right angles to Fig. 1. Fig. 3 is a detached elevation of the hammer-bar. Fig. 4 is a plan of the same corresponding. Fig. 5 is a horizontal section of the frame and steam-cylinder, with the hammer-bar in position; and Fig. 6 is a plan of the frame-top.

The main frame consists of the two vertical standards A, bolted down at their bottom expanded ends to the foundation-plate B, embracing the anvil-block. The upper ends of these frame-pieces are prolonged above the steam-cylinder, and are firmly bound together by a stay, C, bolted between the standards.

The steam-cylinder D is cast with longitudinal flanges E, and bolted between the two frames by rows of bolts passing through corresponding flanges in each frame-piece, the lower end of the cylinder being flush with the crown of the arch formed by the frames above the anvil-block. The upper-end cover, F, of the cylinder and its stuffing-box are made in two halves, the deep-bottom stuffing-box G being solid and cast with the cylinder to form the lower-end cover. The hammer-bar or piston-rod H is, in this instance, supposed to be of wrought-iron, with the working piston I forged upon it at its longitudinal center, a ring-groove being turned out of the piston to receive a single packing-ring. The upper T-head, J, is also formed in one piece with the bar, the two ends K of the cross-piece being planed out to act as steadying-guides by embracing the two parallel vertical slides L. The piston-rod is thus extremely well guided throughout its stroke.

In putting the piston-rod in its place, its lower end is passed down into the cylinder from above and through the bottom stuffing-box until the piston itself is fairly inside the cylinder. The upper divided cylinder-cover, F, is then put on the cylinder above the piston, and the two halves are bolted together, and finally bolted down upon the cylinder, in the usual manner. Both the upper and lower stuffing-boxes are then packed and screwed up steam-tight, and, the steam-valves and gearing being adjusted, the hammer is ready for working use, the hammer-face O being keyed on

after the bar H emerges through the bottom stuffing-box.

Another modification of my improved steam-hammer consists in casting the steam-cylinder with longitudinal flanges, set to one side, and bolting it over the space between the two frames by two rows of bolts passing through each frame edge, whereby the steam-cylinder is placed in front of the standards. In steam-hammers of this class, intended exclusively for puddling, the framing-standards need not be carried up higher than the level of the top of the steam-cylinder; but for general forging work I prefer to prolong them in the manner which I have illustrated herein.

With the working piston, piston-rod, and hammer in one solid piece, the liability to fracture and derangement of the details is very much diminished, while the hammering blows are of superior solidity and effect; and the bolting of the steam-cylinder between the frame-standards at the junction of the arch immediately above the anvil or working level provides a most powerful stay for tying the frames well together and preventing all lateral springing; hence the hammer-face is most accurately directed down upon its work, and shoulders, collars, and other projections can be hammered down with certainty to their intended size and form by means of the side of the hammer. The position of the steam-cylinder in front of the standards is also of great importance in my arrangement, as when the hammer is actually between the frame-pieces the mass of material under the hammer must be angled before it can be swaged, and if it cannot be angled the operating workman must necessarily stand between the frame-pieces, while with my other plan the hammer is quite

clear of the framing, so that the forge-man can swage, shape, or cut any work he may have under the hammer without the necessity of standing at all beneath the framing-arch.

Having thus described the nature of my invention, and the manner in which the same may be used, I desire to be understood that, except as hereinafter expressly mentioned, I do not claim any of the parts or elements of which my said apparatus is composed separate or apart from the combination or application thereof, in the manner and for the purpose herein described, as being of my invention; but,

What, with respect to the arrangement and construction of apparatus for forging, shaping, and crushing iron and other materials, as hereinbefore described, I claim as my invention, and desire to secure by Letters Patent, is—

1. The system or mode of constructing such apparatus with the piston, piston-rod, or hammer-bar and guides in one solid mass.

2. A hammer-bar for steam-hammers constructed substantially as described, and arranged in relation to other parts of the apparatus, so as to dispense with the use of guides below the cylinder.

3. Interposing the cylinder between the framing-standards of apparatus for forging, shaping, and crushing iron, substantially as described, and for the purpose specified.

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Witnesses:

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