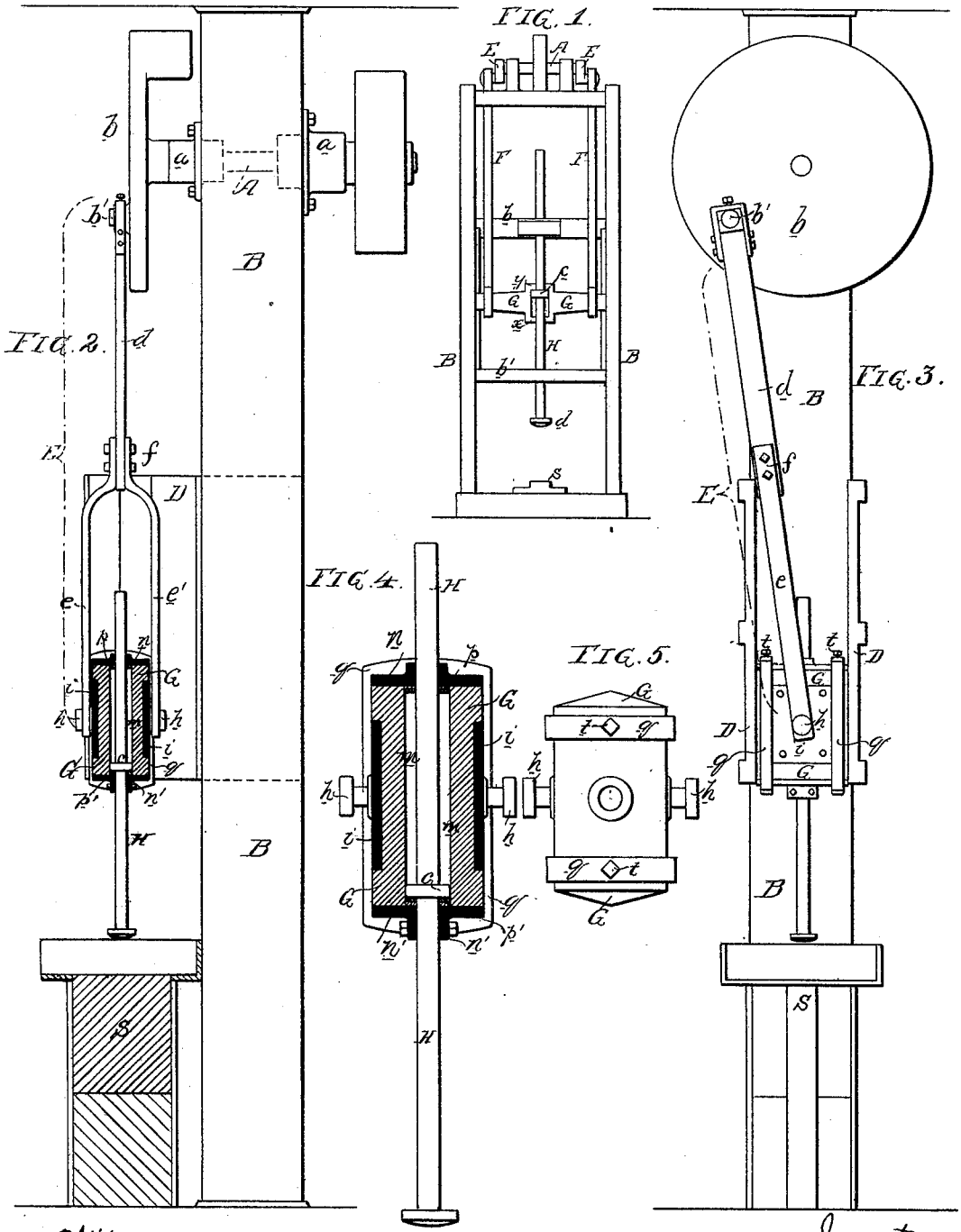
J. H. COOPER.

Gold-Beating Machine.

No. 213,874. Patented April 1, 1879.




Witnesses
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# UNITED STATES PATENT OFFICE.

JOHN H. COOPER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO ROBERT E. HASTINGS, JOHN V. HASTINGS, AND HARRY O. HASTINGS, OF SAME PLACE.

## IMPROVEMENT IN GOLD-BEATING MACHINES.

Specification forming part of Letters Patent No. **213,874**, dated April 1, 1879; application filed January 9, 1879.

*To all whom it may concern:*

Be it known that I, JOHN H. COOPER, of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Gold-Beating Machines, of which the following is a specification:

My invention relates to certain improvements in the power-hammer for which Letters Patent No. 57,380 were granted, August 21, 1866, to R. E. Hastings, assignee of Thos. C. Robbins; and the main object of my invention is to protect the working parts of the machine from the evil effects of shocks and jars, and to insure the steady blows which are essential to the successful operation of gold-beating. This object I attain by such a liberal use of wood or other equivalent material in constructing the machine that the jars resulting from the operation of the working parts shall be absorbed or neutralized by the cushioning influences of the material, the hammer in falling being thus free from tremor, and the steadiness of the blow being further assured by the manner described hereinafter of guiding the hammer-rod.

In the accompanying drawings, Figure 1 is a diagram of the said patented gold-beating hammer; Fig. 2, a side view, partly in section, of a machine made according to my improvements; Fig. 3, a front view; Fig. 4, a vertical section of the reciprocating cross-head and hammer-rod, drawn to an enlarged scale; and Fig. 5, a plan view of Fig. 4.

For the ready understanding of my improvements, I will give, in the first place, a brief description of the construction and operation of the device for which the aforesaid Letters Patent were granted, reference being had to the diagram, Fig. 1.

In this machine a shaft, A, having bearings supported by a suitable frame, B, was provided with two cranks, E E, the pins of which were connected by rods F F to a cross-head, G, adapted to guides on the frame. A vertical rod, H, was guided by the transverse beams *b b'* of the frame, the lower end of the rod being provided with a hammer-head, *d*, below which was the anvil *s*. The hammer-rod passed through the cross-head G and through an opening or recess in the same, so that the said rod and cross-head could have a vertical reciprocating movement, independently of each other, to an extent determined by the play of the collar *c* on the rod in the said opening or recess of the cross-head.

When the hammer struck the gold-beater's mold on the anvil it rebounded; but before it could again strike the mold the collar *c* was arrested by the lower portion, *x*, of the cross-head in its upward movement, and the hammer-rod was carried up until the crank-pins on the shaft reached their most elevated position or upper dead-centers. The downward movement of the hammer-rod was accelerated and the violence of the blow intensified by the upper portion, *y*, of the cross-head in its descent acting on the collar *c* of the rod, owing to the fact that the cross-head descended faster than the rod could fall by its own weight.

While this machine was made on theoretically correct principles for performing the desired duty, there were defects in construction, to remedy which has been the object of my invention.

In Figs. 2, 3, 4, and 5, B is a pillar, preferably of wood, firmly secured above and below to the floors of the building in which the machine is situated. To opposite sides of this pillar are secured the guide-plates D D, adapted to the reciprocating cross-head G, the latter taking the place of the cross-head in the machine above described.

A is the driving-shaft, adapted to bearings *a a*, secured one to each side of the pillar B, and to this shaft is secured the balanced crank-wheel *b*. To the pin *b'* of this crank is connected the upper end of the forked pitman E, which is composed, mainly, of the bar *d*, of wood, and the metal bars *e e'*, secured to each other and to the wooden portion at *f*, the lower ends of the pitman being adapted to pins *h h* projecting from the cross-head G, one on each side of the same.

To the pitman constructed in the manner described is, in a measure, due the successful operation of the machine, as the wooden portion tends to absorb the shocks which take place when the crank-pin is passing its dead-

centers. A much steadier movement of the slide-block is moreover assured by the combination therewith of one crank and a single forked pitman than by the former combination of two cranks and two connecting-rods with the cross-head. The main body of the cross-head G is composed of wood, into which are let two plates, *i i*, one on each side of the cross-head, each plate carrying one of the pins *h* for the lower end of the pitman. A hole, *m*, somewhat larger in diameter than the collar *c* of the hammer-rod H, passes entirely through the wooden cross-head, which is provided at the top with a guide-plate, *n*, for the rod, and below with a similar guide-plate, *n'*, and within the opening *m* are washers *p*, of leather or other equivalent yielding material, immediately below the plate *n*, and similar washers *p'* immediately above the plate *n'*, the upper washers serving to cushion the blow which the cross-head in its descent strikes on the collar *c* of the hammer-rod, and the lower washers to cushion the blow which the cross-head in its ascent strikes against the under side of the collar after the rod has rebounded from the mold on the anvil.

For binding the plates *n n'* to the wooden block reliance is preferably placed on iron bands *q q*, which pass up both sides of the block, over the upper plate, and under the lower plate. The force of both blows on the collar of the hammer-rod is resisted by these bands, but the wood serves to lessen the resultant jars. The good effects of the wooden portion of the cross-head are, however, most apparent when viewed in connection with the pitman, through the medium of which the crank strikes the blows.

It will be seen that the metal plates *i i* are free from contact with the metal plates *n n'*, and hence that the force which is exerted through the pitman to strike the collar of the hammer-rod must be transmitted to the latter through the medium of a wooden cushion.

On referring to the diagram, Fig. 1, it will be seen that the hammer-rod of the former patented machine was guided above and below by parts of the frame, so that any irregularity in the movement of the cross-head tending to exert a lateral force on the hammer-bar would be resisted by these bearings, and the result was lateral tremor imparted to the rod, and the failure of the head to strike a dead blow on the mold on the anvil. This difficulty is obviated in my improvements by dispensing with the fixed guides, and relying solely on the sliding block for the guidance of the hammer-rod.

Although I have referred to my improvements as applied to gold-beating hammers, they may be adopted with advantage in the construction of power-hammers for other purposes.

I claim as my invention—

1. The combination, in a power-hammer, of a reciprocating guided block or cross-head, G, with the hammer-rod H, guided solely by the said cross-head, and having a free vertical play to a limited extent in the same, substantially as set forth.

2. The combination of the guided block or cross-head G and the hammer-rod H, guided by and having a free vertical play to a limited extent in the said cross-head, with the forked pitman and cranked shaft A, substantially as described.

3. The within-described sliding block or cross-head, composed of a body of wood, the metal plates *i i*, carrying the pitman-pins, and the metal guide-plates *n n'*, the said metal plates being isolated from each other by the intervening elastic material, all substantially as specified.

4. The combination of the wooden body of the sliding block or cross-head G, the metal plates *n n'*, and bands *q q*.

5. The combination of the sliding block or cross-head, the crank-shaft, and the pitman E, composed partly of the wooden bar *d* and partly of the metal bars *e e'*, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN H. COOPER.

Witnesses:

WM. JOHN COOPER,

HARRY SMITH.