No. 19,997. PATENTED APR. 20, 1858.

J. W. KERR.

OPERATING TRIP HAMMERS.

Fig. 1.

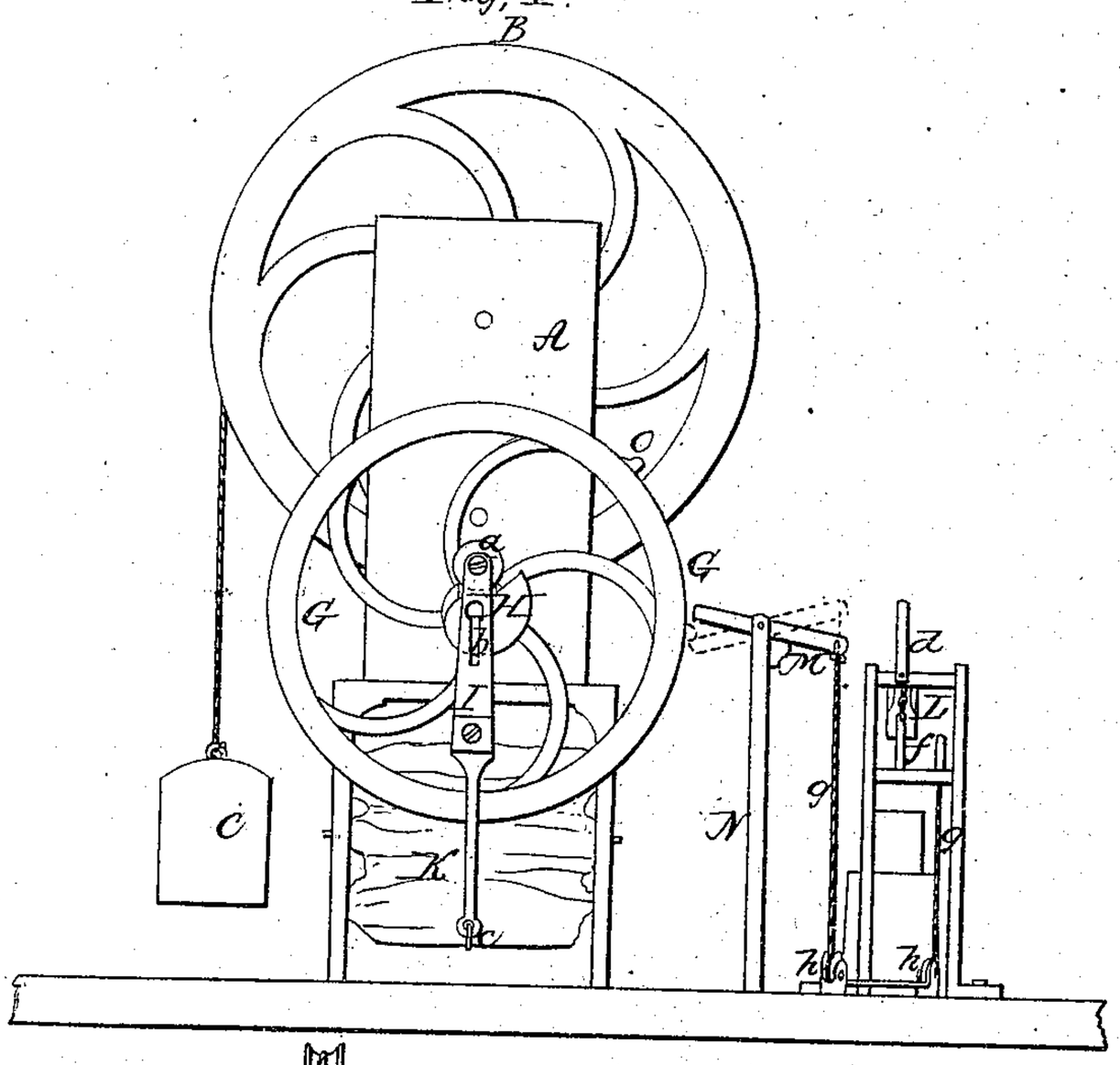


Fig. 2.

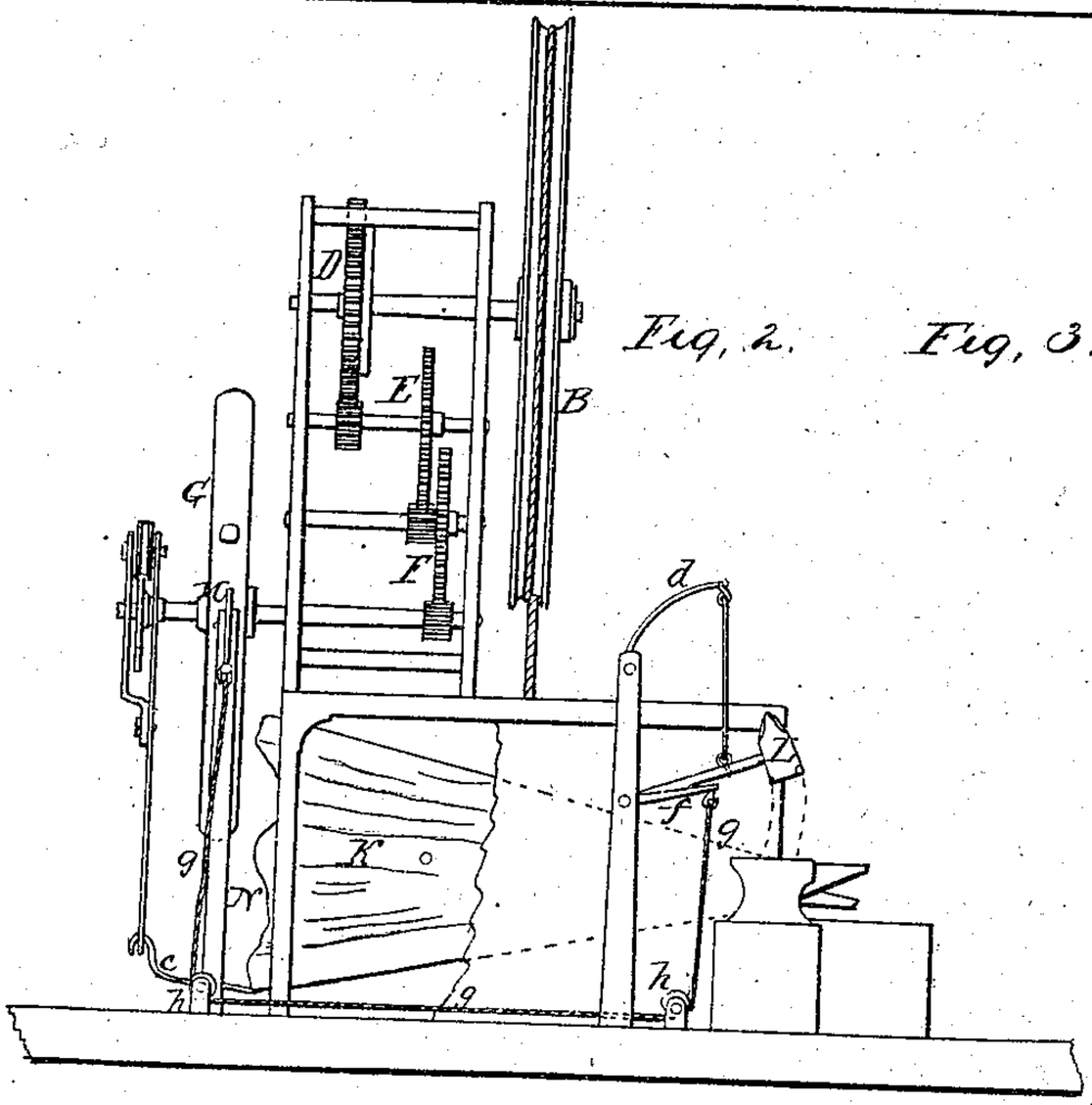
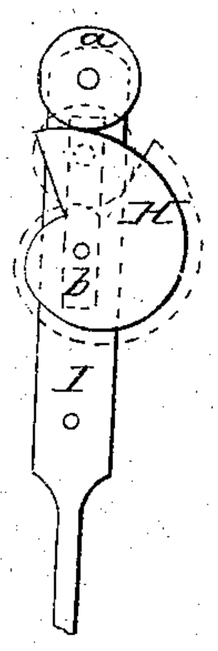


Fig. 3.



Inventor;

James W. Kerr.

UNITED STATES PATENT OFFICE.

J. W. KERR, OF ROCHESTER, NEW YORK.

OPERATING BLACKSMITHS' HAMMERS.

Specification of Letters Patent No. 19,997, dated April 20, 1858.

To all whom it may concern:

Be it known that I, JAMES W. KERR, of Rochester, in the county of Monroe and State of New York, have invented a new and Improved Machine for Operating a Blacksmith's Bellows and Trip-Hammer; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon.

Figure 1 is a front elevation of my machine. Fig. 2 is a side elevation of the same. The same letters refer to corresponding parts in each of the figures.

My improvement, which I denominate the "automatic blacksmith," consists in a method of operating the bellows and hammer conjointly by means of suitable mechanism and in the devices employed to render their operation effective.

A, Fig. 1, is the frame of the machine.

B is a drum or driving wheel for putting in motion the various parts, by means of the weight, C, attached to a rope or chain, which is wound up on the wheel, B, the shaft of which is provided with ratchet wheel and click for that purpose. The motion is conveyed from the driving wheel by a cog-wheel, D, Fig. 2, on its shaft, which drives the series of wheels and pinions, E, and F, thereby setting in motion the balance wheel, G. The end of the shaft of the balance wheel is provided with an eccentric H, snail-shaped in its outline, which revolves with it. A gate, I, hangs upon the same shaft, resting upon the eccentric by a friction pulley, *a*, the eccentric being inclosed between the two sides of the gate, as seen in Fig. 2. These sides are slotted, *b*, Figs. 1 and 2, to admit of the vertical reciprocating action which is imparted to it by the rotation of the eccentric. The gate is connected with the bellows, K, by means of the rod, *c*, which is attached to the bottom board of said bellows.

The operation is as follows: The machine being put in motion by the weight, C, or by any other convenient power, the revolutions of the snail-eccentric on the shaft of the balance wheel, cause the gate to rise and fall, and thus act on the bellows with the required motion for filling and expelling the air. This motion is peculiar, it being necessary that the air, when the bellows is filled, shall be forced out gradually by the contraction of the chambers, but that the reverse motion, for expanding the bellows, shall be very sudden, in order to open the valves, and admit air to the partial vacuum. If this motion is not sufficiently quick, the hot air from the twyer is drawn back with the flames from the forge setting fire to and often exploding the bellows. These movements are produced by the form of the eccentric. In Fig. 1, the gate is shown at its lowest point of motion, the bellows being expanded and filled. The revolution of the eccentric gradually raises it to its highest summit, as shown by its position to the pulley, *a*, in Fig. 3. At this point the bellows is exhausted, and the gate suddenly drops to the smaller part of the eccentric and the bellows opens.

The hammer, L, Fig. 2, is held suspended by the spring, *d*. From the hammer-shaft is a short lever, *f*, to which the cord or chain, *g g*, is attached, and extends down to and under the pulleys, *h h*, and is connected with the lever-bar, M, best shown in Fig. 1.

N, is a post or standard for supporting the lever-bar.

The tension on the rope, *g*, given by the spring *d*, keeps it in a position in which the end near the balance wheel G, is elevated above the horizontal. A cam, or projection, O, from the periphery of the balance wheel, strikes the end of the lever bar, and forces it down, as shown by the dotted lines, to such an angle that it will pass, producing, at the same time, a quick blow of the hammer on the anvil. There may be one or more cams for this purpose on the balance wheel, according to the desired rapidity of succession in the blows, and the force of the blows may be increased or diminished as the rope *g* is tight or slack.

The action of the hammer is produced at that point of the revolution in which the greatest resistance has been overcome, viz. when the highest point of the eccentric has passed the pulley *a*. The power no longer required for the bellows is expended on the hammer, and thus uniform motion is kept up with the greatest economy of power.

The construction and arrangement are exceedingly simple and manageable, and very useful in their results to the blacksmith and mechanic in the increased facilities afforded

for accomplishing rapidly both light and heavy work. Any power which is most convenient may be employed for driving it.

I do not claim the various parts of my automatic blacksmith separately considered, but

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

1. The combination and arrangement of the eccentric, H, with the slotted reciprocating gate, I, and bellows, K, whereby the required motions for successfully operating the bellows are obtained by the revolutions of the balance wheel, G, in the manner and for the purpose herein set forth.

2. I also claim the combined operation of the wheel, G, with cam or cams, O, lever-bar, M, hammer lever, *f*, hammer, L, and spring, *d*, whereby the power may be reciprocatingly employed between the action of the bellows and trip-hammer, so that the power released from one is expended on the other, and vice-versa, substantially in the manner and for the purpose herein described.

JAMES W. KERR.

Witnesses:
JAMES JONES,
S. J. ALLIS.