J. C. BUTTERFIELD.

Trip-Hammers.

No. 153,534. Patented July 28, 1874.

Fig. 1.

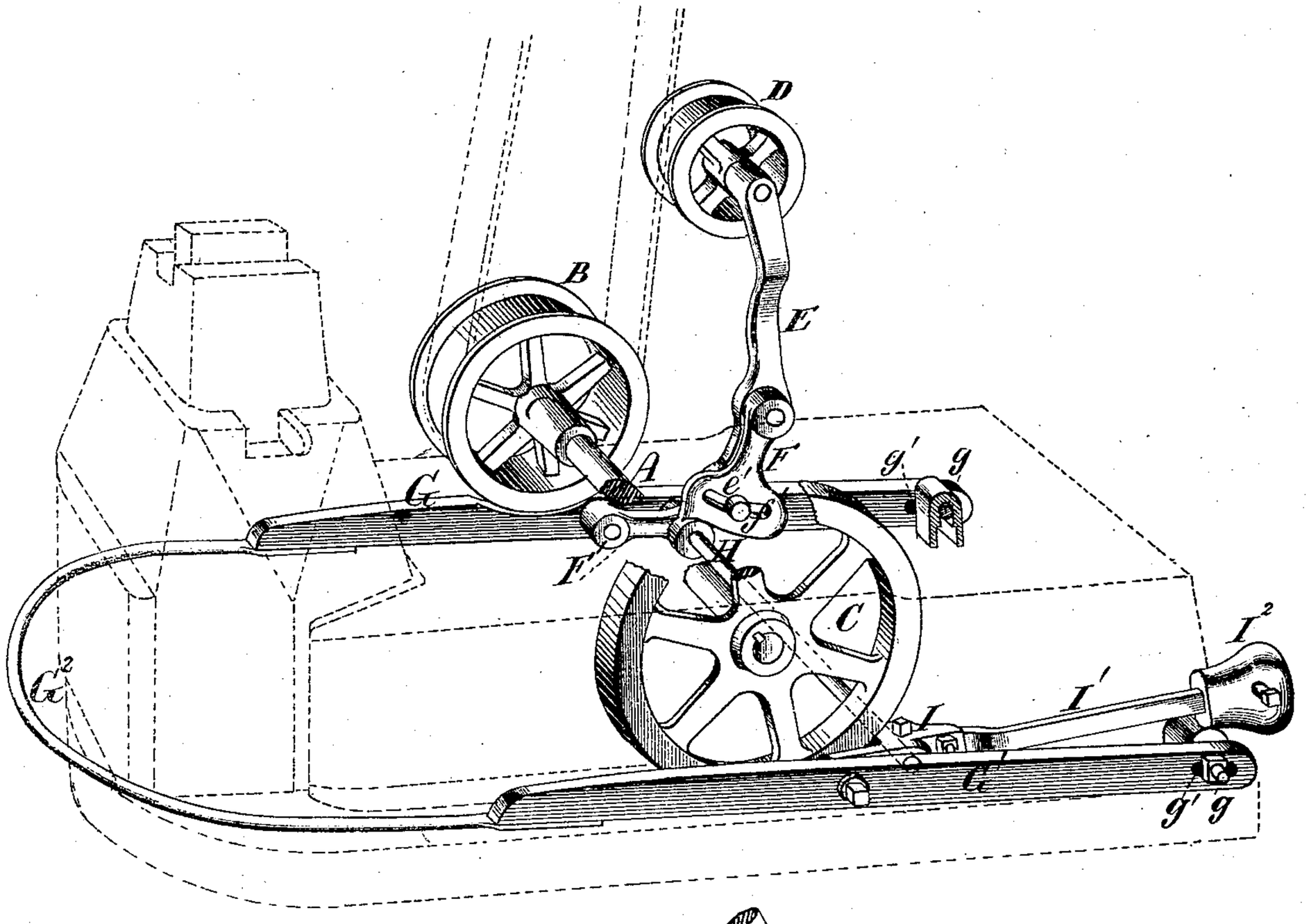



Fig. 2.

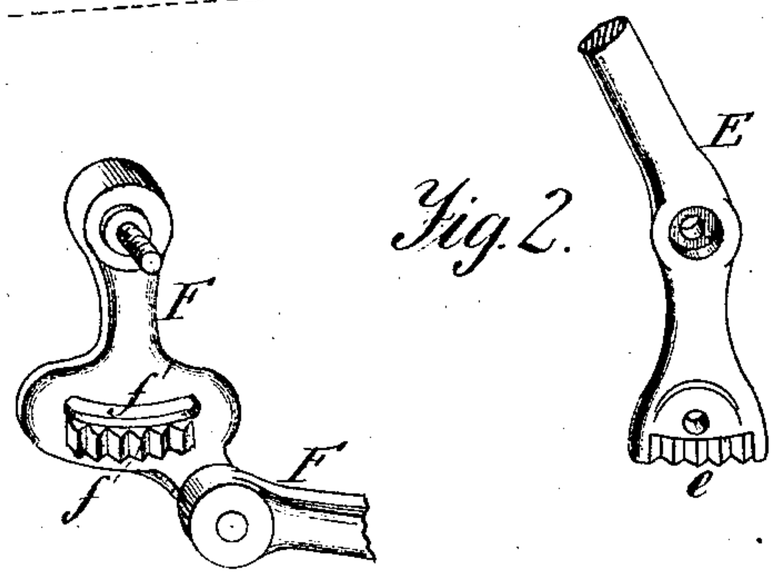
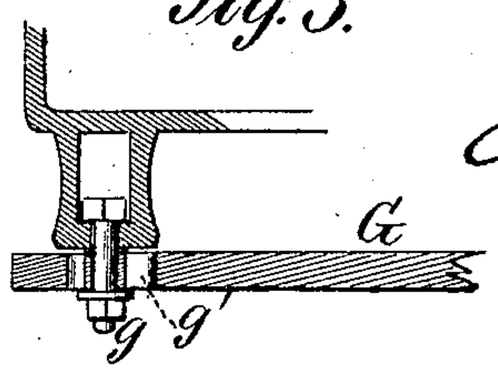



Fig. 3.




Witnesses.
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# UNITED STATES PATENT OFFICE.

JOHN C. BUTTERFIELD, OF CHICAGO, ILLINOIS.

## IMPROVEMENT IN TRIP-HAMMERS.

Specification forming part of Letters Patent No. **153,534**, dated July 28, 1874; application filed January 7, 1873.

*To all whom it may concern:*

Be it known that I, JOHN C. BUTTERFIELD, of Chicago, in the county of Cook and State of Illinois, have invented a certain Improvement in Power-Hammers, of which the following is a specification:

This invention relates to that class of power-hammers which are operated by a revolving shaft through the medium of an eccentric and rod, or equivalent means, the shaft being in turn driven by a pulley and belt. My improvement consists in the employment of a connected belt-tightener and automatic brake, so combined with a treadle that the workman can, with his foot, regulate at will the speed of the driving-shaft, and thus govern the force of the blow struck by the hammer, as that is proportionate to its velocity.

In the annexed drawings, Figure 1 illustrates my improvement in perspective, the bed, anvil-block and anvil, and the driving-belt being shown in dotted lines. Figs. 2 and 3 are detail views, hereinafter more particularly referred to.

The same letters of reference are used in all the figures in the designation of identical parts.

The driving-shaft A is placed in bearings across the bed of the hammer, and carries at one end the rimmed pulley B, and at the other end the fly-wheel C. The pulley is embraced by a slack belt, the tension of which is controlled by a belt-tightener, D, composed of an anti-friction rimmed roller, which revolves freely on a laterally-projecting stud of the arm E. The latter is pivoted to the vertical arm F of a bell-crank lever, the horizontal arm F′ of which is pivoted to the leg G of a treadle. The arm E has at its lower end a series of serrations, *e*, which are adapted to engage with similar serrations, *f*, on the bell-crank. The arm can be adjusted by turning it on its pivot on the bell-crank, to arrange the tightener in proper relation to the belt, after which it is firmly fixed to the bell-crank by a bolt, *e′*, a segmental slot, *f′*, being formed in the latter to permit the bolt to move with the arm in shifting it. The bell-crank is fixed upon the transverse horizontal shaft H, the other end of which carries a brake, I, which is automatically applied to the rim of the balance-wheel by a lever, $I^1$, carrying an adjustable weight, $I^2$. The outer end of the brake is pivoted to the leg $G^1$ of the treadle, and the arrangement of the brake and belt-tightener with reference to the driving belt and fly-wheel is such that on forcing the belt-tightener over against the belt the brake will be swung away from the fly-wheel, and vice versa. The legs of the treadle are connected by a bow, $G^2$, passing around the anvil-block, and they are at their extreme ends pivoted upon studs *g*, secured to the bed of the hammer. These studs are vertically adjustable, so that the bow of the treadle can readily be arranged to suit the workman. The legs of the treadle are slotted, as at *g′*, where the studs *g* pass through them, to provide for the end movement of the treadle.

It is obvious that, although the employment of a compound treadle such as described is preferable for many reasons, a simple treadle composed of a single lever, operating upon one end or the other of the shaft H, might be substituted.

The special advantages of the use of a treadle for controlling the connected belt-tightener and brake is, that the workman can govern the stroke of his hammer with his foot, leaving him the free use of both hands to manipulate the iron he is shaping.

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

The combination of the balance-wheel, treadle G $G^1$ $G^2$, brake I, and belt-tightener, substantially as and for the purpose set forth.

JOHN C. BUTTERFIELD.

Witnesses:

N. B. SMITH,

C. W. SMITH.