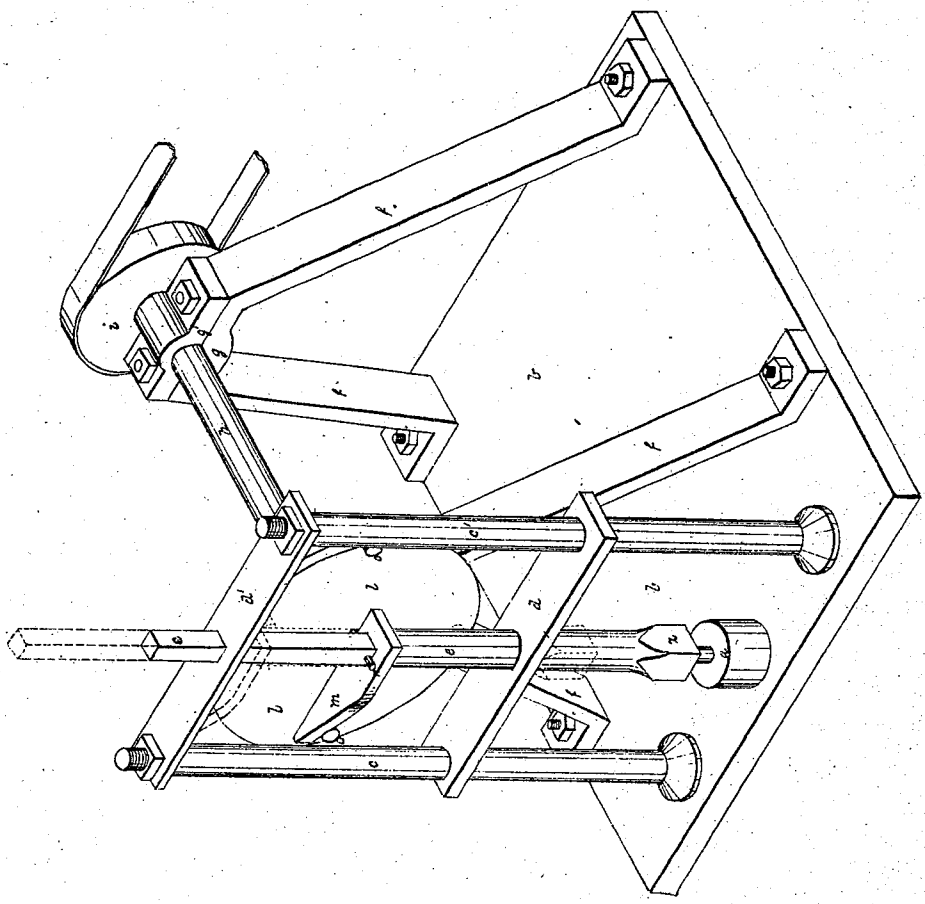
E. Kaylor,

Drop Hammer.

No. 95,693. Patented Oct. 12. 1869.



Witnesses,

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United States Patent Office.

EDWARD KAYLOR, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 95,693, *dated October* 12, 1869.

IMPROVED DROP-HAMMER.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, EDWARD KAYLOR, of Pittsburg, in the county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Drop-Hammers; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, which gives a perspective view of the devices included in my invention, the nature of which consists in operating a drop-hammer by pins or projections attached to revolving arms, or to the face of a revolving disk, the centre around which the pins revolve being so situate, relatively to the vertical hammer-shaft, as that the pins shall pass on both sides of it, the object being to give a longer stroke to the hammer than is produced by lifters of ordinary construction.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and mode of operation.

The anvil *a* rests on a bed, *b*, or other convenient or suitable foundation.

With the construction shown in the drawings, the posts *c* and *c'* stand upright, one on each side of the anvil *a*, and are connected by cross-bars *d* and *d'*, two or more.

Through holes or slots in these cross-bars *d d'*, the vertical drop-shaft *e*, of the drop-hammer *z*, plays up and down, being raised, with the hammer, as hereinafter to be described, and falling under the influence of gravity.

Back of the devices thus described are the braces *f f*, &c., meeting at the top, or connected by caps *g*.

On these caps, and enclosed in proper bearings, *g* and *g'*, rests a horizontal shaft, *h*, at any convenient point, on which is attached a gear or pulley-wheel, *i*, through which latter, in any of the ordinary modes, the power is applied, requisite to raise the drop-hammer *z*.

On the end of the horizontal shaft *h*, next the vertical shaft *e*, of the drop-hammer *z*, and sufficiently near it to accomplish the purposes hereinafter mentioned, and far enough distant to allow the pins *o o'* to pass back of the drop-shaft *e*, I attach firmly a circular disk, *l*, of a diameter equal to, or a little in excess of the lift which it is desirable to give the drop-hammer *z*.

At opposite points, near the circumference of the disk *l*, I construct projections, or attach pins, *o o'*, of sufficient length, that as they revolve with the disk *l* and shaft *h*, they will play against the under side of a bracket, *m*, which is attached to the vertical drop-shaft *e*, commonly at right angles thereto, parallel to the face of the disk *l*, and projecting from the shaft *e* a distance equal or nearly equal to the radius of the circle described by the revolution of the pins *o o'*, and with its inside or back edge sufficiently near the face of the disk to be caught by the pins *o o'*.

The mode of operation, then, is simple.

By applying the power in the manner above described, the disk *l* is put in revolution. As it revolves, one pin, *o*, plays against the under face of the bracket *m*, raises it, with the vertical shaft *e*, to which it is attached, and the drop-hammer *z*, to the position indicated by the dotted lines, sliding, at the same time, outward toward its point, and backward toward its heel, where it slips out, and the drop-hammer falls. The other pin, *o'*, then raises and releases it in the same manner, and so on, alternately.

The bracket *m* may be made adjustable on the vertical drop-shaft *e*, by the pin *n* or otherwise, and should generally be so adjusted that the play, which the vertical shaft *e* and drop-hammer *z* receive, shall be somewhat less than the distance of the pins *o* and *o'* from each other, in order that the drop-hammer *z* may make a complete stroke. To prevent the shaft *e* from revolving on its axis, I commonly make its upper end of other than circular shape, and make the hole in the cross-bar *d'*, through which it plays, of shape to correspond.

I do not, in my invention, limit myself to the use of any particular form of the disk *l*, nor, indeed, to the use of the disk itself, since revolving arms, projecting outward in opposite directions from the head of the horizontal shaft *h*, with the pins *o* and *o'* attached thereto, in the manner above described, would be equally efficacious. Nor do I limit myself to any particular number of pins *o o'*. If but one is used, the drop-hammer *z* may have a fall equal to the diameter of the circle made by the revolution of such pin. If more than two are used, the bracket *m* must be raised, or the disk *l* be enlarged, so that the drop-hammer *z* may make a complete stroke when dropped from one pin, *o*, before being caught by the next, *o'*.

The advantages of the devices above described, consist, among other things, in simplicity of construction, ease and accuracy of operation, and a comparative freedom from liability to get out of order. I claim them, also, as an improved mode of applying power over any mode heretofore used in connection with drop, or tilt, or trip-hammers.

The motion commonly lost during the fall of the hammer, is, in my invention, reduced to the minimum, since I commonly adjust the bracket *m* with reference to the other devices, so that as soon as the drop-hammer *z* completes one downward stroke, it will be again and immediately raised for another stroke by one of the pins *o o'*. Thus the loss of motion is but slight, and such motion as is lost, is lost when of least practical value, namely, while the lower of the pins *o o'* is moving across the direction of the fall of the hammer, and not in a line with it. I hence claim that

the amount of motion which is necessarily lost is, in the devices above described, reduced to the minimum, both in the time during which the machinery is operating uselessly, and in the fact that during the time of the loss, it is working at a point where, and in a direction in which the motion is of little avail in raising the drop-hammer.

I claim the further advantage of securing a quick percussive stroke, by a hammer falling perpendicularly from the greatest height to which it can be raised by a given amount of motion—all which things are essential in drop-hammers for certain purposes, particularly in making bolt-heads, and other similar articles.

I also commonly place the vertical shaft *e* in the line of the horizontal shaft *h*, or near thereto, in order that the pins *o o'* may carry the bracket *m*, and the devices connected therewith, to the highest point of their revolution, and thereby give to the drop-hammer *h* a fall from as great a height as possible. With the cam and bracket-devices ordinarily used for operating drop-hammers, the lifting-power commonly acts entirely on one side of the vertical shaft to be raised, instead of passing from side to side by a rotary movement, as in my invention, a consequence of which is that the hammer and its shaft are, in such machines, dropped before the lifting-power has reached its highest point, and hence the power, at the point where it is greatest, is wholly lost.

In my invention, as above described, the last part of the lift, namely, that made by the pins *o o'*, when nearly or directly over their axis of revolution, is a clear gain or saving of so much power, with a consequent and corresponding increase in the effectiveness of the stroke of the drop-hammer when thus raised and released.

As before stated, the height of lift or stroke of the hammer-shaft may be adjusted by altering the position of the bracket *m* on the drop-shaft *e;* but the peculiar advantage of my arrangement is that the drop-shaft may be raised at each stroke to a height nearly, if not quite equal to the diameter of the disk, or distance of the pins *o o'* from each other, whereas, one-half of that stroke is all that is attainable by the ordinary cam and bracket movement.

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

One or more pins *o o'*, projecting from a revolving disk or arms, on the end of a horizontal shaft, *h*, in combination with a vertical drop-shaft, *e*, and its bracket, *m*, so arranged that the pin or pins, in revolving to raise the drop-shaft, shall operate during one-half of its revolution, substantially as and for the purposes hereinbefore described.

In testimony whereof, I, the said EDWARD KAYLOR, have hereunto set my hand, in presence of—

EDWARD KAYLOR.

Witnesses:

W. D. LEWIS,

ALLAN C. BAKEWELL.