

E. L. Kinsley,
Steam Hammer.

No 54,560.

Patented May 8, 1866.

Fig 1.

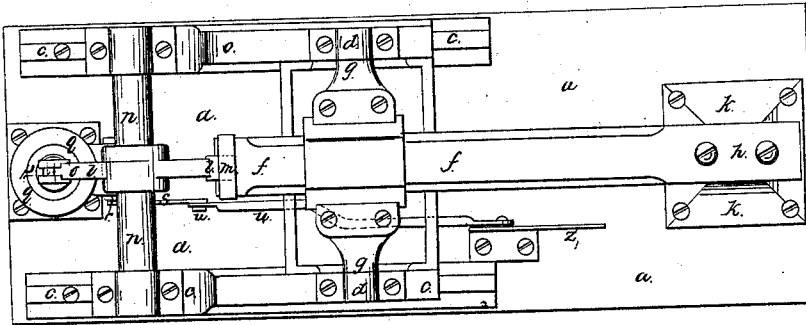


Fig 2.

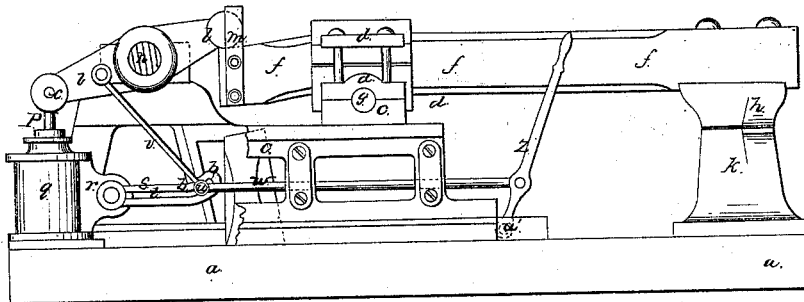
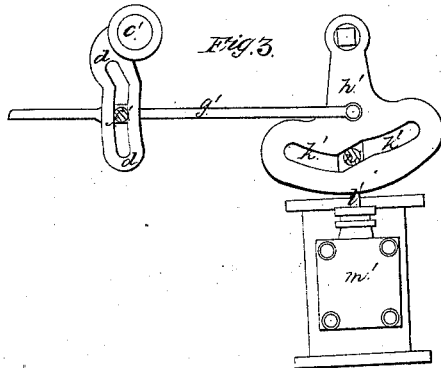


Fig 3.



UNITED STATES PATENT OFFICE.

EDGAR L. KINSLEY, OF CAMBRIDGE, MASSACHUSETTS.

IMPROVEMENT IN STEAM-HAMMERS.

Specification forming part of Letters Patent No. 54,560, dated May 8, 1866.

To all whom it may concern:

Be it known that I, EDGAR L. KINSLEY, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Steam-Hammers; and I do hereby declare that the following is a full, clear, and exact description thereof, which and will enable others skilled in the art to make use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan or top view; Fig. 2, a side view, showing portion broken away; Fig. 3, a detail view.

Similar letters of reference indicate like parts.

The present invention consists, first, in attaching to the rear end of the hammer-helve, by means of any suitable joint, one end of a lever turning upon a fulcrum, and connected at its opposite end to the piston-rod of the engine, so that the upward movement of the piston within its cylinder shall thereby raise the outer or hammer end of the helve, which then not only falls from its own weight, but also, aided by the downward movement of the piston, striking and hammering with great force the iron or other metal placed upon the anvil; second, attaching the lever to the hammer-helve by means of a joint that will permit of the helve being adjusted with regard to the same, so that its hammer can be set in the proper position to hammer the metal to a bevel or any other desired shape; third, connecting the lever or hammer-helve, or their respective shafts, with the valve or valves of the piston-cylinder by means of an arrangement of devices susceptible of adjustment with regard to each other at pleasure, whereby a greater or lesser movement is given to the valves of the piston-cylinder, consequently producing a proportionate increase or decrease in the upward movement of the piston within its cylinder, and thus regulating the height to which the hammer is lifted before falling, as may be deemed desirable or necessary.

a a represent a bed-plate, made of any suitable material, of a rectangular shape, on the upper surface of which are fastened, in the direction of its length and parallel to each other, two upright standard-frames, *c c*.

In the front portion, *d d*, of the standards *c c* the helve *f f* is hung by its trunnions *g g*, turning in suitable bearings.

To outer end of helve *f f* a hammer, *h h*, is securely fastened, which, when the helve is in a horizontal position, rests upon the anvil-block *k k*, fastened to the bed-plate *a a*. On the top of the rear or inner end of the helve one end of a lever, *l l*, rests, but is so attached thereto as to freely move thereon, a band or stirrup, *m*, passing around and over it, fastened at each end, by screws or otherwise, to the helve *f f*.

The lever *l* is fastened to a horizontal shaft, *n*, having bearings in standards *c c*, and at its end *o* to the piston-rod *p* of the steam-cylinder *q*.

r is a rotary steam-valve, made of any of the ordinary constructions, and which is to be arranged within the piston-cylinder in a similar manner to all rotary valves of steam-engines, with passages extending from it to each end of the cylinder, so that by turning the valve in the proper directions to throw it into connection with either one or the other of the steam-passages to the piston-cylinder, communication will thus be established between the steam-chest and such end of the cylinder, the opposite end then being opened to the exhaust, thereby producing the upward and downward play of the piston within the cylinder, and consequently, through the beam or lever *l*, to which the upper end of its rod is hung, alternately raising and lowering the hammer end of the helve, as is obvious, the construction and arrangement of the piston-cylinder and its steam-valve with regard to each other forming no part of the present invention, and therefore needing no more particular explanation than that above given in the specification.

To operate the steam-valve *r* so as to thus alternately throw the steam-chest into communication with the upper and lower ends of the piston-cylinder, I connect it through a cam or circular slotted arm, *s*, fastened at one end to the spindle of the valve, and a connecting-rod, *v*, hung at one end to the lever or beam *l*, and at the other in the slot *t* of the arm *s*, so as to freely play therein, whereby, as is obvious, the swinging of the beam *l*, caused by the upward and downward movement of the steam-piston, to which it is connected, as explained, will produce the necessary oscillating movement to the valve in its seat to alternately throw the steam-chest into communication with either the upper or lower ends of the piston-cylinder, as the case may be, the point of the piston-stroke at which the valve is operated to change its direction of motion being, of course,

regulated by the peculiar shape which may be given to the slot of the arm *s*.

Steam being admitted to the piston-cylinder through the rotary valve *rr*, before referred to, the piston is lifted, and consequently, through the lever *b*, the outer or hammer end of the helve is raised until the piston has traveled its full length in the cylinder, when steam then operating upon the top of the piston forces it down, and at the same time the hammer falls, not only from its own weight, but aided in a great measure by the pressure of the steam within the cylinder with great force upon the anvil or bar of metal placed thereon to be hammered.

By connecting the hammer-helve at its rear end to the piston-rod of the cylinder through a lever or beam, as described, it is obvious that if the helve is hung as explained and embraced in the schedule annexed to Letters Patent granted to Lyman Kinsley on the 10th of February, 1863, for improvements in steam-hammers, the helve can be canted so as to hammer beveled edges, &c., without disconnecting it from the steam-power, it being only necessary that the joint of the lever or beam with the helve should be of such a form or construction as to admit of it—as, for instance, the metallic band or strap *m* shown would answer, or a universal joint.

In the hammering of metals by the use of steam-hammers it is necessary that blows should be given with varying degrees of force or strength, which are, as is evident, regulated according as the hammer falls from a greater or lesser height, and to accomplish this result I have arranged the devices for operating the steam-valve as described, whereby a long and slow or a short and quick movement is given to the valve, thus moving the piston either more or less in an upward direction, and through the lever *l* proportionately raising the hammer from the anvil-block.

The lengthening or shortening of the play of the steam-valve above referred to is caused by simply changing the position of the stud *u* of the connecting-rod *v* in the cam-groove *t*—that is, setting it, by means of the lever-handle *z*, connected through a connecting-rod *w* with the said stud *u*, far from or near to the center of rotation of the valve, correspondingly increasing or decreasing the length of time to which the valve remains open through the movement of the connecting-rod *v* of lever or beam *l*, whereby the hammer is necessarily lifted to a lesser or greater height, as the case may be, and in direct proportion thereto, producing a light or heavy blow upon the metal to be hammered, as is obvious without further explanation.

In lieu of fastening the rod to the lever *l*, as above described, it is evident that it can be attached as well to its shaft or to any part or device moving in unison therewith.

The cam-groove is so formed at *b'* as to enable the opening of the valve to be regulated to the varying distances of the hammer when at rest from the anvil, caused by the thickness of the metal bar placed thereon to be hammered.

In the above I have particularly described the arrangement of the camway as applied to a rotary steam-valve; but it is evident it can be as well applied to a sliding valve and without any material alteration. (See Fig. 3, in which *c'* is the shaft of the lever *l*; *d'*, a projecting arm attached thereto and having substantially the same form of groove as described for the cam *t*, in which is a stud, *f'*, of a connecting-rod, *g'*, secured at one end to a swinging plate, *h'*, with a proper-shaped groove, *k'*, for the raising and lowering of the rod *v'* of the valve *m'* as said groove moves over and upon the stud *n'* of valve-rod *v'*, caused by the reciprocating rotary movement of the cam *d'*.)

The stud of rod *g'* is adjustable within its groove, the same as described for rod *v*, and operates in the same manner to lengthen and shorten the movement of valve *m* and to open the valve, according to the varying heights of the hammer above the surface of the anvil, as before specified.

It is evident that the cam *t* can be attached to the lever-shaft in lieu of the rotary valve and have the same operation.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. Raising the hammer by means of a lever operating upon the rear end of the hammer-helve, and connected with the piston of the steam-cylinder, arranged and operating substantially in the manner and for the purpose described.

2. The stirrup *m*, operating in combination with the helve *f*, lever *l*, and piston-rod *p*, and operating in the manner and for the purpose herein specified.

3. The arrangement of the cam-groove *d*, arm *s*, as applied to the valve of a steam-engine, and rod *v*, and connecting said arm with the lifting lever or beam *l*, or any part moving in unison therewith, substantially as herein described, for the purpose specified.

EDGAR L. KINSLEY.

Witnesses:

ALBERT W. BROWN,
M. M. LIVINGSTON.