J. Evans.

Power Hammer.

No. 47,405. Patented Apr. 25, 1865.

Fig. 1.

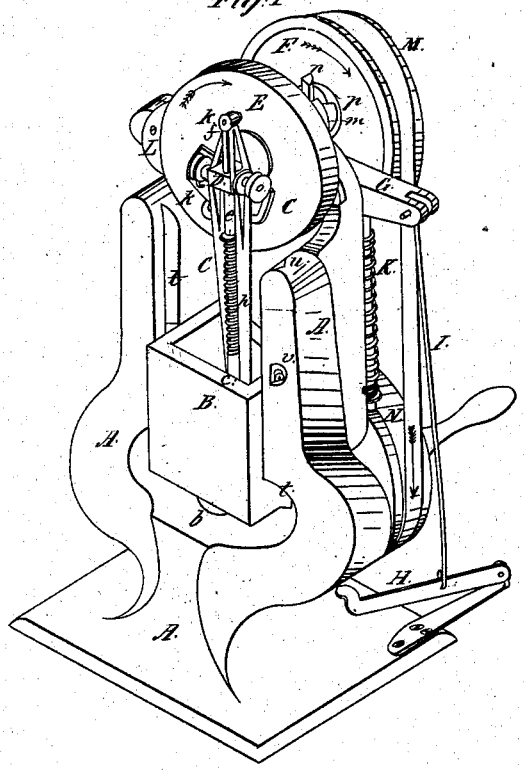


Fig. 2.

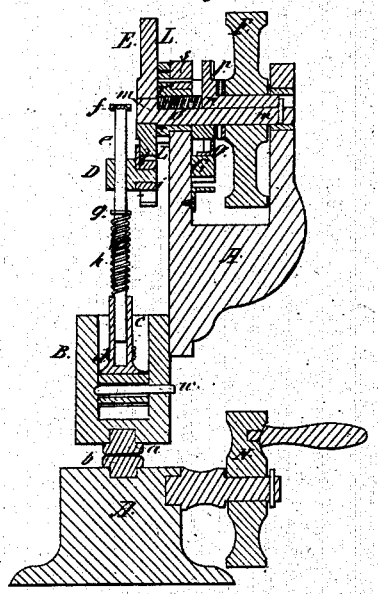
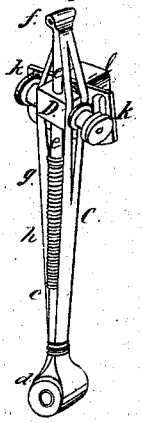


Fig 3.



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JOHN EVANS, OF NEW HAVEN, CONNECTICUT.

IMPROVEMENT IN DROP-HAMMERS.

Specification forming part of Letters Patent No. **47,405**, dated April 25, 1865.

To all whom it may concern:

Be it known that I, JOHN EVANS, of the city and county of New Haven, in the State of Connecticut, have invented a new and useful Improvement in Drop-Hammers; and I do hereby declare that the following is a full, clear, and exact description of the construction, character, and operation of the same, reference being had to the accompanying drawings, which make part of this specification, in which—

Figure 1 is a perspective view of the machine as viewed from the right hand front corner, showing the hammer, connecting-rod, &c. Fig. 2 is a vertical section of the same, cut through the center, from front to rear, showing the relative positions of the working parts, &c. Fig. 3 is a perspective view of the connecting-rod, showing the two cushions on which the belt presses to prevent jarring, &c.

My improvement consists in working the hammer by means of a connecting-rod composed of two parts, (and their appendages,) the lower part being hollow to receive the lower end of the solid or upper part, and with the lower extremity fitted to hold an india-rubber cushion, under which a belt presses, and in having the upper part solid, and its upper extremity fitted to hold an india-rubber cushion, over which a belt presses, and (near the upper end) having this solid part pass freely through a projection or crank-pin, adjustably fitted eccentrically to the face of a wheel which revolves to work the hammer, against which projection the belt is, when vertically adjusted, secured by washers and binding-screws, so that the belt will regulate the extent of the vertical motion of the rod, through the crank-pin, and in using a spiral or any other suitable spring on this rod between a collar or stop on the solid part and the top of the hollow part, to force the hammer downward, and yet to allow it to rise by its own momentum when worked rapidly, by means of the necessary appendages, as hereinafter described.

I make the frame A A of cast-iron or any other suitable material, substantially of the form and proportions shown in Fig. 1, and in part in section in Fig. 2, which I can cast in one piece, to avoid the liability to get out of order by a screw getting loose. In the upper surface of the lower part or bed of this frame I have a suitable groove or space, into which I insert the lower die, *b*, Fig. 2, which I make of a shape or form to suit the work being forged.

I make the hammer of cast-iron or any other suitable material, of a cubic form, as shown at B, Fig. 1, (or of any other convenient shape,) with a hollow or space in the upper portion extending below its center, and of sufficient size to receive the connecting-rod and to allow it to work freely, as shown at B, Fig. 1, and in section in Fig. 2, and in the lower surface of this hammer I make a suitable groove or space, in which I insert a steel die, as *a*, Fig. 2, of a shape or form of face suited to the work intended to be forged.

I make the connecting-rod, Fig. 3, of the several parts shown in the drawings—that is, I make the lower part with a socket or tube to receive the upper part, as shown at *c*, Figs. 1, 2, and 3, with its lower extremity properly shaped (in a semi-tubular form) to receive and hold a piece of india-rubber tubing, as shown at *d*, Fig. 3, and indicated at *d*, Fig. 2, in section.

I make the upper part of a solid iron rod, as shown at *e*, Figs. 1, 2, and 3, with the upper extremity fitted to hold an india-rubber cushion, as shown at *f*, Figs. 1, 2, and 3, and a collar or stop, as shown at *g*, Fig. 2, against which the end of a spiral or any other suitable spring, *h*, is to rest. About this connecting-rod, after putting on the spring *h* and inserting the lower end of the solid part *e* into the hollow part *c*, I fit a leather (or any other suitable) belt C, which will pass under the lower cushion, *d*, and over the upper cushion, *f*, and secure it in its place by binding it round near the top and bottom, as shown in Fig. 3, or by any other convenient means, so that the strain on the belt, from either way, will act first upon the cushions, which, with the elasticity or yielding of the belt, will entirely prevent jarring.

I make the adjustable projection or crank-pin D with a pivot, *i*, to revolve in a plate and block, *l*, Figs. 2 and 3, which block passes or drops into a slot in the wheel E, and the plate is secured to the wheel by binding-screws working in slots for adjustment, as shown at *k k*, Figs. 1 and 3. Through the central part of this crank-pin D, I drill a hole vertically, through which the upper portion of the solid rod *e* passes freely for the

purpose of adjusting the portions of the belt C above and below the crank-pin, where the belt, when adjusted, is secured by washers and binding-screws, as shown in Figs. 1 and 3, or in any analogous way.

I make the crank-pin wheel E of cast-iron or any other suitable material, with a slot, as shown at *l*, in which the crank-pin is to be adjusted; and I fit this wheel E firmly onto the main shaft *m m*, which extends through both parts of the frame from front to rear, as shown in section in Fig. 2. In this shaft *m m* I cut a longitudinal slot, in which I place a clutch-pin, *n*, and a spiral spring, *o*, to force the clutch-pin *n* into the clutch-wheel *p*, all as shown in Figs 2 and 4. I make this clutch-pin *n* and clutch-wheel *p* in the ordinary form, as shown in Figs. 1 and 2, and I firmly secure the clutch-wheel *p* to the face of the driving-pulley F, as shown in Fig. 1, which driving-pulley F runs freely on the shaft *m m* when the clutch is not in gear. Under this shaft *m m*, and at right angles to it, I fit a vibrating bar or lever, G, which vibrates vertically on a fulcrum-pin, (not seen,) and the outer end is held down while the hammer is working by a treadle, H, and connecting-rod I, as shown in Fig. 1. On the upper surface of this bar, under the main shaft, I fit an inclined plane, as shown in section at *q*, Fig. 2, so that when the bar G is thrown up by the spiral spring K, Fig. 1, as indicated in Fig. 2, as the clutch-pin *n* revolves the inclined plane *q* will force it back against the spiral spring *o* and out of the teeth of the clutch-wheel *p*, so that the driving-pulley F will run loose on the main shaft *m m*, while the shaft and all the other working parts will remain stationary until the treadle H is again pressed down to allow the clutch-pin to be forced out to put the parts in gear.

To prevent the wheel E from being turned backward by the weight of the hammer or otherwise while the clutch is out of gear, I fit a shoe or brake, L, Figs. 1 and 2, to work on an eccentric, *r r*, secured by a pin, *s*, to the front portion of the frame, as shown in Fig. 2, or otherwise, so that if it be attempted to turn the wheel *b* backward the eccentric *r r* will press the brake L against its periphery and bind it fast; but if turned forward (in the direction indicated by the dart) the brake L will be carried upward and the wheel E will be freed.

The hammer B is steadied by V-shaped guides *t*, and that it may always work equally steady, I fit in an adjusting-slide, *u*, which I secure when I have properly adjusted it by a binding or thumb screw, *v*, all as represented in Fig. 1.

Having made all the parts as before described, I pass the main shaft through the frame and the revolving parts, place the spiral spring *o* and clutch-pin *n* in their places, and secure the lower end, *d*, of the connecting rod in the hammer B by the pin *w* and the upper end to the wheel E by the plate *l* and the screws, all as shown in section in Fig. 2, when the whole will appear as represented in Fig. 1, and will be ready for use.

The power may be applied by a belt, M, worked by a drum, as N, or by any other convenient method.

The advantages of my improvement consist in that while the spring *h* will cause the hammer to strike with the fullest force, the belt C will always take up the rebound, so as to entirely prevent jarring; and in that the hammer may be adjusted as to the height it will be raised by means of the belt C, as well as by the eccentric position of the crank-pin D; and in that it may be run with any desired velocity without danger, as there is no part liable to heat so as to do any injury, as in the case where any packing is used, as in the atmospheric hammer; and in that the manner of throwing the clutch into and out of gear occasions the least possible jarring or noise while the machine is working.

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

1. The combination of the connecting-rod with the hammer, when they are constructed and attached substantially as herein described.

2. The combination of the connecting-rod with the crank-pin, when they are constructed, arranged, and fitted for adjustment substantially as herein described and set forth.

JOHN EVANS.

Witnesses:

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