E. K. ROOT.

Drop Hammer.

No. 9,941. Patented Aug. 16, 1853.

Fig. 1.

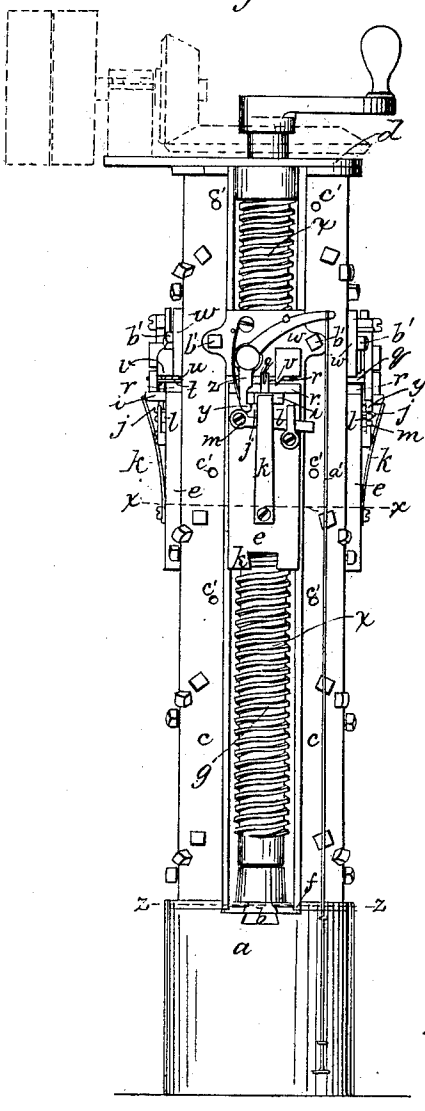


Fig. 7.

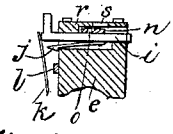


Fig. 8.



Fig. 6

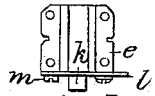


Fig. 5

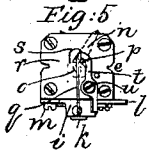


Fig. 4.

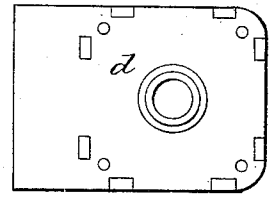


Fig. 2. z.z

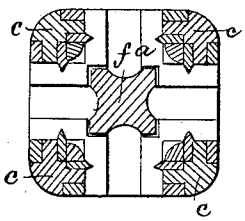
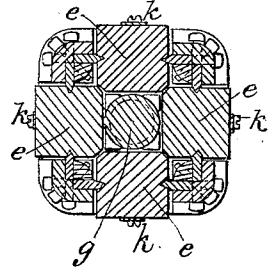


Fig. 3. x.x



N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

E. K. ROOT, OF HARTFORD, CONNECTICUT.

DROP-HAMMER.

Specification of Letters Patent No. 9,941, dated August 16, 1853.

To all whom it may concern:

Be it known that I, E. K. ROOT, of Hartford, Connecticut, have invented a new and useful Improvement in Compound Screw Drops or Hammers for Forging and Swaging Metals, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1, is an elevation; Figs. 2 and 3, horizontal sections taken at the lines Z Z and X X of Fig. 1; Fig. 4, an inverted plan of the cap plate of the frame; Fig. 5, a plan of one of the drops or hammers; Fig. 6, a horizontal section thereof; Fig. 7 a vertical section thereof; and Fig. 8 a perspective view of the spring catch lever.

The same letters indicate like parts in all the figures.

The nature of my invention consists in arranging one or more drops or hammers adapted to work in vertical slides by the side of a vertical screw shaft having a continuous rotary motion, by which they are all elevated, the drops or hammers being provided with a mechanism for breaking the connection or separating them from the thread of the screw to permit them to drop, and then to re-connect them that they may be again elevated. And my invention also consists in disconnecting the drop or hammer from the thread of the elevating screw by the thread of the screw in its rotation catching a finger connected with the slide or its equivalent on the drop or hammer which engages the thread of the screw and rides thereon, so that the rotation of the screw in carrying the said finger around shall force back the slide to the required distance to clear the thread that it may descend freely without catching on or otherwise injuring the thread of the screw. And my invention also consists in combining with the slide or its equivalent, that forms the connection with the thread of the screw and with the finger or its equivalent, by which it is disengaged from the screw, a catch lever or its equivalent for holding up the drop or hammer when liberated from the screw that it may be liberated by the operative. And finally my invention consists in combining with the slide which forms the connection between the drop or hammer and the screw, and with the catch that holds the said slide or its equivalent when disconnected from the screw, a rebound latch, which liberates the catch of the slide that it may become reëngaged with the screw by the rebound of the drop or hammer when it falls and strikes the blow.

In the accompanying drawings *a* represents the base to which is properly fitted four anvils or swages *b*. This base is quadrangular with the corners rounded. At the corners are erected four posts or standards *c*, *c*, *c*, *c*, properly secured at bottom to the base block, and connected together at top by a cap plate *d*, secured by screw bolts, or in any other suitable manner. The inner faces of the standards are parallel and provided with V-formed slides to which are fitted the four drops or hammers *e*, *e*, *e*, *e*, one for each face of the quadrangular base, and adapted to slide freely but accurately.

In the center of the base block is secured a step *f*, to which is fitted the journal, at the lower end, of a vertical screw shaft *g*, which passes up through the cap plate and there fitted to work in a suitable box. Above the cap plate the screw shaft can be provided with a bevel cog wheel gearing into a bevel pinion on a horizontal driving shaft with belt wheels, &c., by which the screw shaft can be rotated as represented by dotted lines. Or, instead of this, the required continuous rotary motion can be imparted in any other suitable manner.

The screw shaft should be square threaded as best adapted to the purpose of lifting the drops or hammers.

The lower face of the drops or hammers is grooved out as at *h*, to receive a striking face or swage of any form desired, which can be put in, taken out, and changed at pleasure to suit any kind of work.

In a suitable recess near the top of each drop or hammer there is a plate *i*, adapted to slide therein, the inner end of which fits in between the threads on the screw shaft, and to the bottom of this is attached a spring catch *j*, which, when the plate is drawn out clear of the threads of the screw, holds it in place until liberated, and when liberated it is forced back into action with the screw by the tension of a spring *k*, in front.

Just under the forward end of the spring catch *j*, there is a rebound latch *l*, that is, an arm hung on the stud pin *m* at one end, so that when the drop or hammer falls and strikes, the rebound will throw up the arm or latch against the spring catch *j*, to dis-

engage it and permit the plate *i* to be forced to its place in the screw, that the drop or hammer may be forced up again. If desired this latch may be made so light or the spring catch so strong, as not to act by the rebound, in which case the operative can throw it up at any time that he may desire the drop or hammer to be carried up.

For forcing the plate *i* out of the threads of the screw at the end of the upward motion it is necessary that the drop or hammer should be held up independently of the threads until the plate clears the threads, otherwise the edges of the threads would soon be seriously injured, and besides this the time of dropping the hammer should be entirely under the control of the operative. For this purpose there is a hinged finger *n*, that turns on a stud pin *o* on the top of the plate *i*, and this finger is provided with a pin *p* against which bears a spring *q* the tension of which forces it to one side so that it lies in an oblique position with its extremity just clearing the threads of the screw. The plate *i* and this finger *n* are covered over by a cap plate *r* for protection, and in the cap there is a hole *s* through which the pin *p* passes and in which it has room to work, and on the top of the cap plate there is a small lever *t* turning on a fulcrum pin *u* and with its inner end curved to bear against the pin *p* when the plate *i* is in the threads of the screw, but not when the plate is forced out of the threads. When the drop has reached the required elevation the outer arm of this lever *t* comes in contact with the inclined face of a stop *v* on a gallows *w* attached to the posts, by which the lever is caused to act against the pin *p* to force the end of the finger *n* against the screw which at that elevation is slightly notched as will be seen at *x*. This notch catches the end of the finger and in carrying it around makes it act in the manner of a toggle joint to force out the plate *i* until the spring catch *j* catches and holds it. And as the plate *i* is forced out its forward end passes onto the lip *y* of a spring catch lever *z* hung on the gallows which holds up the entire drop or hammer. The face of the lip (*y*) on the lever (*z*) is of greater inclination than the thread of the lifting screw and therefore as the plate (*i*) is forced out of the thread and onto the lip of the catch lever the drop or hammer is lifted up and thus clears the thread instead of riding on it. So soon as the finger has been carried around sufficiently for to force out the plate, the finger being hinged to the plate is also carried back so as to be liberated from the screw, and then the spring forces it back to its original position.

The spring lever *z* which holds up the drop is provided with a cord or wire *a'* which extends down to a convenient place to be reached either by the hand or foot of the operative so that by pulling this he can disengage the lip at his pleasure and permit the hammer to drop or fall.

The gallows *w* which carries the catch lever and stop *v* is secured to the posts of the frame by screw bolts *b'*, *b'*, and the posts have holes *c' c'* at different elevations to receive these bolts so that the gallows can be set at any height required according to the force required, and the thread of the screw shaft is provided with notches *x* at different parts of its length, as represented, to correspond with the different heights at which the gallows can be set.

All the drops or hammers are arranged in the same manner described.

I do not wish to limit myself to the special construction herein specified, so long as the same effects are produced by equivalent means.

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

1. The method of elevating the drops or hammers by means of a screw having a continuous rotary motion, in combination with the mechanism or its equivalent for disconnecting the drops or hammers from the screw to permit them to drop substantially as described.

2. I also claim the method of disconnecting the drops or hammers by the rotation of the elevating screw which is notched to catch and act upon the finger or its equivalent connected with the slide or its equivalent to force it back and clear the thread of the screw, substantially as specified.

3. I also claim in combination with the slide which connects the drop or hammer with the elevating screw, and with the finger on the slide or their equivalents, the employment of a catch lever or its equivalent for holding up the drop or hammer when it is liberated from the elevating screw, and there to hold it until it is required to be dropped substantially in the manner described.

4. And finally I claim in combination with the slide which forms the connection with the elevating screw, and with the catch that holds the said slide when liberated from the elevating screw, or their equivalents, the employment of the rebound latch or its equivalent which liberates the parts by the rebound when the drop or hammer strikes, substantially as specified.

E. K. ROOT.

Witnesses:
B. W. GREENE,
JOHN B. ELDREDGE.