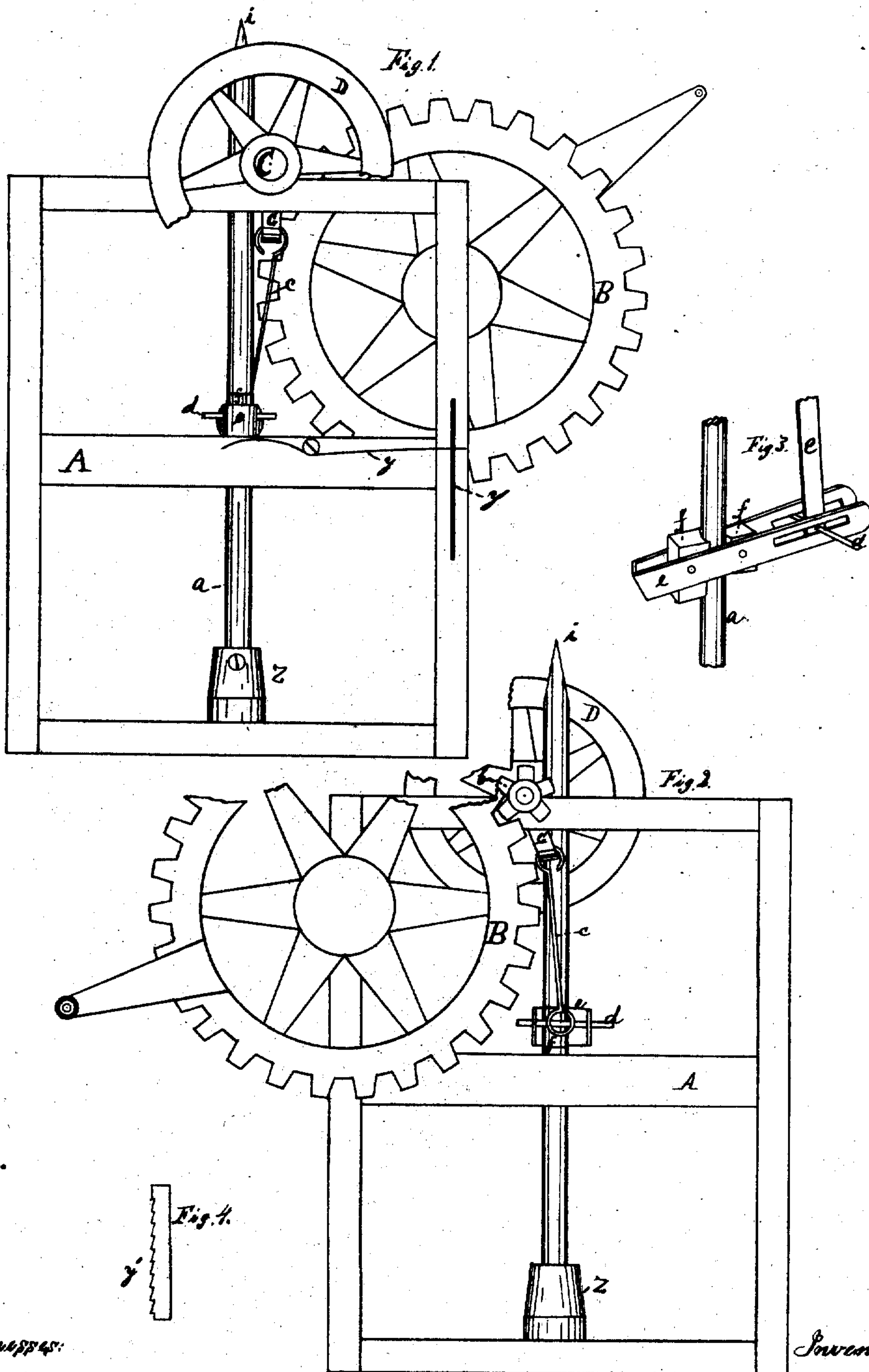


J. W. STOCKWELL.
Machines for Operating Drills.

No. 137,504.

Patented April 1, 1873.



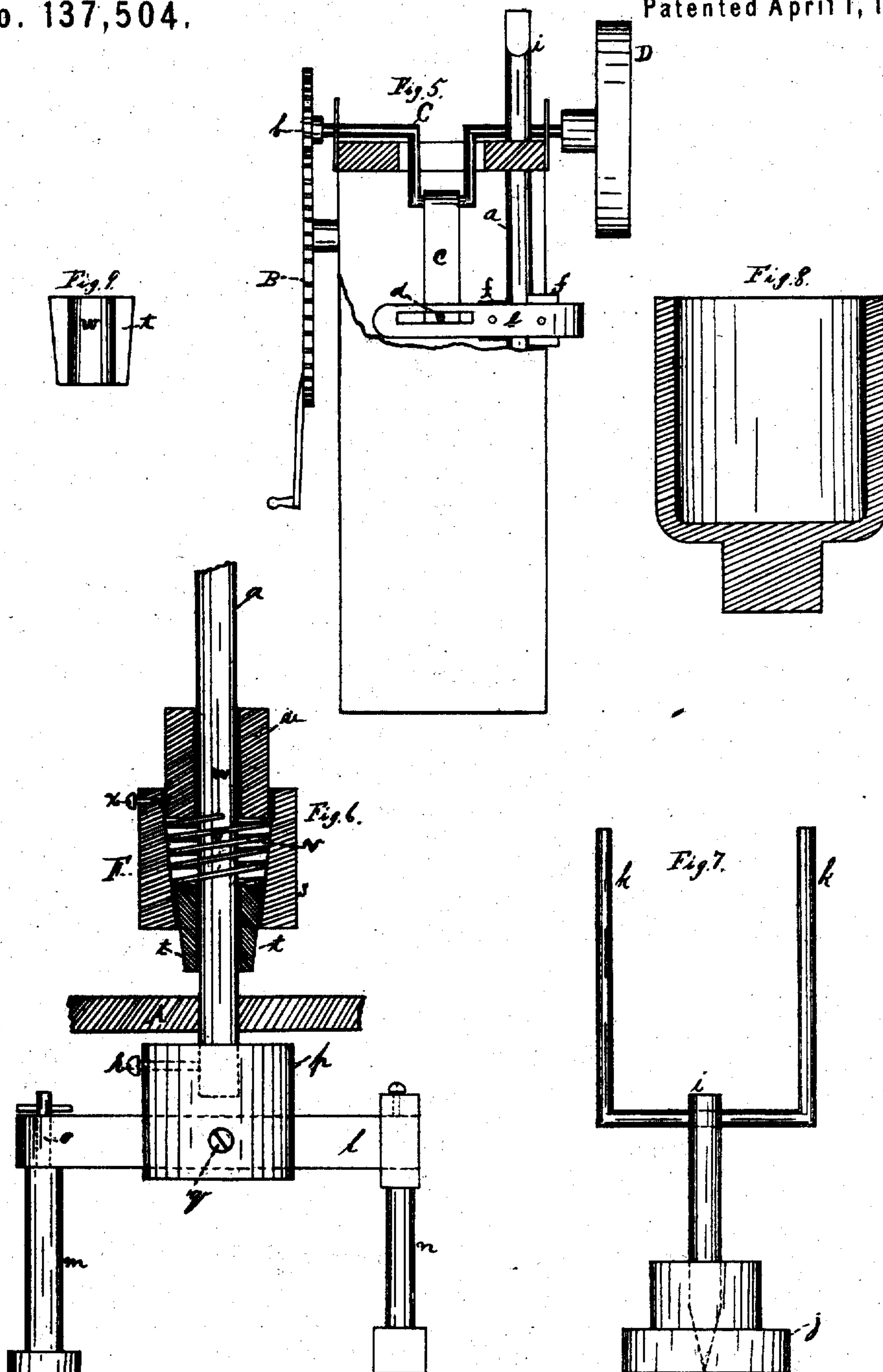
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UNITED STATES PATENT OFFICE.

JOHN W. STOCKWELL, OF PORTLAND, MAINE.

IMPROVEMENT IN MACHINES FOR OPERATING DRILLS.

Specification forming part of Letters Patent No. **137,504**, dated April 1, 1873; application filed November 16, 1872.

To all whom it may concern:

Be it known that I, JOHN W. STOCKWELL, of Portland, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Machines for Operating Drills, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, that will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing and to the letters of reference marked thereon which form a part of this specification.

Figure 1, Plate 1, shows a side view of my invention. Fig. 2, Plate 1, shows an opposite side view. Fig. 3, Plate 1, shows a view, in perspective, of the clamp *e* and the connecting rod or link *c*. Fig. 4, Plate 1, is a side view of the toothed rack *y'*. Fig. 5, Plate 2, shows an end view of my invention with parts broken away to illustrate the mechanism. Fig. 6, Plate 2, shows a sectional elevation of a device for raising the rod *a* in my machine, and also shows a side view of device to be employed with my machine for tamping cement in molds for making water-pipe. Fig. 7, Plate 2, illustrates a method of rotating a drill which can be operated by my machine. Fig. 8, Plate 2, is a side sectional elevation of a mortar. Fig. 9, Plate 2, is a front view of one of the semi-circular wedges *t t*.

Same letters show like parts.

The purpose of my invention is to produce a machine for tamping, drilling, and other like uses. It consists in a means of lifting a rod, *a*, by and in such manner that when elevated to a certain distance it is released and allowed to fall, thus imparting force to a blow of a hammer, drill, tamper, pestle, or similar article.

In the drawing, on Plate 1, A is the machine-frame. B is a large gear matching the pinion *b*. C is a crank-shaft, having the balance-wheel D. *c* is a link or rod, jointed or otherwise connected with the crank-shaft C so as to allow a universal-joint movement with the clamp *e* by means of the pin *d*, which pin passes through a slot in the clamp *e*. This clamp *e* is lifted by the revolution of the crank-shaft C. The effect of this is that the two blocks *f f* are caused to bind or clasp the rod *a*, and thus raise it when the crank-shaft is in position so to do. When the crank-shaft is in position to lift the rod *a* to the highest point

the clamp *e* is in an inclined position, and when the crank-shaft begins to turn downward the clamp is inclined the other way, so that it not only allows the rod *a* to drop in consequence of its being released somewhat from the binding of the blocks *f f*, but, in fact, for a moment impels the rod *a* downward. This, of course, adds force to the blow. It impels the rod *a* downward until the lower of the two blocks *f f* reaches the support under the clamp, when it is fully released.

In Figs. 1 and 2, Plate 1, is shown a head, *z*, for striking blows (as in a receptacle of any kind) and for pulverizing any substance; and the upper end shows the drill *i*.

It is plain that the above-described devices could be well employed to operate a drill.

Rotary motion to the drill, it will be observed, is imparted by the devices *c d e f f C*.

As the crank-shaft C revolves it moves the clamp *e* in a lateral direction, or from side to side, by means of the connecting-rod *c* and the pin *d*. There is a slot, *a²*, in the clamp *e* to receive the pin *d*, and so as to admit of the pin moving backward and forward in the said slot as it (the pin) and the connecting-rod *c* are moved by the crank C. When this lateral motion is imparted to the clamp *e* in the manner described the blocks *f f* are binding or pressing upon the rod *a*, so that whatever motion is given to the clamp is imparted to the rod. These blocks *f f* are set upon pivots, so that they can tip in such manner as to bind the rod *a* when the clamp *e* is lifted by the rotation of the crank-shaft C. When the clamp *e* is thus lifted it is held in an inclined position, as illustrated.

The rod *a* is both lifted and turned directly by the rotation of the crank-shaft C operating through the link *c* upon the slotted clamp *e*. This is different from C. Lee's rock-drill, filed April 14, 1855, in this: The rotary movement of the drill, in that application, is derived from an arm pivoted to the machine-frame, which arm pushes the drill around as it rises and falls. In my application the rotation of the crank-shaft both lifts the rod *a* and turns it in a horizontal plane.

I do not claim, broadly, the operation of thus driving a drill or rod, but merely the devices herein set forth for accomplishing that object. Furthermore, the blocks *f f* present a broad bearing to the rod *a*, and thus the rod is not so much worn in use.

As the lifting of the drill at each stroke might impair its power to penetrate the stone—because it would be obliged to be forced through the fine dust or chips it would make in cutting—I have devised the arrangement seen at Fig. 7, Plate 2, to turn the said drill without lifting it from the hole it makes or removing the point of the drill from constant contact with the bottom of the hole.

j is a guide to be placed over the spot where the drill is to work. *k k* are two arms or branches set into the top end of the drill *i*. I next supply to the lower end of the rod *a* the cross-piece *l*, which may have a hole or slot in each end, in which the arms *k k* may slide. The drill is then set in its place. The machine being operated, the rod *a* is raised and allowed to drop at each revolution of the crank-shaft *C*, and strikes its blow on the upper end of the drill *i*. The cross-piece *l* is placed so as to rest against the outside of each of the arms *k k*. Thus, when the rotary motion is also imparted to the rod *a*, as before described, and after each downward stroke of the rod *a*, the drill is turned in the hole it is cutting, as is known to be desirable in order to the operation of drilling.

It will be remarked that the rod *a* is not to be lifted so high as to carry the cross-piece *l* above the tops of the arms *k k*.

I do not confine myself to this exact mechanism for rotating the drill. The head of the hammer may be made to inclose the upper end of the drill, and may be easily arranged to allow the blow to be given and the drill to be turned without lifting the drill, except very slightly, if desirable.

To the cross-piece *l* I can attach, when I desire to do tamping work, either of the tampers *m n*, one of which turns in its socket at *o*, the other sliding thereon. The cross-piece *l* passes through the head *p*, and slides easily through it, thus allowing the tamper *m* or *n* to be moved while at work to and from the rod *a*, thus permitting work of irregular form to be done, and has, when desired, for its fastening the screw *q*. Chisels may be used instead of tamps in dressing stone. The head *p* itself is secured to the lower end of the rod *a* by the screw *r*.

This arrangement, Fig. 6, Plate 2, can be used for tamping a hollow pipe, and the tampers can be pushed around the cavity, containing the article to be tamped, by the hand if preferable to the automatic arrangement of rotating the shaft shown by devices *c d e f f C*. In that case the rod *a* should be so placed in the frame *A* as to be at right angles to the crank-shaft *C* opposite to its point of connection by means of link *c* and clamp *e*.

In Fig. 6, Plate 2, at *F* is shown a substitute or equivalent for the clamp *e* and the blocks *f f*. It consists of the cylindrical piece *s*, two (more or less) semicircular wedges, *t t*, and the ring *u*, arranged as shown, and having the spring *v*. The spring *v* is not neces-

sary to the action of the device, but helps it act more quickly. The rod *a* passes through the aperture *w*. The aperture of the ring is even, that of the cylinder *s* is conical, and the wedges being placed in this conical hole, and the ring held by the screw *x*, the whole device is held together.

It operates upon the rod *a* as follows: As the crank-shaft *C* lifts the link *c* the rod *a* has a tendency to slip down through the space between the wedges. This carries them down into the lower and smaller portion of the hole in the cylinder *s*, and thus forces them to bind or clamp the rod *a*. Thus the rod is so bound as to be lifted by the revolution of the crank-shaft, and carried and forced down at the two portions of the revolutions of said shaft. It will be seen that at the lower part of the revolution of the crank-shaft the lower end of the wedges *t t* will strike the support or frame *A* below, and this will loosen the hold of the wedges on the rod, thus allowing the rod to adjust itself to any height at which work is being performed, it being released at every blow.

If it is desirable to have blows given exactly at any given point a ring-and-set-screw attachment to the rod above the frame *A*, or some equivalent, will easily accomplish the purpose.

Instead of this crank-shaft and link a lever and cam can be used to raise and drop the rod.

y shows a spring with a toothed rack at *y'* for mitigating the blow of the rod *a* by lessening the distance traveled by the clamp *e*.

It may be remarked that the blow may also be regulated by the length to which the rod *a* is raised, and that this can be effected by an adjustable stop, shoulder, or other device to strike or touch the clamp at any point of its upward or downward motion in such way as to loosen its hold on the shaft, and so allow it to drop at that point.

Figs. 6, 7, 8, and 9, Plate 2, are on an enlarged scale from those on Plate 1. Fig. 5, Plate 2, is on a slightly-lessened scale.

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

1. The combination of the crank-shaft *C*, the link *c*, pin *d*, slotted clamp *e*, the blocks *f f*, when applied to the rod *a* and combined therewith in the manner and for the purposes herein set forth.

2. The combination of the adjustable cross-piece *l*, head *p* with the rod *a*, and a tamper, *m* or *n*, to operate as herein set forth.

3. The arrangement of the clamp *e* with its blocks *f f*, with the spring *y*, and toothed rack *y'*, as herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 14th day of November, 1872.

JOHN W. STOCKWELL.

Witnesses:

FRANK H. JORDAN,
EDGAR S. BROWN.