

Improvement in Drills.

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Witnesses.
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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN DRILLS.

Specification forming part of Letters Patent No. 131,074, dated September 3, 1872.

To whom it may concern:

Be it known that I, ADDIS E. ALLEN, of Perch River, Jefferson county, New York, have invented certain new and useful Improvements in Drills, of which the following is a specification:

My invention, which relates to what are usually termed rock-drills, is designed with special reference to equalizing the draft in the machinery by which the drill is operated. The drill is raised by power, and after having been raised to the proper height is, by suitable devices released from its lifting mechanism, and allowed to fall upon the rock on which it is required to operate. The sudden detaching of the drill, and the equally sudden re-engagement of the lifting devices with it after it has fallen and delivered its blow, cause irregularity of motion of the machinery, which it has been attempted to remedy, usually by means of friction-brakes, which are called into play the moment the drill is released. Under my invention the draft is equalized and the motion of the machinery is made regular by other means. Instead of using friction I employ a weight, so arranged and operating, that when the drill is released the said weight must be lifted by the machinery, thus compensating for the loss of resistance caused by the detachment of the drill, this arrangement being such, on the other hand, that when the drill is being lifted the weight will aid in the lifting operation, thus giving back in a measure the power expended in order to raise it. My invention further consists in a novel arrangement and combination of parts for releasing the drill or drop. These improvements, however, can best be explained by reference to the accompanying drawing, in which—

Figure 1 is a perspective view, and Fig. 2 is a side elevation, of so much of a drill-power mechanism as is needed to illustrate the invention.

The driving-shaft A is supported in the usual bearings, and, by means of suitable gearing, is made to revolve by steam or horse-power, or any suitable prime mover. On one end of the shaft is a crank-arm, B, provided with a wrist-pin or stud, *a*, designed at the proper intervals to engage with and draw back the sliding connecting-rod C, to which the drill or drop E is connected by a suitable

rope or chain, *b*. The slide-rod C runs on a guide, D, which it straddles at its front end, the forked end of the slide-rod being held on the guide by means of a friction-roller, *c*, or other suitable device placed between and supported in the lower portions of the forked end. The slide-rod is so arranged that it can tilt up and down, as well as move to and fro on the guide D. At the front end of the guide is arranged a buffer, *d*, to receive the impact of the rod C when it is jerked forward by the descending drill or drop. The end of the slide-rod nearest the crank-shaft is provided with a notch, *e*, to receive the wrist-pin *a* of the crank B.

The operation of these devices is as follows: Supposing the shaft to be revolving in the direction indicated by the arrow, the parts in Fig. 2 show the position occupied by them after the drill has fallen and delivered its blow. By the revolution of the shaft the pin *a* will be brought up until it engages in the notch *e* of the sliding connecting-rod C. The movement being continued, the crank-pin will tilt and draw back the slide C, as indicated in Fig. 1, until the slide has been retracted to its full extent, at which time the slide will rest upon the shaft; by the further revolution of the crank, the pin *a* will be drawn down out of the notch *e* of the slide-rod, the latter being prevented from following the movement of the crank, by reason of its resting on top of the shaft, and the slide-rod being thus released, the drill will at once drop and deliver its blow, drawing forward at the same time the slide-rod into position to again engage with the crank-pin. The connecting-rope *b*, between the drill and the slide-rod, is suitably connected with the end of the slide-rod, and thence passes over the usual rollers on the post F to the drill. The slide-rod C instead of being caused to bear on top of the shaft A may be brought in contact with any suitable finger or stop for the purpose; but the arrangement shown is very simple and effective.

In order to equalize and steady the draft, and at the same time to add to the power in lifting the drill, I employ a weight, G, connected by means of a rope passing over suitable rollers on the post F with a pitman, *f*, jointed to a crank-arm, B', on the shaft A, diametrically opposite the crank B. The pit-

man can be adjusted, as shown, nearer to or further from the axis of revolution of the crank for the purpose of increasing or decreasing the leverage, as desired.

Under this arrangement, described and shown, it will be seen that while the crank-pin *a* is disengaged from the drop or drill the weight *G* is being raised, thus serving as a balance to compensate for the loss of resistance caused by the release of the drill; on the other hand when the drill is being lifted the weight is descending, and serves to add to the power in raising the drop, and it thus in each case serves to steady and equalize the draft.

For instance, in Fig. 2, the weight is being lifted, and will continue to be until the crank-pin engages with the slide-rod to raise the drill, at which time the crank *B'* will have passed the dead-point, and the machinery will no longer be required to lift the weight which now begins to descend, as indicated in Fig. 1, and serves to add to the power in raising the drill, and it will so descend until the pin *a* is disengaged from the slide-rod, at which time the crank *B'* will have passed above the dead-point, and will, therefore, be caused to elevate the weight. In this way there may be a considerable reduction made in the steam or horse-power which would otherwise be required to raise the drill.

The proportion between the weight and drill or drop may vary. But with a drop of one thousand pounds I prefer to use a balance weight, say, of five hundred pounds.

I have described one arrangement by which my invention may be carried into effect; but it will be understood that the machinery in the details of its construction and arrangement may be considerably varied without departure from the principle of my invention.

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

1. In drill-power mechanism, the mode herein described of equalizing and steadying the draft by means of a compensating or balance weight, arranged and operating substantially as shown and set forth.

2. The combination of the sliding connecting-rod *C* and the drill or drop, with the driving-shaft and its crank and wrist-pin, said parts being arranged for joint operation, as herein shown and set forth.

3. In combination with the drill or drop and the connecting-rod *C*, I claim the balance-weight and the crank-shaft connected permanently with said weight, and engaging intermittently with the said rod *C*, the parts being combined and arranged for joint operation, as shown and set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

ADDIS E. ALLEN.

Witnesses:

I. S. SARGENT,
EDWD. B. STERLING.