H. BURK.

DEVICES FOR REGULATING THE FEED OF MINING-DRILLS.

No. 195,256. Patented Sept. 18, 1877.

Fig. 1.

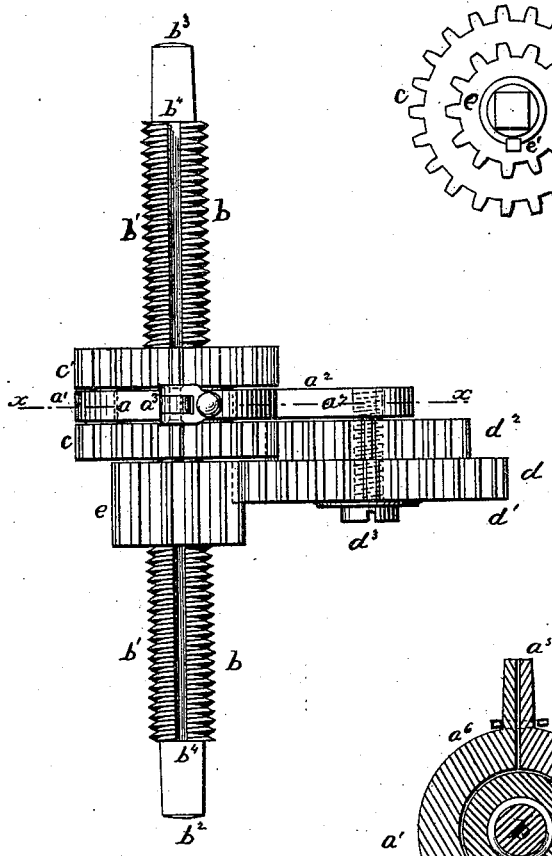


Fig. 2.

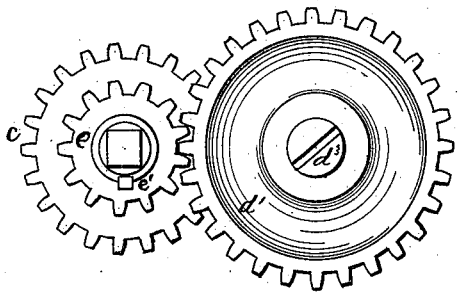
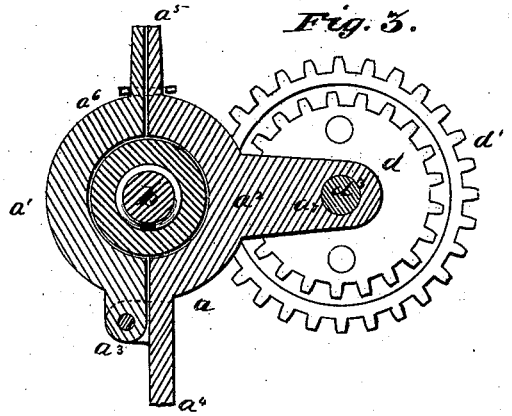


Fig. 3.



Witnesses:

J. B. Holderby

R. H. Lacey.

Inventor.

Hiram Burk

By R. S. & A. P. Lacey

his attorneys

UNITED STATES PATENT OFFICE.

HIRAM BURK, OF ZOAR STATION, OHIO.

IMPROVEMENT IN DEVICES FOR REGULATING THE FEED OF MINING-DRILLS.

Specification forming part of Letters Patent No. **195,256**, dated September 18, 1877; application filed February 21, 1877.

To all whom it may concern:

Be it known that I, HIRAM BURK, of Zoar Station, in the county of Tuscarawas and State of Ohio, have invented certain new and useful Improvements in Device for Regulating the Feed of Mining-Drills; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains 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.

My invention relates to improvements in the means for regulating the feed of hand mining-drills of the class shown in Letters Patent No. 34,941, granted to me April 22, 1862; and has for its object to provide a device which will permit the formation and use of a large thread on the shaft of the drill, and at the same time prevent the too rapid advancement of the bit with each revolution of the crank.

It consists in a novel arrangement of a series of gear-wheels, in combination with the rocking journal and shaft of the drill, whereby the progress of the bit, in any given number of revolutions of the crank, may be retarded, as and for the purposes hereinafter fully explained.

In the drawings, Figure 1 is a perspective view, Fig. 2 an end view, and Fig. 3 is a cross-section on the line $x\ x$, Fig. 1, of my invention.

It has been found by experiment that a hand mining-drill, to be efficient in its operations, should have not less than fourteen threads to the inch on the screw which constitutes the shaft of the drill, for when a less number of threads are employed the shaft is driven forward or toward the face of the mineral faster than the cutting capacity of the drill will admit. When a thread of the size above indicated is employed it is too fine to endure the necessary strain and pressure met with in drilling hard mineral, and, as a consequence, it soon wears out and the shaft becomes worthless.

My invention obviates the above difficulty, for by it I am enabled to construct any size thread on the shaft, and regulate the movement thereof, so that it will not advance faster than the cutting capacity of the drill will permit.

a is the rocking-journal or supporting-frame, composed of the two semicircular arms, $a^1\ a^2$, hinged together at a^3, and provided with the lateral extensions or journals $a^4\ a^5$, which turn in bearings on the upright posts of the drill-frame. The journal a^5 is formed by two half-round, slightly-tapering projections, one from the arm a^1, the other from the arm a^2, the flat faces of which fit snugly and are held together by a ring or sleeve, a^6, which may be removed and the arms opened so as to permit the removal of the gear-wheel, hereinafter described.

a^7 is a lug formed on the arm a^2, to which is secured the axial pin of the double-gear wheel, hereinafter described.

b is the drill-shaft, provided with a thread, b^1, and the rectangular ends $b^2\ b^3$, on which may be placed the crank or drilling-bit, as required.

The device represented in the drawings for the illustration of the principle of my invention shows about twelve threads, b^1, to the lineal inch on the shaft b. I do not, however, confine myself to the number twelve, for it will be understood hereinafter that any desired number of threads may be employed.

The shaft b has on it the longitudinal groove or key-seat b^4, for the reception and movement therein of the spline on the driving-pinion, hereinafter described.

$c\ c'$ are two gear-wheels, connected together by a short central arm, which makes a journal that neatly fits the central opening or bearing between the semicircular arms $a^1\ a^2$, which, when closed, rest between said wheels, as shown in Fig. 1.

I prefer to construct the two wheels as above described, so that they may be reversed, when desired. Only one wheel at a time is brought into use. A single wheel with its journal provided with a flange to hold it in the rocking journal would answer all purposes except that of being reversed, as hereinafter explained.

These wheels are provided with a central threaded opening adapted to receive the threaded shaft b, and it will be seen that, by

opening the arms a^1 a^2, they may be lifted from and placed back with their relative positions reversed in the rocking journal *a*.

d is a double gear, composed of the inner and outer wheels d^1 d^2, rigidly united together and revolving on a pin or axis, d^3, projecting from the lug a^7. The inner wheel d^2 is, in the present instance, made of same size with and gears into the wheel *c*, while the outer wheel d^1 is made somewhat larger and gears into the driving-pinion *e*.

e is a small pinion fitting loosely over and sliding endwise on the drill-shaft *b*. It is provided with a feather or spline, *e'*, which fits into the key seat or groove b^4, which causes it to revolve with the shaft *b*. It gears with and revolves the wheel d^1, and, in the present instance, will make two revolutions to the latter's one. In the operation of the device, it, as well as the double gear *d*, is always placed on that side of the rocking journal next the operator. When the drill-shaft and wheels *c c'* are to be reversed, as hereinafter explained, it is slipped off the end of the shaft and placed on the opposite end, thus preserving its proper relative position to the other wheels.

The drill is operated by turning the shaft *b* with a crank on the end b^2, and it is carried forward or outward from the rocking journal by the action of the thread b^1 moving in the thread in the wheel *c*. The wheel *c* in operation of the device always revolves in the same direction in which the shaft *b* is turned, and, if it revolved in the same time with the shaft, it will be readily understood that no movement or turning of the latter in the former would take place, and the thread b^1 would not be brought into action, and, as a consequence, no advance or forward movement would be given to the drill; but if the wheel *c* revolved slower—that is, made fewer revolutions in a given time—than the shaft, it is clear that the latter would have a turning movement in the former, and that the thread b^1 would be brought into action, and thereby the drill would be caused to advance or move outward from the rocking journal, and that the progress of the shaft or drill would be slow or rapid in proportion as the number of the revolutions of the shaft are made to exceed those of the wheel.

In the device shown in the drawings the shaft is provided with twelve threads to the lineal inch, so that if the nut or wheel *c* were fixed stationary and the wheels *e d* d^1 removed, the shaft would require to be turned twelve times to carry the drill forward a distance of one inch; but with the construction and arrangement of wheels hereinbefore described the wheel *c* revolves half as fast as the shaft—that is, the wheel makes six revolutions while the shaft makes twelve—and, as a consequence of this difference, the forward movement of the shaft is only half as fast as it would be were there no intervening gearing.

When the drill has been driven till the crank on the end b^2 is brought close to the pinion *e*, the crank and pinion are removed, the arms a^1 and a^2 opened, and the shaft carrying the wheels *c c'* lifted out, turned end for end, and replaced in the rocking journal, the pinion *e* and crank are placed on the end b^3, and the device is ready again for use.

I do not confine myself to the particular relative size in the construction of the wheels and pinion, as above explained, for it will be readily comprehended that the several wheels may be so constructed as to drive the shaft forward a greater or less distance by a given number of revolutions of the crank.

By providing two or more rocking journals with suitably-constructed gear-wheels, the miner may have at his hand an efficient means for drilling in mineral of different degrees of hardness.

The lug a^7 may be slotted, so that the axial pin d^3 may be raised or lowered and secured by a suitable set-nut, so as to adjust the drill-gear *d* to smaller or larger sized gears *c c'* and *e*.

This series of gear-wheels may be applied to the stationary frame-work of the drill when the latter is used only for drilling straight forward.

Having described my invention, what I claim and desire to secure by Letters Patent, is—

1. The rocking journal *a*, constructed with the semicircular arms a^1 a^2, hinged together, and provided with a lug, a^7, and pin d^3, arranged and adapted to receive the series of gear-wheels which regulate the movement of the drill-shaft, substantially as set forth.

2. The double-gear wheel *c c'*, provided with an intermediate journal adapted to be received by and revolve in the arms a^1 a^2, and with a central threaded hole for the reception of the threaded shaft of the drill, as and for the purpose set forth.

3. The combination, with the rocking journal *a*, constructed with a lug, a^7, and the shaft *b*, constructed with a groove, b^4, of a sliding pinion, *e*, provided with a feather, *e'*, nut-gear *c*, revolving in a bearing in the rocking journal, and gears d^1 d^2, formed in one piece and revolving on a pin or axle projecting from the lug a^7, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

HIRAM BURK.

Witnesses:
ROSLANN BLACK,
JOHN S. WARK.