(No Model.)

C. K. DAWES.

MACHINE FOR DRILLING IRON.

No. 447,562. Patented Mar. 3, 1891.

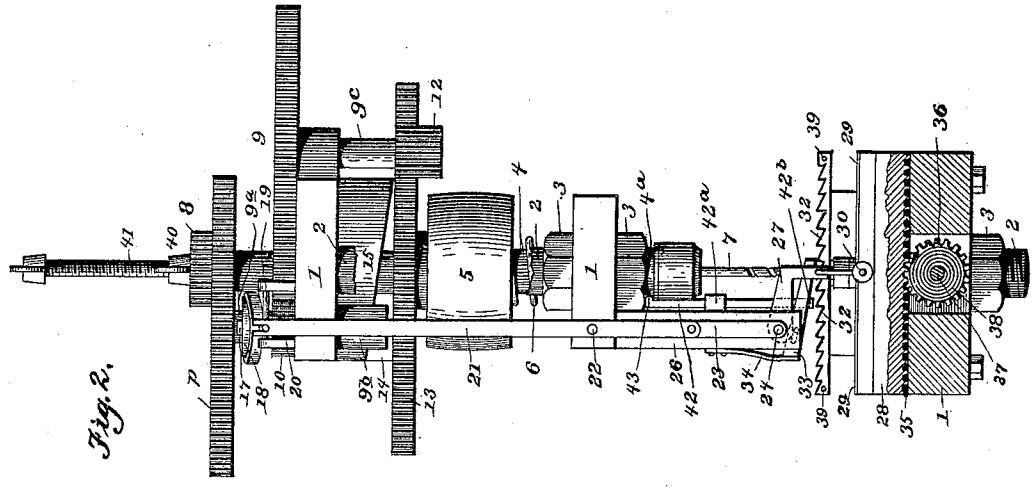


Fig. 2.

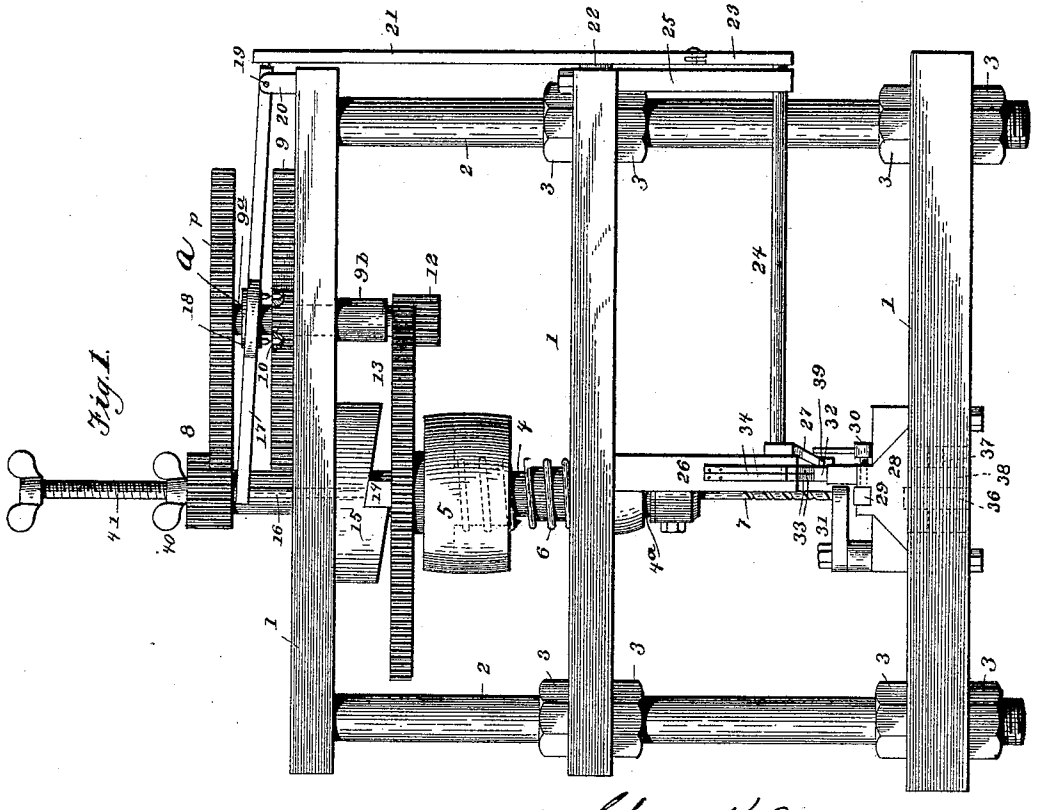


Fig. 1.

Witnesses

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MACHINE FOR DRILLING IRON.

SPECIFICATION forming part of Letters Patent No. 447,562, dated March 3, 1891.

Application filed April 24, 1890. Serial No. 349,357. (No model.)

To all whom it may concern:

Be it known that I, CHARLES K. DAWES, a citizen of the United States, residing at Trenton, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Machines for Drilling Iron; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain new and useful improvements in machines for drilling iron.

The object of the invention is to provide improved means whereby the drill is automatically fed downward to perform its work, and is returned in a similar manner after the work is finished, while at the same time the carriage which carries the work is fed forward.

The invention is designed more particularly for boring holes at predetermined distances apart, and as the work is all performed automatically a great saving in time, labor, and expense is accomplished.

The invention consists in the novel construction, arrangement, and combinations of parts hereinafter more fully described, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a machine constructed in accordance with my invention, and Fig. 2 is an end elevation of the same.

In the said drawings, the reference-numerals 1 indicate top, bottom, and intermediate cross-pieces, which in connection with the screw-threaded bolts or uprights 2, provided with nuts 3, form the frame of the machine.

The numeral 4 indicates the drill-spindle, having a driving-pulley 5 fixed thereto, which is connected by an ordinary belt with any suitable source of power. This pulley is recessed on its under side to receive the upper part of a coiled spring 6, encircling the drill-spindle, the other end or portion bearing against the upper side of the intermediate cross-piece. The tendency of this spring is to press the spindle upwardly. 7 designates the drill. At its upper end the drill-spindle is provided with a pinion or gear 8, meshing with a cog-wheel *p*, secured to a shaft 9^a, mounted in the upper cross-piece 1. This shaft also carries a loose sleeve 9^b, upon the upper end of which is secured a pinion 10, which meshes with a cog-wheel 9 on the shaft 9^c, on which a pinion 12 is secured. The latter meshes with cog-wheel 13, loose on the drill-spindle. This cog-wheel 13 has secured to its upper face one or more lugs 14, which project upwardly and have their upper ends beveled to engage with the inclined notches of the disk 15, secured to the upper cross-piece 1. Passing through said cross-piece and disk is a sliding or reciprocating pin 16, the lower end of which may bear against and be raised in said disk and cross-piece by said inclined lug when the latter slips upward at the notch or shoulder of said disk 15, while said pin 16 may drop to bear against the upper face of the cog-wheel 13 when said lug 14 has passed it and started to slide upon the incline of said disk 15. This pin supports the inner end of the rod 17, which is provided at or near its center with a ring 18, encircling the shaft 9^a and carrying a clutch *a*, that is adapted to rotate in said ring, the said clutch *a* being splined to the shaft 9^a and turning therewith at all times, and being also formed or provided on its under side with pins, as shown, adapted to engage with corresponding holes in the cog-wheel 10 whenever the rod 17 is caused to fall. The cog-wheel 10 is loose on its shaft, consequently when the rod 17 is up said wheel remains idle and the wheel 9, pinion 12, and wheel 13 will not turn, thus for the time being stopping the feed mechanism; but whenever the rod is lowered the clutching of the wheel 10 by clutch *a* will start the mechanism in an obvious manner. The outer end of the rod or arm 17 is laterally movable on a pin extending between two studs 20 and is also in movable connection with the upper end of a lever 21, fulcrumed to the machine at 22. A rock-shaft 24 is journaled in brackets or hangers 25 and 26 on the machine-frame, and has an arm 23 upon its outer end pivotally connected to the lower end of the lever 22 and bent arm 27 at its inner end.

The numeral 28 denotes the movable work-carriage, and 29 the work to be drilled, which is held in place by the screw-clamp 30.

31 designates the drill-guide. The carriage 28 is provided with a templet 32, secured thereto, having a series of notches with which the pawls 33, pivoted to the arm 26, engage, and 34 are springs for actuating these pawls, which are made double, so that in case one should fail to engage with a notch the other will.

A bar 42 slides in a vertical bearing 42^a upon the frame-work of the machine, and has a lip 43 at its upper end, which engages a circumferential groove 4^a in the drill-spindle. The lower end of said bar 42 is formed with a lip 42^b, which projects under the pawls 33, so that said pawls may be raised out of engagement with the notches in the templet by said bar 42, which may be raised and lowered by the drill shaft or spindle. The carriage on its under side is provided with rack-teeth 35, engaging with the pinion 36, mounted upon a barrel 37, provided with a coiled spring 38, by which motion is imparted to said carriage. The carriage is also provided with a lug or projection 39 upon the templet, which strikes the bent lever 27.

The numeral 40 indicates a jam-nut on the end of the screw-threaded extension 41 of the drill-spindle for adjusting the latter to compensate for wear of the drill.

The operation is as follows: The drill-spindle is revolved by suitable belt-gearing, and is continuously revolved while the machine is in use. After the work has been suitably clamped in the carriage the latter is pushed from left to right in the drawings until the stud or lug 39 strikes the bent arm 27 upon the rock-shaft. This will cause the inner end of arm 17 to be carried off the pin 16, thus dropping the clutch upon the pinion 10 and allowing the pins of said clutch to enter the holes in said pinion. As the drill-spindle revolves, the pinion 8 upon the same revolves the cog-wheel *p* and its shaft 9^a, and, the clutch being engaged, the pinion 10 will be revolved with said shaft 9^a. This will in turn cause the wheel 9 and pinion 12 to be revolved, which latter will revolve the wheel 13 and its inclined lug 14. As the lug travels up the incline of the disk it will depress the drill-spindle and the drill into the work, compressing the spring 6, which will again raise the spindle, when the lug 14 slips over the shoulder upon disk 15. The vertically-reciprocating bar 42 will be raised and lowered together with the drill-spindle and will raise the pawls 33 from the templet whenever the drill is raised, admitting of the work-carriage being moved forward by the spring 38 until the drill is again depressed and the pawls 33 have engaged a new notch in the templet, when a new hole can be drilled. In this manner the drill is revolved and reciprocated and the work fed forward automatically until the last hole has been drilled. The vertically-sliding rod 16 has been free to be raised by the inclined lug 14 and to drop again by its own weight, as the inner end of the arm 17 has been tilted away from the upper end of said rod. When, however, the last hole has been drilled, the stud 39, to the right in Fig. 2, will strike the bent arm 27, move the rock-shaft, and tilt the lever 21 in the opposite direction to that in which it was moved at the starting of the work, and the inner end of arm 17 will be thrown over the end of rod 16, so as to be raised by the same and to disengage the clutch mechanism when said rod is next raised by the inclined lug 14. This will stop the pinion 10, wheel 9, pinion 12, and wheel 13, thus causing the drill-feed mechanism to stop.

What I claim is—

1. In a drilling-machine, the combination, with a rotating drill-spindle, of a cog-wheel loose thereon, having a projecting lug engaging with bevels or notches on a fixed disk, a driving-pulley, and a retracting-spring, substantially as described.

2. The combination, with the drill-spindle, driving-pulley, and retracting-spring, of the cog-wheel 13, having lug 14, the disk 15, provided with inclined notches, the gears 8, 9, 10, and 12, the rod 17, formed with the ring in which works the clutch *a*, the lever 21, the crank 22, rock-shaft, and bent lever 27, substantially as described.

3. The combination, with the drill-spindle, driving-pulley, and retracting-spring, of the cog-wheel 13, having lug 14, the disk 15, provided with inclined notches, the gears 8, 9, 10, and 12, the reciprocating pin 16, the rod 17, carrying the clutch, the lever 21, crank 22, rock-shaft 24, bent lever 27, and the work-carriage having lug 39, substantially as described.

4. The combination, with a drill-spindle and means, substantially as described, for actuating the same and feeding the drill to and withdrawing it from the work, of the sliding carriage having a templet provided with notches, spring-actuated pawls for engaging with said notches, a rod or bar actuated by the drill-spindle to raise said pawls out of the notches, and rack-teeth on the under side of the carriage and a spring-actuated pinion meshing therewith, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES K. DAWES.

Witnesses:

JAMES J. CAHILL,

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