(No Model.) 2 Sheets—Sheet 1.

# E. N. HIGLEY.

## MACHINE FOR DRILLING RAILWAY RAILS, &c.

No. 415,780. Patented Nov. 26, 1889.

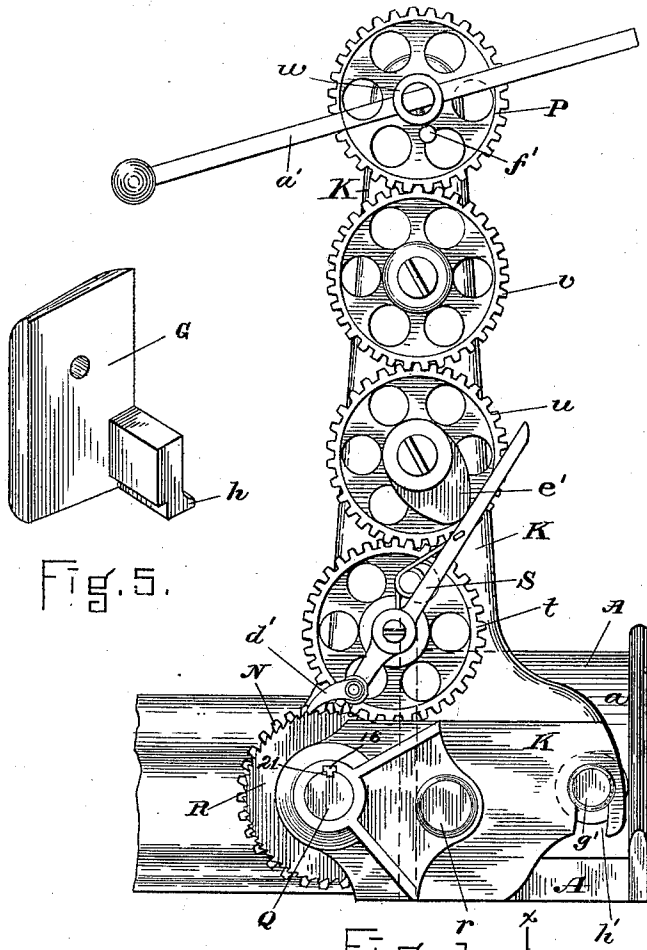



Fig. 5.

Fig. 1.

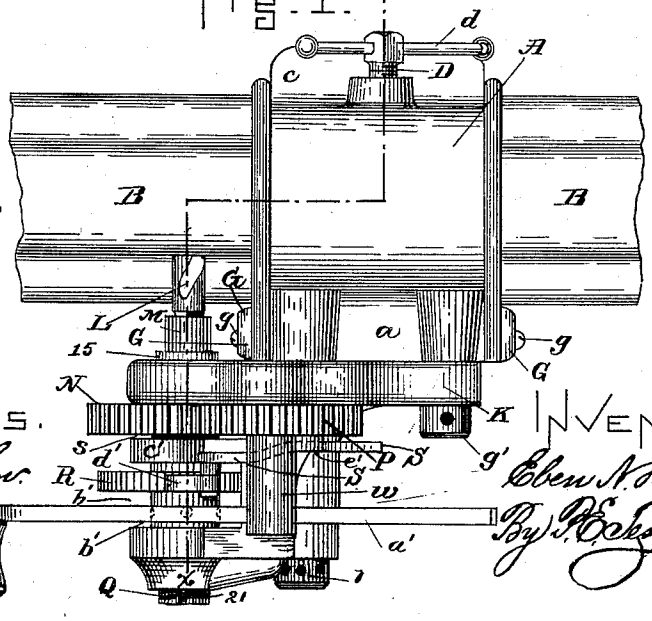



Fig. 2.

WITNESSES.

Harry A. Tilden

A. D. Poore

INVENTOR

Ebenezer N. Higley

By P. E. Tschemnocker

Atty

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

(No Model.) 2 Sheets—Sheet 2.

# E. N. HIGLEY.

## MACHINE FOR DRILLING RAILWAY RAILS, &c.

No. 415,780. Patented Nov. 26, 1889.

Fig. 6.

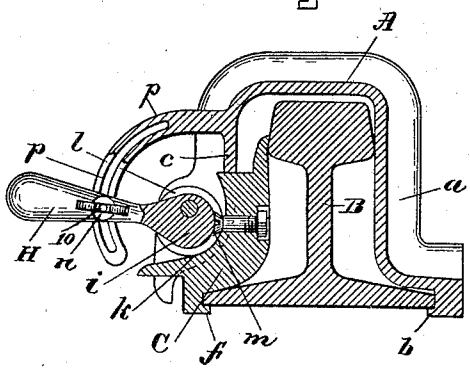
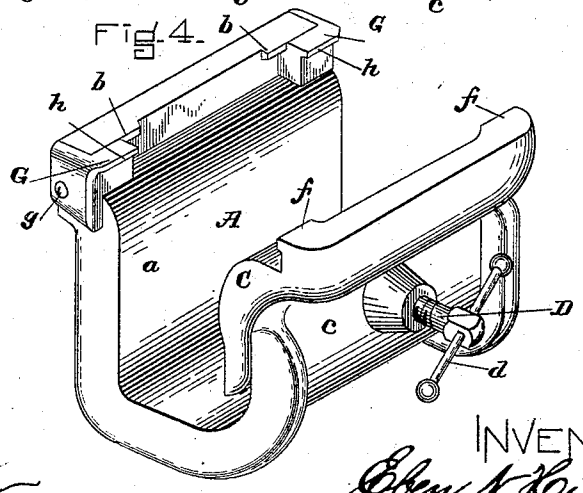



Fig. 3.




Fig. 4.




WITNESSES.

Harry W. Aiken

A. D. Gurr

INVENTOR.

Eben N. Higley

By P. E. Teschemacher

Atty.

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

# UNITED STATES PATENT OFFICE.

EBEN N. HIGLEY, OF SOMERSWORTH, NEW HAMPSHIRE.

## MACHINE FOR DRILLING RAILWAY-RAILS, &c.

SPECIFICATION forming part of Letters Patent No. 415,780, dated November 26, 1889.

Application filed March 25, 1889. Serial No. 304,722. (No model.)

*To all whom it may concern:*

Be it known that I, EBEN N. HIGLEY, of Somersworth, in the county of Strafford and State of New Hampshire, have invented certain Improvements in Machines for Drilling Railway-Rails, Metal Beams, Bars, &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 a front elevation of my improved drilling-machine. Fig. 2 is a plan of the same. Fig. 3 is a vertical section on the line *x x* of Fig. 2. Fig. 4 is a perspective view of the base or stand of the machine inverted. Fig. 5 is a perspective view of one of the auxiliary bearing-plates detached from the base of the machine. Fig. 6 is a vertical section of the base or stand, illustrating a modification to be referred to.

My invention relates to machines for drilling holes in railway-rails, metal beams, bars, &c., and has for its object to provide a portable machine of this character which shall be light and durable and capable of performing its work in a rapid and effective manner, and in which the drill can be readily adjusted to bore the hole at the desired height in the rail, beam, or bar after the machine has been clamped thereto.

To this end my invention consists in the combination, with a base or stand adapted to be firmly clamped to the rail, beam, or bar to be drilled, of a frame pivoted to said base and carrying the drill and its operative mechanism, the pivot of the drill-carrying frame being so placed with respect to the drill that the height of the latter can be varied by rocking the drill on its pivot, as hereinafter set forth.

My invention also consists in certain novel combinations of parts and details of construction, as hereinafter set forth and specifically claimed.

In the said drawings, A represents the base or stand of the machine, which is suitably shaped, as shown, to fit over or embrace the rail B, in which the hole is to be bored. At the lower inner edge of one side *a* of the stand A, at the opposite corners thereof, are formed inwardly-projecting lips or flanges *b*, which are adapted to fit under the base of the rail B when the latter is of extreme width.

C is a clamping shoe or plate, which is connected with the opposite side *c* of the base A by a screw D, which turns in a threaded aperture in the said side *c*, and is provided on the outside of the same with a head, through which passes a sliding bar or handle *d*, by which it may be turned to force the shoe C against the rail and thus clamp the base A firmly thereto. The inner lower edge of the shoe C is provided with projecting lips or flanges *f*, similar to those *b*, and adapted to fit under the opposite edge of the base of the rail, the flanges *b* and *f* holding the base A firmly to the rail and preventing it from rising up or getting out of position after being clamped. The inner end of the screw D is secured to the clamping-shoe C by a knuckle-joint *e*, which permits the shoe to rock slightly to enable it to adjust itself to the side of the rail and take a firm bearing thereon.

When the machine is to be used for boring rails in which the base is of ordinary and not of extreme width, auxiliary bearing-plates G are secured by screws *g* to the inner edges of the portion *a* of the base A, at the corners thereof, as seen in Figs. 2 and 4, said plates having inwardly-projecting lips or flanges *h*, similar to those *b*, and like them adapted to fit under the base of the rail. These bearing-plates G, one of which is shown detached in Fig. 5, are intended to be made of several different sizes for rails having bases of different widths, it being merely necessary to remove one size and substitute another in accordance with the width of the base of the rail to be bored, while for the widest rails made no bearing-plates G are required, as the flanges *b* on the base itself can then be used, as seen in Fig. 6.

I do not confine myself to the employment of a screw D for forcing the clamping-shoe up to the rail, as any other device may be used, if preferred. For instance, a hand-lever H, having a cam or eccentric *i*, as shown in Fig. 6, may be used, which, when the lever H is depressed, bears against a projecting portion *k* of the shoe and forces said shoe inward

against the side of the rail to clamp the base A thereto as desired. This cam or eccentric *i* is provided on its face with a dovetail groove *l*, in which is fitted the head of a bolt *m*, projecting from the clamping-shoe, which is thus connected with the hand-lever, so that it will be drawn back when the said lever is raised. The projecting portion *k* of the shoe fits within the aperture in the side of the base A in which the hand-lever H is pivoted, and serves as a guide for the clamping-shoe as the latter is advanced or withdrawn, the loose fit of the head of the bolt *m* in the dovetail groove *l* permitting the shoe to rock sufficiently to enable it to adjust itself to the rail and take a firm bearing against it when forced up thereto by the lever H, which latter is firmly secured, when moved into a position to clamp the shoe, by means of a thumb-nut *n* and screw-bolt 10, in connection with a curved slotted guide *p*, passing through a slot in the hand-lever H.

K is an upright frame or plate, which is pivoted at *r* to the base or stand A and carries the drill L and its operative mechanism, said drill being adapted to bore holes in the web of the rail or beam at suitable distances from its end. The shank of the drill L fits in a socket made to receive it in the outer end of a horizontal shaft M, which rotates in a bushing 15 and slides with a spline or key through a gear N, by which it is rotated, said gear fitting within a narrow recess or space *s*, formed in the lower portion of the frame K, whereby it is prevented from moving laterally. The gear N is connected by a train of intermediate gears *t u v* with a gear P on a crank-shaft *w*, provided with a crank-handle *a'*, and thus as the shaft *w* is rotated its motion is communicated to the drill L.

The end 20 of the drill-shaft M is turned down, as seen in Fig. 3, and to this end 20 is secured by a swivel-joint a screw-spindle Q, over which fits an internally-threaded ratchet-wheel R, which rotates within a recess or space *b'*, formed in the lower portion of the frame K, adjacent to the recess *s*, and separated therefrom by a partition *c'*, said ratchet-wheel being thus prevented from having any lateral motion. The screw-spindle Q is provided with a longitudinal groove 21, within which fits a spline or key 16, projecting from the frame K into the aperture therein in which the spindle is placed, whereby the said spindle is prevented from rotating as it is pushed forward, and thus as the ratchet-wheel R is rotated by mechanism to be presently described the drill-shaft M is advanced in the direction of its length, causing the drill to be fed forward as required.

The ratchet-wheel R is actuated by a pawl *d'*, pivoted to the lower end of a lever S, the upper arm of which is acted upon by a cam *e'* on the gear *u*, and thus as the crank-shaft is rotated to revolve the drill the ratchet-wheel is moved as required.

The crank-handle *a'* slides through an aperture in the end of the crank-shaft *w*, and is held in place by a set-screw *f'*, whereby its effective length can be adjusted as desired, so that more or less leverage or power can be exerted, and thus when the conical point of the drill is first penetrating the metal and less power is required the crank can be shortened and rotated more rapidly, which will be found a great convenience and facilitate the work.

When it is desired to raise or lower the drill L to vary the height of the hole to be bored, the frame K is rocked to the right or left on its pivot-bolt *r*, which is located on one side of the said drill, as seen in Fig. 2, and when the said frame is adjusted it is held securely in place by a clamping-bolt *g'*, passing through a curved slot *h'* in the frame into the base A, the frame being further clamped, if desired, by tightening the screw-bolt *r*, on which it is pivoted. The bolts *g'* and *r* are provided with holes in the peripheries of their heads, as shown in Fig. 2, into which may be inserted the end of a rod or spindle to be used as a lever in tightening them up as required. By thus attaching the drill to a frame or plate made adjustable on the stand or base A by rocking it on a pivot, as described, the drill L can be easily raised or lowered to drill a hole in the exact spot required without disturbing the clamping device by which the machine is secured to the rail or beam, whereas if the drill-carrying frame and base were made solid or in the same piece the position of the hole to be bored could only be changed by raising or lowering the entire machine, which would be inconvenient and troublesome and cause much loss of time. Another advantage incident to this construction is that the drill L is located outside the base A, where it can be easily oiled and its operation seen as the work progresses.

The drill can be withdrawn, after boring a hole, by rotating the ratchet-wheel R backward with the hand; but if the drill should stick the ratchet-wheel can be rotated by means of a rod or spindle introduced into holes *i'* in its hub, thus enabling sufficient leverage to be applied thereto to easily withdraw the drill.

Where the machine is to used for boring holes in metal beams, bars, girders, &c., the shape of the base or stand A would be varied in accordance with the requirements of the case.

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

1. In a drilling-machine, the base or stand A, adapted to fit over or embrace the rail or beam to be bored, said stand being provided on one side at its lower inner edge with inwardly-projecting lips or flanges adapted to fit under one side of the rail or beam to hold the base or stand firmly in place thereon, in combination with a clamping shoe or plate connected with said base A and having inwardly-projecting lips or flanges adapted to fit under the opposite side of the rail or beam,

and a device for operating said clamping-shoe to force it against the rail or beam, substantially as set forth.

2. In a drilling-machine, the combination, with a base or stand A, constructed substantially as described and having the inwardly-projecting lips or flanges *b*, of the rocking clamping-shoe C, provided with inwardly-projecting lips or flanges *f*, and an operating-screw D, passing through the side of the base A and having its inner end jointed to said shoe, whereby the latter is permitted to adjust itself to the rail or beam as it is forced up to the latter by the screw D, substantially as described.

3. In a drilling-machine, the combination, with the base A, of the removable bearing-plates G, adapted to be secured to the lower inner edge of the base, at the corners thereof, and having inwardly-projecting lips or flanges adapted to fit under the lower edge of the rail or beam, substantially as and for the purpose set forth.

4. In a drilling-machine, the combination of the drill-shaft M, with its drill L, rotating in a suitable bearing in its supporting-frame K, the crank-shaft *w*, a train of gearing between the crank-shaft *w* and the shaft M, whereby the latter is operated, said shaft sliding with a spline or key within the gear N and being rotated thereby, an externally-threaded screw-spindle Q, sliding with a spline through an aperture in the frame K and secured by a swivel-joint to the rear end of the shaft M, a ratchet-wheel R, having an internal thread fitting over the thread of the spindle Q, whereby the latter is moved in the direction of its length to feed the drill, and the pawl *d'* and its actuating-lever S, all operating substantially in the manner and for the purpose set forth.

5. In a drilling-machine, the combination, with the base or stand A, of the frame or plate K, carrying the drill L and its operating mechanism, said plate being pivoted at its lower end to the base A on one side of the drill, whereby it may be adjusted to raise or lower said drill by rocking it on its pivot, and a clamping-screw for clamping the frame K when adjusted, substantially as set forth.

6. In a drilling-machine, the drill-carrying frame K, having its lower portion provided with recesses or spaces *s b'*, separated from each other by a partition *c'*, in combination with the gear N and the ratchet-wheel R, fitting within said recesses, and the drill-shaft M and screw-spindle Q, connected together by a swivel-joint and operated by said gear and ratchet-wheel, substantially as set forth.

Witness my hand this 22d day of March, A. D. 1889.

EBEN N. HIGLEY.

In presence of—
P. E. TESCHEMACHER,
HARRY W. AIKEN.