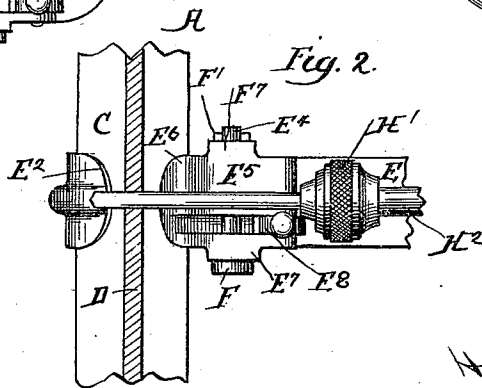
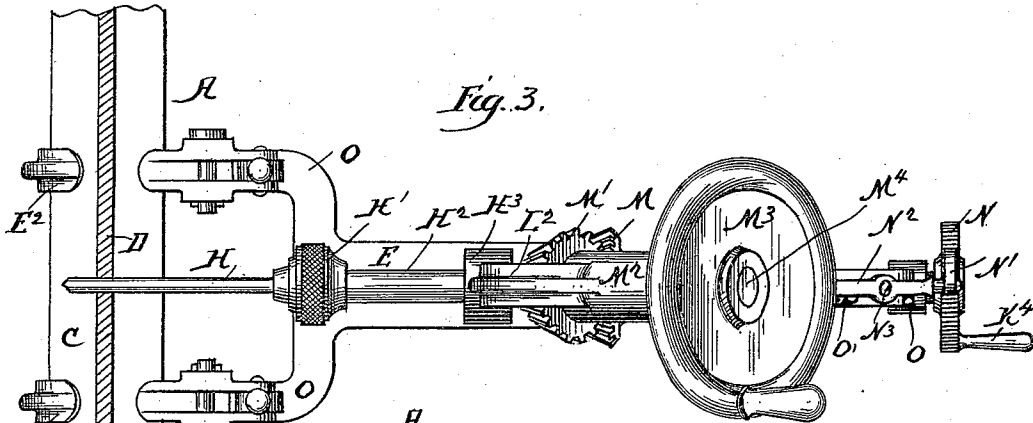
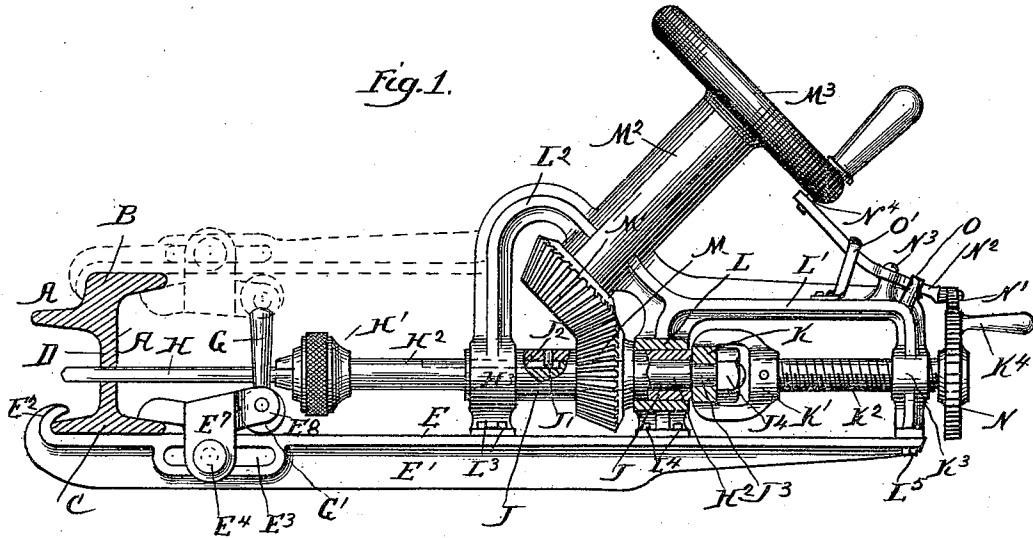


(No Model.)

H. P. BRADFORD.
DRILL FOR ELECTRIC RAILWAYS.

No. 464,673.

Patented Dec. 8, 1891.



Witnesses:

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UNITED STATES PATENT OFFICE.

HARRY P. BRADFORD, OF LITTLE ROCK, ARKANSAS.

DRILL FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 464,673, dated December 8, 1891.

Application filed July 27, 1891. Serial No. 400,817. (No model.)

To all whom it may concern:

Be it known that I, HARRY P. BRADFORD, a citizen of the United States, residing at Little Rock, Pulaski county, State of Arkansas, have invented a new and useful Improvement in Drills for Electric Railways, of which the following is a full, clear, and exact specification.

My invention relates to drills substantially designed for electric railways, and has for its object to provide a drill which can be conveniently applied for the purpose of drilling the holes in the ends of the rails which are usually required for railway-bonds and for other such purposes. In regard to its application in connection with electric railways it may be observed that in the application of electrical systems to railways the rails of which have already been laid down it is thought necessary to bond the roads by connecting the ends of the rails by short rail-bonds or short lengths of wire. This, in the usual manner of application, requires a hole to be drilled through each end of each rail. This it is commonly desired to do without removing the rails, as it is not otherwise necessary to raise the rails for the purpose of converting an ordinary railway into an electric railway. The difficulty in boring these holes springs from the fact that the hole must be drilled very close to the foundation below the ground and the drill must travel parallel to the ground, or nearly so. This with ordinary forms of drills would require a considerable excavation. Moreover, the drilling is preferably done while the road is in use and operation, which precludes the use of ordinary forms of drills and makes necessary a convenient drill clamping and securing device.

My invention is illustrated in the accompanying drawings, wherein—
Figure 1 is a side elevation of the device. Fig. 2 is a plan view of the drill end and clamp. Fig. 3 is a plan view of the entire drill with a modified or double clamp.

Like parts are indicated by the same letters in all the figures.

A is the rail, having the tread B, the base C, and the middle portion D.

E is a plate provided with a rib E' below and an upwardly-turned outer end E², which serves as a hook to grasp one side of the base.

E³ is a slot which passes through the rib E' beneath the plate E and is adapted to receive the bolt E⁴. A clamping-block E⁵, having the forwardly-projecting end E⁶ and upon both sides the downwardly-projecting parts E⁷ E⁷ and the rear upwardly-projecting end E⁸, is pivoted or fulcrumed upon the pin E⁴. The pin E⁴ has at one end the head F and at the other the securing nut or collar F'. Pivoted in the projecting portion E⁸ is the part consisting of the handle G, and the eccentrically-pivoted cam-circle G'.

H is the drill proper in the chuck H', which is secured to the rod H², journaled in the standard H³ and passing thence into the sleeve J. In this sleeve is a pin J', received into the long slot J² in the rod H², whereby the rod and sleeve are keyed together, though the rod is permitted to have motion along the sleeve. The rod H² is turned down at the point J³ and terminates in the nut J⁴.

K is a collar encircling the smaller portion of the rod, and beneath the nut J⁴ and continuous with the yoke K' on the end of the screw-rod K², which is journaled in the standard K³ and driven by the crank K⁴ on the end thereof. The sleeve J is journaled in the standard L.

The three standards H³, L, and K³ are preferably united by the connecting-bars L' L², so as to form therewith a continuous rigidly-connected piece, and they are secured upon the plate E respectively by the bolts L³, L⁴, and L⁵, so that by blocking up under these standards the distance from the rod and drill to the plate E may be varied, while the two are kept substantially parallel with each other. Rigid on the sleeve is a beveled gear M, meshing with a similar beveled gear M' on a shaft M⁴ within the long bearing M² and driven by the crank M³. On the crank K⁴ is the ratchet-wheel N, adapted to be engaged by the dog N' on the end of the lever N², which is pivoted at N³ and adapted to be engaged by the pin N⁴ on the crank M³.

O is a stop, and O' a spring whereby the lever N² is kept in proper position or returned to its normal position after having been slightly moved by the crank M³.

In Fig. 3 the structure is in all respects the same, only that the plate E is bifurcated, forming the two terminals O O, which are

provided each with clamping mechanism similar to that more fully illustrated in Figs. 1 and 2. It is evident that these several parts may be somewhat varied without departing from the spirit of my invention, and I do not wish to be limited to the specific form of the several constructions shown. The devices may be provided with one or more clamping parts, as shown, and the lever N², with its accessories, may be dispensed with, if desired. Moreover, in some instances it may be desirable to clamp the tread to the rail instead of the base, as indicated in Fig. 1 in dotted lines, where the dotted lines indicate a clamping device similar to that shown in full lines and applied to the tread of the rail.

The use and operation of my invention are as follows: The apparatus, substantially as shown, preferably in the form indicated by full lines in Figs. 1 and 2, can be applied to an ordinary rail while the same is in position in a completed track by digging away sufficiently in the vicinity of the rail or by taking out one or two paving-stones, if such are provided, so that the ribbed plate may be placed along beneath the rail and then retracted until its hooked outer end engages the flange of the base of the rail on the opposite side of the drill proper. The clamping device consisting of the parts E⁶ E⁷ E⁸, &c., may then be moved forward, the point E⁴ sliding in the slot E³ until the projecting part E⁶ rests over the flange on the base of the rail toward the drill. By raising the handle G a certain distance the eccentrically-pivoted disk will cause the clamp to securely grasp the rail, and thus the drill is rigidly fixed in proper position and relation to the rail. If the flanged plate is bifurcated, two of these clamps could be employed when engaging the rail on each side of the drill. The drill in the various figures is shown in an advanced position, where it has passed a considerable distance through the web or body of the rail. The drill may be now easily moved forward, assuming that it has not yet disengaged the rail or the point of engagement with the rail, this being done by moving or rotating the crank K⁴ and rail N, the dog N' being thrown out of engagement, if necessary, according as the device is organized.

To drive the drill or cause it to disengage the rail or bore a hole therein, the crank M³ is rotated by means of its handle, and this of course rotates the gears M M' and the sleeve, and by means of the key also rotates the drill-rod H². The operation in all respects is the same in the case of the device shown in Fig. 3, except that two clamps are employed.

In Fig. 1, in dotted lines, it is suggested that a rail-clamping device may be attached in such manner as to grasp the thread or upper portion of the rail. This of course is a mere detail of construction, but in most instances would not be desired, as it is usually important to operate upon the rails while the cars are still running, which perhaps could not be

done in the case of a clamp attaching itself to the tread if there were cars running in rapid succession.

It will be observed that by a device constructed as here illustrated the driving of the drill is accomplished without any interference between the driving-clamp or the ground and the moving car, if there be one. It may also be added that the automatic device whereby the feeding forward of the drill is accomplished need not be employed. In other words, the forward feeding of the drill as it is operatively rotated by one clamp is accomplished by means of the other clamp, and if the automatic device is employed the other or smaller clamp is driven from the larger one without any interference by the hand.

I claim—

1. The combination of a supporting-base with a drill-rod, and a series of supports or bearings therefor, adjustably attached to the base, so as to permit the rod to be supported at varying distances from but substantially parallel to the base.

2. The combination of a supporting-base with a drill-rod, means for driving the same mounted thereon, a hook at the outer end of such base, whereby it is adapted to engage the flange of the rail on the opposite side from the drill proper, and a clamp on the base adapted to engage the other side of the flange or base of the rail, said clamp consisting of a clamping-piece with a cam and a movable pivot.

3. In a drill, the combination of a drill with a driving mechanism at an angle thereto, a feeding mechanism parallel therewith, and a supporting-base.

4. In a drill, the combination of a drill with a driving mechanism at an angle thereto, a feeding mechanism parallel therewith, and a supporting-base, and a connection from the driving mechanism to the feeding mechanism, whereby the latter is moved forward step by step by the action of the former.

5. The combination of a supporting-base with a drill-rod, means for driving the same mounted thereon, a hook at the outer end of such base, whereby it is adapted to engage the flange of the rail on the opposite side from the drill proper, and a clamp on the base movable there along and adapted to engage the other side of the flange or base of the rail.

6. The combination of a supporting-base with a drill-rod thereon and a driving device disposed at an acute angle with reference to the line of motion of such drill-rod.

7. The combination of a supporting-base with a drill-rod supported so as to be movable along such base, with a feed mechanism to move the rod, and a fixed driving mechanism to rotate the rod.

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Witnesses:

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