

No Model.)

2 Sheets—Sheet 1.

C. W. HIGGINS.
RATCHET DRILL.

No. 472,120.

Patented Apr. 5, 1892.

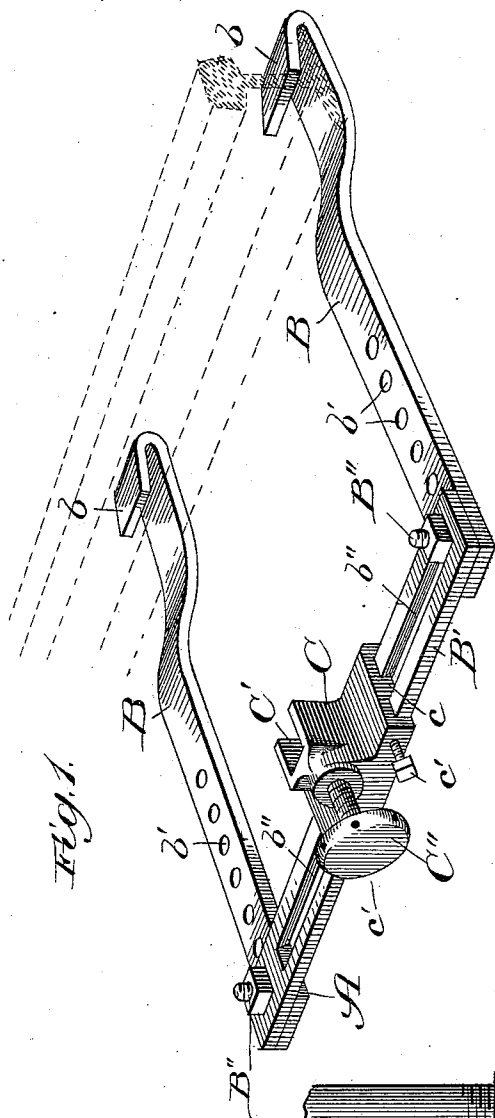


Fig. 1.

Fig. 2.

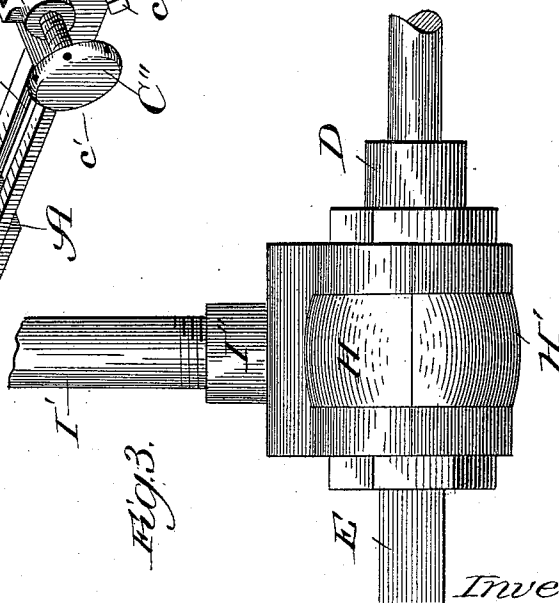
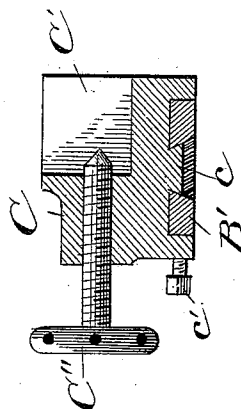


Fig. 3.

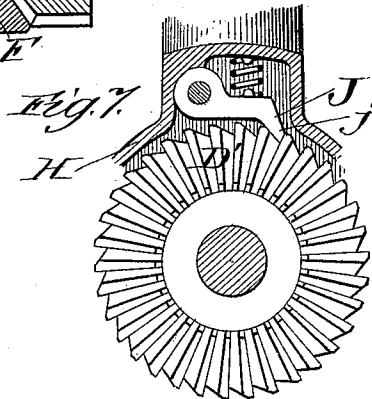
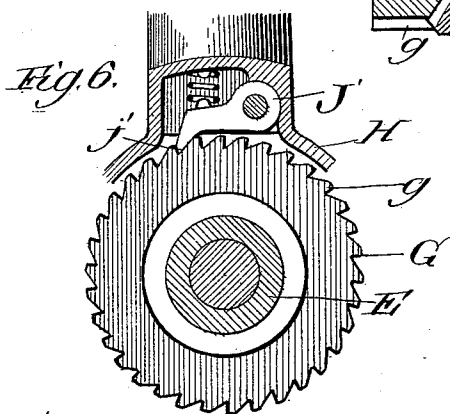
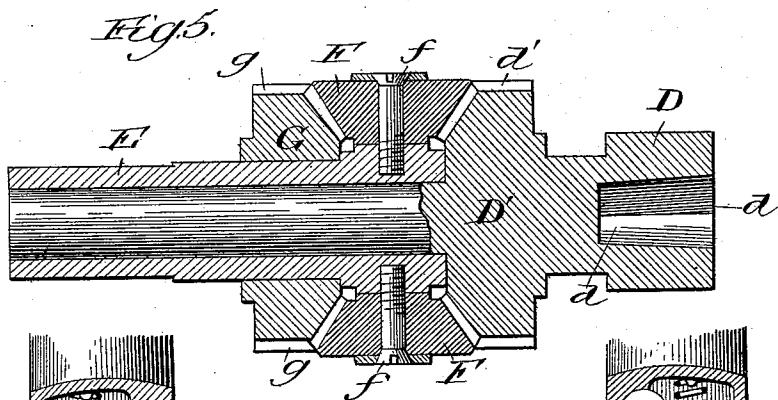
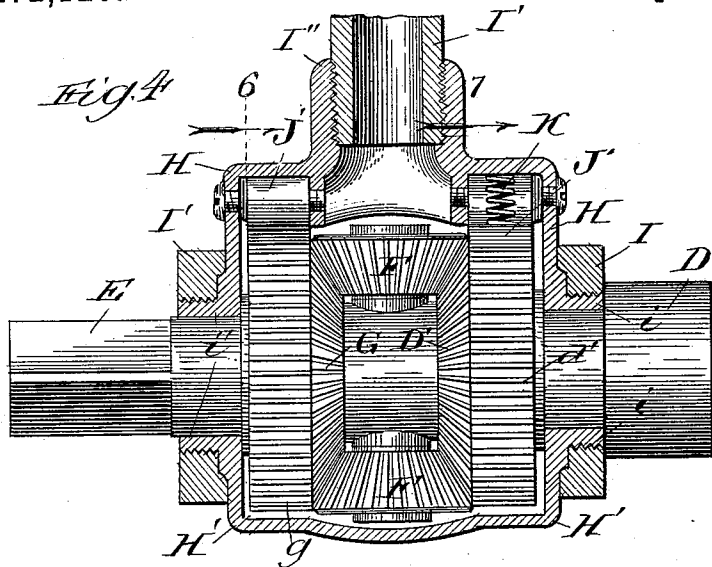
Witnesses:
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RATCHET DRILL.

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UNITED STATES PATENT OFFICE.

CRAFTS W. HIGGINS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE SCHUTTLEMAN MANUFACTURING COMPANY, OF SAME PLACE.

RATCHET-DRILL.

SPECIFICATION forming part of Letters Patent No. 472,120, dated April 5, 1892.

Application filed July 21, 1891. Serial No. 400,241. (No model.)

To all whom it may concern:

Be it known that I, CRAFTS W. HIGGINS, a citizen of the United States, residing at Chicago, Illinois, have invented certain new and useful Improvements in Ratchet-Drills, of which the following is a specification.

My invention, in so far as the drill proper is concerned, relates more particularly to ratchet-drills, and has for its object the improving and simplifying in various ways upon the construction of such drills.

It is also my object to improve upon the frame which supports the drill, so constructing it as to allow it to be easily and quickly adjusted either laterally or longitudinally. This frame is also preferably provided with means for engaging with the drill and for feeding the same to its work; and the invention consists in the features and combinations hereinafter described and claimed.

In the drawings, Figure 1 is a perspective view of the drill-frame attached to a railroad-rail; Fig. 2, a cross-section through the drill-socket; Fig. 3, a side elevation of the drill; Fig. 4, a similar view, partly in section; Fig. 5, a central longitudinal cross-section; and Figs. 6 and 7, cross-sections on lines 6 and 7 of Fig. 4, respectively, looking in the direction of the arrows, the last four figures being on an enlarged scale.

The frame A is made, preferably, in the form shown in Fig. 1, consisting of arms B and a cross-bar B'. In this form the arms are bent, as shown at b, to pass under and engage with the flange and are provided with a number of holes b'. The cross-bar B' is secured to the arms B by means of bolts B'', which bolts pass through the holes b' and holes in the ends of the bar B', this construction enabling the bar to be adjusted toward and from the rail, as may be desired.

The carriage C, for supporting one end of the drill, fits over the bar B', being preferably provided with a dovetailed lug c, fitting and sliding in the beveled groove b'' in such bar. By this means this carriage can be adjusted back and forth on the bar B', as desired, being held in any desired position by means of the set-screws c'. The carriage is also provided with a socket C', of suitable shape to engage with the drill in the manner hereinafter described,

and with a feed-screw C'', by means of which the drill is advanced to its work.

The drill itself is shown more particularly in the last five figures of the drawings. The drill-spindle D is provided with a socket d for the reception of the drill-bit and carries a preferably beveled gear D', having right-handed ratchet-teeth d' around the periphery thereof. Over this spindle fits a sleeve E, to which gears F are secured by means of pins f in such manner as to be free to revolve on such pins, but to have no other motion independent of the sleeve. These gears mesh with the gear D' and also with a preferably beveled gear G, loosely mounted upon the sleeve E and provided with left-handed ratchet-teeth g around its periphery. This form of construction as a means for imparting continuous motion to the drill in whichever direction the operating-handle of the drill be moved is well known and in itself forms no part of my invention; but pawls are necessary to engage with the ratchet-teeth of the two beveled gears, and my invention in part consists in an improved pawl for this purpose. Furthermore, some means for holding the sleeve to prevent its revolution is required in order that the beveled gear G may impart any motion to the drill, and these means it is one of the objects of my invention to provide, as now to be described.

For the purpose of protecting the parts of the drill from dust, &c., and to afford a bearing for the pawls I prefer to inclose the gears, &c., in a suitable case formed in two parts H H' of suitable form and dimensions to inclose the parts, as shown in Figs. 3 and 4. These two parts of the case pass over the gears, &c., fitting and revolving, as shown, upon the spindle and sleeve. The two parts of the case are held together by means of rings I I', fitting over flanges i i'. The operating-handle I' is secured to one of the parts of the casing, being shown in Fig. 4 as fitting into a socket I'' on the part H'. In one of these parts H are mounted the improved pawls J J', by means whereof I operate the beveled gears. The construction of these pawls is shown more particularly in Figs. 6 and 7. They are pivoted at one end, as shown, and are provided with points or teeth j j',

adapted to engage with the ratchet-teeth formed on the peripheries of the beveled gears. The pawls are held in yielding engagement with these gears by means of springs 5 K K', preferably coiled, and held in place by means of projections *k k'*, formed on the pawl and the case H, one pawl extending in one direction and the other in the other direction.

To prevent the sleeve E from revolving 10 when the drill is operated, I preferably make the end of this sleeve square, as shown in the drawings, although any desired form may be given to it which will enable it to rigidly engage with the socket in the carriage C in such 15 manner as to prevent its revolution. For instance, although I do not prefer such construction the end of the sleeve might be made triangular in cross-section, the socket being given in such case a proper shape to receive 20 and hold the end of the sleeve, so as to prevent the sleeve from rotating, and when I claim a "squared" sleeve I do this merely for brevity and include under the term all other suitable forms.

25 The drill having been constructed and put together as above shown and described operates as follows: The frame A is attached to the rail at a desired point, and the bar and carriage having been properly adjusted the 30 drill-point is placed against the rail and the squared end of the sleeve E inserted into the socket C'. As the handle is moved in one direction the pawl J' will trail upon the teeth *d* and the pawl J engage with the teeth on 35 the gear-wheel D' and revolve the same, carrying along the drill-spindle D, to which such gear is fastened or with which it is integral. As the handle is moved back the pawl J will trail upon the teeth *d'* and the pawl J' will 40 engage with the teeth *g* on the beveled gear G. This gear is loosely mounted upon the sleeve, and as it revolves will revolve the beveled gears F, which will in turn act upon the gear D' and spindle D, revolving the same, 45 since the sleeve to which the beveled gears F are attached is prevented from revolving by its engagement with the carriage. In this way a continuous motion is imparted to the drill, which may be fed to its work by means 50 of the feed-screw C''. When it is desired to adjust the drill to another point, the carriage may be moved along in either direction upon the bar B', or this bar, together with the carriage, may be adjusted along the arms B, as 55 already described. In this manner I construct a most efficient and easily-operated drill. The manner of constructing the carriage allows for any possible desired adjustment of the drill in any direction. The form 60 and construction of the pawls render them very strong, since the strain is directly communicated through the pawls to their supporting pivots or spindles and not wholly taken up by the teeth of the pawl, which 65 might be easily broken off. Again, the case which I provide wholly incloses the parts, is easily put in place, and being held together

by the rings I I' furnishes what I consider the strongest and at the same time the simplest possible form of construction. 70

While I have described more or less precise forms, I do not desire to be limited strictly thereto, since I contemplate changes in form, material, and dimensions and the substitution of equivalent members, as may be necessary or desirable. For instance, the bar B' 75 might be made adjustable along the arms B by other means than by the holes B', and similarly the carriage C might simply embrace the bar B' without being dovetailed into it, 80 the object of this part of my invention being to construct a frame in which the drill-carriage is both laterally and longitudinally adjustable, and any other means for accomplishing this result will come within the spirit of my 85 invention. This frame may be used for any drill and in any desired position, the arms B being suitably constructed for use in the desired position.

I claim— 90

1. In a drill, the combination of a drill-spindle carrying a beveled gear provided with ratchet-teeth on its periphery, a sleeve carrying beveled gears engaging with the gear on the spindle, a beveled gear loosely mounted 95 upon such sleeve and engaging with the beveled gears attached thereto, means for preventing the rotation of the sleeve, an operating-handle, and pivoted pawls engaging as the handle is moved in one direction or the other 100 with one or the other of the ratchet-gears, whereby the drill is continuously rotated in the same direction, substantially as described.

2. In a drill, the combination of a spindle carrying a ratchet-gear, a sleeve mounted on 105 such spindle and having a squared end, gears mounted upon such sleeve and engaging with the ratchet-gear on the spindle, ratchet-gear loosely mounted upon such sleeve and engaging with the gears fastened to the sleeve, and 110 means for engaging with the squared end of the sleeve to prevent the sleeve from revolving, substantially as described.

3. In a drill, the combination of a drill-spindle carrying a beveled ratchet-gear, a sleeve 115 mounted on such spindle having a squared end and provided with beveled gears F, meshing with the ratchet-gear on the spindle, a beveled ratchet-gear loosely mounted on the spindle, an operating-handle, pawls connected 120 thereto and engaging with the teeth on the ratchet-gears, and a rigid socket for engaging with the squared end of the sleeve and preventing the same from rotating when the drill is operated, substantially as described. 125

4. A drill-frame provided with a laterally and longitudinally adjustable carriage, whereby the drill supported by such carriage may be adjusted to any desired position, substantially as described. 130

5. A drill-frame comprising arms to hold the frame in place, a bar adjustable on such arms, and a drill-carriage adjustable on such bar, substantially as described.

6. In a drill, a cover for the operative parts, formed in two parts fitting together, as shown, and held in position by rings fitting over flanges on such parts, substantially as described.

7. The combination of a drill-spindle carrying a beveled ratchet-gear, a sleeve having a squared end fitting over such spindle and carrying beveled gears F, meshing with the ratchet-gears on the spindle, a ratchet-gear loosely mounted on the sleeve and engaging with the beveled gears thereon, and a frame provided with a socket to receive and hold the squared end of the sleeve to prevent such sleeve from revolving when the drill is operated, substantially as described.

8. A drill-frame comprising arms for holding the frame in place, provided with two or more holes, a bar attached to such arms by means of bolts passing through such bar and the holes in the arms, and a drill-carriage engaging with and sliding upon such bar, whereby the bar may be adjusted in one di-

rection or the other upon the arms and the carriage adjusted back and forth upon the bar, substantially as described.

9. The combination of a drill-spindle carrying a beveled ratchet-gear, a sleeve having a squared end mounted on such spindle and carrying beveled gears meshing with such ratchet-gear, a beveled ratchet-gear loosely mounted on such spindle and engaging with the beveled gears, a two-part case inclosing these gears and journaled upon the spindle and sleeve, pawls pivoted in such case and engaging with the teeth on the ratchet-gears, and a handle secured to such case, whereby the case may be moved back and forth upon the spindle and sleeve to operate the drill by the engagement of the pawls with the ratchet-teeth, substantially as described.

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