(No Model.)

2 Sheets—Sheet 1.

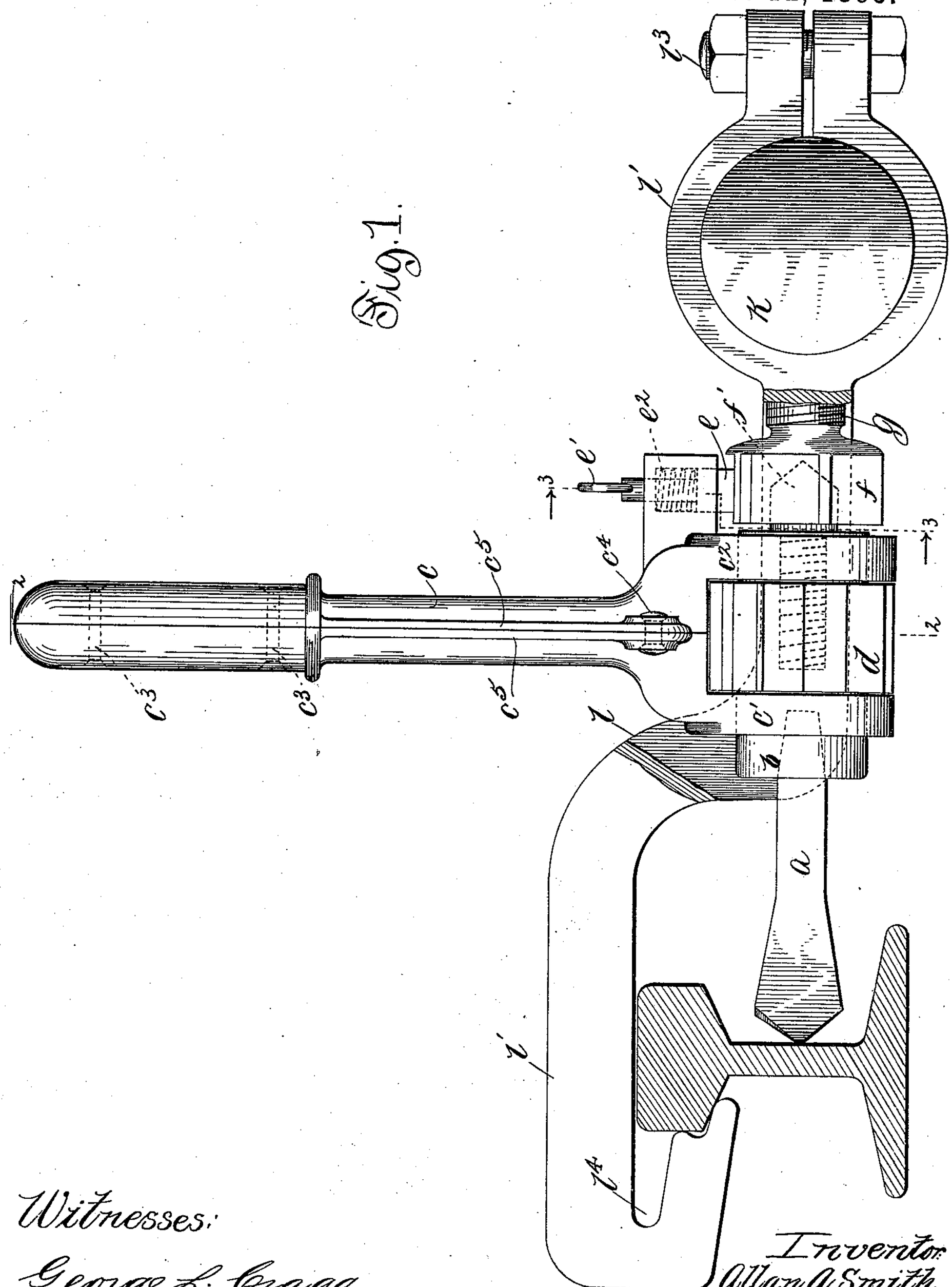
# A. A. SMITH.

## RATCHET DRILL.

No. 549,661.

Patented Nov. 12, 1895.

Fig. 1.




Witnesses:

George L. Bragg.

W. Clyde Jones.

Inventor:

Allan A. Smith

By Burton & Brown

Attorneys.

(No Model.) 2 Sheets—Sheet 2.

# A. A. SMITH.

## RATCHET DRILL.

No. 549,661. Patented Nov. 12, 1895.

Fig. 2.

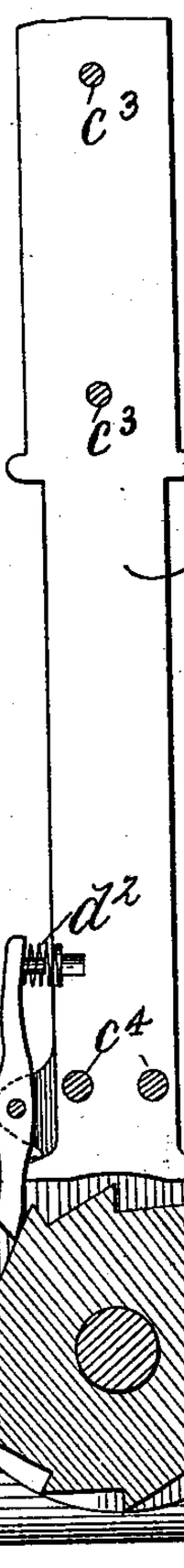



Fig. 5.

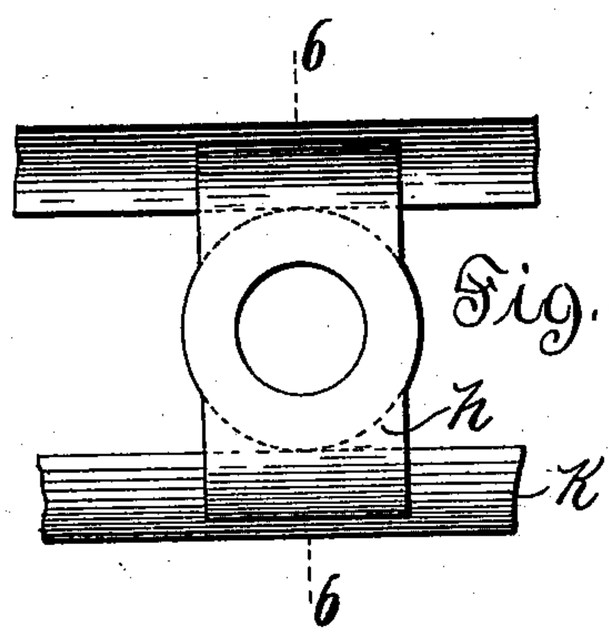



Fig. 3.

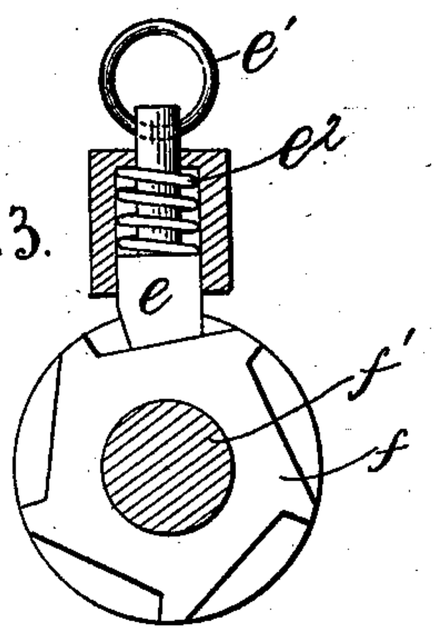



Fig. 6.

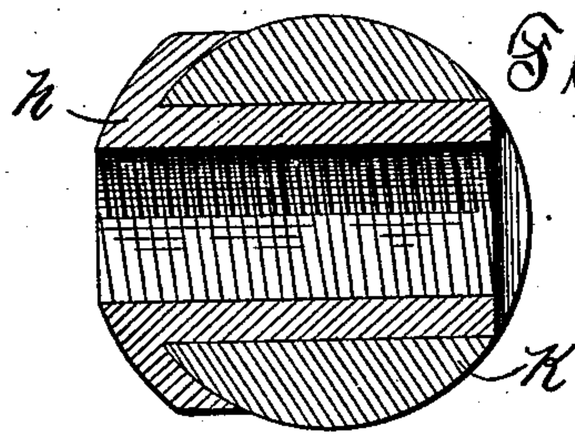
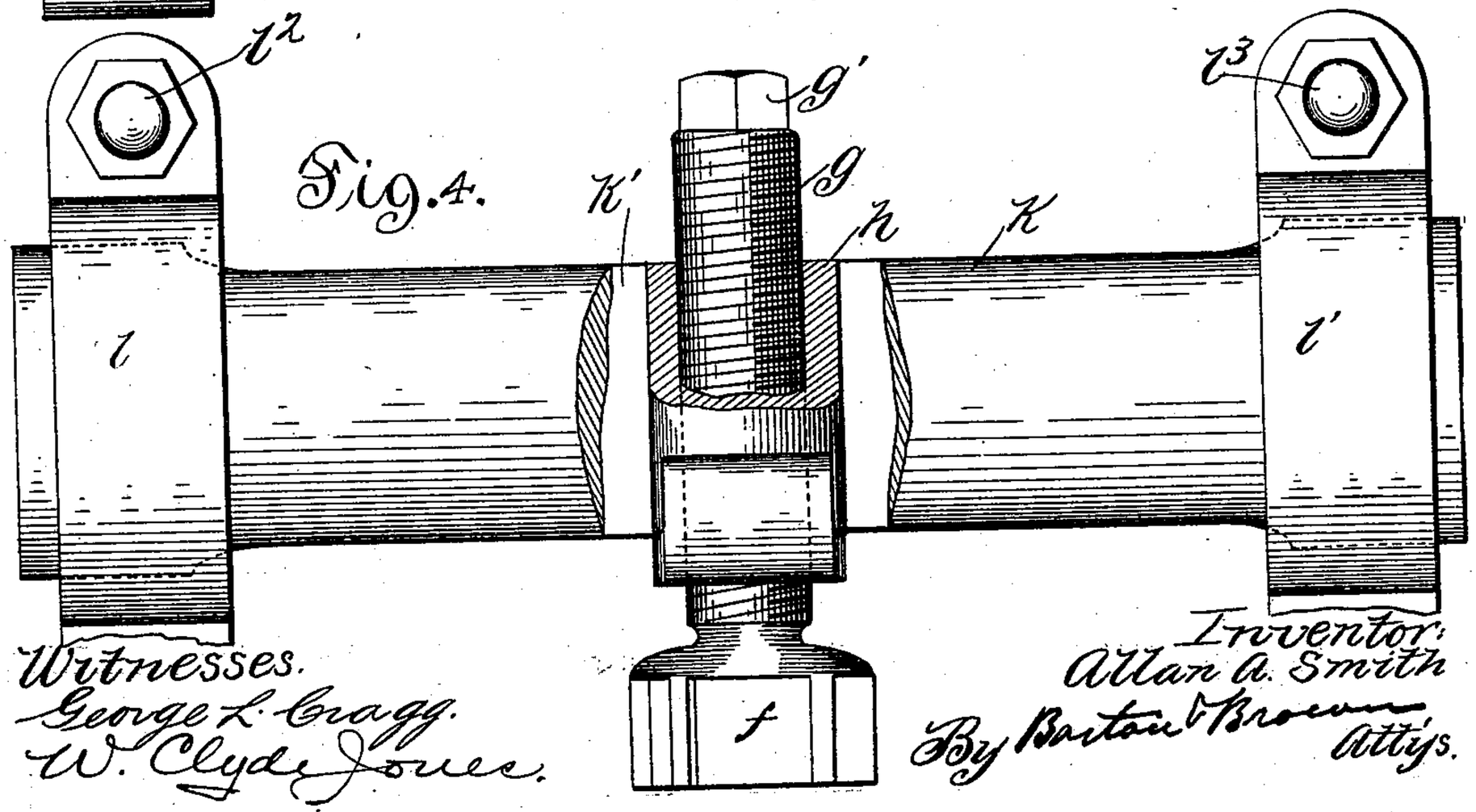



Fig. 4.




Witnesses.
George L. Cragg.
W. Clyde Jones.

Inventor:
Allan A. Smith
By Barton & Brown
Attys.

# UNITED STATES PATENT OFFICE.

ALLAN A. SMITH, OF GRAND ISLAND, NEBRASKA.

## RATCHET-DRILL.

SPECIFICATION forming part of Letters Patent No. 549,661, dated November 12, 1895.

Application filed September 10, 1894. Serial No. 522,615. (No model.)

*To all whom it may concern:*

Be it known that I, ALLAN A. SMITH, a citizen of the United States, residing at Grand Island, in the county of Hall and State of Nebraska, have invented a certain new and useful Improvement in Ratchet-Drills, (Case No. 1,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to ratchet-drills of the class usually employed by track-repairers. In all drills of this class heretofore in use having self-feeding mechanism the movement of the lever in rotating the drill necessarily causes the drill to be fed forward. I have found it of the greatest importance to be enabled to control the feeding at will, and the means by which such control is effected constitute the first feature of my invention and will be referred to as the "controlled feeding mechanism."

A second feature of my invention consists in the construction of the operating-lever, which I preferably cast in two parts, the bearings of the spindle being provided one on each of the castings forming the operating-lever.

These two features of construction may be more generally described as consisting in a ratchet-spindle and a separate self-feeding screw, which self-feeding screw is adapted to effect the feeding of the drill in accordance with the will of the user—that is to say, there will be no feeding of the drill unless the operating-lever is moved a particular distance. Moreover, the pawl for engaging with the device I term the "self-feeding screw" may be disengaged therefrom when desired, so that the self-feeding screw may serve as an abutment. In order that the feeding-screw may, if desired, be turned manually, I preferably adapt the end thereof to be engaged by a wrench. In this instance I have made the end rectangular in cross-section.

No track-drill heretofore has been constructed having the spindle and the self-feeding screw in separate parts and having upon said spindle and screw ratchet-teeth adapted to be engaged by separate pawls controlled or operated by the lever. By making the feeding-screw separate and distinct from the spindle I am enabled to take my drill apart and use the spindle in places where there is not room for the feed-screw, simply blocking the end of the spindle, so as to provide a suitable abutment, this being frequently necessary at crossings and turn-outs, where very short drills are required. When thus provided with an abutment, the spindle can be fed by a screw which I provide in the end of the spindle.

My drill as thus constructed will take the place of short and special drills, while at the same time being equipped for the usual and general work. The construction of the operating-lever is such that the ratchet-wheel of the spindle will come between the bearings provided on the two parts thereof. On one of the halves or portions of the operating-lever I provide a projecting lug, which is drilled out to receive a pawl, which is adapted to engage with the ratchet-teeth provided upon the feeding-screw. The pawl for engaging with the ratchet of the spindle is preferably mounted on a bolt passing through the holes in lugs provided in suitable position therefor upon the lever. The ratchet-wheel of the spindle is formed integral therewith, and the parts of the lever forming the bearings for the spindle are constructed to fit over the ends of the spindle and preferably to bear against the sides of the enlarged portion of the spindle in which the ratchet-teeth are formed. The necessity of making a separate ratchet-wheel for the spindle is thus obviated.

As before explained, there are two pawls provided upon the operating-lever. One engages with the ratchet-teeth of the spindle and the other with the ratchet-teeth of the feeding-screw, which feeding-screw is a separate and distinct piece from the spindle. The teeth of the ratchet upon the feeding-screw are farther apart than the teeth of the spindle-ratchet, preferably about three times as far—that is to say, I have found it desirable to provide, say, three or four—possibly five—ratchet-teeth only upon the feed-screw and, say, fourteen to sixteen ratchet-teeth upon the spindle. Thus we have a considerable margin for reciprocating the lever to rotate the drill without feeding the same forward. When, however, it is desired to feed the drill,

the lever is moved far enough so that the feeding-pawl takes a notch of the feeding-screw, whereupon the feeding-screw is turned with the spindle and the controlled feeding effected as the lever is operated.

A subordinate feature of my invention which I have found of great convenience consists in providing a cross-piece, in which the feeding-screw is supported, the supporting-arms that engage the rail or other object to be operated upon being capable of longitudinal movement upon the cross-piece to adjust the distance between the same and at the same time capable of rotation about the cross-piece, whereby the direction of the drill-spindle may be adjusted as circumstances may require.

I will describe my invention in connection with the accompanying drawings, in which—

Figure 1 is a view in elevation of a drill embodying my invention. Fig. 2 is a sectional view on line 2 2, Fig. 1. Fig. 3 is a detached view of the feeding ratchet and pawl. Fig. 4 is a plan view of the cross-piece in which the feeding-screw is supported, a portion being broken away to show the block in which the feeding-screw works. Fig. 5 is a detached view showing the cross-piece and the block which carries the feeding-screw. Fig. 6 is a sectional view on line 6 6, Fig. 5.

Like letters refer to like parts in the several figures.

The drill $a$ is supported in the end of a spindle $b$, said spindle being mounted to rotate in bearings provided in the bifurcated end of a manual lever $c$. Mounted upon the spindle $b$ and between the members $c'$ $c^2$ of the bifurcated end of the manual lever is a ratchet-wheel $d$, adapted to be engaged by a pawl $d'$, mounted upon the manual lever. The pawl $d'$ may be made in the form of a centrally-pivoted lever, a spring $d^2$ being interposed between its upper end and the manual lever to yieldingly maintain the opposite end against the ratchet-wheel in a well-known way. By moving the manual lever back and forth the drill-spindle may be rotated through the agency of the pawl and ratchet.

Mounted upon the manual lever $c$ is a pawl $e$, adapted to engage the teeth of the ratchet-wheel $f$, mounted upon or formed integral with a feeding-screw $g$. The pawl $e$ is adapted to slide vertically and is provided at its upper end with a ring or handle $e'$, by means of which it may be lifted out of engagement with the ratchet-wheel $f$, a spring $e^2$ being provided for yieldingly maintaining the pawl in engagement with the ratchet-wheel.

The feeding-screw $g$ engages a thread provided in a nut or block $h$, adapted to slide back and forth in a channel or slot $k'$, provided in the cross-piece $k$. The forward end of the block $h$ is enlarged and preferably made to conform to the circular form of the cross-piece, so that the thrust of the feeding-screw upon the block may be taken up by the cross-piece.

Upon the end of the feeding-screw $g$ may be provided a nut or squared portion $g'$, adapted to be engaged by a wrench to feed the drill forward when it is not desired to employ the automatic feed device, as above described.

Upon the ends of the cross-piece $k$ are mounted supporting-arms $l$ $l'$, adapted to grasp the work, as shown in Fig. 1, in connection with a rail, to react against the thrust of the drill. The ends of the arms $l$ $l'$ are clamped about the circular cross-piece $k$ by bolts $l^2$ $l^3$, so that by releasing the bolts the arms may be adjusted to any desired angular position relatively to the axis of the drill, or they may be adjusted longitudinally upon the cross-piece to bring them closer together or farther apart.

If it be desired to have the arms extend beneath the rail and engage the flange, the arms may be turned, so that the bend extends downward. As shown, the end of the arm is provided with a recess $l^4$, in which the flange of the rail is adapted to rest.

If it be desired to have the supporting-arms engage the rail between two ties, they may be brought together for this purpose, while if it be desired to span a tie the distance between the arms may be adjusted accordingly.

Upon the end of the spindle is provided a pivot-journal $f'$, adapted to bear by its conically-formed end against a bearing provided in the end of the ratchet-wheel $f$, so that as the feeding-screw is advanced the spindle $b$ is moved longitudinally to feed the drill forward.

The teeth upon the feeding ratchet-wheel $f$ are situated at a greater distance apart than the teeth upon the rotating ratchet-wheel $d$, so that when a short stroke is given to the manual lever $c$ ratchet-wheel $d$ is rotated to rotate the spindle $b$ and, in consequence, the drill without advancing the same. When, however, a longer stroke is given to the manual lever, pawl $e$ is adapted to engage the ratchet $f$ to rotate the screw $g$ within the block $h$, thus advancing the drill-spindle simultaneously with the rotation thereof due to the engagement of pawl $d'$ with the rotating ratchet-wheel $d$.

The manual lever $c$ I preferably form in two halves, screws or rivets $c^3$ $c^3$ being passed through the handle to hold the upper ends of the two halves together, while rivets or screws $c^4$ are passed through the webs $c^5$ $c^5$ at the lower end to hold the lower ends of the two halves together.

The ratchet-wheel $d$ is formed integral with the drill-spindle $b$, and in assembling the spindle may be placed in the bearings $c'$ $c^2$, with the ratchet-wheel $d$ lying between the same, after which the two halves of the handle may be secured together.

The details of construction of the drill may be varied in many particulars without departing from my invention, and I do not, therefore, limit myself to the precise construction shown.

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

1. In a ratchet drill, the combination with a support adapted to be held stationary during the drilling operation, of a feeding screw adapted to engage threads provided on said stationary support to advance the feeding screw when the same is rotated, a feeding ratchet wheel mounted to rotate with said feeding screw, a drill spindle adapted to receive longitudinal movement from said feeding screw, a driving ratchet wheel mounted to rotate with said drill spindle, the teeth upon said feeding ratchet wheel being at a greater angular distance apart than the teeth upon said driving ratchet wheel, a manual lever, and pawls carried thereon adapted respectively to engage said ratchet wheels; whereby said drill spindle may be rotated to produce rotation of said feeding screw, or not, according to the length of the stroke of said manual lever, substantially as described.

2. In a ratchet drill, the combination with a cross-piece, provided with a longitudinal slot, of a block or nut movable longitudinally within said slot, a feeding screw working in said block or nut, and supporting arms mounted one upon each end of said cross-piece, said arms being adapted to be adjustably rotated upon said cross-piece and to be adjustably moved longitudinally thereon; substantially as described.

3. In a ratchet drill, the combination with a support adapted to be held stationary during the drilling operation, of a feeding screw adapted to engage threads provided on said stationary support to advance the feeding screw when the same is rotated, a ratchet wheel carried upon said screw, a drill spindle separable from said screw and adapted to rest with its end centered against said feeding screw, a ratchet wheel carried upon said drill spindle, a manual lever journaled upon said drill spindle, and a pair of pawls carried upon said lever, one of said pawls being adapted to engage the ratchet wheel upon the drill spindle and the other adapted to engage the ratchet wheel upon the feeding screw, substantially as described.

In witness whereof I hereunto subscribe my name this 7th day of September, A. D. 1894.

ALLAN A. SMITH.

Witnesses:

GEORGE P. BARTON,

GEORGE L. CRAGG.