(No Model.)

W. R. BONHAM.

RATCHET DRILL.

No. 515,395. Patented Feb. 27, 1894.

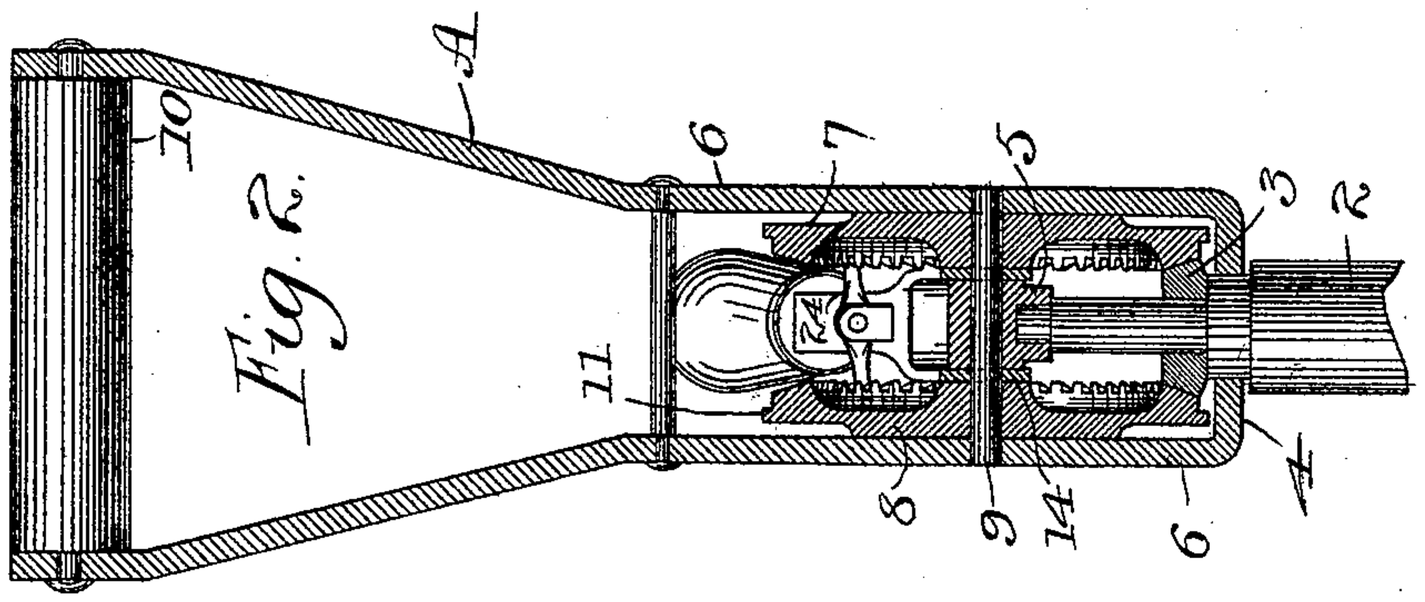

Fig. 2.

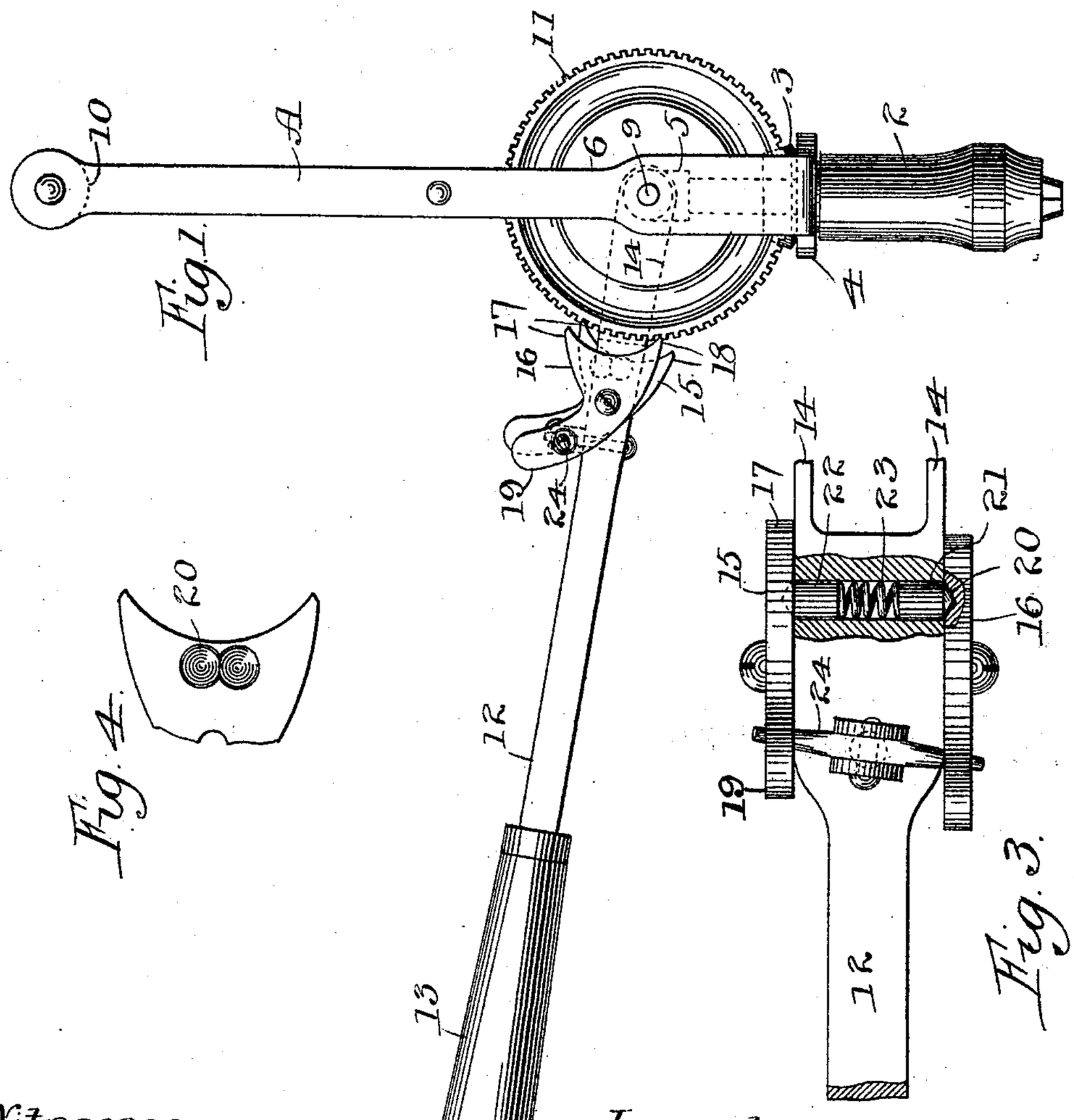

Fig. 1.

Fig. 4.

Fig. 3.

Witnesses
C. F. Caldwell.
H. S. Johnson.

Inventor
Walter R. Bonham.
per T. D. Merwin
Attorney.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WALTER R. BONHAM, OF ST. PAUL, MINNESOTA.

RATCHET-DRILL.

SPECIFICATION forming part of Letters Patent No. 515,395, dated February 27, 1894.

Application filed July 20, 1893. Serial No. 480,972. (No model.)

To all whom it may concern:

Be it known that I, WALTER R. BONHAM, of St. Paul, Ramsey county, Minnesota, have invented certain Improvements in Ratchet-Drills, of which the following is a specification.

My invention relates to improvements in devices for transmitting power from a pivoted lever to a shaft or other rotary part, by means of which the rotary part may be operated continuously in the same direction without regard to the direction in which the lever moves, and which may be instantly set so as to reverse the direction of the movement of the rotary part without varying the movement of the lever.

To this end my invention consists in providing a bevel pinion upon the rotary part, arranged between and meshing with a pair of bevel gears turning loosely upon a common shaft, and in mounting upon the bevel gear shaft a lever carrying a pair of double pointed pawls, each adapted to engage with spur or double ratchet teeth upon the periphery of the adjacent bevel gear. Each pawl is pivoted in such manner that it may be turned so that either of its points or teeth will engage with the adjacent ratchet, and the operation of the lever will turn the gear in the direction in which the engaging tooth of the pawl points. The two pawls are joined by means of a bar, the ends of which are loosely connected to the pawls, its center having universal joint connection with the lever. This connection is so arranged that if either pawl is in engagement with its ratchet, the other pawl must be oppositely engaged with its ratchet, and by turning the arm on its joint it reverses the position of the pawls and their engagement with their respective gears. Thus with the movement of the lever in either direction, one of the pawls serves to turn its gear in the same direction and thus the rotary part, its movement being continuously in one direction, which is determined by the position of the pawls.

My invention further consists in the construction and combination hereinafter more particularly described and claimed.

In the accompanying drawings forming part of this specification: Figure 1 is a side elevation of my invention, shown connected to a bit stock, illustrating the opposite position of the pawls engaging their respective gears. Fig. 2 is a central, vertical section through the gears. Fig. 3 is a sectional detail of the pair of pawls showing their connection with each other and the means for holding them in adjusted positions, and Fig. 4 is a detail of one of the pawls showing the dimples or sockets into which the retaining pin enters to hold it in adjusted positions.

In the drawings 2 represents the rotary part of the device, in this case being shown as a bit stock, upon which is fastened a bevel pinion 3. The stock has journal support in the yoke shaped frame A, the cross piece 4 of which has an opening through which the stock passes, as shown in Fig. 2, a block 5 being secured between the side bars 6 in which the end of the stock is journaled. Arranged between and next the side bars 6 are the bevel gears 7 and 8, which are mounted upon a common pivot 9 and mesh with the pinion 3. The bars 6 preferably flare outward at the top and are provided with an interposed handle 10, by means of which the device may be held firmly in position. Upon the periphery of each of the gears 7 and 8 are arranged the double ratchet or spur teeth 11.

12 is the operating lever provided with a handle 13 and having its opposite end bifurcated, the members 14 turning on the pivot 9, and embracing the block 5. Pivoted to swing in planes parallel with the plane of movement of the lever, and arranged on each side thereof in line with the gears 7 and 8, are the pawls 15 and 16. Each of the pawls is provided with upper and lower points or teeth 17 and 18. When the rearwardly projecting arm 19 is pressed upward to its limit, the upper tooth 17 is in engagement with the adjacent gear, and when the arm is depressed, the lower tooth 18 is brought into engagement with the gear. On the inner face of each pawl is provided a pair of sockets or dimples 20, and working through the body of the lever 12 is the pair of retaining pins 21 and 22 interposed between which is the spiral spring 23 by means of which they are both pressed outwardly. The projecting ends of the pins are pointed or rounded to conform to the shape of the dimples or sockets 20. Thus each holds its respective pawl in the po-

sition in which it is set, the pin being in engagement with the lower socket when the lower tooth is in engagement with the gear, and with the upper socket to hold the upper tooth in engagement with the gear, and yet yielding to sufficient pressure upon the arm 19 to allow the pawl to be turned from one of its positions to the other, the pin being crowded back against the tension of the spring when carried out of the socket. Mounted upon the lever 12, intermediate of the arms 19 of the pawls and having universal joint connection with the lever, is the transverse bar 24, the ends of which have a loose connection with the arms 19. By means of this if the arm of either of the pawls is raised or lowered to shift the position of the pawl, the bar serves to oppositely move the other pawl. It will thus be seen, as illustrated in Fig. 1, with the pawls oppositely engaging their respective gears, that as the lever 13 is operated, the gear with which the lower tooth of a pawl engages, is turned with the downward movement of the lever, and the other is turned by the upward movement of the lever, and as the gears are operated in opposite directions, they impel the stock by means of the interposed bevel pinion in the same direction, no matter in which direction the lever moves. By giving a twisting movement to the projecting arms 19 of the pawls their position may be instantly reversed and the direction of movement of the stock similarly reversed. The device is guided and forced forward by means of the handle 10, and by means of the lever it is driven in either direction at will.

I claim—

1. In a device of the class described, the combination with the rotary part and the pivoted operating lever, of the bevel pinion carried by the rotary part, the pair of bevel gears meshing with said pinion, double ratchet teeth on the periphery of said gears, and the pair of pawls carried by said lever adapted to oppositely engage the ratchet teeth of said gears, substantially as described.

2. The combination with the stock or shaft and the pivoted lever, of the bevel pinion carried by said shaft, the pair of bevel gears meshing therewith, each of said gears having peripheral double ratchet teeth, the pair of double pointed pawls pivoted to said lever, each adapted to engage one of said gears, and the connection between said pawls whereby when either of them is set in engagement with its gear the other pawl is set oppositely in engagement with its gear, substantially as described.

3. Means for transmitting an oscillating movement to a continuous rotary movement in either direction as desired, consisting of the combination with a pivoted lever and the part to be rotated, of the pair of double ratchets, oppositely geared to the rotary part, the pair of double pointed pawls pivoted to the lever and adapted to engage said ratchets so as to turn the same in either direction, and means connecting said pawls whereby when one engages its ratchet to turn it in one direction the other pawl engages its ratchet to turn it in the opposite direction, substantially as described.

4. Means for transmitting an oscillating movement to a continuous rotary movement in either direction, comprising in combination with the rotary part, and the oscillating part, of the pair of double ratchets oppositely geared to the rotary part, the pair of double pointed pawls pivoted to the oscillating part and adapted to respectively engage said ratchets, and the bar loosely connecting said pawls and having an intermediate fixed universal joint support, whereby said pawls are always held in opposite positions while engaging their ratchets, substantially as described.

5. In a device of the class described, the combination with the rotating part, of the oscillating part, the pinion fastened to the rotating part, the pair of similar ratchet gears oppositely engaging said pinion, the pair of double pointed pawls carried by said oscillating part and respectively engaging said ratchet gears, means for holding said pawls in opposite engagement with their respective ratchet gears, means for reversing their position, and the automatic locking device for holding said pawls in adjusted positions, substantially as described.

6. In a device of the class described, the combination of the frame, the rotatable shaft journaled therein, the bevel pinion carried by said shaft, the pair of similar ratchet bevel gears journaled in said frame and oppositely engaging said pinion, the lever pivoted to said frame, the pair of double pointed pawls pivoted to said lever, means for holding said pawls in opposite engagement with their respective ratchet gears, means for reversing said engagement, and the spring controlled locking device for automatically securing said pawls in adjusted positions, substantially as described.

In testimony whereof I have hereunto set my hand this 13th day of July, 1893.

WALTER R. BONHAM.

Witnesses:
T. D. MERWIN,
H. S. JOHNSON.