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DOUBLE ACTING RATCHET MECHANISM.

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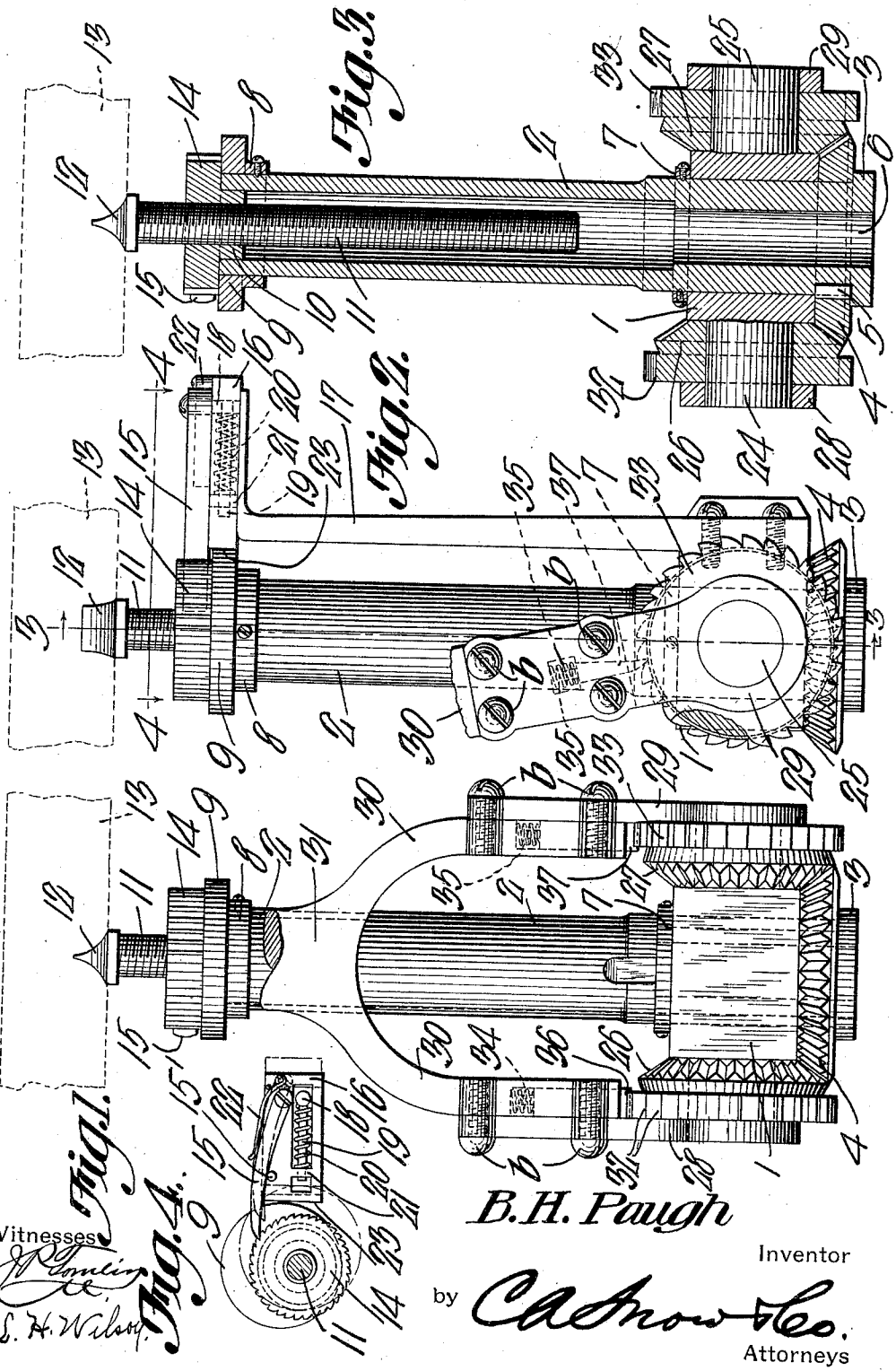

Fig. 3.

Fig. 2.

Fig. 1.

Fig. 4.

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# UNITED STATES PATENT OFFICE.

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## DOUBLE-ACTING RATCHET MECHANISM.

1,049,389. Specification of Letters Patent. Patented Jan. 7, 1913.

Application filed December 13, 1911. Serial No. 665,514.

*To all whom it may concern:*

Be it known that I, BENJAMIN H. PAUGH, a citizen of the United States, residing at Parsons, in the county of Tucker and State of West Virginia, have invented a new and useful Double-Acting Ratchet Mechanism, of which the following is a specification.

The present invention relates to improvements in double acting ratchet mechanisms, the primary object of the invention being the provision of a double acting ratchet mechanism for driving drills, bits or other rotary tools, wherein a frame has mounted thereon a handle capable of an oscillatory movement in combination with a rotary shaft and operably connected with said handle whereby the movement of the handle in one direction will impart the same rotation to the shaft as when moved in the opposite direction, one end of the rotary shaft being provided with a tool receptacle while the other end carries a feed screw mechanism adapted to remain stationary during the rotation of the main shaft of the ratchet mechanism so as to impart the desired feeding movement to the tool.

A further object of the present invention is a pawl and ratchet controlled mechanism for locking a feed screw to a double acting rotary ratchet operated mechanism so that a longitudinal movement may be imparted thereto, whereby the ratchet mechanism may be rotated without having such longitudinal movement imparted.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings Figure 1 is an elevation of the complete mechanism taken from the handle side thereof, the handle being broken away above the yoke end thereof. Fig. 2 is a side elevation taken from the right of Fig. 1 the yoke of the handle being broken away. Fig. 3 is a section taken on line 3—3 of Fig. 2. Fig. 4 is a section taken on line 4—4 of Fig. 2, dot-and-dash lines illustrating the cam in the position for throwing the pawl out of locking engagement with the toothed ratchet.

In the drawings, the numeral 1 designates the main frame of the mechanism which has rotatably mounted therein the tubular standard or shaft 2, having upon its lower end the annular rim or collar 3 for the reception of the lower bevel pinion 4 which is keyed at 5 to the lower end of the said tubular shaft 2 so as to be rotatable therewith. The reduced bore 6 in the rotatable end of the shaft 2 provides a tool receptacle, whereby a bit or drill or in fact any object that is adapted to be rotated by the mechanism is operably connected to the said shaft 2.

In order to hold the shaft 2 relatively within the frame 1 and to coact with the upper face of the bevel pinion 4 in retaining the said shaft 2 in proper relation with the frame 1, a locking ring or collar 7 is secured upon the said shaft 2. Secured exteriorly near the upper end of the shaft 2 is a locking or retaining ring or collar 8 which forms a lower limiting means for the eccentric or cam 9, which is rotatably mounted upon the upper extreme end of the collar shaft 2, the purpose of which will presently appear.

Mounted within the upper end of the shaft 2 and rotatable therewith is the reduced end 10 of the ratchet wheel 14, a feed screw 11 being mounted in the threaded bore of the same and projected within the hollow shaft 2, as clearly shown, and also without and above the ratchet 14 carrying at its top an object engaging cleat or point 12 which is adapted to enter a stationary object such as indicated in dotted lines and as 13, whereby the shaft 2 may be rotated as the screw 11 remains in a stationary position.

In order to arrest the shaft against a retrograde movement during the rotation thereof and consequently lock the feed screw 11, a pawl 15 is pivoted on a sliding casing 16 upon the upper end of an arm 17 which is connected to the base 1 of the machine. In this box 16 is mounted a stud 18 which is secured to the arm 17 and has connected thereto a pin 19, which is also slidably mounted in the lug 21 of the casing 16 so that the spring 20 will exert a tension to normally hold the pawl 15 in engagement with the teeth of the ratchet 14, a spring 22 being carried by the casing 16 and engaging the pawl 15 to hold the same toward the

teeth of the ratchet 14. When it is desired to release the pawl 15 and permit the screw 11 to be rapidly fed downwardly, the cam 9 is rotated from the position as shown in Fig. 4 to the dot-and-dash line position therein so that the inner face 23 of the casing 16 is engaged by the cam and pushed outwardly to its fullest extent so as to disengage the pawl 15 from the teeth of the ratchet 14 and permit it to have its free end held as shown in dot-and-dash lines, Fig. 4, by means of the pin 15'.

Formed integral with the base 1 of the machine and projecting from opposite sides thereof are the trunnions 24 and 25, which have rotatably mounted thereupon the bevel pinions 26 and 27 which are in mesh at all times with the main drive bevel pinion 4, and mounted for oscillation upon the extreme ends of the trunnions 24 and 25 are the plates 28 and 29 which are connected by the securing screws *b* to the lower ends of the forks of the operating handle 31.

In order to impart the desired rotation to the respective bevel pinions 26 and 27, ratchet wheels 32 and 33 are formed integral with the respective pinions 26 and 27, and mounted within the sockets 34 and 35 of the respective terminals of the forks 30 of the operating lever are the spring actuated detents or pawls 36 and 37, whose engaging ends are in operable relation to the teeth of the respective ratchets 32 and 33, the ratchet 33 being operated when the lever 31 is moved away from the shaft 2, while the ratchet 33 is operated when the lever 31 is moved toward the shaft 2, both of said ratchets moving in the direction of the arrow Fig. 1 so as to impart the same rotation to the bevel pinion 4 and tubular shaft 2 as indicated by the arrow below the pnion 4 in Fig. 1.

From the foregoing description taken in connection with the drawings, it is evident that when it is desired to drive any form of tool, such for instance as a drill, that the drill is placed within the bore 6 of the tubular shaft or main drive 2, while the pointed end 12 is placed against any rigid support, the drill being placed in position for drilling the desired object. The cam 9 is now moved in the position as shown in Fig. 4 so that the pawl 15 is thrown in engagement with the ratchet 14. By the oscillation or reciprocation of the lever 31, the pinion 4 will be operated in the direction of the arrow Fig. 1 and impart such movement to the shaft 2 and to the drill carried thereby, so as to rotate the drill in the desired cutting direction and at the same time rotate the ratchet 14 and as the feed screw 11 is held rigid through its point 12, the said ratchet will be fed downwardly carrying with it the entire sleeve and the drill, so that the drill will be fed longitudinally during the rotation thereof to produce the desired cut or bore to the object being operated upon.

It is evident from the construction herein set forth, that the entire mechanism is assembled upon the shaft 2 from the upper end thereof, a bevel pinion 4 being first placed in position and keyed above the shoulder 3 while the frame 1 is slipped upon the shaft 2 and is held in place thereupon by means of the retaining ring or collar 7 after which the retaining sleeve 8 is secured to the top of the shaft 2 to allow proper positioning of the cam or eccentric 9 after which the ratchet 14 is keyed within the upper end of the shaft 2 and finally the feed screw 11 is placed within the threaded bore of the ratchet 14.

By reason of the base 1 being provided with the large trunnions 24 and 25, in combination with the other features, a mechanism of this character can be made very strong, simple and durable and may be used in connection with lathes or other work where it is desired to impart a rotary movement to a tool through a reciprocatory or oscillatory actuating mechanism.

What is claimed is:

1. A double acting ratchet mechanism, having a frame with oppositely disposed trunnions, two ratchet gears rotatably mounted upon said trunnions, a hollow shaft rotatably mounted in said frame and having a gear meshing with said first two gears, a manually controlled oscillatory lever operably connected to the frame and said ratchet gears for rotating said shaft, a ratchet wheel carried by and rotatable with the shaft at the opposite end to the gear, a feed screw disposed concentrically of the ratchet wheel and having means to engage a stationary object whereby the rotation of the ratchet will impart a longitudinal movement to the screw, and a pawl engaging the ratchet wheel to prevent a retrograde movement thereof.

2. A double acting ratchet mechanism, having a frame with oppositely disposed trunnions, two ratchet gears rotatably mounted upon said trunnions, a hollow shaft rotatably mounted in the frame and having a gear meshing with said first two gears, a manually controlled oscillatory lever operably connected to the frame and said ratchet gears for rotating said shaft, a ratchet wheel carried by and rotatable with the shaft at the opposite end to the gear, a feed screw disposed concentrically of the ratchet wheel and having means to engage a stationary object whereby the rotation of the ratchet will impart a longitudinal movement to the screw, a spring actuated casing normally held toward the ratchet, a pawl mounted therein to engage the ratchet to prevent a retrograde movement thereof, and a cam mounted upon the shaft and disposed

to actuate the frame to move the pawl into and out of engagement with the ratchet.

3. A double acting ratchet mechanism, having a frame, a tubular shaft rotatably mounted therein, mechanism operably connected to the lower end of said shaft for imparting a rotation to said shaft, a ratchet wheel mounted in the upper end of said shaft and provided with a concentrically threaded opening therein, a feed screw mounted in said concentrically threaded opening of the ratchet wheel, and movable into and out of the hollow shaft, means carried upon the upper end of said screw to engage a stationary object, whereby the rotation of the shaft will impart a longitudinal movement to the screw, a pawl engaging the ratchet wheel to prevent a retrograde movement thereof, and means for moving the pawl outwardly to disengage the same from the ratchet.

4. A double acting ratchet mechanism, having a frame, a tubular shaft rotatably mounted therein, mechanism operably connected to the lower end of said shaft for imparting a rotation to said shaft, a ratchet wheel mounted in the upper end of said shaft and provided with a concentrically threaded opening therein, a feed screw mounted in said concentrically threaded opening of the ratchet wheel and movable into and out of the hollow shaft, means carried upon the upper end of said feed screw to engage a stationary object whereby rotation of the shaft will impart a longitudinal movement to the screw, a spring actuated casing mounted adjacent to the ratchet wheel and normally held toward the same, a spring pawl mounted in said casing and normally in the path to engage with the ratchet to prevent a retrograde movement thereof, and a cam mounted upon the shaft and disposed to actuate the casing to move the casing and the pawl, to release the pawl from the ratchet.

5. A double acting ratchet mechanism, having a frame with oppositely disposed trunnions and having a vertical bore, a tubular shaft rotatably mounted in said vertical bore and projecting through the frame, a gear carried upon and rotatable with the lower end of said shaft, a concentrically disposed feed screw mounted in the upper end of said shaft, means carried upon the upper end of said feed screw to engage a stationary object whereby the rotation of the shaft will impart a longitudinal movement to said feed screw, two rotatable gears, one upon each trunnion of the frame, in mesh with the gear of the tubular shaft, a ratchet wheel to each gear, each of which are arranged in opposite relation to each other, a handle provided with a yoke terminal straddling said gears and ratchet and mounted for oscillation upon the ends of the trunnions of the frame, and a spring actuated detent carried by each terminal of the yoke and disposed in operable relation with its respective ratchet.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

BENJAMIN H. PAUGH.

Witnesses:
A. V. DANIELSEN,
E. A. HAYS.