

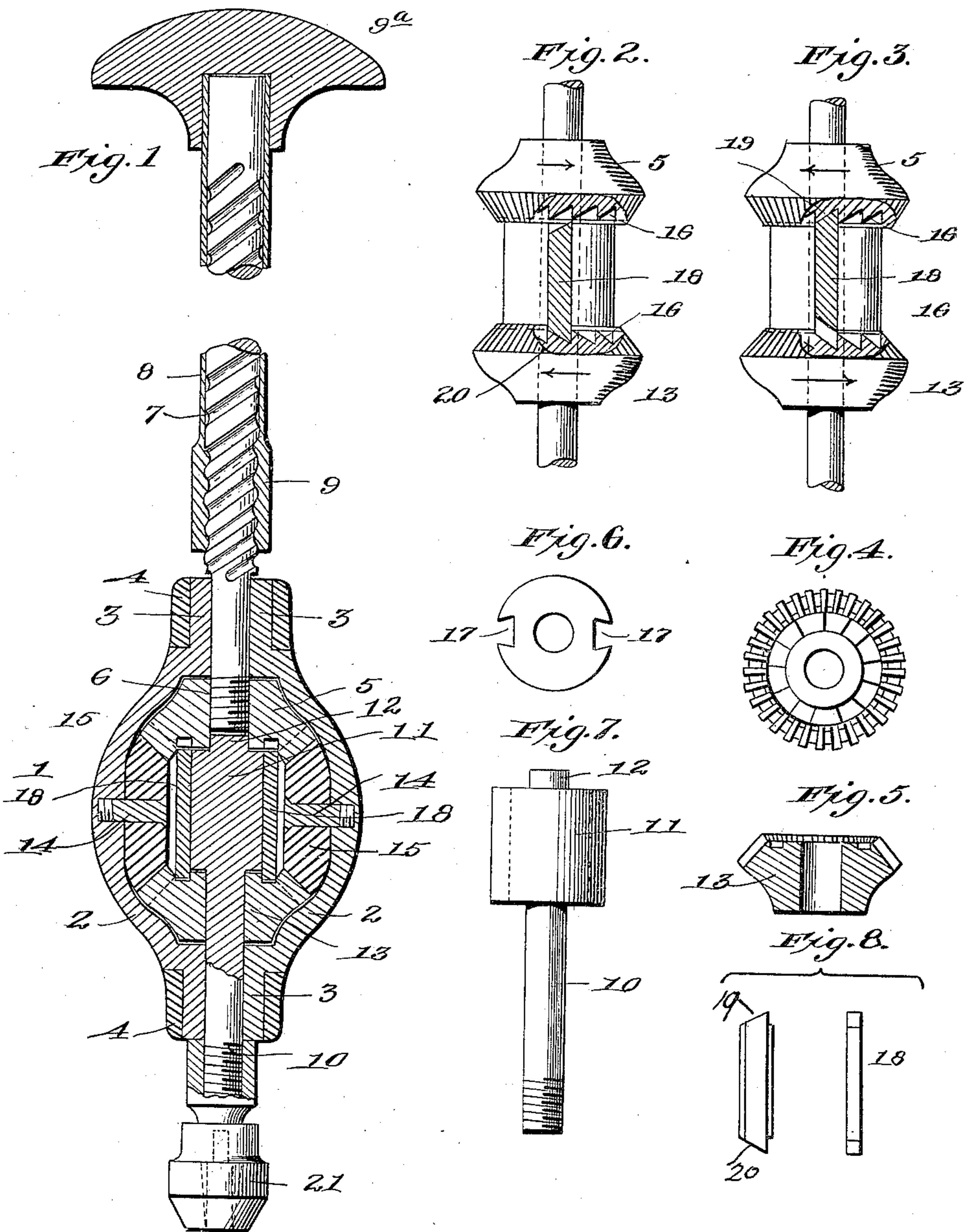
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Patented June 19, 1900.

J. E. OLSON.
HAND DRILL.

(Application filed Apr. 3, 1900.)

(No Model.)



Witnesses:
C. D. Hester

[Signature]

Inventor
John E. Olson

By James L. Norris

Atty.

UNITED STATES PATENT OFFICE.

JOHN E. OLSON, OF CHICAGO, ILLINOIS.

HAND-DRILL.

SPECIFICATION forming part of Letters Patent No. 652,137, dated June 19, 1900.

Application filed April 3, 1900. Serial No. 11,348. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. OLSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Hand-Drills, of which the following is a specification.

This invention relates to hand-drills, and has for one object to provide a double-acting ratchet-drill of improved construction wherein the reciprocating movement of the hand actuating mechanism is converted into a continuous rotary movement by the double ratchet mechanism, whereby the drill or boring-tool is continuously rotated in the proper direction to effect the drilling or boring operation.

It has for its further object to provide a hand-drill of the character described which shall be simple and inexpensive in construction and efficient and rapid in operation.

To these ends my invention consists in the features and in the construction, combination, and arrangement of parts hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a longitudinal sectional view of my improved drill. Figs. 2 and 3 are detail views illustrating the manner in which the bolt alternately engages the ratchet-wheels. Fig. 4 is a face view of one of the ratchet-wheels. Fig. 5 is a transverse sectional view of the same. Fig. 6 is a top plan view of the hub. Fig. 7 is a side elevation of the same. Fig. 8 is a view showing the bolt in side and front elevation.

Referring to the drawings, the numeral 1 indicates a casing for inclosing the ratchet mechanism and comprising two semi-ellipsoidal shells 2, each provided with semicylindrical extensions 3 at its opposite ends, said shells being arranged face to face and secured together by ferrules 4, fitted over the extensions 3. The two shells, constructed and secured together in the manner described, form a hollow bulb-like casing, which may be conveniently grasped in the hand of the operator. Disposed in the upper part of the casing 1 is a beveled gear-wheel 5, centrally

cored, as at 6, and fixed in said gear-wheel is the lower end of a spirally grooved or threaded rod 7. Sleeved upon the rod 7 is a tube 8, provided at its lower end with a nut 9, which engages the spiral grooves or threads on the rod 7, and said tube is provided at its opposite end with a handle 9^a, of any approved or preferred construction, suitable to be grasped in the hand of the operator. By holding the casing 1 stationary and reciprocating the tube 8 on the spirally-grooved rod 7 said rod and the beveled pinion 5, fixed thereon, will be alternately rotated in opposite directions in a well-known manner. Passing through the lower end of the casing 1 is a shaft 10, on the upper end of which is formed a barrel or hub 11, the extreme upper end 12 of said shaft being loosely fitted in the centrally-cored portion 6 of the beveled pinion 5, which forms a journal-bearing therefor. Disposed in the lower portion of the casing and journaled on the shaft 10 is a beveled gear-wheel 13, corresponding in shape and size to the gear-wheel 5, and screwed into the sections 2 2 of the casing are two screws 14, which serve as journals, on which are journaled beveled gear-wheels 15, which gear the beveled gear-wheels 5 and 13 together. It therefore follows that if the beveled gear-wheel 5 be rotated in either direction the gear-wheel 13 will be rotated in the reverse direction. On the inner adjacent faces of the gear-wheels are formed ratchet-teeth 16, the teeth being arranged in the form of a circle on each gear-wheel and the teeth on one gear-wheel being arranged in a reverse direction to those of the other gear-wheel. Formed in the opposite vertical sides of the barrel or hub 11 are two vertical dovetailed grooves 17, in each of which is arranged to freely reciprocate a bolt 18, the opposite ends of which are reversely inclined or beveled, as shown at 19 and 20, said bolt being dovetailed in cross-section to fit the dovetailed groove in the barrel or hub in which it plays. The bolts 18 are of such length that when one end of either of said bolts is in engagement with the ratchet-teeth of one of the beveled gear-wheels its opposite end will be out of engagement with the ratchet-teeth of the other gear-wheel.

On the outer end of the shaft 10 is fixed a

chuck 21, of any suitable or preferred construction, which operates to hold the drill or bit.

The operation of my improved device is as follows: The drill, bit, or other boring-tool is placed in the chuck 21 in the usual manner, and being centered at the point to be bored the casing 1 is grasped in one hand and the handle 9^a in the other hand. The operator holds the casing stationary, pressing it slightly toward the work, and with the other hand reciprocates the tube 8 backward and forward over the rod 7. As the tube 8, and with it the nut 9, is moved in one direction it rotates the rod 7 and with it the beveled gear-wheel 5 in a certain direction, and through the medium of the intermediate gear-wheels 15 rotates the other beveled gear-wheel 13 in a reverse direction. For example, let it be assumed that when the nut is forced toward the casing the ratchet-wheels 5 and 13 will be revolved in the directions indicated by the arrows in Fig. 2, then the lower beveled ends 20 of the bolts 18 will engage the ratchet-teeth of the wheel 13 and will cause the barrel or hub 11, and consequently the boring-tool, to rotate in the same direction as the wheel 13, the ratchet-teeth of the wheel 5 passing idly over the upper ends 19 of the bolts. When the nut 9 is moved in the reverse direction, however—that is to say, away from the casing 1—then the wheels 5 and 13 will also be moved in the reverse direction or in the directions indicated by the arrows in Fig. 3, and the ratchet-teeth acting on the beveled ends 20 of the bolts 18 will force the latter endwise toward the wheel 5 and into engagement with the ratchet-teeth on the latter, and the barrel or hub 11, and with it the boring-tool, will then rotate with the said wheel 5, the movement of which is now the reverse of that before described. It will be readily understood, therefore, that the boring-tool will always be rotated in one certain direction or in a direction to cause the tool to enter the work irrespective of the direction in which the nut 9 is moved on the spirally-grooved rod 7.

I have shown and described two bolts 18 as engaging the ratchet-teeth on the beveled gear-wheels; but it will be evident that a single bolt may be employed for the purpose, though two bolts are preferred, as such arrangement more equally distributes the strain on the parts and causes the device to operate more evenly.

Having described my invention, what I claim is—

1. In a hand-drill, the combination with a spirally-grooved rod and a nut sleeved thereon and operating when reciprocated to rotate said rod alternately in opposite directions, a tool-holder, and double-acting ratchet mechanism actuated by said rod for rotating the drill-holder continuously in one direction, substantially as described.

2. In a hand-drill, the combination with a

spirally-grooved rod and a nut sleeved thereon and operating when reciprocated to rotate said rod alternately in opposite directions, a tool-holder, and ratchet-gearing interposed between the said rod and tool-holder and actuated by the said rod, said ratchet-gearing being constructed and arranged to rotate the tool-holder continuously in one direction, substantially as described.

3. In a drill, the combination with a casing, of two oppositely-arranged wheels geared together to rotate in opposite directions, a spirally-grooved rod and nut for rotating one of said wheels alternately in opposite directions, a tool-holder, and means for automatically connecting said tool-holder alternately with said wheels as the movement of the latter is reversed, whereby the tool-holder is rotated continuously in one direction, substantially as described.

4. In a drill, the combination with a casing, of two oppositely-arranged wheels geared together to rotate in opposite directions, means for rotating one of said wheels alternately in opposite directions, a tool-holder, a sliding connection carried by the tool-holder and means for automatically throwing said connection alternately into engagement with said wheels, substantially as described.

5. In a drill, the combination with a casing, of two oppositely-arranged wheels geared together to rotate in opposite directions and provided on their adjacent faces with oppositely-arranged ratchet-teeth, of a tool-holder, a sliding bolt arranged to alternately engage said ratchet-teeth, and means for alternately rotating one of said wheels in opposite directions, substantially as described.

6. In a drill, the combination with a casing, of two oppositely-arranged wheels geared together to rotate in opposite directions and provided on their adjacent faces with reversely-arranged ratchet-teeth, of a hub rotatably arranged between said wheels and carrying a sliding bolt beveled on its opposite ends and arranged to alternately engage said wheels, a tool-chuck carried by said hub, and means for alternately rotating one of said wheels in opposite directions, substantially as described.

7. In a drill, the combination with a casing, of two oppositely-arranged wheels geared together to rotate in opposite directions and provided on their adjacent faces with reversely-arranged ratchet-teeth, of a hub rotatably arranged between said wheels and carrying a sliding bolt reversely beveled on its opposite ends and arranged to alternately engage said wheels, a tool-chuck carried by said hub, and means for alternately rotating one of said wheels in opposite directions, substantially as described.

8. In a drill, the combination with a casing, of two oppositely-arranged wheels geared together to rotate in opposite directions and provided on their adjacent faces with reversely-disposed ratchet-teeth, of a hub ro-

tatably arranged between said wheels and provided on its periphery with a dovetailed groove, a bolt slidably arranged in said groove and reversely beveled on its opposite ends, said bolt being arranged to alternately engage said ratchet-teeth, means for alternately rotating one of said wheels in opposite directions, and a tool-chuck carried by said hub, substantially as described.

9. In a drill, the combination with a casing, of two oppositely-arranged wheels geared together to rotate in opposite directions and provided on their adjacent faces with reversely-disposed ratchet-teeth, of a shaft passing loosely through said casing and one of said wheels, a hub carried by the shaft and provided on its periphery with a dovetailed groove, a bolt slidably arranged in said groove and reversely beveled on its opposite ends, said bolt being arranged to alternately engage said ratchet-teeth, a tool-chuck fixed on the free end of the shaft, and means for alternately rotating one of the said wheels in opposite directions, substantially as described.

10. In a drill, the combination with the hollow casing, of the beveled gear-wheels arranged in the opposite ends thereof and provided on their adjacent faces with reversely-arranged ratchet-teeth, said wheels being geared together to rotate in opposite directions, a shaft passing loosely through the casing and one of said wheels, a hub carried by the shaft and provided on its periphery with a dovetailed groove, a bolt slidably arranged in said groove and reversely beveled on its opposite ends, said bolt being arranged to alternately engage said ratchet-teeth, a tool-chuck fixed on the free end of the shaft, a spirally-grooved rod fixed in one of said wheels, a nut sleeved on said rod, and means for reciprocating said nut on the rod in opposite directions, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN E. OLSON.

Witnesses:

ARVID ERICKSON,
W. C. BLOOMQUIST.