No. 885,914. PATENTED APR. 28, 1908.

J. A. DALTON & E. D. THOMPSON.

REVERSIBLE TAPPING CHUCK.

APPLICATION FILED JUNE 17, 1907.

2 SHEETS—SHEET 1.

Fig. 1

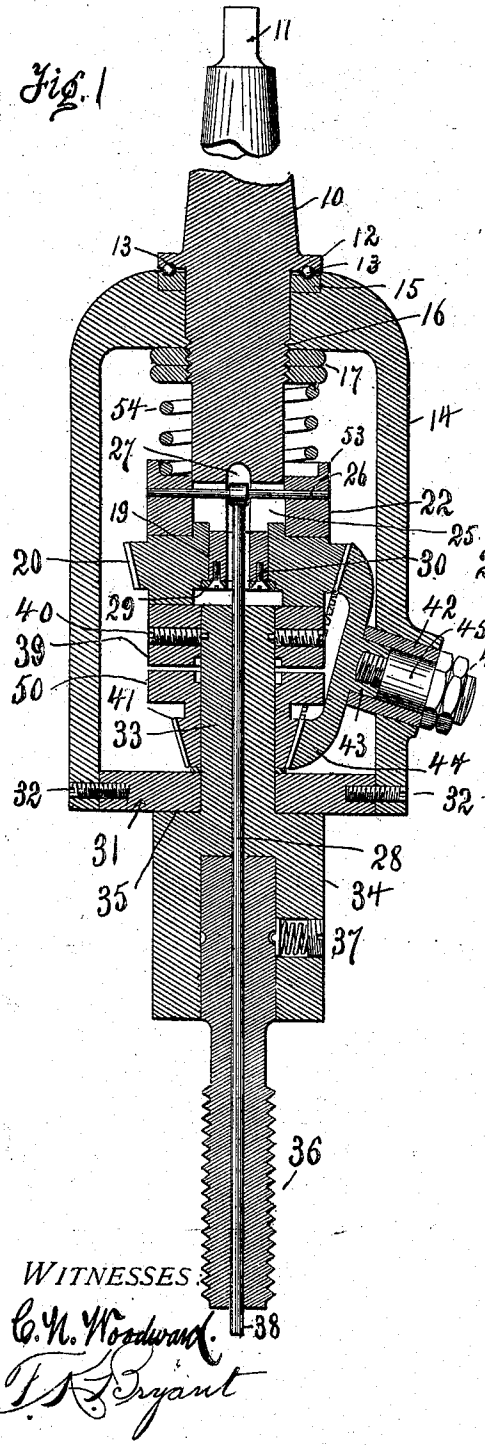
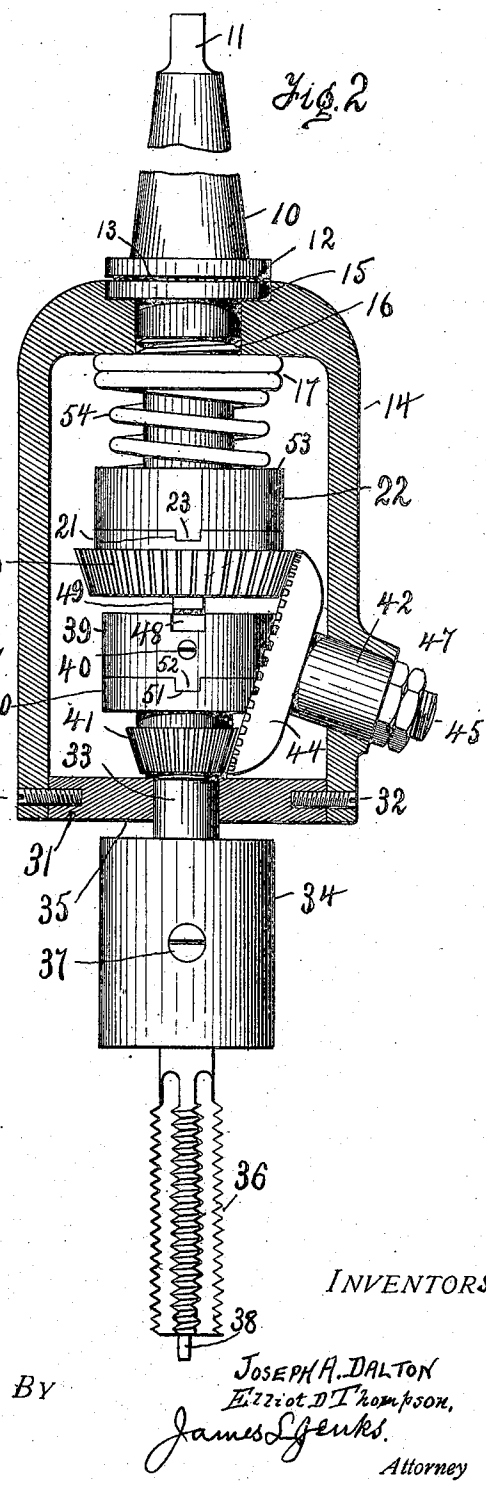



Fig. 2




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2 SHEETS—SHEET 2.

Fig. 5

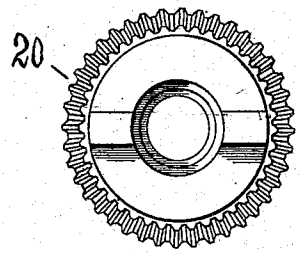



Fig. 6

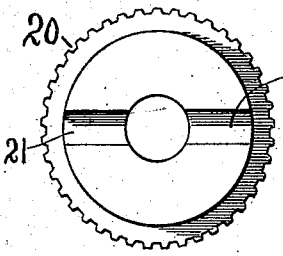



Fig. 3

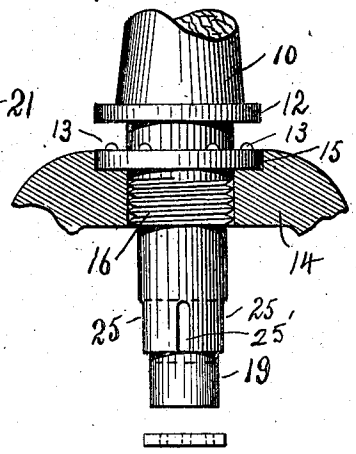



Fig. 7

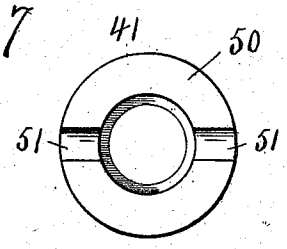



Fig. 9

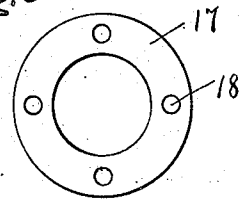



Fig. 4

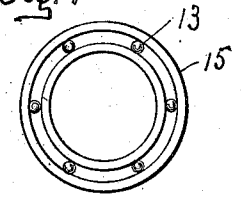



Fig. 8

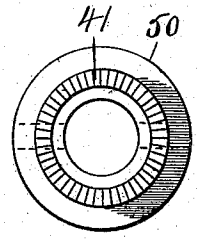



Fig. 10

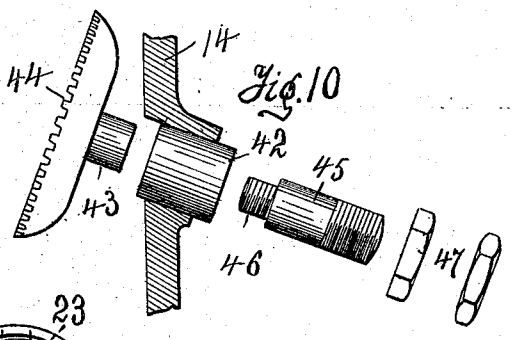
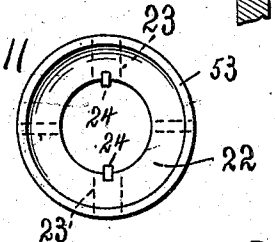



Fig. 11




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# UNITED STATES PATENT OFFICE.

JOSEPH A. DALTON, OF PAWTUCKET, AND ELLIOTT D. THOMPSON, OF CENTRAL FALLS, RHODE ISLAND; SAID DALTON ASSESSOR TO SAID THOMPSON.

## REVERSIBLE TAPPING-CHUCK.

No. 885,914. Specification of Letters Patent. Patented April 28, 1908.

Application filed June 17, 1907. Serial No. 379,446.

*To all whom it may concern:*

Be it known that we, JOSEPH A. DALTON and ELLIOTT D. THOMPSON, both citizens of the United States, said DALTON residing at Pawtucket, in the county of Providence, in the State of Rhode Island, and said THOMPSON residing at Central Falls, in the county of Providence, in the State of Rhode Island, have jointly invented a new and useful Improvement in Reversible Tapping-Chucks, of which the following is a specification.

Our invention relates to implements employed for holding taps and like tools, and has for its object to produce a simply constructed and efficient implement of this character, whereby the tap or other tool is adapted to be automatically disengaged as the end of the top or other tool approaches the bottom of the aperture in which it is operating, and to reverse the motion and cause the automatic withdrawal of the tool.

With these and other objects in view, which will appear as the nature of the improvement is better understood, the invention consists in certain novel features of construction, as hereafter shown and described, and specifically pointed out in the claims.

In the drawings forming part of this application, and in which corresponding parts are designated by like reference characters, is illustrated the preferred embodiment of the invention, capable of carrying the same into practical operation.

In the drawings thus employed: Figure 1 is a longitudinal sectional elevation of the improved device complete. Fig. 2 is a side elevation with the housing portion of the device in section. Fig. 3 is a detail side view of the "head" portion of the device, with the adjacent portion of the housing in section. Fig. 4 is a plan view of the bearing washer of the head portion of the device. Fig. 5 is a bottom plan view of the upper drive gear. Fig. 6 is a top plan view of the upper drive gear. Fig. 7 is a top plan view of the lower drive gear. Fig. 8 is a bottom plan view of the lower drive gear. Fig. 9 shows a plan view of one of the check nuts employed upon the head portion of the device. Fig. 10, is a side elevation of the crown gear, the bushing of the crown gear, the crown gear stud, and the crown gear stud check nuts disconnected, with the adjacent portion of the housing in section. Fig. 11 is a plan view of the clutch member.

The improved device comprises a head portion or stock 10 having at one end means for attachment to the driving mechanism such as a squared or flattened portion 11, and with an intermediate flange 12 having an annular channel in its lower face to receive bearing balls 13. The stock 10 is supported by a housing or cage 14 through whose upper end the lower portion of the stock projects, the stock being surrounded at the point where it passes into the housing with a bearing washer 15 provided with an annular channel in its upper face to receive the bearing balls 13, the washer thus forming a seat upon which the stock 10 is adapted to rotate upon its bearing balls.

The stock 10 is threaded for a distance as at 16, and engaging this threaded portion are lock washers 17, one of the washers represented in Fig. 9 and shown provided with sockets 18 to receive a suitable pin wrench or like implement by which the washer may be rotated to provide for the proper adjustment. By this simple means the stock 10 may be readily adjusted relative to the housing 14 and the bearing balls 13, as will be obvious.

The lower end of the stock 10 is reduced as at 19, and journaled upon this reduced portion is a beveled gear 20, the upper face of the gear provided with oppositely disposed clutch recesses 21, and surrounding the stock 10 above the gear 20. A clutch member 22 surrounds the stock 10 and is provided with oppositely disposed ribs 23 adapted to engage the cavities 21 of the gear 20 when in one position, and thus constitute a clutch device. The upper face of the member 22 is provided with an annular rib 53, and bearing at one end within the cavity formed by the rib is a spring 54, the other end of the spring bearing beneath the adjusting washer 17. By this means the clutch member 22 is maintained yieldably in its downward position, as hereafter explained.

The portion of the stock within the clutch member 22 is provided with longitudinal slots 25 adjacent to said upper drive gear, the clutch member 22 being provided with vertical keys 24 which fit into the guide-channels 25′, and extending through the slots 25 and clutch member 22 is a pin 26. The lower portion of the stock 10 is provided with a central vertical aperture 27 through which a rod 28 operates, the upper end of the rod being

connected to the pin 26 within the cavity 27. By this arrangement the vertical movement of the rod 28 acting upon the pin 26 will move the clutch member 22 vertically to a limited extent upon its guide-keys 24—24, the object to be hereafter explained.

The gear 20 is provied with an annular recess in its lower face surrounding the lower end of the stock 10, and fitting within this recess and surrounding the rod 28, and also bearing against the lower end of the stock 10, is a stop washer 29 secured rigidly to the lower end of the stock by screws 30. By this means the gear 20 is rotatively coupled to the stock 10.

The housing 14 is provided at its lower end with a closure 31 secured in place by screws 32, or other suitable fastening means, the closure having a central bearing aperture through which a stud 33 projects slidably and rotatively, the stud being integral with a tap socket 34, and the tap socket being larger than the stud 33, whereby a shoulder 35 is formed which bears against the lower face of the closure 31, when the tap socket is in its upper position, as shown in Fig. 1.

The tap represented at 36 is held in the socket preferably by a yieldable holding device 37. The stud 33, socket 34, and tap 36 are provided with registering longitudinal apertures through which the rod 28 extends, the lower end 38 of the rod projecting below the lower end of the tap 36 when the clutch member 22 is in engagement with the upper gear 20, as shown in Figs. 1 and 2. Surrounding the upper end of the stud 33 is a collar 39 rigidly secured to the stud as by clamp screws 40, the collar thus forming a bearing for the gear 20. Rotating on the stud 33 between the collar 39 and the closure 31 of the housing is a beveled gear 41, and for the purpose of this description the gear 20 is designated as the upper drive gear and the gear 41 as the lower drive gear. Fitting through one of the side walls of the housing 14 is a bushing 42, preferably of steel, and mounted for rotation within this bushing is the hub 43 of a crown gear 44, the crown gear meshing with the upper drive gear 20 and the lower drive gear 41 as shown.

The hub 43 of the crown gear 44 extends only part way through the bushing 42, and fitting into the outer end of this bushing is a stud 45 having a threaded projection 46 at the inner end fitting into a threaded aperture in the hub 43. The outer end of the stud 45 projects beyond the bushing 42 and is externally threaded, and engaging this externally threaded portion are adjusting nuts 47. By this means the crown gear 44 is efficiently supported, and is also capable of being delicately adjusted to any required extent relative to the gears 20 and 41.

The collar 39 is provided in its upper face with oppositely disposed recesses 48, and the gear 20 is provided on its lower face with oppositely disposed ribs 49 adapted to engage the recesses 48 when the tap socket and its stud are in their upper position, as shown in Fig. 1. The upper portion of the gear 41 is enlarged into a bearing 50 corresponding in size to the collar 39, and provided with oppositely disposed recesses 51 into which correspondingly formed ribs 52 on the lower face of the collar 39 are adapted to enter when the tap socket 34 and its stud 33 are in their lower position, as shown in Fig. 2.

The tap socket 34 with its stud 33 carried by collar 39 have a vertical movement sufficient to enable the recess 48 and the ribs 52 of the collar to be alternately engaged with the ribs 49 of the gear 20 and the recess 51 of the gear 41—50, as will be hereafter explained.

With a device thus constructed the operation is as follows: When starting to tap a hole, the operator presses downwardly upon the tap body 14 thereby carrying the gear 20 with it and coupling the ribs 49 of the upper gear with the recesses 48 of the collar 39, and at the same time disengaging the bottom drive gear recesses 51 from the rib 52 of the collar. This action couples the top drive gear 20 directly to the tap socket 34, and the top drive gear being coupled operatively to the stock 10 through the medium of the clutch member 22 and spring 54, the tapping operation will be accomplished, the lower gear 41 running idle during the tapping operation. When the tap reaches the bottom of the aperture the lower end 38 of the rod 28 bearing upon the bottom of the aperture is forced upwardly carrying the pin 26 with it and disengaging the clutch member 22, and at the same time by elevating the housing 14 the lower drive gear 41 is coupled through its cavities 51 with the ribs 52 of the collar 39, and the gear 20 disconnected from the collar 39, leaving the gear 20 free to rotate the lower drive gear 41 in the opposite direction through the action of the crown gear 44, and removing the tap from the completed hole. The stock 10 will usually be coupled to a drill press and when the tap is to be removed the operator turns the handle of the drill press in the opposite direction to reverse the motion and the "pull" against the tap caused by this action, produces the lifting action of the housing 14 above referred to. By this simple means the hole will be effectually tapped, and the tap removed from the hole by simply reversing the motion as above described.

The construction is simple and effectual, and the device is adapted for taps of various sizes, and to taps employed for metals of different kinds.

Having thus described the invention, what is desired to secure by Letters Patent, is:

1. In an implement of the class described, a stock having means at one end for connection to the drive mechanism and with an upper drive gear rotative upon the other end and provided with upper and lower clutch faces, a clutch member rotative with said stock and movable longitudinally thereon and adapted to be coupled with and uncoupled from the clutch face of said upper drive gear, a tap socket, a lower drive gear rotative upon said tap socket and provided with an upper clutch face, a collar carried by said tap socket and operating between said drive gears and provided with clutch faces in its opposite sides adapted to be alternately engaged with the clutch faces of said gears, and a gear engaging said upper and lower gear.

2. In an implement of the class described, a stock having means at one end for connection to the drive mechanism and with an upper drive gear rotative upon the other end and provided with upper and lower clutch faces, a clutch member rotative with said stock and movable longitudinally thereon and adapted to be coupled with and uncoupled from the clutch face of said upper drive gear, a tap socket, a lower drive gear rotative upon said tap socket and provided with an upper clutch face, a collar carried by said tap socket and operating between said drive gears and provided with clutch faces in its opposite sides adapted to be alternately engaged with the clutch faces of said gears, a housing in which said stock is rotatively disposed and in which said tap socket is slidably and rotatively disposed, and a gear mounted for rotation in said housing and engaging said upper and lower drive gears.

3. In an implement of the class described, a stock having means at one end for connection to the driving mechanism and with an upper drive gear rotative upon the other end and having a lower clutch face, a tap socket, a lower drive gear rotative upon said tap socket and provided with an upper clutch face, a collar carried by said tap socket and operating between said drive gears and provided with clutch faces at its opposite sides adapted to be alternately engaged with the clutch faces of said gears, a housing in which said stock is rotatively disposed and in which said tap socket is slidably and rotatively disposed, and a gear mounted for rotation in said housing and engaging said upper and lower drive gears.

4. In an implement of the class described, a stock having means at one end for connection to the driving mechanism and with an upper drive gear rotative upon the other end and provided with upper and lower clutch faces, said stock having guide-keys and longitudinal slots adjacent to said upper drive gear, a clutch member having a clutch face adapted to be engaged with the adjacent clutch face of said upper drive gear and provided with channels slidably engaging said guideways, a transverse pin extending through said clutch member and likewise through the slots in said stock, a tap socket, a lower drive gear rotative upon said tap socket and provided with an upper clutch face, a collar carried by said tap socket and operating between said drive gears and provided with clutch faces in its opposite sides adapted to be alternately engaged with the clutch faces of said gears, a gear engaging said upper and lower gears, and a rod extending through said tap socket and into said stock and connected to said transverse pin.

5. In an implement of the class described, a stock having means at one end for connection to the driving mechanism and with an upper drive gear rotative upon the other end and provided with upper and lower clutch faces, said stock having longitudinal guide-channels and longitudinal slots adjacent to said upper drive gear, a clutch member having a clutch face adapted to be engaged with the adjacent clutch face of said upper drive gear and provided with guide-keys slidably engaging said guide-channels, a transverse pin extending through said clutch member and likewise through the slots in said stock, a tap socket, a lower drive gear rotative upon said tap socket and provided with an upper clutch face, a collar carried by said tap socket and operating between said drive gears and provided with clutch faces in its opposite sides adapted to be alternately engaged with the clutch faces of said gears, a housing in which said stock is rotatively disposed and in which said tap socket is slidably and rotatively disposed, a gear mounted for rotation in said housing and engaging said upper and lower drive gears, a spring operating to maintain said clutch member yieldably in operative position relative to said upper drive gear, and a rod operating through said tap socket and connected to said transverse pin.

In testimony whereof we affix our signatures, in presence of two witnesses.

JOSEPH A. DALTON.
ELLIOTT D. THOMPSON.

Witnesses:
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ROSCOE M. DEXTER.