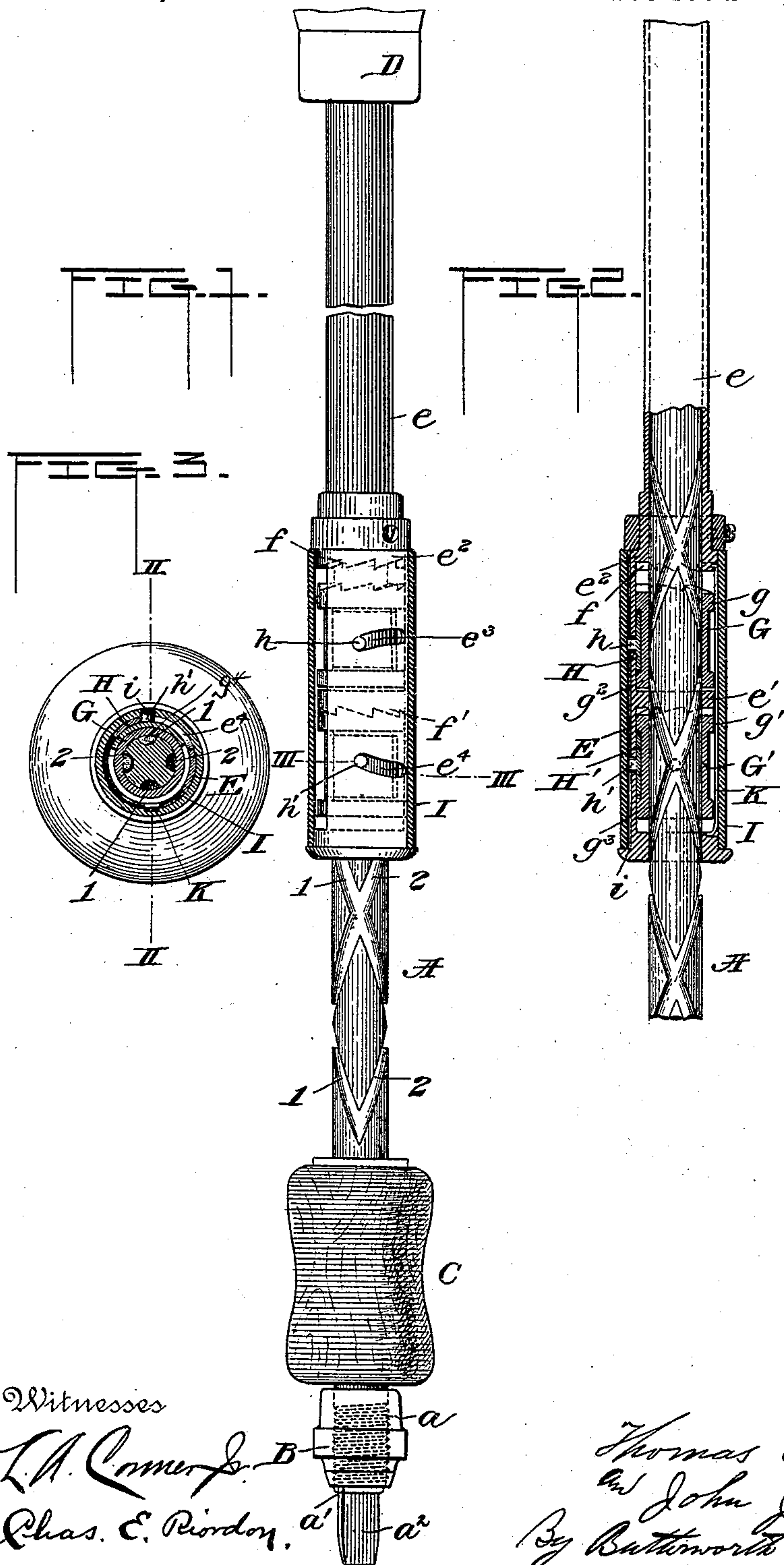


(No Model.)

T. EDWARDS, Jr., & J. J. EDWARDS.
SCREW DRIVER.

No. 487,946.

Patented Dec. 13, 1892.



Witnesses

L. A. Comer, Jr. B
Chas. E. Pindon, a' a'

Inventors

Thomas Edwards Jr
John J. Edwards
By Battisworth & Dowell
Attorneys

UNITED STATES PATENT OFFICE.

THOMAS EDWARDS, JR., AND JOHN J. EDWARDS, OF GRAND RAPIDS,
MICHIGAN.

SCREW-DRIVER.

SPECIFICATION forming part of Letters Patent No. 487,946, dated December 13, 1892.

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To all whom it may concern:

Be it known that we, THOMAS EDWARDS, Jr., and JOHN J. EDWARDS, citizens of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Screw-Drivers; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention is an improvement in self-actingscrew-drivers and like tools; and its object is to improve the construction of the tool, so that upon the reciprocation of the handle the stock will be rotated either forward or backward without turning the handle by means of improved devices for reversing the rotation of the stock at the will of the operator.

The invention consists, essentially, in the combination, with a stock having a shank provided with opposite intersecting spiral grooves, of a reciprocating handle, and a peculiarly-constructed duplex adjustable clutch device connected therewith by which the reciprocating movements of the handle are converted into rotary movements of the stock in either a forward or backward direction, and in certain novel details of construction and combinations of parts, all as will be hereinafter fully described, and then pointed out in the claims at the end of this specification.

Referring to the drawings, which form a part of this specification, and in which similar letters and figures of reference are used to denote similar parts, Figure 1 is an elevation of a device embodying our invention, the sleeve inclosing the duplex clutch device being shown in section. Fig. 2 is a vertical sectional elevation taken on the line II II of Fig. 3, and Fig. 3 is a transverse section taken on line III III of Fig. 1.

A denotes the tool-stock, which consists of a metal rod having its front end threaded, as at a , and split or slitted longitudinally, as at a' , to receive the shank of the screw-driver bit a^2 or other tool which may be inserted therein.

B is a chuck adapted to be screwed onto the end a of the stock and having the open-

ing therethrough reduced at its outer end, so as to bind the conical end of the stock and cause the slitted portion thereof to close upon the tool inserted therein.

To insert the tool, the chuck B is partly unscrewed to permit the shank of the tool to be inserted in the slit, and thereupon the chuck may be turned so as to bind the tool in place. Above this chuck is a hand-block C, which is loosely mounted on the stock, so that the latter can revolve freely therein, but is prevented from moving longitudinally thereon by a cross plate or plates secured to the block and engaging an annular groove in the stock or any suitable device adapted to loosely confine the block against longitudinal movement on the stock. Above the block C the stock is provided with high-pitched spiral grooves 1 1 and 2 2. Grooves 2 twist oppositely to grooves 1 and intersect the latter at regular intervals, as shown.

D designates a handle, which is bored or slotted longitudinally to receive the spirally-grooved end of the stock, and E is a cylinder loosely fitted on the stock between the handle and block C and firmly connected to the handle by a tube e , as shown, which also protects the spiral grooves of the stock from dust. The cylinder is provided with a central annular ring e' , the lower face of which and the lower face of the upper cylinder-head e^2 (supposing that the handle is at the top of the tool) are each ratchet-faced, as shown at $f f'$, the said ratchet-teeth, however, pointing or inclining in opposite directions.

G G' are two collars or thimbles loosely fitting the stock within the cylinder E on opposite sides of ring e' . The upper ends of said thimbles are formed with enlarged ends or flanges $g g'$, which are ratchet-toothed on their upper faces and respectively adapted to engage within the ratchets $f f'$. On the lower ends of said thimbles are flanges $g^2 g^3$. Thimble G has interior lugs or projections g^4 , which engage the spiral grooves 1 1 of the stock, and thimble G' has similar interior lugs which engage the spiral grooves 2 2 of the stock, so that if the cylinder be moved longitudinally upon the stock (or vice versa) while the thimbles are loose in the cylinder

said thimbles will be caused to revolve in opposite directions by the respective spiral grooves.

H H' are clips, or may be rings fitted loosely on the thimbles G G' between the same and the cylinder-shell and of such width as to have only a limited amount of lateral movement between the flanges of the thimbles. These clips have central projections or studs *h h'*, respectively, which project through cam-slots *e³ e⁴* in the cylinder-wall, said slots extending in opposite directions, so that if the clips are moved or turned in one direction they will move the thimbles toward each other, and if turned in the opposite direction they will separate the thimbles.

I designates a sleeve fitted over the cylinder and loosely confined thereon between the heads thereof in any suitable manner, so that it can rotate on the cylinder. This sleeve is provided with an internal longitudinal groove or grooves *i* into which the studs *h h'* project. The slots *e³ e⁴* are diagonal to the groove *i*.

K is a leaf or flat spring secured within the case and bearing laterally against sleeve I, so as to hold the groove *i* in said sleeve in engagement with the studs *h h'* and retain the sleeve and thimbles in operative position, thus preventing accidental displacement or derangement of the parts when the handle is reciprocated.

In using the device the handle D is grasped in the hand, and then sleeve I is given a partial turn on the cylinder E, according to the direction in which the screw is to be turned. This movement turns clips H H' partly around the stock, because of the engagement of studs *h h'* with groove *i*, and at the same time the studs *h h'* ride up or down in slots *e³ e⁴* in the cylinder E, thereby causing the clips to move longitudinally on the thimbles, and in doing so they abut against the collars or flanges on said thimbles and cause the latter to move in opposite directions on the stock, throwing the ratchet of one thimble into engagement with the opposed ratchet on the cylinder and at the same time disengaging the other thimble. Supposing thimble G to be thus engaged, (thimble G' being disengaged,) the tool-point is engaged in the eye of the screw and the stock firmly held against the screw by means of block C. The handle is then pushed down or toward the block, and as the cylinder is fast to handle and the thimble G locked to the cylinder, the lugs on the thimble G, moving in grooves *l l*, cause the stock to rotate and drive or force in the screw. As the handle is drawn outward the rotary movement of thimble G is of course reversed, but its ratchet-teeth ride over those of the cylinder-head and the stock remains stationary; but when the handle is pushed down again the ratchets of thimble G and cylinder-head *e²* re-engage and the stock is again rotated in the desired direction. Thimble G' meantime being disengaged from the cylinder is free to revolve therein during the reciprocating

movements of the handle. In order to reverse the tool, the sleeve I is turned back in the reverse direction, disengaging thimble G and throwing thimble G' into engagement. Then upon the reciprocation of the handle the operation of parts is substantially as described, except that the rotary motion of the stock is reversed. By simply holding the sleeve I firmly and turning the handle in the direction you wish to turn the screw the parts are adjusted for operation; but, if desired, a cross pin or handle may be fixed to the sleeve to facilitate the adjustment. It will be noticed that by having the ratchet-teeth on the upper (or same) end of each thimble we operate the stock in either direction by the inward push of the handle, so that the pressure on the handle is utilized to hold the bit in place as well as to turn the stock. The spring K, while holding the sleeve I in place, also holds the thimbles against the force of gravity, so that when the stock is pushed downward the thimbles cannot recede from the cylinder-head by their own weight, and thereby prevent the ratchets from interlocking, thus insuring the engagement of the ratchet-teeth of the thimbles with those of the cylinder. It is obvious that the slots in the cylinder-wall might be straight and the groove or channel in sleeve I inclined, or, in other words, the slots transferred to the sleeve and the groove to the cylinder and the effect—*i. e.*, the reversing of the motion—would be practically the same in either case, though we prefer the construction shown, as the slots are concealed. It will also be evident that, if desired, the bit could be attached to the cylinder or tube and the handle to the stock, which would cause the cylinder to revolve by reciprocating the stock therethrough, this being simply an obvious transposition of parts, the working of the reversing mechanism being the same in either case. To take off or loosen the chuck, simply turn sleeve I in the direction you would turn the chuck, then hold the chuck and work the handle, as described, and the chuck will run off the thread.

We do not desire to limit our invention to the exact construction shown and described herein, as the same may be modified in a number of ways without departing from the spirit of our invention.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination, with the stock having right and left hand spiral grooves, of a cylinder or case loosely fitted on said stock and provided with two sets of ratchet-teeth, which are inclined in opposite directions, a pair of thimbles within said cylinder, each provided with a lug or lugs engaging the respective spiral grooves of the stock and with ratchet-teeth adapted to interlock with one set of teeth on the cylinder when properly shifted, and means for shifting either thimble into

engagement with the cylinder and simultaneously disengaging the other thimble, substantially as described.

2. The combination of the stock having right and left hand spiral grooves, a cylinder loosely fitted thereon, and a pair of thimbles loosely fitted on the stock within the cylinder having internal lugs engaging the respective grooves of the stock and adapted to be locked to the cylinder, together with the clips loosely connected to said thimbles, having projecting studs, and a sleeve inclosing said cylinder, the wall of said cylinder and the sleeve being slotted and channeled or grooved for the reception of the studs, substantially as described.

3. The combination of the stock having right and left hand spiral grooves, the cylinder thereon having two sets of ratchet-teeth, located the one centrally thereof and the other at one end, and a pair of thimbles loosely fitted on the stock within the cylinder, having internal lugs engaging the respective grooves of the stock, one of said thimbles being adapted to engage the inner set of ratchet-teeth and the other thimble the outer set of teeth, together with mechanism for simultaneously shifting said thimbles, so as to engage one with and disengage the other from the ratchets of the cylinder, substantially as described.

4. The combination of the stock having right and left hand spiral grooves and a cylinder or case loosely fitted on said stock, having a centrally-disposed ring with ratchet-teeth thereon and a head with oppositely-inclined ratchet-teeth, a pair of thimbles within said cylinder, each having ratchet-teeth on its upper end adapted to engage the opposed ratchets at the center and end of the cylinder and each having internal lugs respectively engaging the right and left hand spiral grooves of the stock, and mechanism for throwing either thimble into engagement with the cylinder and simultaneously disengaging the other thimble therefrom, so as to reverse the rotary movement of the stock, substantially as described.

5. In combination with the spirally-grooved

stock, the reciprocating handle, the cylinder with oppositely-inclined ratchet-teeth thereon, the thimbles with ratcheted ends adapted to engage or interlock with the corresponding ratchet of the cylinder, the rotatable sleeve fitting over said cylinder, and means connected therewith for effecting the engagement of one thimble and simultaneously disengaging the other, so as to cause the stock to rotate in either forward or backward direction by the reciprocating movements of the handle, substantially as described.

6. In combination with the stock having the opposite spiral grooves, the pair of thimbles thereon having lugs which respectively engage said grooves, said thimbles being provided with ratchets on their upper ends, the cylinder having ratchets adapted to engage the ratchets of said thimbles, the clips loosely connected to said thimbles for longitudinally shifting the same and having projecting studs thereon, the diagonal slots in said cylinder for the passage of said studs, the sleeve fitted on the cylinder and having the internal longitudinal groove to receive the ends of the studs, and the spring interposed between said thimbles and sleeve, so as to retain the same in operative position, substantially as described.

7. In combination with the spirally-grooved stock, the ratcheted cylinder and the thimbles with ratchet-teeth for engaging the ratchets of the cylinder, the sleeve fitted over said cylinder and thimbles, and means connected therewith for effecting the engagement of either one of the thimbles and the simultaneous disengagement of the other, together with the interposed spring adapted to retain the sleeve and thimbles in operative position, substantially as described.

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

THOS. EDWARDS, JR.
JOHN J. EDWARDS.

Witnesses:

JNO. G. STEKETEE,
H. B. HINTON.