(No Model.)

J. H. SATTERLEE.

SCREW DRIVER.

No. 452,617. Patented May 19, 1891.

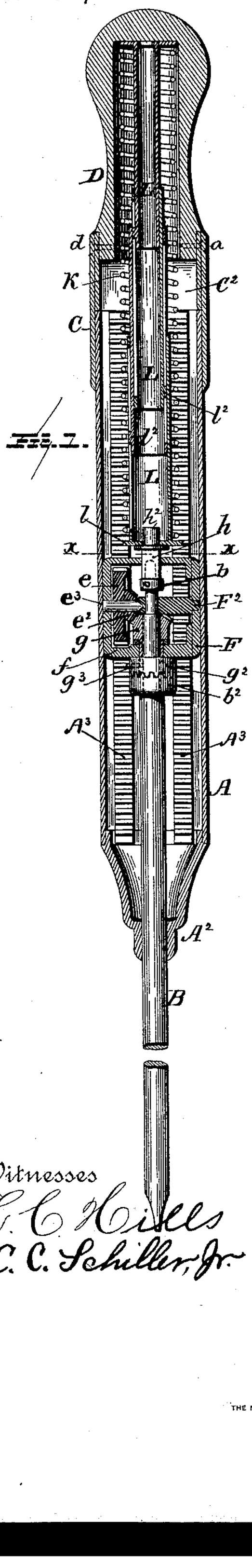

Fig. 1.

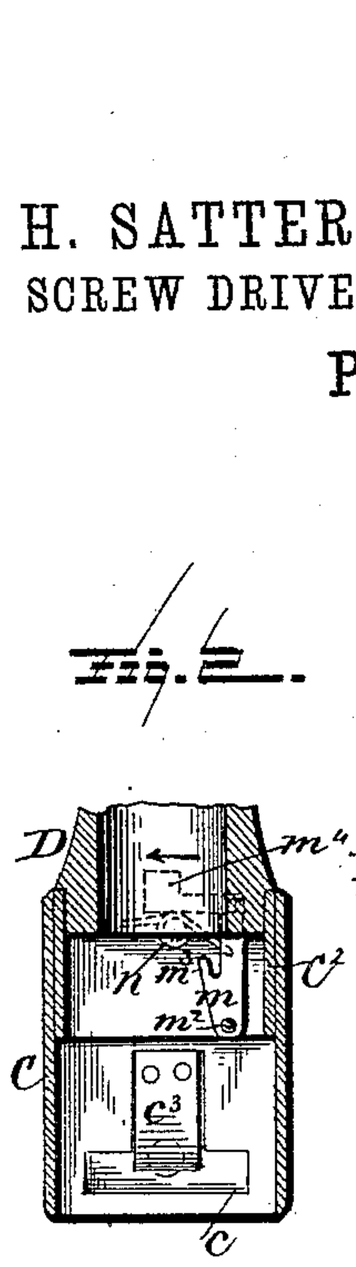

Fig. 2.

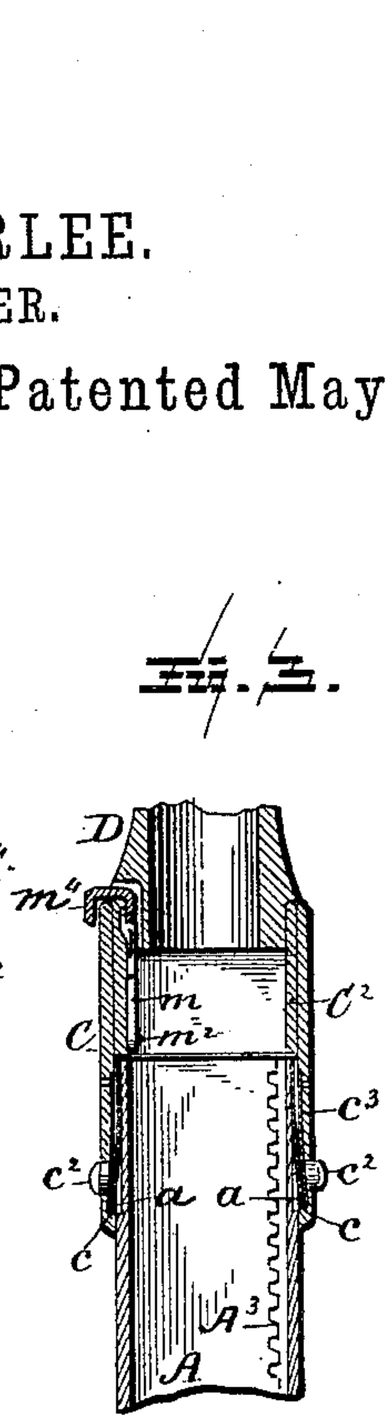

Fig. 3.

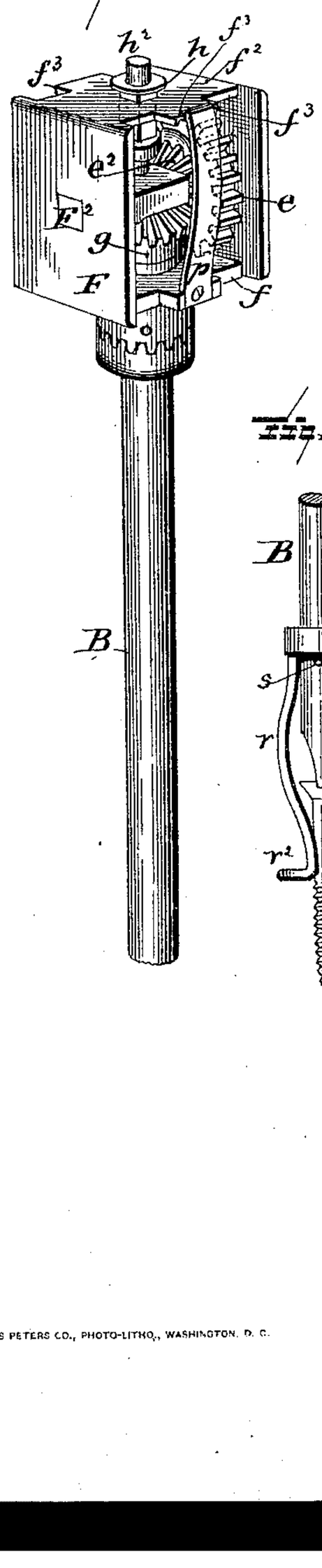

Fig. 4.

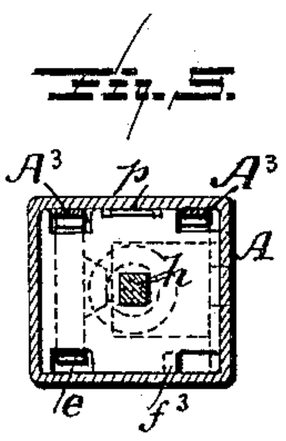

Fig. 5.

Fig. 6.

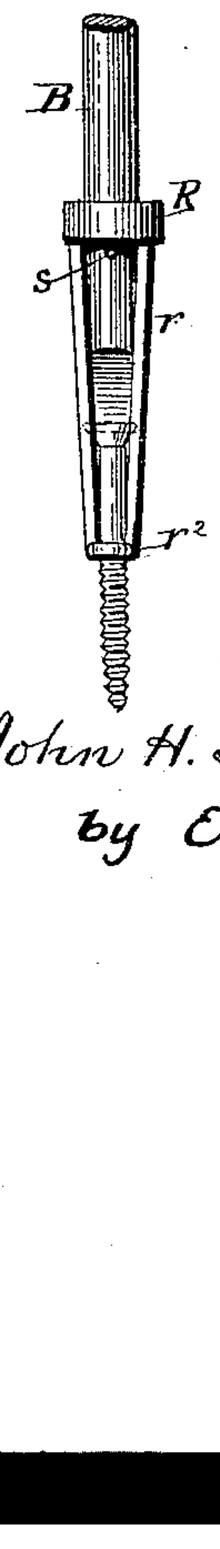

Fig. 7.

Witnesses
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UNITED STATES PATENT OFFICE.

JOHN H. SATTERLEE, OF FULTON, NEW YORK.

SCREW-DRIVER.

SPECIFICATION forming part of Letters Patent No. 452,617, dated May 19, 1891.

Application filed June 26, 1890. Serial No. 356,848. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. SATTERLEE, a citizen of the United States, residing at Fulton, in the county of Oswego, State of New York, have invented certain new and useful Improvements in Screw-Drivers, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to that class of screw-drivers in which the spindle can be revolved to the right or left by pressing upon the handle thereof; and the object of my invention is to produce a screw-driver of that class free from spiral grooves or ribs upon the spindle. I attain this object by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal central section of a screw-driver constructed in accordance with my invention, the spindle being shown in clutch with the gearing. Fig. 2 is a longitudinal section through a portion of the handle and the rectangular cap for the shell of the device. Fig. 3 is a longitudinal section through a portion of the handle, a portion of the shell, and the cap and catches uniting the shell to the handle. Fig. 4 is a perspective view of the gear-frame, the gears, and spindle connected therewith. Fig. 5 is a transverse section of the shell and end bushing of the spindle on line *x x* of Fig. 1. Figs. 6 and 7 represent in front and side views a screw-holder constructed in accordance with my invention and retained upon the spindle of the screw-driver.

In said drawings, A represents the tubular shell of the screw-driver, which is rectangular and preferably nearly square in cross-section, as shown in Fig. 5, but has its lower end cylindrical at A^2 to form a bearing for the spindle B. To the upper end of the shell is removably attached a correspondingly-rectangular cap C, to which the wooden handle D is secured by means of screws *d*. The handle and cap C are removably connected to the shell, so that they can be withdrawn promptly from over the end of the shell, be given a half-rotation, and secured again in said new position upon the end of the shell when it is desired to reverse the location of the gear-frame therein, and thus have the motion given to the spindle reversed, as after having used the tool to drive in screws it is desired to use it to unscrew or remove screws from their driven position, or vice versa, as will be hereinafter described.

To secure the cap upon the head of the shell, the latter has two flat spring-catches *a* on opposite sides thereof that have one end secured to the upper or outer end of the shell, and the opposite end of said catches is slightly bent outwardly and has a tendency to spring into engagement with a recess and shoulder *c*, formed on the inner surface of the cap.

To release the two catches *a* simultaneously from engagement, the operator presses with his thumb and finger upon two small knobs c^2, slightly projecting through the two opposite sides of the cap. Said knobs are attached to one end of flat spring-tongues c^3, secured at their opposite end c^4 in recesses formed in the walls of the cap, and the free end of the tongues forces the catches out of engagement. The operator can then pull the cap away from its seat upon the end of the shell. To prevent the end of the shell entering too far within the cap, the latter has an internal flange or lining C^2, against which the end of the shell will abut when it properly occupies its seat.

To the inner surface of the side of the shell are secured two parallel racks A^3, extending the length thereof, with either one of which the gear-wheel *e* is adapted to mesh, so that when its carrying-frame F is pushed upward toward the handle D said gear *e* will revolve in one direction upon one rack and in the opposite direction upon the other rack and transmit opposite rotations to the spindle B. The gear *e* carries a bevel-pinion e^2, and both are mounted upon a short shaft e^3, that has one end secured in the side of the frame F, and the opposite end rests in a bearing-plate F^2, secured to the opposite side of said frame F. With the bevel-pinion e^2 meshes a bevel-pinion *g*, that is provided with a long collar that passes through the bottom plate *f* of the gear-frame and carries upon the lower end of said collar a clutch-gear g^2, secured thereto by a pin g^3, passing through the side of said clutch-gear and into said collar. A similar clutch-gear b^2 is carried by the spindle B and is securely attached thereto upon a portion

that is of reduced diameter to form a supporting-shoulder for said gear b^2. Said portion is free to slide a short distance through the body and collar of the bevel-pinion g for its clutch-gear b^2 to come into or out of clutch with the gear g^2. The spindle has a still smaller diameter where it passes through the bearing-plate F^2, and has a collar b attached thereto, which limits the extent that the spindle can slide down in the bearing F^2, the space between the under side of said collar and said bearing being about equal, but slightly more than the length of the teeth of the clutch. The collar b also serves as a bearing for the lower end of the bushing h, that is constantly pressed upon by the coil-spring K. The lower half of the bushing h is square and enters a correspondingly-formed perforation in the top of the gear-frame to keep said bushing from rotating under the impulse of the spindle, the small end of which enters into said bushing.

To cause the bushing h and the spindle B to continuously receive the pressure of the spring K, and thus maintain the lower end of the spindle in constant engagement with a slot of a screw, for example, the bushing has a collar to support the lower disk or flanged end l of the tubular telescopic guide L of the coil-spring K. The upper end h^2 of the bushing enters a central perforation in the disk l and retains one end of the telescopic guide centrally in the shell A, while the opposite end is also retained centrally in the cavity of the handle D. The telescopic guide is in this case formed of four lengths of tubes, the separation of which is prevented by pins or projections l^2, extending outwardly from one tube and entering a longitudinal groove in the next tube of the series. The spring K is retained connected with its telescopic guide by the disks or flanges l at the end of the latter.

After the device has been used to drive in screws, if it is desired to use it to remove driven screws the change is promptly made as follows: Placing the lower end of the spindle B against a resisting substance—for example, the floor or the top of a bench—an end pressure is applied to the handle D until the whole of the spring K has been compressed within the cavity of said handle and the top plate f^2 of the gear-frame reaches the bottom of the handle. A hook-catch m is then used to retain the gear-frame F and spindle temporarily locked to and within the cap C. The catch m is pivoted at m^2 to the cap-plate, and has a side hook m^3 formed thereon that is normally kept out of engagement with the undercut portions f^3 of the top plate of the gear-frame by a spring n; but when the operator desires to lock the gear-frame within the cap he presses upon the side of the outwardly-projecting handle m^4 in the direction of the arrow in Fig. 2 until the hook m^3 is directly under the undercut portions f^3 of the gear-frame and then slightly releases his pressure upon the handle D. The hook m^3 then enters into engagement with the gear-frame and retains it within the cap C. The latter is then disconnected from the end of the shell A by pressing upon the buttons c^2, and at the same time pulling said cap away from said shell. The shell is then given a half rotation and its end reinserted and locked within the cap C, with the gear e in engagement with the opposite rack. The point of the spindle is then slightly pressed upon the floor, and thereby the top plate of the gear-frame reaches the bottom of the handle D and the hook-catch m becomes released under the impulse of its spring n. The release of pressure upon the handle D causes the spring K to push the gear-frame and its spindle to the bottom of its course without revolving said spindle, as said spring acts upon the end of the spindle and disconnects its clutch-gear b^2 from the clutch-gear g^2; but as soon as the operator presses upon the end of the handle the gear b^2 again clutches the gear g^2, as the gear-frame is retained stationary for an instant by the bent sheet-spring p, secured to the side of the gear-frame, pressing against the interior of the shell of the device, and said clutching and unclutching is repeated for each alternate motion of the handle of the screw-driver.

To guide the screw while being driven, a screw-holder is placed upon the lower portion of the spindle B. Said holder consists of a ring R, provided with two looped wires r, having their ends secured to said ring. Said wires are made of springy metal and have their looped portion outwardly bent at r^2 to rest upon the board in which the screw is driven and gradually force the holder upward on the spindle while said screw is being fully driven. A pin s, inserted in the spindle at a point under the ring R, retains the holder connected with said spindle.

Having now fully described my invention, I claim—

1. In a screw-driver, the combination of a tubular shell having racks secured therein with a gear-wheel adapted to engage with either one of said racks, a frame carrying said gear, a spindle having one end retained in said frame and bevel-gears to rotate it, and a clutch upon said spindle with a spring bearing upon said spindle, substantially as described.

2. The combination of a tubular shell having racks secured therein, a handle having a cap removably engaging with one end of said shell, a spindle passing through the opposite end of the shell, a clutch upon said spindle, a gear-frame connected with said spindle, straight and bevel gears carried by said frame, and a coiled spring pressing upon the end bushing of the spindle, substantially as described.

3. The combination of a tubular shell having racks secured therein, a handle having a cap removably engaging one end of said shell, a spindle, a clutch upon said spindle, a gear-frame connected with said spindle, straight

and bevel gears carried by said frame, a sliding bushing in said frame for the end of the spindle, a telescopic sleeve resting upon said bushing, and a coiled spring bearing upon the end disks of said sleeve, substantially as described.

4. The combination of a tubular shell having racks secured therein, a spindle, a gear-frame connected with said spindle and having a straight gear *e* mounted upon an axle in said frame, a bevel-pinion e^2, connected with the gear *e*, a bevel-pinion provided with a sleeve, a clutch-gear g^2, mounted upon said sleeve, and a clutch-gear b^2, secured to the spindle, substantially as described.

5. The combination of a tubular shell having racks secured therein, a spindle, a gear-frame, and gears to connect the racks to the spindle with a frictional spring *p* secured to the side of the gear-frame, substantially as described.

6. The combination of a rectangular tubular shell having racks secured therein, a spindle, a clutch upon said spindle, a gear-frame, gears to connect the racks with the spindle and a spring to press upon said spindle, the gear-frame having undercut portions f^3 in the top thereof with a handle and cap for the tubular shell, and a hooked catch *m*, pivoted to the cap and having a handle projecting from said cap, substantially as described.

7. The combination of the tubular shell of a screw-driver, having racks secured thereto, and the operating mechanism, as described, of the spindle therein, and flat spring-catches *a* on the outer surface of the shell, with a cap C, having internal shoulders *c* and adapted to fit over the end of the shell, spring-tongues secured to the interior of the cap, and knobs upon said tongues, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN H. SATTERLEE.

Witnesses:

MELVIN F. STEPHENS,

C. H. DAVID.