No. 887,423. PATENTED MAY 12, 1908.

W. M. PRATT.

AUTOMATIC SCREW DRIVER.

APPLICATION FILED NOV. 7, 1906.

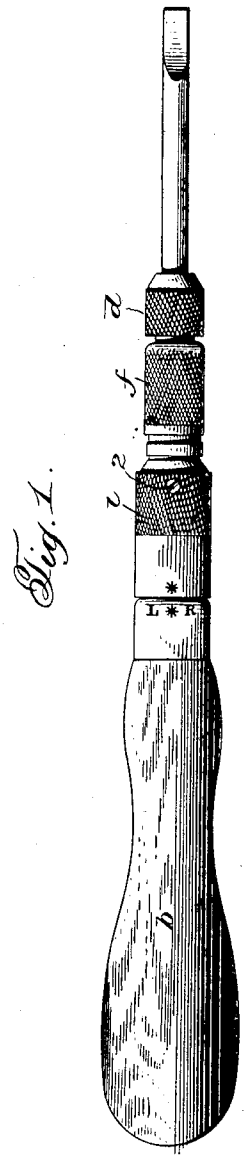


Fig. 1.

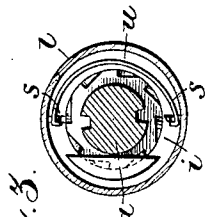


Fig. 3.

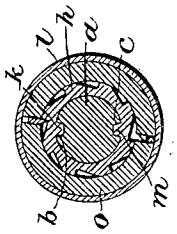


Fig. 2.

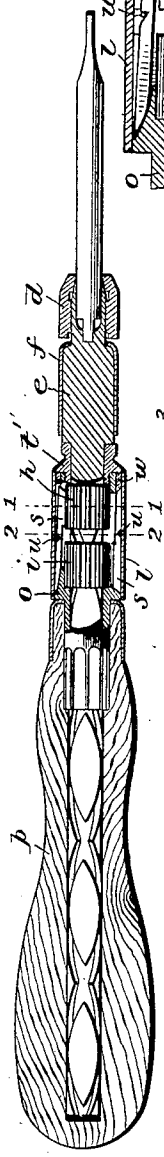


Fig. 4.

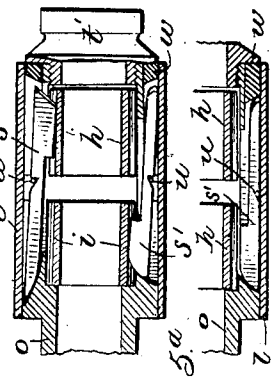


Fig. 5.

Fig. 5a.

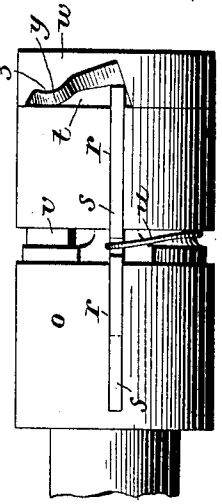


Fig. 6.

Witnesses

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AUTOMATIC SCREW-DRIVER.

No. 887,423. Specification of Letters Patent. Patented May 12, 1908.

Application filed November 7, 1906. Serial No. 342,408.

To all whom it may concern:

Be it known that I, WILLIAM M. PRATT, citizen of United States, residing at Greenfield, Massachusetts, have invented new and useful Improvements in Automatic Screw-Drivers, of which the following is a specification.

My invention relates to spiral ratchet screw drivers and its object is to provide such a tool which is compact and simple in construction, pleasing in appearance and highly efficient in use.

The invention includes the combination and arrangement of component parts to be hereinafter described and particularly pointed out in the claims.

In the accompanying drawings which illustrate one exemplification of my invention Figure 1 is a view of the tool in side elevation. Fig. 2 is a transverse sectional view on the line 1—1. Fig. 3 is a transverse sectional view on the line 2—2, and Fig. 4 is a longitudinal sectional view. Fig. 5 is a detail sectional view. Fig. 5[a] is a detail sectional view showing the lower pawl of Fig. 5 out of engagement with its ratchet and Fig. 6 is a detail view in elevation.

The invention particularly appertains to the type of spiral ratchet screw driver which includes a spiral spindle, a barrel fitted to the tool handle in which the spindle is axially guided, a pair of ratchet wheels housed within the barrel having keys engaging the spiral grooves of the spindle, pawls carried by the barrel and co-acting with the ratchet wheels and means for shifting the pawls to disengage the same from their respective ratchet wheels.

In the illustrated exemplification of the invention the spindle is designated *a* and is provided with the usual reversely running spiral grooves designated *b*—*c*. The front end of the spindle is bifurcated to provide a socket for the reception of the tool and is threaded exteriorly to conceive a compression nut *d* which forms with the bifurcated end a tool chuck. Directly back of the threaded part of the spindle an enlargement *e* is provided upon which a supporting sleeve *f* is mounted to turn freely, this sleeve having an inwardly extending flange at its front end which is confined between the rear edge of the nut *d* and the shoulder formed at the front end of the enlargement. To place the sleeve *f* in position the nut *d* is unscrewed from the spindle and after the sleeve *f* has been slipped over the enlargement *e* the nut is replaced and the sleeve is thus confined against longitudinal displacement while it is free to rotate, or the spindle is free to rotate therein while the sleeve is held between the fingers of the operator of the tool.

The ratchet-wheels, designated *h*—*i*, are arranged end to end upon the spindle *a* and are each provided with an inwardly extending key designated *k*—*m*; the key *k* engaging the groove *b* and the key *m* the groove *c*. The ratchets are housed within a barrel *o* which is fixedly secured in the handle *p*, is provided with diametrically opposed slots *r* in which plates, designated *s*, *s'*, respectively, are located, which constitute pawls for engaging the ratchet wheels. The ends of the slots *r*, contiguous the handle *p*, are beveled and the corresponding ends of the pawls *s*, *s'* rest upon these beveled ends. The opposite or forward ends of both pawls extend into a channel *t* provided at the forward end of the barrel *o*, exteriorly of the same. The pawl *s* is provided with an engaging face at the forward end of the same coacting with ratchet-wheel *h* and the remaining portion thereof is so reduced as to work free of ratchet wheel *i*. The pawl *s'* is provided with an engaging face at its rear end coacting with ratchet wheel *i* and the remaining portion thereof is reduced so as to work free of ratchet-wheel *h*. Both pawls are normally forced toward their respective ratchet-wheels to engage the same by a light spring *u* having its central part engaging the central portion of the pawls and its intermediate part held within a circumferential channel *v* in the barrel *o*.

For shifting the pawls a cam ring *w* is provided which fits within the channel *t* and is provided at directly opposite points with cut-out portions provided with cam edges *y* which are brought into engagement with the ends of the pawls as the ring is rotated and serves to lift the same out of engagement with the ratchet wheels.

For facilitating the shifting of the ring and for housing the parts so as to give the tool a finished and pleasing appearance a sleeve 1 is provided which fits snugly over the barrel and ring and is secured to the latter by a detachable fastening as a screw 2. The fit of the sleeve to the barrel permits of its rotation, and to facilitate the turning of the same its peripheral surface is preferably knurled or roughened. As will be appreciated, the

rotation of the sleeve will rotate the cam ring and shift the cam surfaces of the latter into and out of engagement with the pawls. The cut-out parts of the ring and the cam surfaces thereof are so disposed that when the high part of one cam surface is in engagement with one pawl, the cam surface on the opposite side of the ring will be entirely disengaged from the other pawl and the latter will consequently be in engagement with its ratchet, and the cut-out parts of the ring are of such length that the ring may be shifted to a medial position so as to disengage both lifting surfaces thereof from the pawls. Both cam surfaces are provided with an excessive high part or shoulder 3 closely contiguous to its high end which presents an abutment which tends to prevent the accidental shifting of the ring.

To guide the operator in the shifting of the sleeve *t* the ferrule of the handle is preferably provided with suitable indicating characters which co-act with an indicating character on the sleeve. In the illustrated exemplification of the invention the sleeve is shown as provided with a star and the ferrule is provided with the characters L, X R with which the star on the sleeve is intended to be registered. When the star on the sleeve registers with the star on the ferrule both cam surfaces are disengaged from the pawls so that the spindle is prevented from turning in either direction independently of the handle; when the star on the sleeve is registered with the letter R the spindle is turned to the right as the handle is pressed forward, and when the star is registered with the letter L the spindle is turned to the left as the handle is pressed forward.

In the illustrated embodiment of the invention the channel *t* is provided by reducing the diameter of the main body of the barrel at one end, by turning the same down, which provides the bottom and one side wall of the channel, and a barrel-cap *t'* threaded into the barrel, after the wheels *h*, *i*, have been positioned, which cap has a flange serving as the other wall of the channel.

The pawl *s'* has considerable endwise movement in shifting into and out of engagement with its ratchet wheel *i;* the inner ends of the slot *r*, containing the pawl *s'*, and the inner end of said pawl being so relatively inclined, or beveled, that as the pawl is forced lengthwise, by cam *w*, against the tension of spring *u*, it will be shifted away from the ratchet wheel *i*. The pawl *s* is given little, if any, endwise movement by the cam *w*, the inner end thereof fulcruming upon the inner end of its slot *r* as the opposite end thereof is raised by the cam ring *w*.

I claim:

1. In a tool of the character described and in combination a spindle having reversely extending spiral grooves, a pair of ratchet-wheels mounted thereon provided with keys co-acting with the grooves, a barrel provided with radial slots, pawls mounted in the slots and extending lengthwise of the same, corresponding ends of the pawls resting against corresponding ends of the slots, a spring engaging the central parts of the pawls to normally force the same into engagement with the ratchets and means engaging the opposite ends of the pawls to lift the same, substantially as described.

2. In a tool of the character described and in combination a spindle having reversely extending spiral grooves, a pair of ratchet-wheels mounted thereon provided with keys co-acting with the grooves, a barrel provided with radial slots, pawls mounted in the slots and extending lengthwise of the same, corresponding ends of the pawls resting against corresponding ends of the slots, a spring engaging the central parts of the pawls to normally force the same into engagement with the ratchets and a cam ring co-acting with the opposite ends of the pawls, substantially as described.

3. In a tool of the character described and in combination a spindle having reversely extending spiral grooves, a bifurcated end threaded exteriorly and an enlargement adjacent said end, a nut threaded on the end and forming a tool chuck therewith, a supporting sleeve fitted to the enlargement having an inwardly extending flange retained between the front end of the enlargement and said nut, a tool handle mounted on the spindle and movable relatively thereto lengthwise of the same and means interposed between the spindle and tool for locking the handle to the spindle or for rotating the spindle independently of the handle as the handle is moved lengthwise of the spindle, substantially as described.

4. In a tool of the character described, the combination of a spindle having reversely extending spiral grooves, a pair of ratchet wheels mounted thereon having keys co-acting with the grooves, a handle, a barrel fixed therein provided with radial slots having corresponding ends beveled, pawls mounted in the slots and having corresponding ends bearing upon the said beveled ends, said pawls being reversely arranged whereby the engaging face of one pawl co-acts with one ratchet wheel and the face of the other pawl engages the other ratchet wheel, means for normally pressing the pawls into engagement with their ratchet wheels and a cam ring co-acting with the ends of the pawls remote from their beveled ends for shifting the pawls, substantially as described.

5. In a tool of the character described including a pair of reversely beveled ratchet wheels, of a barrel having oppositely disposed lengthwise extending radial slots having beveled inner ends providing bearing surfaces,

said barrel having a channel at its outer end, a pawl associated with each slot having an engaging face for a single ratchet wheel, and a tail piece, said pawls being reversely arranged whereby they engage different ratchet wheels, the ends of one of the pawls contiguous its engaging face resting upon one of said bearing surfaces, and the end of the other pawl remote from its engaging face resting upon the other of said bearing faces, the opposite ends of said pawls projecting within said channel, a spring normally forcing the pawls inwardly for interengaging their engaging faces with the respective ratchet wheels, and a cam ring located in the channel for shifting the pawls against the tension of said spring.

6. In a tool of the character described including a pair of reversely beveled ratchet wheels, of a handle, a pair of pawls carried by the handle, one of said pawls co-acting with one of said ratchet wheels and the other of said pawls co-acting with the other of said ratchet wheels, a spring tending to hold the pawls in engagement with their respective ratchet wheels, and means for shifting one of said pawls lengthwise and radially respecting its ratchet wheel to disengage the same therefrom.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM M. PRATT.

Witnesses:
CHARLES N. STODDARD,
VINNIE M. FARR.