

W. A. PECK.
 RATCHET MECHANISM.
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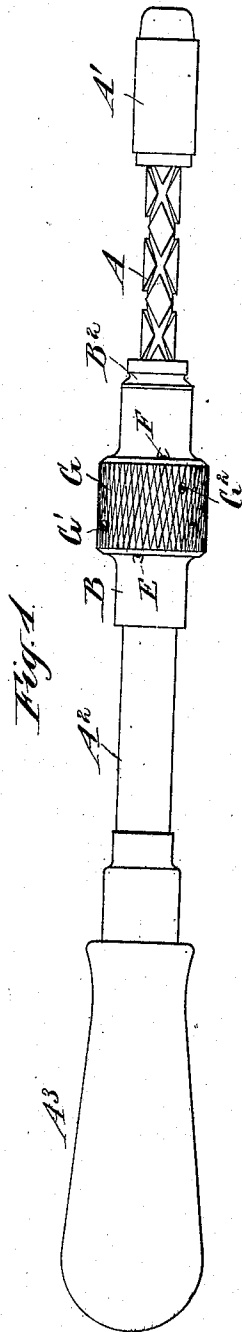


Fig. 1

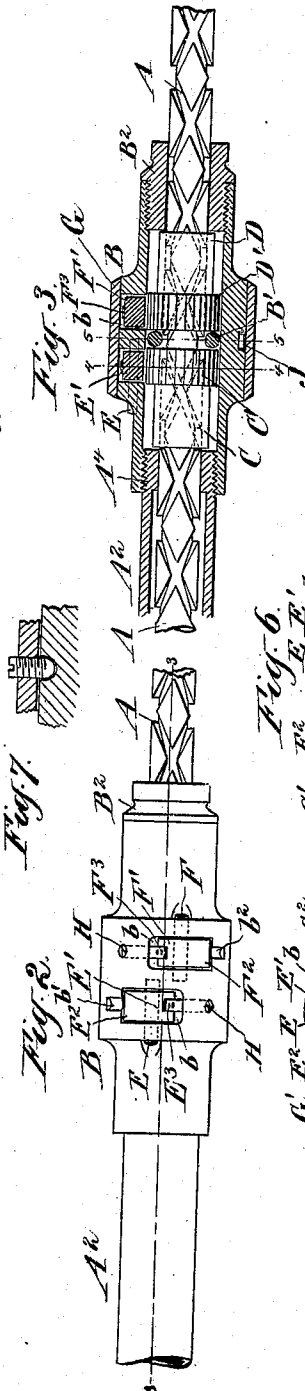


Fig. 2

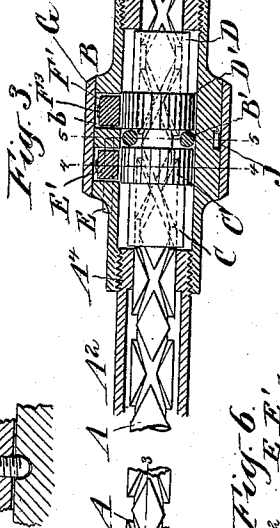


Fig. 3

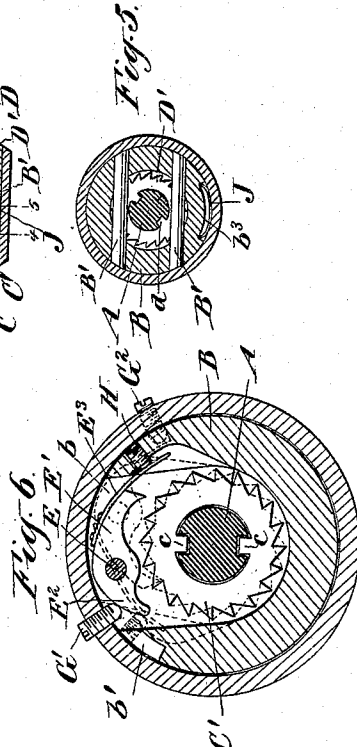


Fig. 4

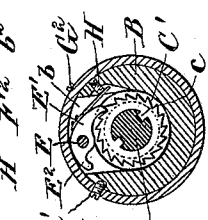


Fig. 5

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UNITED STATES PATENT OFFICE.

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RATCHET MECHANISM.

No. 924,372.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM A. PECK, a citizen of the United States, residing in Jersey City, in the county of Hudson and State of New Jersey, have invented a certain new and useful Improvement in Ratchet Mechanisms, of which the following is a specification.

The invention relates to mechanism for rotating the spindle in automatic screw-drivers and analogous tools, and the object of the invention is to provide a simple, easily constructed and assembled mechanism which shall be positive in its operation and durable and efficient in service.

The invention consists in certain novel features and details of construction by which the above objects are attained, to be hereinafter described and pointed out in the claims.

The accompanying drawings form a part of this specification and show the invention applied to a double-spiral tool adapted to serve in turning a screwdriver or like implement.

Figure 1 is a side view of the improved tool. Fig. 2 is a similar view of the ratchet mechanism alone, on a larger scale, with the operating-sleeve omitted. Fig. 3 is a corresponding longitudinal axial section, partly in elevation, taken on the line 3—3 in Fig. 2. Fig. 4 is a transverse section on the line 4—4 in Fig. 3. Fig. 5 is a similar view, taken on the line 5—5 in Fig. 3. Fig. 6 is a transverse section corresponding to Fig. 4 but on a greatly enlarged scale. Fig. 7 is a longitudinal section partly in elevation, on the same scale as the preceding figure, showing a detail.

Similar letters of reference indicate the same parts in all the figures.

A is the spindle having opposite spiral grooves of quick pitch, carrying at one end a chuck A^1 adapted to receive and hold the screwdriver or other tool to be rotated, and inclosed at the other end in a tube A^2 secured in a handle A^3 ; these portions may be understood to be of the usual or any approved construction.

The ratchet mechanism through which the spindle passes comprises a cylindrical casing B secured to the tube A^2 and inclosing two ratchet-sleeves C and D having internal spiral fins c and d matching respectively the spiral grooves on the spindle, and

carrying on their ends ratchets C^1 and D^1 , the teeth of one presented oppositely to the other. The sleeves are held separated by studs B^1 B^1 extending through the casing B on each side of the spindle, and are held against endwise movement in the opposite directions by a tubular screw-plug B^2 set in the free end of the casing and abutting against the sleeve D, and a similar plug A^4 forming part of the tube A^2 abutting against the sleeve C. As usual in tools of this character the spindle is rotated by reciprocations thereon of the ratchet mechanism, induced by thrusting movements of the handle, the direction of rotation being determined by holding one of the ratchets relatively to the casing during the thrusting movement, the other revolving idly, and permitting both to rotate idly during the return movement. By holding both ratchets the spindle is locked and becomes in effect a fixture with the handle.

In the present invention the ratchets C^1 D^1 are controlled by two spring-pawls E^1 and F^1 extending transversely of the casing, each the counterpart of the other, lying in cavities b produced in the casing to receive them, and mounted oppositely on pins E and F set in the casing B parallel with the axial line thereof. Each pawl is in the form of a curved lever having an arm E^2 F^2 shaped to match approximately to the periphery of the casing and having light springs E^3 F^3 tending to hold the pawls in engagement with their respective ratchets.

On the tubular sleeve G inclosing the casing are internally projecting screw-pins G^1 G^2 received in short circumferential channels b^1 b^2 in the casing, which lead to the cavities b ; a partial rotation of the sleeve brings one of the pins into contact with its pawl-arm, depresses the latter and correspondingly raises that pawl out of engagement with its ratchet. The same movement traverses the other pin in its channel away from its pawl-arm and leaves its pawl in engagement; a reverse partial rotation frees the second pawl and reengages the first.

The ends of the channels serve as stops for the pins to limit the rotation of the sleeve and prevent damage by crowding the pins too far upon the pawl-arms, and the pins are so spaced as to permit both to stand out of contact with their pawl-arms when

the sleeve is turned to an intermediate position in which the spindle is locked by the simultaneous engagement of both pawls with their ratchets.

5 In order that the casing may be returned after a thrusting movement without rotating the spindle in a reverse direction it is essential that the tension of the springs be very light, and it is therefore preferable to
10 provide means for adjusting the tension. This may be variously accomplished; as shown in the drawings each pawl carries on its upper face a leaf spring E^3 F^3 projecting beyond the nose of the pawl into a recess
15 extending from the cavity b , and contacts with the end of an adjusting screw H sunk below the surface of the casing. By turning these screws the tension of the springs and the consequent frictional contact of the
20 pawls with their ratchets may be increased or lessened.

When either of the screw-pins G^1 G^2 has ridden upon its pawl-arm sufficient friction is developed between the casing and sleeve,
25 aided by the spring E^3 or F^3 , to insure against unintentional movement of the sleeve relatively to the casing; as a further frictional holding means adapted to serve in all positions of the sleeve, the friction-
30 spring J is supplied. It consists of an arched leaf-spring lying in a short groove or recess b^3 in the peripheral face of the casing and exerts its force against the inner surface of the sleeve thus producing sufficient
35 friction alone to hold the sleeve when the latter is in the intermediate position, and serving as an auxiliary to the springs E^3 F^3 when the sleeve is at the extreme of its movement in either direction.

40 It will be observed that the channels b^1 b^2 serve as guides for the pins G^1 G^2 and also with the latter as the means for holding the sleeve G to the casing. Their ends also serve as stops to limit the rotation of
45 the sleeve, as above described.

The casing B is preferably a single piece of metal bored axially to a diameter large enough to permit the introduction of the
50 ratchets from the ends. By removing or retracting the screw-pins G^1 G^2 the sleeve G is freed and may be removed to afford access to the parts for adjustment or repairs, and by withdrawing the pivots E and
55 F the pawls E^1 and F^1 are released. Thus all the parts are easily accessible and may be removed when worn and new ones substituted.

60 Modifications may be made in the forms and proportions without departing from the invention and parts may be used without the whole. Other means than the springs E^3 F^3 may be substituted for inducing the yielding engagement of the pawls with their ratchets, and the adjusting
65 vices for such means may be varied or

omitted. The friction spring J may be dispensed with or other means substituted therefor.

Although the invention has been described as applied to a double-spiral tool of the screwdriver class, it will be understood that it will serve with other implements or in other situations to which it may be adapted.

I claim:—

75 1. In a tool of the character set forth, a casing, means contained therein for operating a spindle, a sleeve movable on said casing, there being a channel in the latter, and a pin in said sleeve projecting into said
80 channel, said pin and channel serving to hold said sleeve to said casing, and the pin constructed to actuate said means.

85 2. In a tool of the character set forth, a casing, a ratchet wheel therein, a pawl pivoted in said casing and arranged to engage said ratchet wheel, a sleeve movable on said casing, there being a channel in said casing, and a pin in said sleeve projecting into said
90 channel, the latter with said pin serving to hold said sleeve upon said casing, and the pin serving to actuate said pawl, and to limit the movement of said sleeve relatively to said casing.

95 3. In a tool of the character set forth, a cylindrical casing, a ratchet wheel therein, a pawl pivoted in said casing and arranged to engage said ratchet wheel, a tubular sleeve inclosing said casing, there being a circumferentially arranged channel in the periph-
100 ery of said casing, and a pin in said sleeve projecting into said channel, the latter with said pin serving to hold said sleeve upon said casing, and said pin serving to actuate said pawl, and to limit the movement of said
105 sleeve relatively to said casing.

110 4. In a tool of the character set forth, a casing, a ratchet wheel therein, a pawl pivoted in said casing and arranged to engage said ratchet wheel, a sleeve inclosing said casing and movable thereon, a spring for inducing the engagement of said pawl with said ratchet wheel and means for inducing
115 frictional contact of said means with said pawl, and an auxiliary friction means between said casing and sleeve.

120 5. In a tool of the character set forth, a cylindrical casing, a ratchet wheel therein, a pawl pivoted in said casing and arranged to engage said ratchet wheel, a tubular sleeve inclosing said casing and rotatable thereon, a spring for inducing the engagement of said pawl with said ratchet wheel and means for inducing frictional contact between said pawl and means, and an auxiliary spring between
125 said casing and sleeve and exerting its force frictionally to hold the sleeve in position.

130 6. In a tool of the character set forth, a casing, a ratchet wheel therein, a pawl pivoted in said casing and arranged to engage

said ratchet wheel, a spring for inducing such engagement, means for adjusting the tension of said spring, a sleeve movable on said casing, and means carried by said sleeve for disengaging said pawl from said ratchet wheel in opposition to said spring.

7. In a tool of the character set forth, a cylindrical casing, a ratchet wheel therein, a pawl pivoted in said casing and arranged to engage said ratchet wheel, a spring between said casing and pawl for inducing such engagement, means for adjusting the tension of said spring, a sleeve inclosing said casing and rotatable thereon, and means carried by said sleeve for disengaging said pawl from said ratchet wheel in opposition to said spring.

8. In a tool of the character set forth, a cylindrical casing, a ratchet wheel therein, a pawl pivoted in said casing and arranged to engage said ratchet wheel, an arm on said pawl, a sleeve inclosing said casing, a pin on the inner face of said sleeve, there being a circumferentially-arranged channel in the periphery of said casing receiving said pin, the latter with said channel serving to hold said sleeve rotatably upon said casing, and

said pin serving to contact with said arm and actuate said pawl, and to limit the rotation of said sleeve on said casing. 30

9. In a tool of the character set forth, a spindle having opposite spiral grooves therein, two ratchet wheels encircling said spindle and engaged with said grooves, a cylindrical casing inclosing said ratchet wheels, oppositely arranged pawls pivoted in said casing and adapted to engage one with each of said ratchet wheels, springs for inducing such engagement, each pawl being provided with an arm, a sleeve inclosing said casing, there being two circumferentially-arranged oppositely-extending channels in the peripheral face of said casing, one for each of said pawls, and pins in said sleeve projecting into said channels, said pins serving to contact with said arms to free said pawls from their ratchet wheels. 35 40 45

In testimony that I claim the invention above set forth I affix my signature, in presence of two witnesses.

WILLIAM A. PECK.

Witnesses:

CHARLES R. SEARLE,
H. J. PETERSEN.