

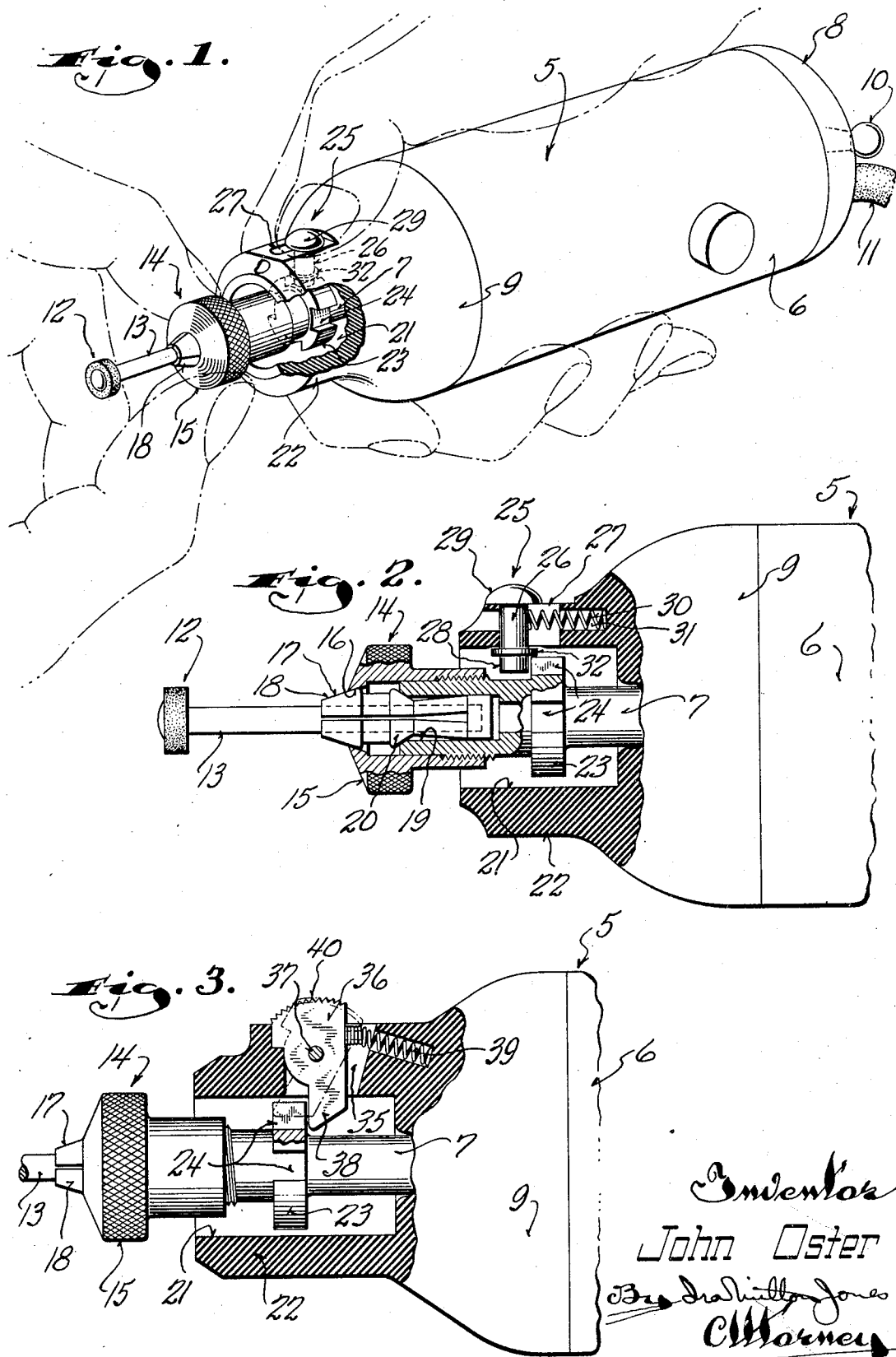
Aug. 13, 1940.

J. OSTER

2,211,216

SMALL POWER DRIVEN TOOL

Filed Feb. 11, 1938



UNITED STATES PATENT OFFICE

2,211,216

SMALL POWER DRIVEN TOOL

John Oster, Racine, Wis., assignor to John Oster Manufacturing Company, Racine, Wis., a corporation of Wisconsin

Application February 11, 1938, Serial No. 190,024

5 Claims. (Cl. 51—170)

This invention relates to small power driven tools, and refers particularly to a chuck structure by which any one of a variety of cutting or grinding tools may be readily detachably secured to the drive shaft of the unit.

Tool units of this character generally comprise an electric motor, the housing of which forms a handle or grip by which the unit may be conveniently held in one hand, while the armature shaft carries a chuck at one end by which the spindles of different tools are securable to the shaft.

In the attachment of a tool spindle to the motor shaft or its removal therefrom, it is necessary to effect relative rotation between the shaft and part of the chuck, which cannot be done unless the motor shaft is held against turning.

It is also essential in a tool of this nature, being held in the hand during use, to have as much as possible of the revolving or moving assembly covered. In other words, it is desirable to completely enclose all revolving parts of the motor and to have only the operating end of the shaft which carries the chuck by which the tool spindle is secured to the motor shaft exposed. This prerequisite gives rise to the necessity for special provision of some means whereby the motor shaft may be held against turning to permit tightening and loosening of the chuck.

This invention therefore has as its major object the provision of means whereby this requirement is met in a practical simple manner.

Another object of this invention is to provide means for locking the motor shaft against rotation, which is so designed and positioned that the latching member provided for this purpose will not be accidentally actuated during the normal handling of the tool unit.

It is also an object of this invention to provide means for locking the armature shaft of the driving motor against rotation which is so constructed that only a small part thereof is exposed to view so that the appearance of the tool unit is not in anywise marred.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described, and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawing illustrates two

complete examples of the physical embodiment of the invention constructed in accordance with the best modes so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a perspective view of a tool unit embodying this invention, and illustrating the manner in which the armature shaft is secured against turning;

Figure 2 is a side view of the front end of the tool unit, partially in elevation and partially in longitudinal section; and

Figure 3 is a view similar to Figure 2, illustrating a slightly modified embodiment of the invention.

Referring now particularly to the accompanying drawing in which like numerals indicate like parts, the numeral 5 designates generally an electric motor having a substantially cylindrical housing 6 and an armature shaft 7. The ends of the housing are closed by caps 8 and 9. The end cap 8 carries an electric switch (not shown), the actuator 10 of which is readily accessible for turning the motor on and off, electric current being supplied thereto by a cord 11.

It is to be observed that the housing is of a size and shape to be conveniently grasped in one hand. A tool 12 is attached to the outer end of the armature shaft by having its spindle 13 secured in a chuck, indicated generally by the numeral 14. Obviously, the tool may be any one of a wide variety. It may be, inter alia, a small grinding wheel, a router, a drill, or an eraser.

The chuck 14 comprises a sleeve 15 threaded to the outer end of the shaft and having a tapered bore 16 in its outer end to engage the outer tapered end 17 of a split bushing 18 in which the spindle of the tool is fitted. The bushing 18 projects into a bore 19 in the outer end of the armature shaft and has an inner tapered surface 20 which engages the edge of the bore 19. Consequently, tightening of the sleeve 15, that is, threading it onto the shaft 7, compresses the split bushing 18 to securely grip the tool spindle therein.

It is apparent that tightening and loosening of the chuck entails relative rotation between the armature shaft and the sleeve 15 of the chuck, and that unless the armature shaft is held against rotation, neither can be accomplished. To so hold the armature shaft is the purpose of this invention, it being noted that all of the revolving parts, excepting the chuck, are covered.

The manner in which this desideration is attained will now be described.

The cap 9 of the motor housing is reduced in diameter at its outer end and counterbored, as at 21, to provide a hollow sleeve or skirt 22. Within this hollow sleeve or skirt 22, the motor shaft carries a disc 23 notched as at 24 about its periphery. A latching member 25 mounted in the wall of the hollow sleeve or skirt cooperates with the notched disc to secure the shaft against rotation at will.

In that form of the invention illustrated in Figures 1 and 2, the latching member 25 is in the form of a headed pin or stud 26 extending radially through an elongated slot 27 in the wall of the hollow sleeve or skirt. Its inner end 28 is in position to be moved into one of the notches 24 upon applying an inward force on the button 29 which constitutes the outer end of the pin.

A compression spring 30 disposed in a well 31 extending into the wall of the sleeve or skirt and confined between the bottom of the well and the pin 26, yieldingly holds the pin disengaged from the notched disc 23. A collar 32 fixed to the inner end of the pin 26 holds the same in the elongated slot 27.

By virtue of the round topped formation of the button 29, and the fact that it is mounted on the front end of the cap 9, which is considerably smaller in diameter than the housing 6 or the handle of the tool unit, it is improbable that the latching member will be accidentally moved to operative position during use of the tool.

To effect such motion of the latching member, a definite inward pulling force must be applied on the button 29, most conveniently done by the thumb, as illustrated in Figure 1. The latching member is preferably mounted in the outer end of the sleeve 22 so that in ordinary use of the tool unit, the button may be conveniently and positively held from accidental latching motion by interposing the thumb of the hand holding the unit between the button and the shoulder formed by the handle.

If desired, the latching member may be pivotally mounted, as illustrated in Figure 3. In this instance, the wall of the hollow sleeve or skirt has a radial slot 35 in which a lever-like member 36 is positioned. A pivot pin 37 holds the lever member in the slot with its inner end 38 in position to be rocked forwardly into one of the notches 24 of the notched disc 23.

A compression spring 39 yieldingly opposes such motion of the latching member, which is conveniently effected by an inward force applied to the outer serrated edge 40 of the lever-like latching member. As will be readily apparent, the spring propelled movement of the latching member is limited by its engagement with the forward edge of the slot 35.

From the foregoing description taken in connection with the accompanying drawing, it will be readily apparent to those skilled in the art that this invention provides a simple, but highly practical manner of securing the armature shaft in tool units of the character described against rotation for the purpose of tightening or loosening the chuck associated therewith.

What I claim as my invention is:

1. In a device of the character described: an electric motor having a substantially cylindrical housing; a skirt carried by the housing at one end thereof, said skirt being smaller in diameter than the housing; an armature shaft having an end portion disposed within said skirt; a chuck for

securing a tool spindle to said end portion of the shaft including, a part adapted to be threaded onto the end of the shaft and extending inwardly into said skirt, so that attachment and detachment of the tool spindle entails relative rotation between said chuck part and the shaft; a notched member carried by the shaft within said skirt; a latching member passing through an elongated longitudinal slot in the wall of the skirt with its inner end in position for engagement with the notched member; and an exposed actuator for the latching member spaced from the shoulder formed by the junction of the skirt with the housing when the latching member is disengaged from the notched member so that engagement of the latching member with the notched member requires motion of the latching member actuator toward said shoulder.

2. In a device of the character described: an electric motor having a substantially cylindrical housing; a skirt carried by the housing at one end thereof, said skirt being smaller in diameter than the housing; an armature shaft having an end portion disposed within said skirt; a chuck for securing a tool spindle to said end portion of the shaft including a part adapted to be threaded onto the end of the shaft and extending inwardly into said skirt, so that attachment and detachment of the tool spindle entails relative rotation between said chuck part and the shaft; a notched member carried by the shaft within said skirt; a latching member carried by the end of the skirt opposite the shoulder formed by the junction of the skirt with the housing, so as to be spaced from said shoulder, said latching member passing through an elongated longitudinal slot in the wall of the skirt with its inner end adjacent to the notched member and its outer end providing a finger piece by which the latching member may be moved in said slot toward the shoulder for engagement of its inner end with said notched member, and against which the thumb of the hand holding the unit is engageable to prevent movement of the latching member toward engagement with the notched member.

3. A tool unit of the character described comprising: an electric motor having a housing of a size to be conveniently held in one hand; a skirt carried by the housing at one end thereof, said skirt being smaller in diameter than the housing; an armature shaft having an end portion disposed within said skirt; a chuck for securing a tool spindle to said end portion of the shaft including, a part adapted to be threaded onto the end of the shaft and extending inwardly into said skirt, so that attachment and detachment of the tool spindle entails relative rotation between said chuck part and the shaft; a notched member carried by the shaft within said skirt; a latching member passing through an elongated longitudinal slot in the outer end portion of the skirt and constrained to translating motion toward and from the shoulder formed at the junction of the skirt with the housing and having its inner end portion engageable with said notched member upon movement of the latching member in said slot toward said shoulder, and its outer end exposed to provide an actuator; and a spring for yieldingly holding said latching member in an inoperative position spaced from said shoulder sufficiently to enable the thumb of the hand grasping the motor housing to be naturally positioned between the actuator of the latching member and said shoulder to positively prevent acci-

dental engagement of the latching member with the notched member.

4. In a device of the character described: an electric motor having a substantially cylindrical housing; an end cap for the housing having a skirt on its outer end substantially smaller in diameter than the housing; an armature shaft having an end portion disposed within said skirt; a chuck for securing a tool spindle to said end portion of the shaft including, a part adapted to be threaded over the end of the shaft and extending inwardly into said skirt, so that attachment and detachment of the tool spindle entails relative rotation between said chuck part and the shaft; said threaded part and the skirt cooperating to wholly enclose the armature shaft; a notched member carried by the shaft within said skirt; a latching member passing through an elongated longitudinal slot in the wall of said skirt with its inner end in position for engagement with the notched member and its outer end providing a finger piece by which movement of the latching member in said slot may be controlled; and a spring confined within the wall of the skirt for yieldingly urging the latching member away from the housing in a direction substantially parallel to the longitudinal axis of the device and holding said member in a position disengaged from the notched part.

5. In a device of the character described: an electric motor having a substantially cylindrical housing; an end cap for the housing having a skirt on its outer end substantially smaller in diameter than the housing; an armature shaft having an end portion disposed within said skirt; a chuck for securing a tool spindle to said end portion of the shaft including, a part adapted to be threaded onto the shaft inside said skirt, so that attachment and detachment of the tool spindle entails relative rotation between said chuck part and the shaft; a notched member carried by the shaft within said skirt; the wall of the skirt having a longitudinal slot therethrough adjacent to said notched member; a latching member pivotally mounted in said slot with its inner end longitudinally movable for engagement with the notched member and its outer end providing a finger piece by which movement of the latching member may be controlled; and spring means for holding the latching member in an inactive position and restraining movement of the outer end of the latching member toward the housing and holding its inner end disengaged from the notched member.

JOHN OSTER.