No. 621,401. Patented Mar. 21, 1899.

# L. M. DAVIS.

## SPIRAL TOOL DRIVER.

(Application filed June 24, 1898.)

(No Model.)

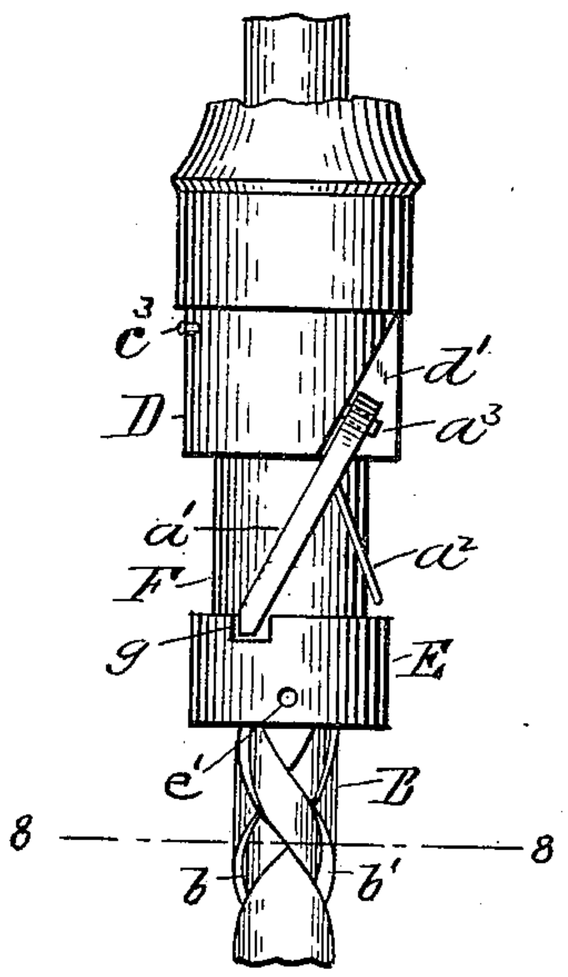


Fig. 2.

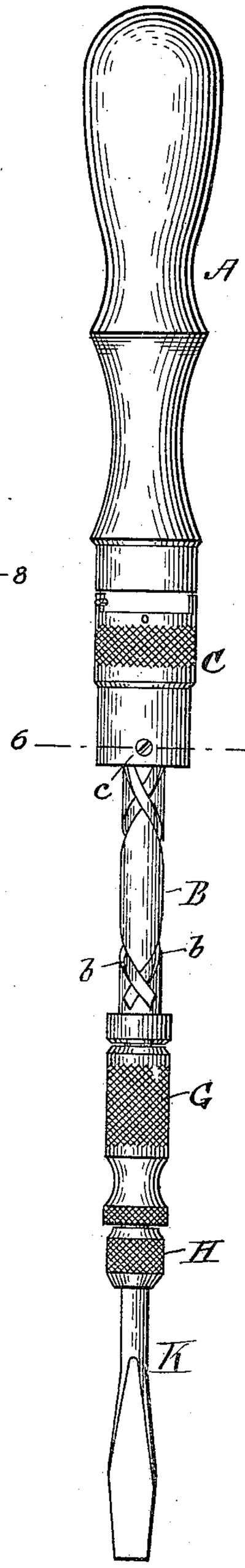


Fig. 1.

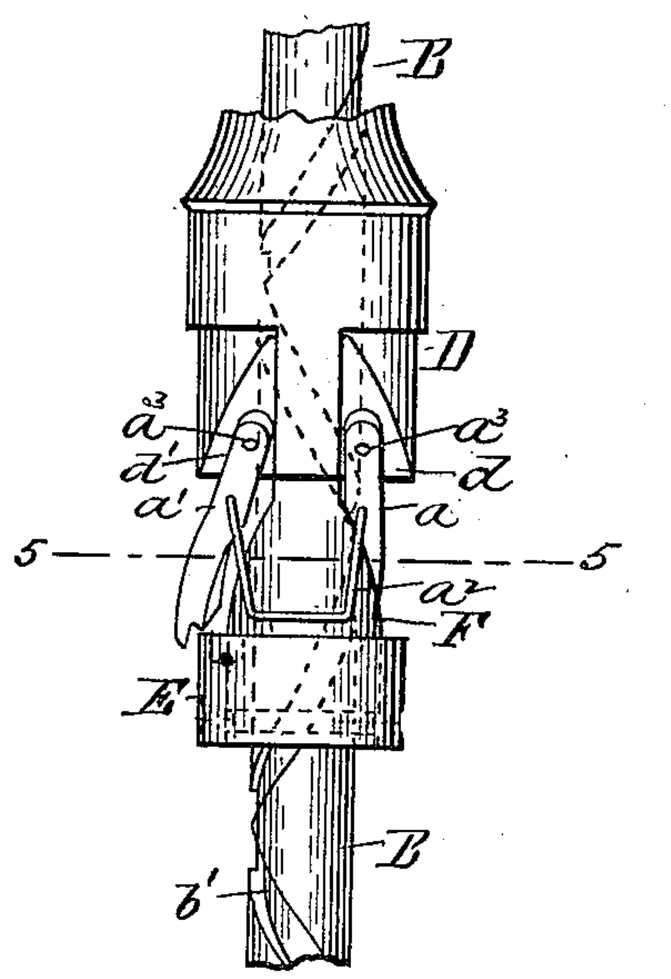


Fig. 4.

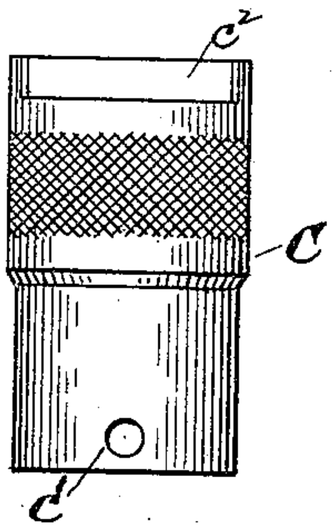


Fig. 3.

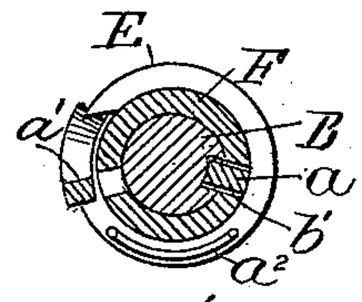


Fig. 5.

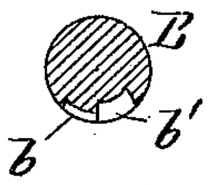


Fig. 8.

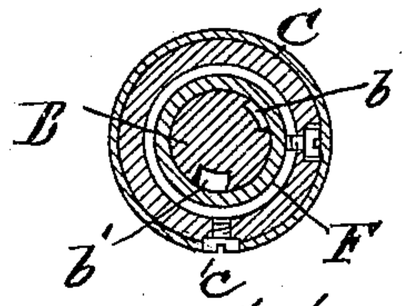


Fig. 6.

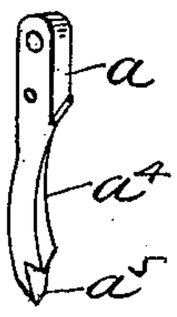


Fig. 7.

WITNESSES

W. E. Holmes.

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INVENTOR

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By Bowlon & Parker Attys.

# UNITED STATES PATENT OFFICE.

LEONARD M. DAVIS, OF ERVING, MASSACHUSETTS, ASSIGNOR TO THE MILLERS FALLS COMPANY, OF MILLER'S FALLS, MASSACHUSETTS.

## SPIRAL-TOOL DRIVER.

SPECIFICATION forming part of Letters Patent No. 621,401, dated March 21, 1899.

Application filed June 24, 1898. Serial No. 684,340. (No model.)

*To all whom it may concern:*

Be it known that I, LEONARD M. DAVIS, of Erving, in the county of Franklin and State of Massachusetts, have invented certain new and useful Improvements in Spiral Screw-Drivers, of which the following is a specification.

My present invention relates to that class of tools in which a spindle is grooved or threaded and by means of which, with suitable attachments, the tool-holder is revolved.

The special points of my present improvement consist in the peculiarity of the double grooves or threads formed on the spindle, one being formed deeper than the other, the purpose of which will be explained hereinafter; also, in providing certain dogs to act in connection with the grooves, and also in the construction of parts that will be specially indicated.

In the drawings, Figure 1 represents in general view the entire screw-driver assembled for working. Fig. 2 is a detail of certain of the operative parts. Fig. 3 is the shell covering the parts shown in Fig. 2. Fig. 4 represents a sectional view and elevation of the operative parts. Fig. 5 is a sectional view on line 5 5 of Fig. 4. Fig. 6 is a sectional view in line 6 6 of Fig. 1. Fig. 7 represents one of the dogs. Fig. 8 is a sectional view on line 8 8 of Fig. 2.

Like letters of reference indicate corresponding parts.

In Fig. 1, A is the handle, which is secured to the spindle B in any convenient manner. Grooves *b b'* are formed on the surface of the spindle B, running in opposite directions, the groove *b'* being formed deeper than the groove *b*. The different depth of grooves is shown in Figs. 6 and 8.

To the handle A are secured the bands D and F. These may be separate or of one piece. The spindle B freely turns in the bands D F. On one side of band D is formed two bevels *d d'*. On these bevels the upper end of the dogs *a a'* are secured by a pin, upon which they move easily. Slots are formed in the band F corresponding with the pitch of the grooves or threads *b b'*, and into these slots the dogs *a a'* fit and fall into the said grooves *b b'*. One of these slots in band F is shown in Fig. 5 at *h*. On the band F is placed a collar E, being movably secured thereto by the screw *e* or other suitable means. In the collar E is formed a recess *g*, into which the ends of the dogs set in the course of the operation of the tool.

The dog is illustrated in Fig. 7. It will be seen that it is made quite long and with a curved surface to exactly fit into the groove *b* or *b'*. On the end of the dog is formed the extension or lip $a^5$. This form of dog enables it to follow the grooves without catching in the points of intersection of said grooves, as is often the case where a pin is used to move in the grooves. On the outside of the parts D F E is placed the outer shell C, which is secured to the collar E by the screw *c* or other suitable means. The dogs are operated within the shell by means of the spring $a^2$, which tends to force them outwardly, and when one of them arrives opposite the offset *g* of collar E it is thrown out of the groove and does not act. The shell C has a section on one edge $c^2$ cut out, and when placed over the bands D F and collar E the movement of the shell is determined by the length of the part cut away, the stud $c^3$ striking the shell at each end of the section cut away. The object of this is to bring the offset *g* of collar E directly opposite one of the dogs, so that it may be thrown out of the groove. This offset or slot *g*, formed through the collar E on its inner edge, is made beveling from the outside—that is, the slot is made much wider at the bottom than it is at the top or outside. This forms a bevel each way, and as the collar is turned forces the dog that is elevated again into one of the grooves. When not raised, the dogs lie in the grooves, the end of the dog $a^5$ resting under the collar E, by which it is held in place, and the only way it can be removed from the groove is by bringing the offset or opening in the collar E opposite a dog, when the dog will rise by the force of the spring $a^2$, the end of the dog resting in the said offset *g*.

It has been customary to make the two grooves of the spindle of the same depth, but in use it is found that there is a continuous wear at the points of intersection of the grooves or threads, and that after a time the nut, pin, or part that is used in connection with

the spindle-grooves catches as it reaches the points of intersection and often becomes unserviceable in consequence. To overcome this weakness, I have devised the plan of making the grooves of unequal depths. It will be seen that $b'$ is made much deeper than groove $b$. This I regard as one of the most important points of my present invention, especially in connection with the new form of dogs, made long and adapted to run in the grooves with far greater steadiness and smoothness than an ordinary pin or nut or something of a similar nature.

The operation of the device is as follows: The parts being assembled as shown in Fig. 1, the screw-driver is secured to the chuck in the usual manner, and by seizing the shell C with one hand and then by the other hand turning the handle to the left the offset $g$ will be brought opposite to the dog $a'$, which will be forced upward by the spring $a^2$, the end of the dog $a^5$ resting in the said offset, while the other dog $a$ is held in the groove by the end $a^5$ of the dog being held under the collar E. Now if operated the driver will be turned to the right. If it is desired to reverse the motion, it is only necessary to turn the handle or sleeve to the opposite end of the section cut away of shell C, and the dog $a'$ will be forced into one of the grooves and the offset $g$ will be brought opposite to the end of dog $a$, which will be thrown outward by the spring $a^2$, the end $a^5$ of the dog being in the offset or beveled opening $g$ of the collar E, while the dog $a'$ is held in the groove. The action of the dog in the opposite groove will of course cause the driver to revolve in the opposite direction from that hitherto. Now if it is desired to use the tool for or as an ordinary screw-driver by simply turning the shell C midway between the two points the two dogs will both be held into the grooves, and as each will act against the other it follows that the spindle will be held firmly and will not move in either direction, thus making of the tool an ordinary fixed screw-driver. This locking of the dogs in the spindle-grooves can be done near any point where the grooves intersect. Thus it follows that either a short, medium, or long fixed screw-driver can be made in an instant. I consider this a valuable feature of my invention. The deep groove is preferably formed right-handed for use in driving in the screw, while the shallower groove is formed left-handed, as the power required to remove a screw is usually much less than to drive it. The different depth of grooves makes a more positive action and prevents the wearing of the points of the intersecting grooves, thus obviating the catching and sticking of the parts frequently found in the operating of the ordinary forms of spiral tools.

The other details of the tool are so well known that it is unnecessary to explain the parts further.

I do not claim as new the grooved spindle nor the method of securing the tool to the chuck or to the ordinary construction found in this class of articles.

I do not confine myself to the precise form of parts constituting my invention set forth.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In a spiral tool, the band D, provided with the bevels $d$, $d'$, the said bevels corresponding with the pitch of the grooves; the dogs $a$, $a'$, each having the long curved body $a^4$ and the lip $a^5$, the spring $a^2$, the band F, provided with slots to receive the said dogs; the collar E, provided with the beveled recess $g$, the shell C, and the spindle B, provided with spiral grooves or threads $b$, $b'$, one of said grooves being deeper than the other; and, all combined substantially as and for the purposes set forth.

2. In a spiral tool, the combination of a right and a left hand groove, one of said grooves being deeper than the other; a suitable dog arranged to fit in and move in each groove and said dogs adapted to be both engaged with said grooves, at the same time, opposite to each other in relation to the length of the tool, whereby the tool is held firmly near any point of its length where said grooves intersect, substantially as and for the purposes set forth.

3. In a tool having a spindle provided with a right and a left hand groove or thread, the band D, having the bevels $d$, $d'$, the dogs $a$, $a'$, arranged to be suitably secured to the bevels of the band D, and adapted to be locked or secured in said spindle-grooves, opposite to each other, in relation to the length of the spindle, near any point of intersection of said grooves, substantially as and for the purposes set forth.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 15th day of June, A. D. 1898.

LEONARD M. DAVIS.

Witnesses:
WILLIAM H. MCCOY,
GEO. W. NIMS.