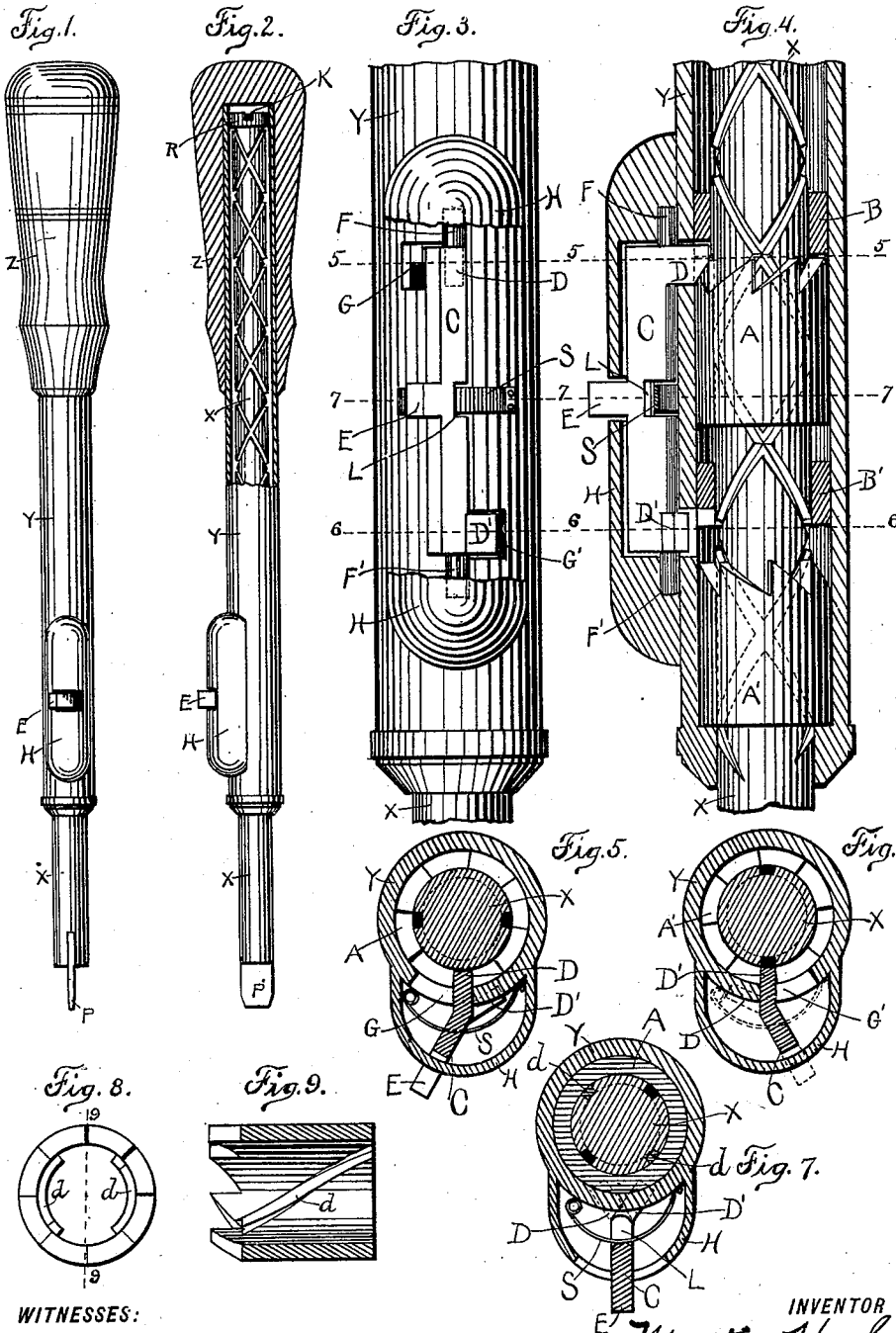


(No Model.)

M. H. SCHAY.  
SCREW DRIVER.

No. 568,460.

Patented Sept. 29, 1896.



WITNESSES:

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MARTIN H. SCHAY, OF TACOMA, WASHINGTON.

## SCREW-DRIVER.

SPECIFICATION forming part of Letters Patent No. 568,460, dated September 29, 1896.

Application filed March 5, 1896. Serial No. 581,919. (No model.)

*To all whom it may concern:*

Be it known that I, MARTIN H. SCHAY, a citizen of the United States, residing at Tacoma, in the county of Pierce and State of Washington, have invented a new and useful Reversible Screw-Driver, of which the following is a specification.

My invention relates to screw-drivers having a traveling shaft with winding grooves, and inserted in a tubular handle so made to fit in the grooves that the pressure of the hand on the handle will bring a sliding pressure on the grooves that causes the traveling shaft to revolve and thus drive a screw, bore a hole, or perform other work required of tools of this character.

The objects of my invention are, first, to not only turn the traveling shaft to the right, but also to cause the shaft to turn to the left and thus, by the downward pressure of the hand, to draw a screw out as well as drive it into place; second, to lock the traveling shaft so it will not turn to the right nor left, and the tool may then be used to drive or to draw a screw by the turn of the hand, as with an ordinary tool, and, third, to prevent the tool from rolling out of place, as off a scaffold or bench, when laid down by the workman. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front external view of the finished tool. Fig. 2 is a side view of the same with a part of the tubular handle removed, showing the traveling grooved shaft of the screw-driver. Fig. 3 is an enlarged view of my improvement with the covering removed, so as to give a view of the small pivoted cam-piece by which the motion of the shaft is reversed or held stationary. Fig. 4 is a longitudinal section through the center of the tube, showing a side view of the pivoted cam-piece and the driving-cylinders by means of which the traveling shaft is turned to the right or to the left. Fig. 5 is a cross-section at 5 5, showing how the upper cylindrical driver can be locked so as to turn the shaft to the right. Fig. 6 is a cross-section at 6 6, showing how the lower cylindrical driver is locked to turn the shaft to the left. Fig. 7 is a cross-section at 7 7, showing the cams set so as to lock both cylindrical drivers and hold

the shaft stationary. Fig. 8 is an end view of one of the cylindrical drivers; and Fig. 9 is a section at 9 9, showing an inside view of the same.

Similar letters refer to similar parts throughout the several views.

The tool is composed of the traveling shaft X, the tube Y, and the handle Z, attached thereon. The shaft X is provided with four grooves cut spirally into its sides, two of these grooves being cut so as to be on opposite sides and wind regularly to the right around the shaft, the other two being so as to wind in the same manner to the left around the shaft. The shaft fits loosely in the tube and easily moves lengthwise or revolves within the tube. The small rim R prevents the shaft from coming out of the tube.

By means of two separate pairs of sliding drivers fixed in the tube, one pair to fit and slide in the grooves cut to wind to the right around the shaft and the other pair to run in the grooves winding in the opposite direction, I am enabled to turn the shaft to the right or to the left as may be desired. I accomplish this by means of the cylindrical drivers A and A', made to fit loosely about the shaft X and within the tube Y. On the inner side of each of these cylinders is a pair of sliding drivers, those in the upper cylinders being inclined so as to fit the pair of grooves that will turn the shaft to the right and those in the lower cylinder fit in the grooves that turn the shaft to the left. These drivers are more clearly indicated at *d d*, Figs. 8 and 9. Each cylinder is confined to a limited space by means of the bands B and B', brazed to the inner side of the tube Y, and which also form a solid bearing for the cylinders when driving the shaft. The cylinders are each made with the upper ends ratcheted, so they can be locked when used to turn the shaft. This is done by means of the reversible locking-piece C, pivoted at F F' and operated by the small extension E. This reversing-piece is provided with cams D and D', which, when set radially with the axis of the shaft, extend through and rest firmly against the sides of the openings cut in the tube Y and into the bands B and B', as shown at G G', and thus firmly lock the driving-cylinders A or A' by engaging the teeth of the ratcheted ends.

To drive a screw forward, the operation is as follows: The pivoted piece C, by means of the extension E, is turned to the left, as shown in Figs. 1, 3, 4, and 5, so that the cam D sets 5 radially and perpendicularly with the shaft X, as shown in Figs. 3, 4, and 5. The screw-driver point P is set in the head of the screw, being held stationary with one hand, while with the other hand the tubular handle Y and 10 Z is withdrawn till the rim R comes to the band B. It is to be observed that during this withdrawal of the handle the cylindrical driver A drops down on the band B', which brings the teeth below the cam D and allows 15 the cylinder to revolve freely in the tube. It is also to be observed that the lower cam D' now extends to one side, as shown in Figs. 4 and 5, so as to allow the teeth of the cylindrical driver A' to pass clear of it, and the cylinder 20 revolves freely to the right or left within the tube Y. Now a downward pressure on the handle causes the driver A to come against B, while cam D engages the teeth so as to hold A from revolving, and the 25 inclined drivers *d d*, sliding in the winding grooves of the shaft X, cause it to revolve to the right and drive the screw into place. This motion can be repeated indefinitely.

To reverse the motion of the shaft X, the 30 extension E of the pivoted piece C is turned to the right, as shown in Fig. 6. This turns the cam D out, so as to let the driver A revolve freely, and sets the lower cam D' so as to engage the teeth of the driver A'. It is to 35 be observed that the teeth and sliding drivers of A' are made to work in the opposite direction from those of A, and fit in the winding grooves that will turn the shaft X to the left. Now, by operating the tool as before de- 40 scribed, the screw may be drawn out by the same downward pressure on the handle.

To convert the tool into a stationary screw-driver, the pivoted piece C is set so that E 45 will be radial with X, as shown in Fig. 7. In this position D and D' extend within the tube

so as to engage the teeth of both A and A', and the shaft can be turned to the left or to the right by twisting the hand. In addition to this, it will be observed, a small rivet is put through the upper end of the tube Y 50 to fit into a groove cut in the end of the shaft X and the rim R, as shown at K, Fig. 2, to hold X stationary without the aid of C.

It is to be noticed that C is held in its several positions by means of the small spring S, 55 fitted into the notch L, which is so beveled as to give a flat bearing in each position, as more clearly shown in Fig. 7.

The pivoted piece C is held in place and protected by the rounded piece H, neatly fitted 60 and brazed onto the tube Y. This piece also serves the purpose of forming a projection on the side of the tool that prevents it from rolling when laid down and thus keeps it from 65 rolling off a scaffold or bench when not in use by the workman.

I am aware that previous to my invention screw-drivers and tools have been made with tubular handles and loosely-traveling shafts 70 made to revolve with winding grooves and sliding drivers working therein. I therefore do not claim such a combination, broadly; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

The combination, in a spiral-shaft screw- 75 driver, of the ratcheted cylinders A and A', each provided with sliding drivers *d d* fitted into the winding grooves of the shaft X, said cylinders working loosely in the spaces formed by B and B', the reversing-piece C pivoted 80 at F F' and having the locking-cams D and D' and the extension E, the spring S fitted to the beveled notch L, the rivet K and the covering-piece H, all substantially as described and for the purposes set forth.

MARTIN H. SCHAY.

Witnesses:

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