(No Model.) 2 Sheets—Sheet 1.

N. STOW.

Screw Driver.

No. 237,065. Patented Jan. 25, 1881.

Fig. 1.

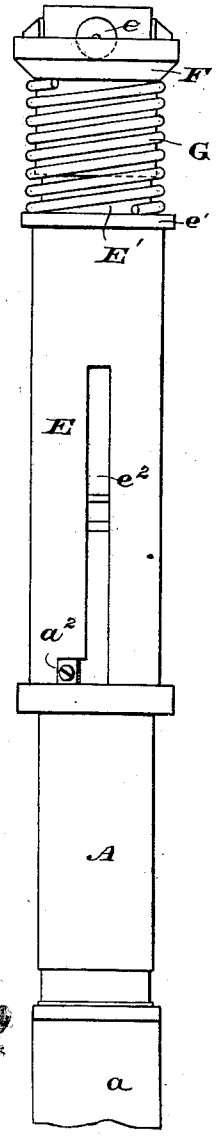


Fig. 2.

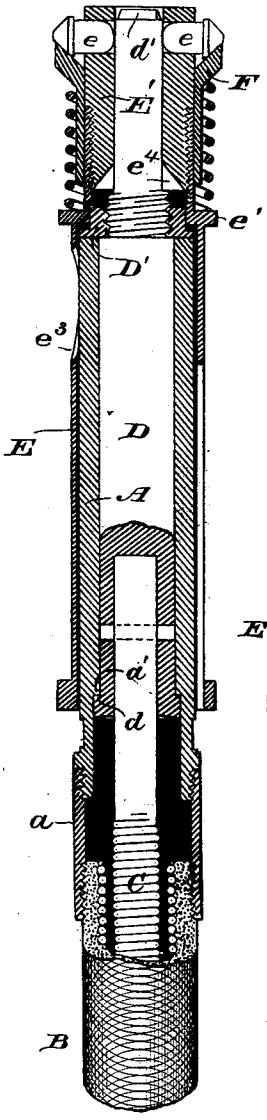
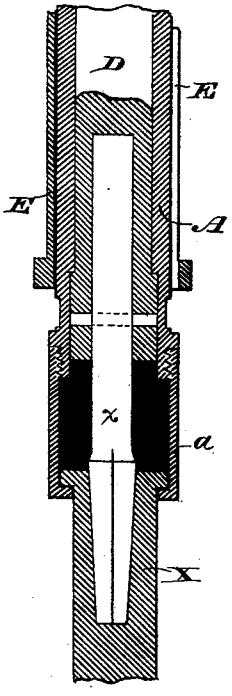


Fig. 3.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

N. STOW.

Screw Driver.

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Fig. 4.

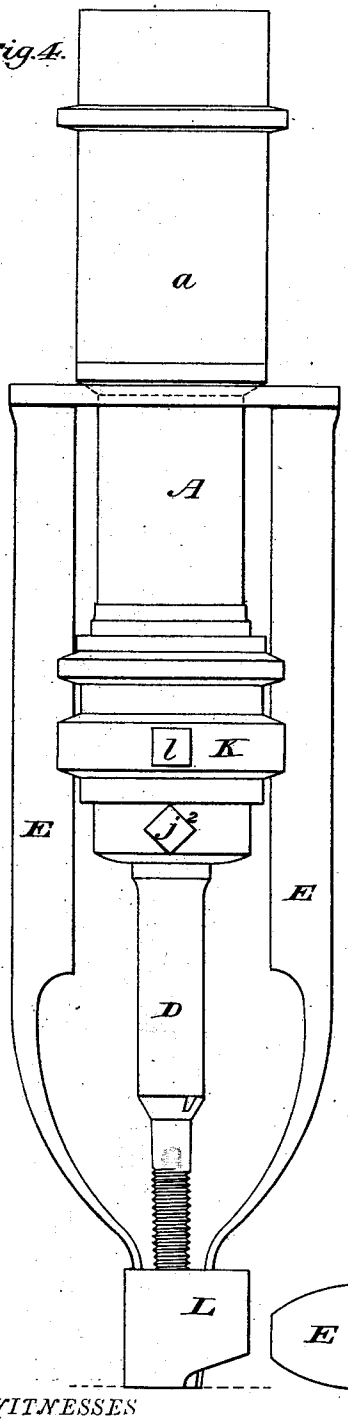


Fig. 5.

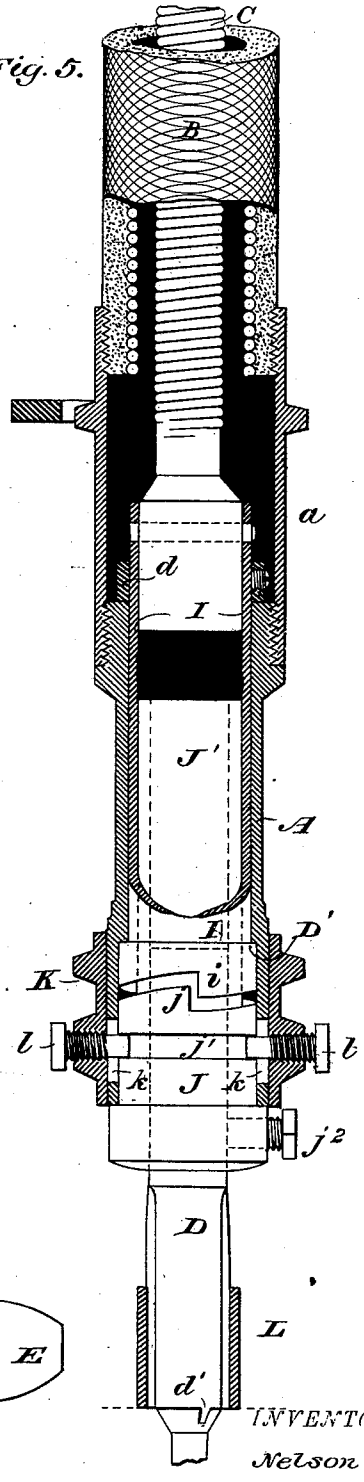
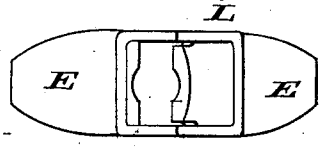


Fig. 6.



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UNITED STATES PATENT OFFICE.

NELSON STOW, OF BINGHAMTON, NEW YORK.

SCREW-DRIVER.

SPECIFICATION forming part of Letters Patent No. 237,065, dated January 25, 1881.

Application filed April 29, 1880. (No model.)

To all whom it may concern:

Be it known that I, NELSON STOW, a citizen of the United States, residing at Binghamton, in the county of Broome and State of New York, have invented certain new and useful Improvements in Screw-Drivers, of which the following is a specification.

My invention relates more especially to a screw-driver driven by power in contradistinction to a screw-driver turned by the hand alone in driving the screw.

The object of my invention is to enable screws to be rapidly driven or inserted by the power of a machine, while enabling the driver to be moved freely about in various directions, so as to operate at different points, whereby the labor, fatigue, and time required in driving screws by the ordinary hand-drivers in common use are avoided.

To these ends my invention consists in certain new combinations of devices which are recited at the close of the specification.

In the accompanying drawings, which illustrate my improvements as embodied in the best way now known to me, Figure 1 is a view, in elevation, of the device. Fig. 2 is a longitudinal central section therethrough, and Fig. 3 is a sectional view of a modification of driving-connection, the driving-power being shown as derived from a carpenter's hand-brace, or so much thereof as is necessary to an understanding of the application. Fig. 4 is a view, in elevation, of a modified form of my device, and Fig. 5 is a longitudinal central section therethrough. Fig. 6 is an end view of the screw-holding end of the form of device shown in Figs. 4 and 5.

In the form of instrument shown in Figs. 1 and 2, A represents a tubular casing or hand-piece, connected at its butt-end by a coupling or extension, *a*, with the outer or free end of a flexible sheath or cover, B, which envelops a flexible wire-coil shaft or power-conveyer, C, the outer or free end of which shaft is connected with the butt-end of a rotary spindle-driver, D, so as to give said driver a rapid revolving motion in its bearings in the casing A. The said flexible power-conveyer and the said flexible sheath or cover therefor may be similar to those in common use, and are preferably like the shaft and sheath shown by me in my Letters Patent of August 6, 1872, which Letters Patent have been reissued under date of March 4, 1879, as No. 8,607. Motion is communicated to the flexible driving-shaft by any suitable prime mover, such as treadle, steam, or other power, in the usual ways.

The spindle-driver D, as will be seen in Fig. 2, is locked from endwise movement in the casing A. An annular shoulder, *d*, formed on the driver at or near its butt-end, abuts against a similar shoulder, *a'*, formed on the internal surface of the casing, so as to prevent movement of the spindle-driver in an outward direction, while a flanged nut, D', is fitted on the driver near its front end, so as to be screwed up against the front end of the casing and prevent movement of the spindle-driver in an inward direction, whereby, it will be seen, endwise movement of the spindle-driver in the casing is positively prevented in either direction, the nut D' acting as a thrust-bearing, while the annular shoulder *d* acts as a pull-bearing for the driver.

The extreme front end of the spindle-driver D, beyond the casing A, is formed with a nib or blade, *d'*, which engages in the slot in the head of the screw to drive or turn it. Surrounding the casing A, and capable of endwise movement thereon, is a sleeve or thimble, E, the front end of which carries the screw-holder, into or through which the front end of the driver may move in driving the screw. The said holder consists, in the example shown in Figs. 1 and 2, of a tubular portion or extension, E', of the sleeve E, having lateral openings at its front end for the reception of laterally-moving devices to hold the screw, while permitting its release when sufficiently driven.

The holding devices are, in the example shown in Figs. 1 and 2, laterally-moving pins *e*, having tapering heads acted upon by a flaring-mouthed cup, F, surrounding the extension E'. Said cup is acted upon by a spiral spring, G, compressed between the flaring flange or mouth of the cup and an annular flange, *e'*, on the sleeve E, so as to keep the cup normally thrust over the heads of the holding-pins, and said pins normally in position to grasp the screw fed into the tubular holder E'. The connection between the casing

A and the sleeve E is formed, in this example, by a pin or lug, a^2, on the casing engaging a longitudinal slot, e^2, in the sleeve, whereby the sleeve is permitted to move endwise on the casing, for the purpose of enabling said sleeve to be thrown forward, with the tubular holder E′, beyond the front end of the driver, for the insertion of the screws to be driven.

Fig. 1 shows the sleeve as drawn out with the holder beyond the end of the driver, while Fig. 2 shows the said sleeve as drawn back to its farthest point, with the front and reduced end of the driver extending through the holder. The said screws are inserted in the said holder, when in its forward position, through an opening, e^3, in the side of the sleeve E, (shown clearly in Fig. 2,) with the points of the screws forward and the slotted heads back, for engagement with the driver when the sleeve is drawn back upon the casing. To facilitate the passage of the screw to the holding devices the rear end of the bore of the tubular extension or holder E′ is preferably provided with a conical or flaring mouth, e^4, as shown in Fig. 2.

The tubular portion or holder E′, when the sleeve E is drawn forward on the casing A, is carried beyond the front end of the driver, it will be understood, so that the screws can be inserted through the opening e^3 into said tubular part, somewhat in the manner of inserting a cartridge in a breech-loading gun, the holding-pins seizing the screw laterally and holding it, while the engagement of the slot in the head of the screw with the driving nib or blade of the driver D is effected by sliding or forcing the sleeve back upon the casing A, as before stated. As the driver is forced forward in the holder E′, or said holder drawn back to effect engagement of the screw with the end of the driver, the screw is forced or driven forward through the holder into its place in the work designed for it, and finally escapes, when driven completely into the work, by the yielding of the holding devices to permit the passage or escape of the head of the screw.

In Fig. 3 I have shown so much of the instrument illustrated in Figs. 1 and 2 as is necessary to exhibit the application of the device to a carpenter's brace as the prime mover, the coupling *a*, instead of connecting the casing A with the sheath B, being so formed as to constitute a swiveling connection with the bit-holding portion of the brace or stock X, while the connection between the driver D and brace X is made in the form of a common bit, *x*, connected to the driver and inserted at its rear end in the bit-stock, so as to be turned thereby.

In Figs. 4, 5, and 6 I have shown a modified form of instrument. In the form of holder shown in Figs. 1 and 2 it will be seen that the capacity of the instrument for driving screws is limited to screws of a size in which the heads will pass through the bore of the tubular holder. In the form of holder shown in Figs. 4, 5, and 6, screws with larger heads may be driven than could be used with the holder shown in Figs. 1 and 2, while in said modified form of instrument there is also shown a clutch arrangement, whereby I am enabled to stop and start the driver at will without stopping the rotation of the power-conveyer. In said Figs. 4 and 5 the butt-end of the casing A is connected with the outer or free end of the sheath B by the coupling *a*, while the front end of the flexible wire-coil shaft or power-conveyer C is connected with the butt-end of a tubular journal or spindle, I, locked from endwise movement in the casing in one direction by the annular shoulder D′ at the front end of said journal, which abuts against a similar shoulder formed in the casing, and in the other direction by an annular collar or shoulder, *d*, at the butt-end of said journal, which abuts against the annular shoulder formed by the butt-end of the casing. The said journal I, at its front end, is formed with a tooth or projection, *i*, with which a corresponding tooth or projection, *j*, on an endwise-movable chuck, J, engages, when said chuck is moved inwardly, to bring its driving-tooth into contact with the tooth of the journal I. The said chuck is provided with a tubular stem, J′, which fits snugly in the socket of the tubular journal I.

In order to govern the movements of the chuck J and bring it into or throw it out of actuating connection with the journal I, with which it revolves when the teeth *i* and *j* are in engagement, or, in other words, when the chuck and journal are clutched together, I mount a thimble, K, on the outer end of the non-rotating casing A and permit it to be moved backward and forward thereon within certain limits, while rendering it incapable of turning by longitudinal slots *k k* in said casing, into which pins or screws *l l*, passing through openings in the thimble K, project and engage with an annular groove, *j′*, formed in the head of the chuck J, whereby said chuck may be moved endwise at will in the casing A, to connect it with or disconnect it from the journal I by means of the pins, while its free rotation, when connected with said journal, is unimpeded.

Inserted in the front end of the chuck J, and locked therein by a fastening device, (shown as consisting of a set-screw, j^2,) is the driver proper, D, of the instrument in the organization of parts shown in the modification being described.

The screw-holder consists of an endwise-movable frame, E, fitted to slide on the casing A, the two side arms of said frame being connected at their rear ends by a circular bar conforming to the contour of the casing, while the front ends of said arms are converged and constitute spring-jaws or holders for the screw when inserted between them, as shown in Fig. 4, the normal tendency of said holding-jaws being to spring together. A box or loop, L, is connected to one of the holding-jaws, while the opposite jaw plays within it. (See Fig. 6.) The screw is inserted in the holder when drawn

forward on the casing, as in the form of instrument first described. Back movement of the holder on the casing or forward movement of the driver through the holder permits feeding of the screw forward through the holder, and when driven sufficiently the screw is released, owing to the yielding of the holding-jaws, to permit the passage or escape of the head of the screw.

The operation and advantages of my improved power screw-driver will readily be understood and appreciated from the foregoing description, and I therefore deem it unnecessary to elaborate with further explanations. I may state, however, that practical operation has demonstrated the great value of my improvements.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, of the flexible power-conveyer, the hand-piece casing, the rotary driver locked from endwise movement in said casing, and the screw-holder movable endwise relatively to said casing and rotary driver.

2. The combination, substantially as hereinbefore set forth, of the power-conveyer, the enveloping sheath of said conveyer, the casing connected at its butt-end with said sheath, the rotary driver mounted in bearings in said casing and connected at its butt-end with the power-conveyer, and the screw-holder movable endwise relatively to said casing and rotary driver.

3. The combination, substantially as hereinbefore set forth, of the casing, the rotary driver, the screw-holder, movable endwise relatively to said casing and rotary driver, so as not to disturb the relation of the casing and driver when manipulating the screw-holder, and the laterally-operating holding devices of said screw-holder.

4. The combination, substantially as hereinbefore set forth, of the casing, the rotary driver, the clutch arrangement by which the driver may be stopped or started at will without interfering with the driving-connection, and the screw-holder movable endwise relatively to said casing and rotary driver, to hold and guide the screw as it is driven and automatically release it.

NELSON STOW.

Witnesses:
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WM. L. GRISWOLD.