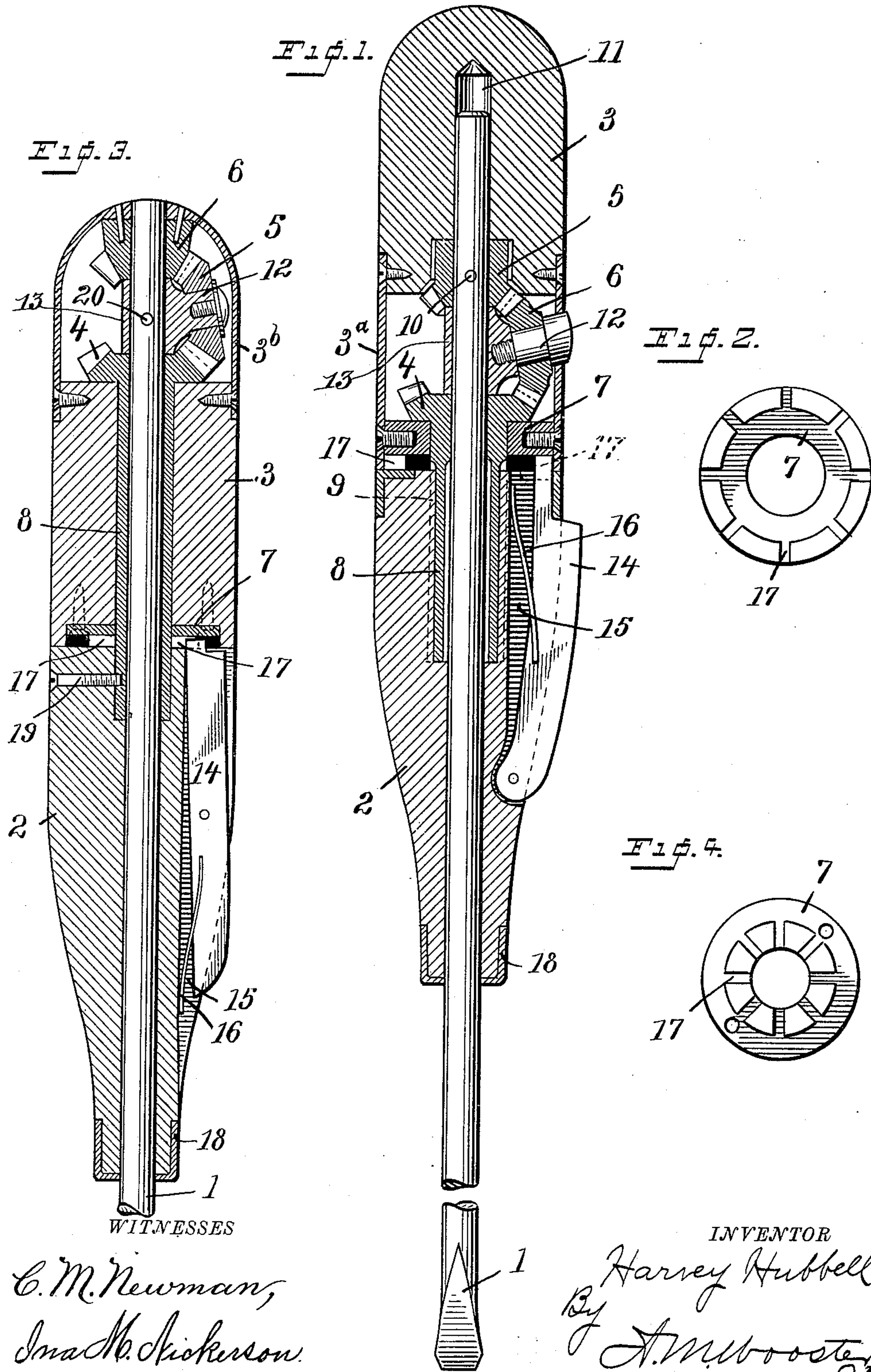


(No Model.)

H. HUBBELL.
CHANGEABLE SPEED SCREW DRIVER.

No. 481,304.

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CHANGEABLE-SPEED SCREW-DRIVER.

SPECIFICATION forming part of Letters Patent No. 481,304, dated August 23, 1892.

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To all whom it may concern:

Be it known that I, HARVEY HUBBELL, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Changeable-Speed Screw-Drivers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide a simple, inexpensive, and durable screw-driver of general cylindrical shape—that is, a screw-driver in which the driver normally is rigidly locked to the handle, so that the device will act as an ordinary screw-driver, but which without adjustment and by simply holding and operating it in another way will produce a change of speed of the screw-driver relative to the handle, and consequently a change in the power applied to the screw that is being driven.

The principle of operation is adapted, with slight changes in the details of construction, to produce a screw-driver having in addition to its normal action an action in which either the speed or the power is greatly increased.

With this end in view I have devised the simple and novel two-speed screw-driver of which the following description, in connection with the accompanying drawings, is a specification, numerals being used to designate the several parts.

Figure 1 is a longitudinal section of a screw-driver embodying the principle of my invention, the parts being so constructed and arranged that the speed of the driver may be increased in the proportion of two and one-half to one; Fig. 2, an inverted plan view of a form of locking-plate used in this form; Fig. 3, a longitudinal section of a screw-driver embodying the principle of my invention, the parts being so constructed and arranged that the power of the driver may be increased in the proportion of two and one-half to one; and Fig. 4 is an inverted plan view of a locking-plate adapted for use in this form.

1 denotes the driver, 2 the part of the handle that is stationary relative to the driver when the speed is changed, and 3 the rotary part of the handle.

In the handle are three bevel-gears, which mesh with each other. These gears I designate, respectively, as 4, 5, and 6. Gear 4 is rigidly secured to part 2 of the handle, and is therefore stationary at all times. Gear 5 is connected to the driver and imparts movement thereto, and gear 6 is connected to part 3 of the handle, and is therefore turned with it at all times.

In the form illustrated in Fig. 1 the operating mechanism is located in the central portion of the handle and is inclosed in a metallic sleeve 3^a, which forms a portion of the rotary part of the handle, said sleeve being rigidly secured to the base of part 3, which is preferably made of wood, and to the locking-plate 7. Gear 4 is formed integral with a shank 8, which is provided with fins 9, so that the part may be locked in place by driving it into the wood of part 2. The shank of the driver extends down through shank 8 and gears 4 and 5, the latter being locked to the shank by a pin 10 and the base of the driver lying in the socket 11 in the base of the handle. The inner side of shank 8 is preferably cored out, as shown, so as to reduce the bearing on the driver, leaving the latter to turn freely. Pinion 6 turns upon a stud 12, which is made integral with or is rigidly secured to a sleeve 13, through which the driver passes freely. The stud in this form is rigidly secured to sleeve 3^a, constituting a portion of the rotary part of the handle, so that when said part is rotated gear 6 and the sleeve are carried with it, said gear rotating on its axis and also rotating about the driver. Supposing gear 5 to consist of sixteen teeth and gear 4 of twenty-four teeth, gear 6 being merely an intermediate gear and gear 4 being stationary, it is obvious that a single rotation of part 3 of the handle will impart to gear 5, which carries the driver with it, two and one-half rotations, the relative size of these gears being such that the smaller would gain one-half a revolution upon the larger if both rotated. It necessarily gains an additional revolution, owing to the fact that the larger one is held stationary, which compels the intermediate gear to move over its surface, itself taking up in the form of additional speed the motion that would be imparted to gear 4 were it permitted to rotate.

As it is of course frequently desirable to use the implement as an ordinary screw-driver, I provide a latch 14, which is pivoted in a slot 15 in part 2 of the handle, a spring 5 16 acting to hold the latch in engagement with one of the notches 17 in locking-plate 7, this locking-plate, as already stated, being rigidly secured to the rotary part of the handle. Latch 14 projects outward sufficiently from 10 slot 15 to permit the latch to be readily pressed inward by the hand to disengage it from the locking-plate when it is required to change the speed, it being understood that in using the multiple speed the operator holds part 2 15 of the handle stationary with one hand, at the same time pressing the latch inward, and turns part 3 of the handle with the other hand. Under ordinary circumstances the latch will be in engagement with one of the 20 notches of the locking-plate and the driver will act as an ordinary driver—that is to say, rotation of the handle will carry the driver with it, but without increase of speed.

18 denotes ferrules, which are preferably 25 placed upon the ends of part 2 of the handle to strengthen the implement and prevent the wood from splitting.

In the form shown in Fig. 3 the parts are so arranged that when part 2 is held station- 30 ary and the latch manipulated the speed of the driver is reduced and the power increased in the proportion of two and one-half to one. In this form the operating mechanism is placed at the outer end of the handle and is 35 inclosed in a metallic cap 3^b, which is rigidly secured to part 3 of the handle. The shank 8 of gear 4 extends entirely through part 3 of the handle and into part 2, where it is locked by a screw 19. The locking-plate in 40 this form is set in a recess in part 3, where it is retained by screws. The latch in this form is pivoted centrally and the notches 17 in the

locking-plate are placed at the the center instead of at the edge thereof. Gear 6 in this form is rigidly secured to cap 3^b, and gear 5 45 is mounted on stud 12 upon sleeve 13, said sleeve being rigidly locked to the driver by a pin 20 instead of rotating upon it, as in the other form.

It will be seen that, while the principle of 50 operation is the same in the two forms, the results are the reverse of each other. In this form gear 4 is fixed to part 2 of the handle, as before, but the power, instead of being applied to the intermediate gear, as in the other 55 form, is applied in this form to the smaller gear, so that when the latch is pushed in and the speed changed the relation of power to speed is as two and one-half to one. This form is especially adapted for very heavy 60 work, as it enables the operator to turn forward and set heavy screws that are absolutely immovable under any power that it is possible to apply with an ordinary screw-driver.

Having thus described my invention, I 65 claim—

A tool-handle of general cylindrical shape, comprising the following elements: two parts, one part of which is stationary relative to the tool when the speed is changed and the other 70 part rotary, a sleeve 13, through which the tool passes and which carries a bevel-gear, two other bevel-gears meshing therewith and attached one to each of the two parts of the handle, and a locking-plate and latch for hold- 75 ing the two parts of the handle and the tool stationary relative to each other.

In testimony whereof I affix my signature in presence of two witnesses.

HARVEY HUBBELL.

Witnesses:

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INA M. NICKERSON.