No. 698,418. Patented Apr. 22, 1902.

R. F. SPRAGUE.

POWER DRIVEN TOOL.

(Application filed Jan. 8, 1902.)

(No Model.)

Fig. 1.

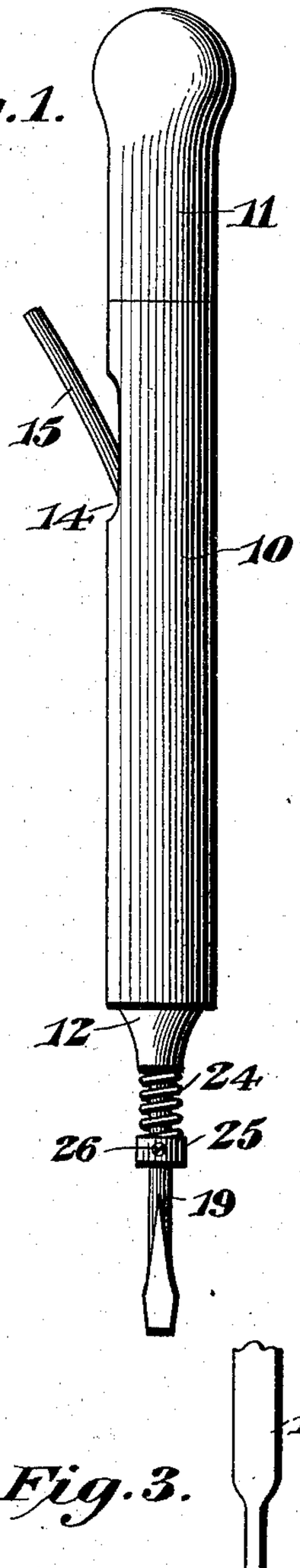

Fig. 2.

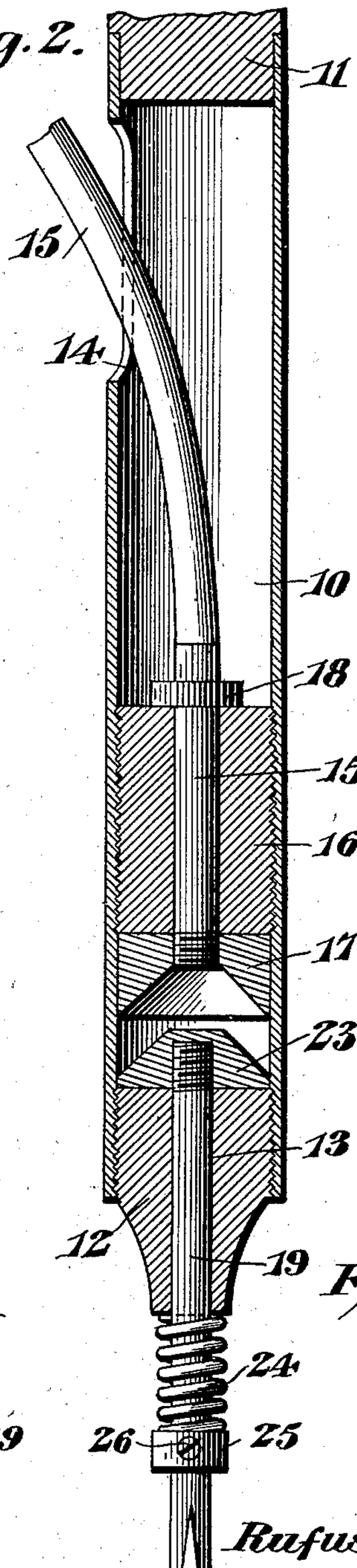

Fig. 5.

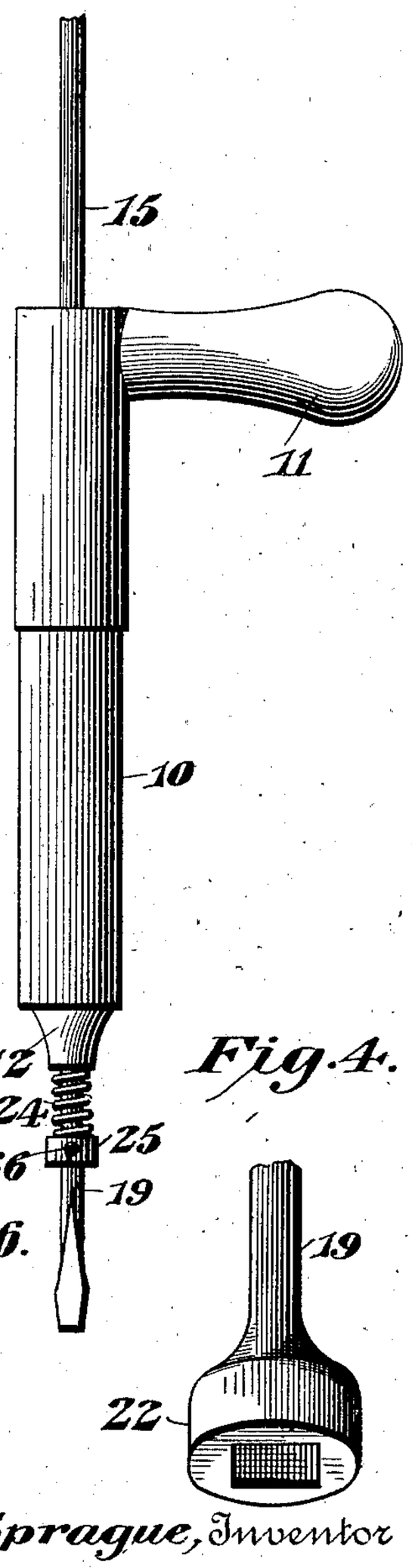

Fig. 4.

Fig. 3.

Fig. 6.

Witnesses
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POWER-DRIVEN TOOL.

SPECIFICATION forming part of Letters Patent No. 698,418, dated April 22, 1902.

Application filed January 8, 1902. Serial No. 88,923. (No model.)

To all whom it may concern:

Be it known that I, RUFUS F. SPRAGUE, a citizen of the United States, residing at Greenville, in the county of Montcalm and State of Michigan, have invented a new and useful Power-Driven Tool, of which the following is a specification.

The use of tools rotated by hand—such, for instance, as screw-drivers and the like—is very tedious and tiresome, as well as slow, and while the "spiral" and "ratchet" tools of this sort are more convenient and expeditious time is wasted in the retrograde movements necessary to their operation. While this is apparently of small importance where there are few articles to be operated upon, in large factories the loss of time is very great, and as these tools are in extensive use in many industries, the matter becomes one of considerable magnitude in the aggregate.

The present invention relates to tools of this character; and the object thereof is to provide a power-driven instrument which may be readily applied to the article to be operated upon, will rotate continuously as long as desired, and can be stopped immediately when the article is driven home.

The embodiment of the invention shown in the accompanying drawings and described in the following specification is in the form of a screw-driver; but it will be readily seen that it may be employed in connection with wrenches, bits, and various other tools.

In the drawings, Figure 1 is a side elevation of a screw-driver constructed in accordance with the present invention. Fig. 2 is a longitudinal sectional view through the same. Fig. 3 is a detail view showing a portion of a slightly-modified tool which may be employed for turning in screw-eyes. Fig. 4 is a similar view of a wrench. Fig. 5 is a slightly-modified form of the tool. Fig. 6 is a bit that may be employed for boring the holes that receive the screws to be driven.

Similar numerals of reference designate corresponding parts in all the figures of the drawings.

In carrying out the invention a support, preferably in the form of a tubular casing 10, is provided, having one end closed by a handle 11 and having threaded into its other end a head 12, provided with a centrally-arranged longitudinal opening 13. The casing is furthermore provided contiguous to the handle 11 with an opening 14, through which is passed a flexible shaft 15, which may be attached to any suitable source of power (not shown) and is connected at its inner end with a longitudinally-disposed stub-shaft 15^a, journaled in a box 16, secured by suitable means within the casing. To the lower end of this stub-shaft is secured a clutch member 17, while the other end carries a thrust-bearing in the shape of a nut or collar 18, so that said shaft is held against longitudinal movement in either direction.

A tool-spindle 19 is rotatably and slidably mounted in the opening 13 of the head 12 and is in alinement with the stub-shaft 15^a. The outer end of this spindle is formed into suitable shape to operate upon any well-known article. For instance, in Figs. 1 and 2 a screw-driver is shown, while in Fig. 3 a device 21 is shown intended to engage in the eye of a screw-eye for turning the same. In Fig. 4 an ordinary and well-known form of wrench-head 22 is illustrated, or a bit, as shown in Fig. 6, can be used for boring the holes that receive the screws to be driven. Attached to the inner end of the spindle is a clutch member 23, that is movable into and out of engagement with the member 17 of the shaft. In the form shown the member 23 has its inner face beveled and frictionally engages in the corresponding depression of the member 17. Its opposite face, as shown, is arranged to abut against the inner end of the head 12, thus limiting the outward movement of the spindle and forming a brake to hold the spindle against rotation when out of engagement with the clutch member, this latter feature, however, being unimportant. For the purpose of normally holding the spindle in its outer position, but primarily of holding the screw-driver firmly in the slot in the screw or the wrench on the nut at all times, a coiled resistance-spring 24 surrounds the exposed portion of the same and bears at one end against the outer end of the head, the other end bearing against a tension-collar 25, that is adjustably secured upon the shank by a screw 26 or other suitable fastening means.

In Fig. 5 a slightly-modified form of the tool is illustrated. In this case the handle instead of extending in alinement with the casing is secured at right angles thereto, forming what is generally known as a "pistol-grip." In this case the opening 14 through the casing is dispensed with and the flexible shaft 15 passes through the end of said casing.

The operation of the device will be perfectly apparent. Assuming that the shaft 15^a is in rotation while the spindle 19 is in its outer position, it will be seen that said spindle is not affected by the movement of the shaft. The operator places the bit in the slot of the screw-head and then applies sufficient pressure to the handle to disengage the clutch member 23 of the spindle from the inner end of the head and bring such clutch member into frictional engagement with the clutch member 17 of the shaft, causing the spindle to be rotated with the shaft. It will readily be seen that the sudden transmission of motion to the spindle would tend to cause its outer extremity to leave the slot in the screw were it not for the coiled spring 24, which is adjusted to impart the requisite resistance to the spindle to overcome this tendency and hold the screw-driver firmly in place in the slot. When the screw has been driven home, the pressure upon the handle is relieved, causing the two clutch members to separate, the clutch member 23 to again engage the inner end of the head, and the spindle to cease to rotate. The resistance-spring therefore performs three distinct functions. First, it promptly disengages the clutch members upon the release of the pressure that induces their contact; secondly, it increases the frictional contact between the outer face of the clutch member carried by the tool-spindle and the head in which the spindle is journaled, thus quickly stopping the rotary motion of the spindle; thirdly, and most important, it holds the tool to its work, and for this reason it is placed in exposed position and is so arranged that its tension may be readily regulated to suit the requirements of all classes of work. By this means it will be seen that an exceedingly simple instrument is provided, which accomplishes all the objects mentioned in the preliminary portion of the specification. Furthermore, the clutches in this preferred form are entirely housed within the casing, and thereby protected from injury.

While this instrument has been described with the minutest detail, it is to be distinctly understood that the invention is not limited to the specific form shown and described, but is open to such changes and modifications as the scope of the appended claims will permit.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is--

1. In an instrument of the class described, the combination with a suitable support, of a driving-shaft journaled upon the support, a tool-spindle also journaled upon the support and movable toward and from the driving-shaft, coacting clutch members carried by the shaft and spindle, and a resistance-spring mounted upon the tool-spindle on one side of its clutch member to move said spindle away from the driving-shaft and hold it in engagement with the article operated upon.

2. In an instrument of the class described, the combination with a suitable support, of a driving-shaft journaled upon the support, a tool-spindle also journaled upon the support and movable toward and from the driving-shaft, coacting clutch members carried by the shaft and spindle, and an exteriorly-located resistance-spring mounted upon the tool-spindle on one side of its clutch member and bearing against the frame, said spring being arranged to move the spindle away from the driving-shaft and hold it in engagement with the article operated upon.

3. In an instrument of the class described, the combination with a suitable support, of a driving-shaft journaled upon the support, a tool-spindle also journaled upon the support and movable toward and from the driving-shaft, coacting clutch members carried by the shaft and spindle, an exteriorly-located resistance-spring mounted upon the tool-spindle and bearing against the frame, said spring being arranged to move the spindle away from the driving-shaft and hold it in engagement with the article operated upon, and means for adjusting the tension of the spring.

4. In an instrument of the class described, the combination with a suitable support, of a driving-shaft journaled upon the support, a tool-spindle also journaled and longitudinally movable on the support in alinement with the driving-shaft, said spindle having one end adjacent to and in line with one end of the shaft, coacting clutch members carried by the adjacent ends of the driving shaft and tool-spindle, and means engaging the tool-spindle and the support to move said spindle away from the driving-shaft.

5. In an instrument of the class described, the combination with a suitable support, of a driving-shaft journaled on the support, a tool-spindle also journaled and longitudinally movable on the support in alinement with the driving-shaft, said spindle having one end located adjacent to and in line with one end of the shaft, coacting clutch members carried by the adjacent ends of the driving-shaft and tool-spindle, and a coiled spring surrounding the spindle and bearing against the same and the support to move said spindle away from the driving-shaft and maintain it in operative relation to the article operated upon.

6. In an instrument of the class described, the combination with a suitable support, of a driving-shaft journaled on the support, a tool-spindle also journaled and longitudinally movable on the support in alinement with the driving-shaft, said spindle having one end located adjacent to and in line with one end of the shaft, coacting clutch members carried by

the adjacent ends of the driving-shaft and tool-spindle, a collar adjustably mounted upon the spindle, and a coiled spring surrounding the spindle and bearing against the collar and the support to move the spindle away from the driving-shaft and maintain said spindle in operative relation to the article operated upon.

7. In an instrument of the class described, the combination with a casing having a handle, of a shaft journaled in the casing, a tool-spindle projecting from the casing and movable toward the shaft, and coacting clutch members carried respectively by the inner ends of the spindle and shaft, said members being located within the casing, the member of the spindle being movable into and out of engagement with the shaft member upon the movement of said spindle.

8. In an instrument of the class described, the combination with a casing having a handle at one end, of a tool-spindle rotatably mounted in the other end of the casing and longitudinally movable therein, power-transmitting means passing through the side of the casing, clutch members secured respectively to the inner end of the tool-spindle and the power-transmitting means, said clutch members being located within the casing and one of said members being movable into and out of engagement with the other, and means for holding the tool-spindle in operative engagement with the article operated upon.

9. In an instrument of the class described, the combination with a casing, of a driving-shaft journaled in the casing, a tool-spindle rotatably and slidably mounted in the casing in alinement with the shaft, the inner ends of said shaft and spindle being located within the casing, coacting clutch members carried by the adjacent inner ends of the shaft and spindle, the clutch member of the spindle being movable into and out of engagement with the shaft member upon the longitudinal reciprocation of said spindle, and adjustable yielding means engaging the spindle to move it outwardly, and maintain it in operative engagement with the article operated upon.

10. In an instrument of the class described, the combination with a casing having a head at one end, of a shaft journaled in the casing and having a clutch member at its inner end, a spindle rotatably and slidably mounted in the head of the casing, a clutch member secured to the inner end of the spindle and having one face coacting with the clutch member of the shaft, and means engaging the exposed end of the spindle to move said spindle away from the driving-shaft and maintain it in operative engagement with the article operated upon.

11. In an instrument of the class described, the combination with a casing having a head at one end, of a shaft journaled in the casing and having a clutch member at its inner end, a spindle rotatably and slidably mounted in the head of the casing, a clutch member secured to the inner end of the spindle and having one face coacting with the clutch member of the shaft, and the other coacting with the inner face of the head as the spindle is moved in one direction or the other to respectively rotate said spindle and hold it against rotation, and a spring located upon the projecting portion of the spindle and bearing against the same and the casing to move the spindle outwardly and maintain it in operative engagement with the article operated upon.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

RUFUS F. SPRAGUE.

Witnesses:

JOHN H. SERRISS,

PAUL VAN DENISE.