

May 26, 1931.

J. V. WALKER

1,807,265

SCREW DRIVING DEVICE

Filed Oct. 9, 1929

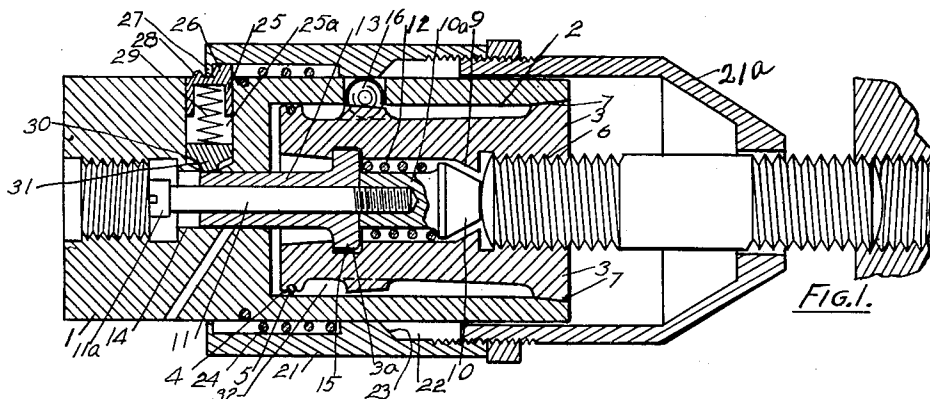


FIG. 1.

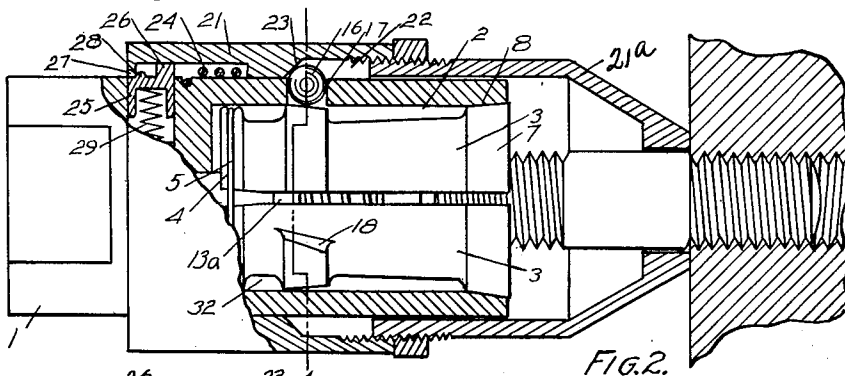


FIG. 2.

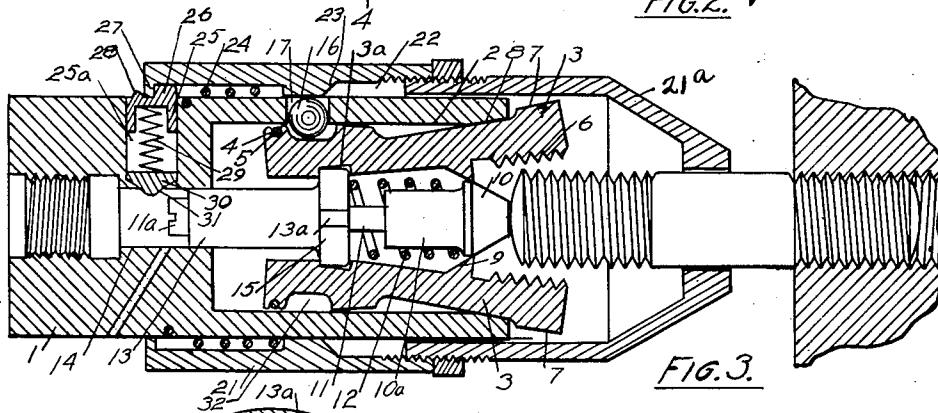


FIG. 3.

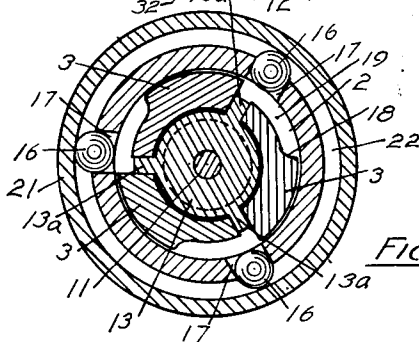


Fig. 4.

John V. Walker
INVENTOR.

INVENTOR.

BY *H. Z. Lind*
ATTORNEYS.

ATTORNEYS.

UNITED STATES PATENT OFFICE

JOHN V. WALKER, OF FAIRVIEW, PENNSYLVANIA, ASSIGNOR TO TITAN TOOL COMPANY, OF ERIE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

SCREW DRIVING DEVICE

Application filed October 9, 1929. Serial No. 398,547.

This invention is designed to improve screw driving devices and as exemplified is particularly arranged for driving screw studs. In devices of this kind heretofore made, it has been common to provide a head with a jaw-receiving socket, the jaws being slidably mounted in the socket and locked rotatively with the head as drawn into the socket and released with withdrawal from the socket. The locking of the jaws rotatively through the axial movement of the jaws leads to difficulty with the continued rotation of the head during the engaging and releasing movement. The present invention is designed to obviate this difficulty by providing an independent clutch for locking the jaws rotatively with the head so that the rotative locking may be accomplished independently of the axial movement of the jaws. In this way, the jaws may be engaged and released without injury to the thread studs and in a smooth and efficient manner. Features and details of the invention will appear from the specification and claims.

A preferred embodiment of the invention is illustrated in the accompanying drawings as follows:—

Fig. 1 shows a central section of the device with the driver in position to drive a stud.

Fig. 2 a similar section at the completion of the driving movement.

Fig. 3 a similar section with the jaws released.

Fig. 4 a section on the line 4—4 in Fig. 2. 1 marks the head which in use is connected to a driving spindle. It has the jaw-receiving socket 2 in which jaws 3 are placed. These jaws are movable axially in the socket and are also free to rotate except when locked in the manner hereinafter described. The jaws are separable. The device as shown comprises three jaws. They have a groove 4 at their rear ends in which is arranged a spring ring 5 which holds the jaws in proper register. The jaws are internally screw-threaded at 6 at their front ends and are provided with exterior cam closing surfaces 7 at their front ends engaging similar surfaces 8 at the end of the head. The jaws have the internal

opening cam surfaces 9 at the rear of the threads 6.

An opening plunger has a cam surface 10 at its front end engaging the cam surfaces 9 and opening the jaws when the jaws are withdrawn from the socket. The cam surfaces 10 are on a yielding extension 10a which is secured by a pin 11 with a sliding plug 13. The plug 13 is slidably mounted in a bore 14 in the head and has a head 15. The head 15 has ribs 13a which extend into the spaces between the jaws and keeps the jaws in spaced relation so that they will open and close freely. The head 15 extends into grooves 3a in the jaws so that the plunger 13 is locked to move with the jaws. A spring 12 yieldingly urges the extension 10a forward so as to crowd the jaws into open position through the action of the cam surfaces 10 when the jaws are withdrawn from the socket. The pin 11 is provided with a head 11a and the pin is of such length as to give the extension the necessary freedom of movement relatively to the plug 13 and the jaws 3 to accomplish the opening movement of the jaws. Clutch balls 16 are slidably mounted in radial openings 17 in the head. The jaws have raised portions 19 which terminate in driving shoulders 18 and the balls when forced inwardly are brought into these portions and thus into driving relation with the jaws. An actuating sleeve 21 is slidably mounted on the head. This has a ball-receiving recess 22 which terminates in a cam surface 23. The recess is sufficient to permit the balls to pass outwardly under the camming action of the shoulder 18 and centrifugal force so as to release the jaws and permit them to rotate relatively to the head. The cam 23 forces the balls into locking position when the sleeve is moved forward. A spring 24 yieldingly urges the sleeve forward to force the balls into locking position. A latch 25 is arranged in a socket 25a in the head. This latch has a shoulder 26 which limits the forward movement of the sleeve 21 and also through the action of a catch shoulder 27. The latch also has a projection 28 which is adapted to engage the catch shoulder 27 when the sleeve is retracted. A spring 29 yield-

ingly forces the latch outwardly into locking position. The spring is seated on a sliding plug 30 which has a cam end 31 which, with the plug 30 seated, is in the path of the plug 13.

The sleeve 21 has a projection 21a which is adapted to engage the work as the device advances so as to retract the sleeve and release the clutch at a pre-determined position. This pre-determined position places the locking shoulder 27 over the catch 28. This locking out has a functional purpose hereinafter specified. In operating the device, the stud is initially set in the work, as indicated in Fig. 1. The driver parts are in the position shown in Fig. 3 and this is placed over the stud and the driver forced forwardly. As the driver is pushed forward, the end of the stud contacts the extension 10a and at the limit of its movement the plug and jaws are forced inwardly to the position shown in Fig. 1. During this inward movement the jaws are being rotated because the clutch balls are in their inner, or set position. This is desirable in that the threads are then certainly brought into register. The spindle continues in operation driving the stud to the position shown in Fig. 2, when the projection 21 has advanced sufficiently to retract the sleeve 21 to the position shown in Fig. 2, and this releases the balls 16, the balls acting both under centrifugal force and the camming action of the shoulders 18. The operator then withdraws the driving device. In the interval during which the jaws are being withdrawn and before they reach the position of disengagement from the thread the catch 28 retains the sleeve 21 in its retracted position and consequently the jaws are stationary, or not being driven by the balls. This prevents any shock, or chatter between the balls and the shoulders 18 as this disengagement is taking place. As soon as the plug 13 is withdrawn from under the seat 30, the spring 29 is so released that the spring 24 overcomes the resistance of the shoulder 28 and the sleeve snaps to its forward position driving the balls to their inward position, the balls being received by a groove, or recess 32 which extends entirely around the jaws.

What I claim as new is:—

1. In a screw driving device, the combination of a head having a jaw socket; separable jaws axially movable and rotatable in the socket and closed by the walls of the socket as drawn thereinto; a clutch mechanism locking the jaws rotatively with the head; and means actuating the clutch mechanism independently of the movement of the jaws relatively to the head.

2. In a screw driving device, the combination of a head having a jaw socket; separable jaws axially movable and rotatable in the socket and closed by the walls of the socket as drawn thereinto; a clutch mechanism lock-

ing the jaws rotatively with the head; and means actuating the clutch mechanism independently of the movement of the jaws relatively to the head comprising means advanced with the driving device and actuated at a pre-determined point of advancement.

3. In a screw driving device, the combination of a head having a jaw socket; separable jaws axially movable and rotatable in the socket and closed by the walls of the socket as drawn thereinto; a clutch mechanism locking the jaws rotatively with the head; means actuating the clutch mechanism independently of the movement of the jaws relatively to the head; and means comprising a sleeve slidably mounted on the head and advanced with the driving device and actuated at a pre-determined point of advancement.

4. In a screw driving device, the combination of a head having a jaw-receiving socket; separable jaws axially and rotatively mounted in the socket, said jaws having raised portions and closing as drawn into said socket; clutch devices in the wall of the head movable into and out of said portions; and means on the head actuating said clutch devices.

5. In a screw driving device, the combination of a head having a jaw-receiving socket; separable jaws axially and rotatively mounted in the socket, said jaws having raised portions and closing as drawn into said socket; clutch devices in the wall of the head movable into and out of said portions; and means on the head actuating said clutch devices, said means comprising a sleeve slidably mounted on the head and having an interior recess receiving the clutch devices to release the jaws, and a cam surface acting on the clutch devices.

6. In a screw driving device, the combination of a head having a jaw-receiving socket; separable jaws axially and rotatively mounted in the socket, said jaws having raised portions and closing as drawn into said sockets; clutch devices in the wall of the head movable into and out of said portions; and means on the head actuating said clutch devices, said means comprising a sleeve slidably mounted on the head and having an interior recess receiving the clutch devices to release the jaws, a cam surface acting on the clutch devices, and a latch locking the sleeve in released position, said latch being released as the jaws are withdrawn from the socket.

7. In a screw driving device, the combination of a head having a jaw-receiving socket; separable jaws axially and rotatively mounted in the socket, said jaws having raised portions and closing as drawn into said socket; clutch devices in the wall of the head movable into and out of said portions; and means on the head actuating said clutch devices, said means comprising a sleeve slidably mounted on the head and having an interior recess receiving the clutch devices to release the jaws,

a cam surface acting on the clutch devices, a jaw separating plug movable with the jaws and opening the same as the jaws are withdrawn from the socket, a latch in the head locking the sleeve in closed position, and means releasing the latch with a movement of the plug as the jaws are withdrawn.

8. In a screw driving device, the combination of a head having a jaw-receiving socket; separable jaws axially and rotatively mounted in the socket, said jaws having raised portions and closing as drawn into said socket; clutch devices in the wall of the head movable into and out of said portions; and means on the head slidably mounted on the head and having an interior recess receiving the clutch devices to release the jaws, a cam surface acting on the clutch devices, and a jaw separating plug movable with the jaws, said plug having a spring-pressed extension moving relatively to the jaws and opening the same as the jaws are withdrawn from the socket.

9. In a screw driving device, the combination of a head having a jaw-receiving socket; separable jaws axially and rotatively mounted in the socket, said jaws having raised portions and closing as drawn into said socket; clutch devices in the wall of the head movable into and out of said portions; and means on the head slidably mounted on the head and having an interior recess receiving the clutch devices to release the jaws, a cam surface acting on the clutch devices, a jaw separating plug movable with the jaws, said plug having a spring-pressed extension moving relatively to the jaws and opening the same as the jaws are withdrawn from the socket; a latch in the head locking the sleeve in released position; and means releasing the latch with a movement of a plug as the jaws are withdrawn.

In testimony whereof I have hereunto set my hand.

JOHN V. WALKER.