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2,763,173

NUT HOLDING AND CENTERING MEANS FOR NUT DRIVING MACHINE

Filed July 20, 1953

3 Sheets-Sheet 1

Fig. 1

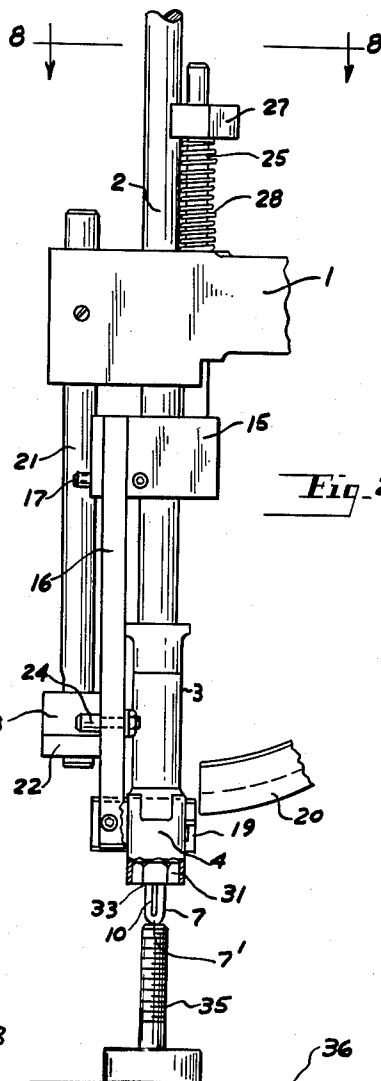
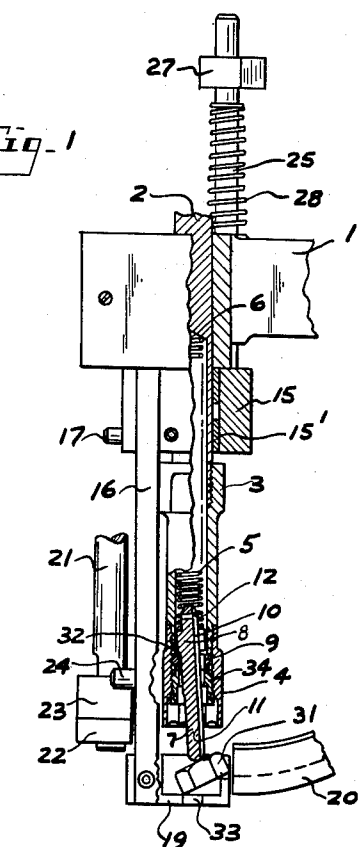


Fig. 2

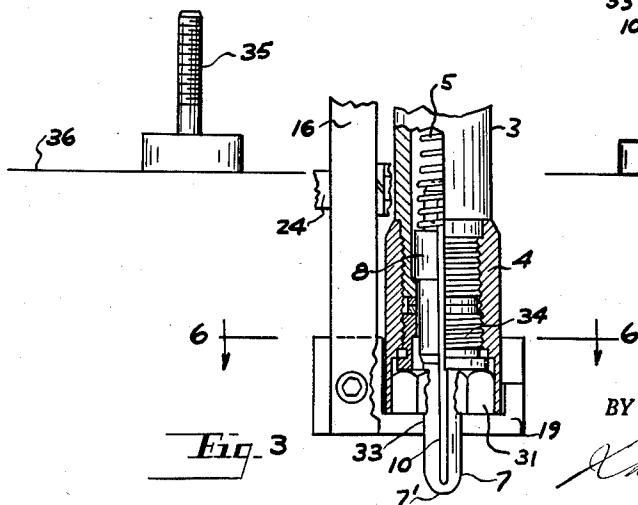


Fig. 3

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3 Sheets-Sheet 2

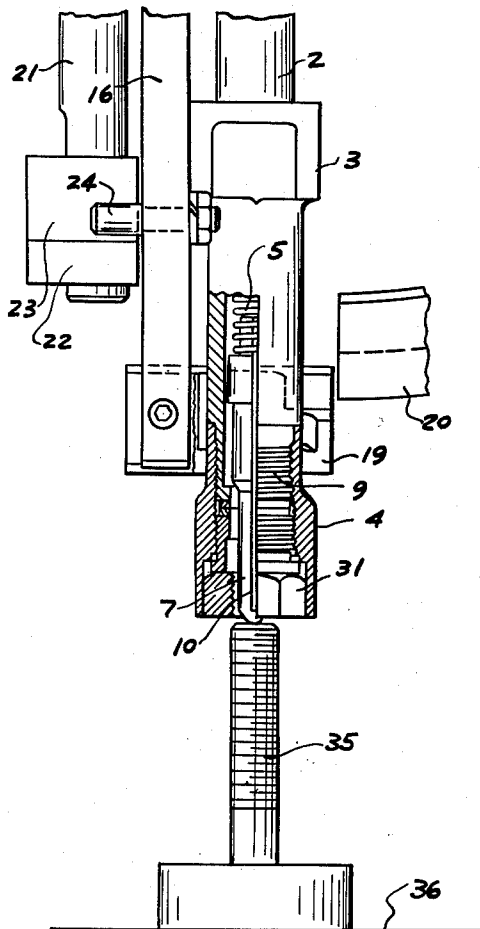


Fig. 4

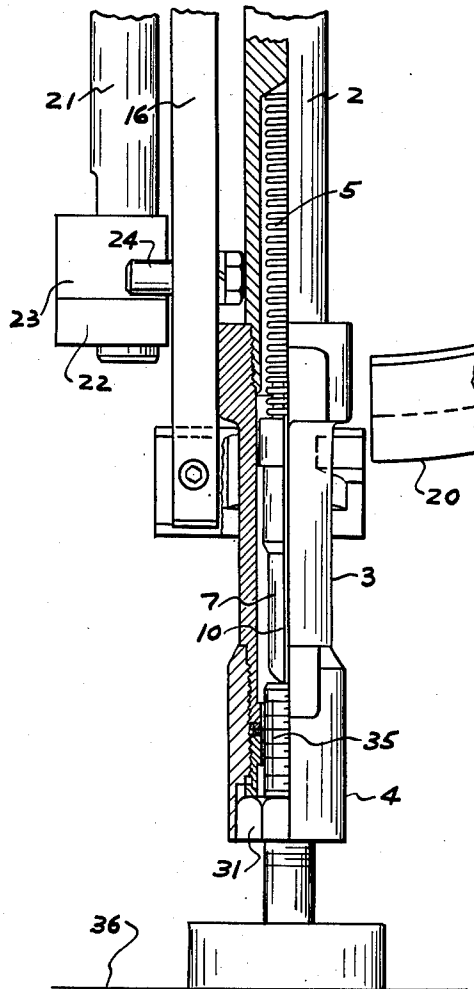


Fig. 5

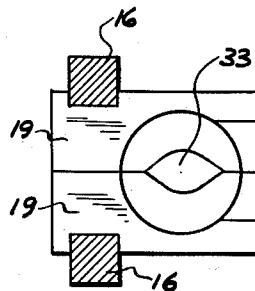


Fig. 6

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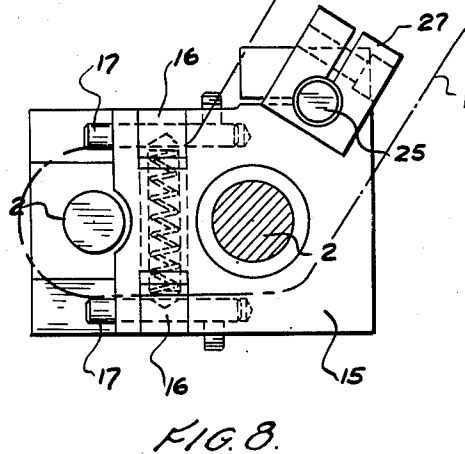
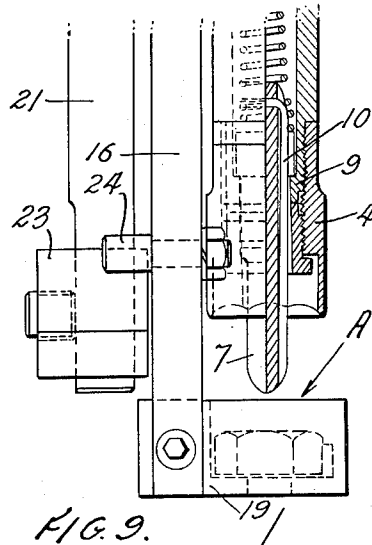
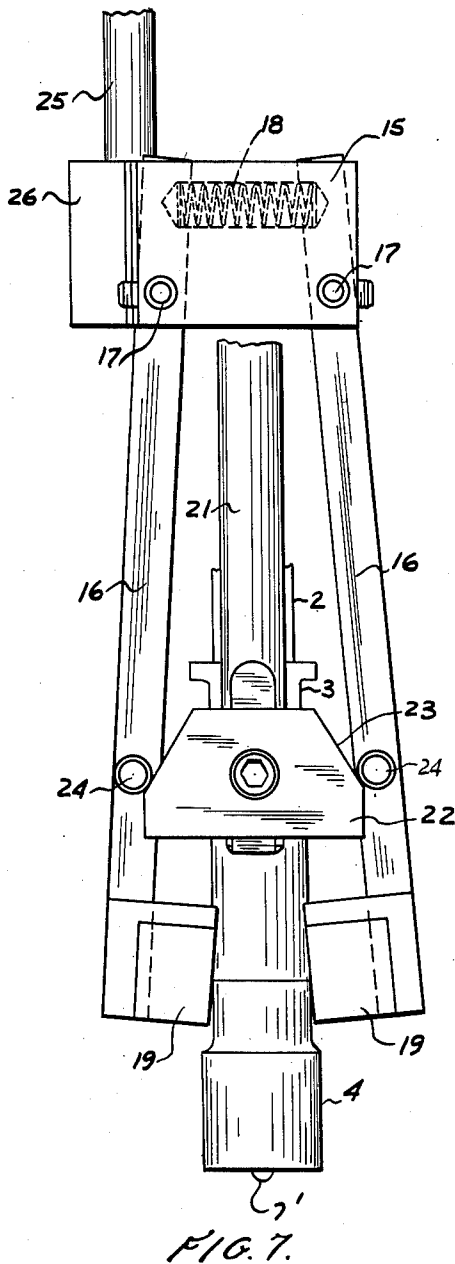
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NUT HOLDING AND CENTERING MEANS FOR NUT DRIVING MACHINE

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3 Sheets-Sheet 3



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1

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NUT HOLDING AND CENTERING MEANS FOR NUT DRIVING MACHINE

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11 Claims. (Cl. 81—54)

The present invention pertains to a novel nut driving machine, and the principal object of the invention is to provide a construction that is operated by a slidable and rotatable spindle of a standard machine tool.

Another object of the invention is to provide a relatively simple, inexpensive and effective construction for the purpose set forth. A further object is to provide a mechanism having a receiver for the nut to be driven, with means for righting a nut that does not lie properly seated in the receiver. Still another object is to provide means for positively retaining a nut in a downwardly facing wrench while being delivered to the work piece.

In the accomplishment of these objects, a wrench is mounted on the spindle of the described machine, and in the wrench is fitted a spring-backed pilot pin. Opposite the free end of the pin is a nut receiver consisting of split sections. The pilot pin has lateral play in its mounting and has a pointed tip, whereby the pin will right a nut that is not squarely seated in the receiver.

After the pilot pin has passed through the nut, the wrench comes down over the nut. The pin carries a lengthwise spring wire bowed outwardly to hold the nut in a downwardly facing wrench.

When the wrench bears upon the nut in the receiver, the pressure initiates a cam action as it spreads the receiver sections and permits the wrench and nut to pass between them to the work. The same pressure is partially opposed by another spring, whereby the nut is positively inserted in the wrench against the tension of the bowed spring.

The invention is fully disclosed by way of example in the following description and in the accompanying drawings in which

Figure 1 is an elevation of the device, partly in section, showing the initial engagement with the nut;

Figure 2 is a similar elevation, partly broken away, showing an advanced position;

Figure 3 is a detail of Figure 2, in section;

Figure 4 is another elevation, partly in section, showing a more advanced position;

Figure 5 is an elevation, partly in section, showing the nut applied on the stud;

Figure 6 is a section on the line 6—6 of Figure 3, showing the nut receiver in plan view and without the internal parts;

Figure 7 is a detail elevation at right angles to Figure 1;

Figure 8 is a plan section on the line 8—8 of Figure 2 with the fixed arm 1 omitted, and

Figure 9 is an enlarged detail section showing the bowed spring.

Reference to these views will now be made by use of like characters which are employed to designate corresponding parts throughout.

In Figure 1 is shown a fixed horizontal arm 1 extending from the post or other part of an upright machine such as a drill press. A vertical spindle 2 passes slidably through the arm and is driven by suitable means. On

2

the lower end of the spindle is screwed an adapter sleeve 3, and on the lower end of the sleeve is screwed a bit or socket wrench 4. It will be understood that the sleeve and the wrench may be furnished in various sizes according to the dimensions of the nut to be driven.

A coil spring 5 is inserted in the sleeve 3, extending into and being seated in the spindle at 6 as shown in Figure 5. Against the lower end of the spring is assembled a pilot pin 7 having a collar 8 engaged by the lower end of the spring. An internal shoulder 9 on sleeve 3 screwed into the bit retains the pilot pin by extending under the collar 8. The pin has lateral play or looseness in the enclosing parts and is normally held co-axial by a slightly bowed spring wire 10 inserted in a lengthwise notch 11 from end to end and anchored by having its upper end bent at a right angle and inserted crosswise in the pin at 12.

Directly below the arm 1, the spindle 2 is surrounded by a block 15 having a bushing 15'. From the block are pivotally suspended two opposed fingers 16 mounted on parallel pivot pins 17 so that they may swing away from each other. A compressed coil spring 18 is fitted between the ends of the fingers, above the pivot pins, to bring the lower ends of the fingers together. The lower ends of the fingers carry split halves 19 of a nut receiver that lies directly below the pilot pin 7. The receiver is fed with single nuts from a chute 20 which is controlled by a suitable escapement mechanism as known in the art.

A rod 21 is fixedly suspended from the arm 1, lying adjacent to the fingers 16 and midway between them. On the lower end of the rod 21 is secured a cam block 22 having a pair of opposed downwardly sloping shoulders or cam surfaces 23. Pins 24 projecting from the fingers 16 engage the shoulders 23 and cause the split sections 19 to spread apart when the fingers 16 are moved downward by the means presently to be described.

Another rod 25 is fastened in a split clamp 26 (Figure 7) on the block 15 and extends upwardly and slidably through the arm 1. A split collar 27 is secured on the rod 26 at some distance above the arm 1, and a coil spring 28 surrounds the rod between the collar 27 and the top of the arm 1.

In the operation of the device, the spindle 2 and parts carried at the lower end thereof are moved downward by means known in the art and therefore not illustrated. The finger carrying block 15 does not move initially with the spindle since it is not rigidly attached thereto.

The nut to be driven may have entered the receiver 19 in upright position. However, the operation may be described more completely with reference to Figure 1 in which a nut 31 has settled in an oblique or unseated position in the receiver. Also, the nut has lateral play in the space in which the wrench 4 is to be received in the receiver 19. This space would be relatively wider than shown, where a heavier wrench is required for applying a greater torque. Another consideration involved in the alinement of the nut with the wrench is that some of the nuts may come through with an eccentric tapped hole. The loose or floating pilot pin 7 with its rounded tip 7' finds the hole in the nut and brings it into co-axial relation to the wrench for driving as shown in Figures 2 and 3. As the pilot pin 7 continues to descend, it finds its way into the hole of the nut by reason of the pointed end 7' of the pin and the angular displacement permitted by the looseness of the pin in the surrounding parts at 32, as previously stated. Continued downward movement of the pin 7 eventually rights the nut, since the angular movement of the pin is limited; and the wrench 4 works its way on the nut while the pin 7 passes through an opening 33 in the bottom of the receiver 19. An adapter 34 below the retaining shoulder 9 then bears upon the nut as in Figures 2 and 3 and establishes a rigid connection

3

between the spindle 2 and the block 15 through the nut 31, the sections 19 and the fingers 16.

As the block 15 moves downward with the spindle, the spring 28 becomes compressed and exerts an upward or retarding force on the receiver 19. The resulting resistance of the receiver to downward movement forces the nut positively into the wrench 4 against the tension of the bowed spring wire 10. Some nuts do not require the described action of spring 28. The large majority of nuts, however, are not initially engaged by the wrench 4 in an aligned relation. The spring 28 provides a cushion or resilient relation between the sleeve 3 and the block 15 carrying the receiver 19. If not for this cushion and the time interval permitted thereby, the end of the wrench 4 would merely engage the top of the nut and push it through the receiver 19 in the manner presently to be described. In this condition the nut would be held by the bowed wire 10 and would cross thread on the stud 35 or cause other damage.

Continued downward movement of the spindle 2 causes the pins 24 to ride on the cam shoulders 23 to spread the receiver sections 19 and permit the wrench and nut 31 to pass between them as in Figures 4 and 7. The bowed spring wire 10 holds the nut from falling out of the wrench, as may be seen in Figure 4.

When the pilot pin 7 has been stopped by engaging the end of a stud 35 on a table 36, the spring 5 permits the spindle to continue downward while rotating the nut on the stud as shown in Figures 4 and 5. During the relative movement of the spindle and pin 7, the spring 5 in the spindle has become compressed. When the spindle is raised, the spring-pressed parts are returned to their starting position.

Although a specific embodiment of the invention has been illustrated and described, it will be understood that various alterations in the details of construction will be made without departing from the scope of the invention as indicated by the appended claims.

What we claim is:

1. In a nut driving machine, a fixed frame piece, a slidable and rotatable spindle therein, a spring-backed pilot pin slidably mounted in the working end of said spindle, a wrench on said spindle and surrounding said pin, a block slidable relatively to said spindle, a resilient cushion between said block and said frame piece and normally holding said block against sliding on the working stroke, a pair of fingers pivotally suspended from said block, nut receiving sections carried by said fingers and forming a nut receiver normally disposed axially adjacent to said pin, whereby said block slides against the pressure of said cushion through pressure of said wrench on a nut seated in said receiver, a fixed cam block adjacent to said fingers, means on said fingers engageable with said cam block to spread said fingers and separate said sections on pressure of said wrench on a nut seated in said receiver, said pin being movable with said spindle, through its backing spring, to penetrate the bore of a wrench-enclosed nut in said retainer, and means on said pin for holding such nut after it and the wrench have passed between the separated receiver sections.

2. In a nut driving machine, a fixed frame piece, a slidable and rotatable spindle therein, a spring-backed pilot pin slidably mounted in the working end of said spindle, a wrench on said spindle and surrounding said pin, said pin having lateral play in said spindle and wrench, a block slidable relatively to said spindle, a resilient cushion between said block and said frame piece and normally holding said block against sliding on the working stroke, a pair of fingers pivotally suspended from said block, nut receiving sections carried by said fingers and forming a nut receiver normally disposed axially adjacent to said pin, whereby said block slides against the pressure of said cushion through pressure of said wrench on a nut seated in said receiver, a fixed cam

4

block adjacent to said fingers, means on said fingers engageable with said cam block to spread said fingers and separate said sections on pressure of said wrench on a nut seated in said receiver, said pin being movable with said spindle, through its backing spring, to penetrate the bore of a wrench-enclosed nut in said retainer, and means on said pin for holding such nut after it and the wrench have passed between the separated receiver sections.

3. In a nut driving machine, a fixed frame piece, a slidable and rotatable spindle therein, a spring-backed pilot pin slidably mounted in the working end of said spindle, a wrench on said spindle and surrounding said pin, said pin having lateral play in said spindle and wrench, a block slidable relatively to said spindle, a resilient cushion between said block and said frame piece and normally holding said block against sliding on the working stroke, a pair of fingers pivotally suspended from said block, nut receiving sections carried by said fingers and forming a nut receiver normally disposed axially adjacent to said pin, whereby said block slides against the pressure of said cushion through pressure of said wrench on a nut seated in said receiver, a fixed cam block adjacent to said fingers, means on said fingers engageable with said cam block to spread said fingers and separate said sections on pressure of said wrench on a nut seated in said receiver, and an outwardly acting spring mounted lengthwise on the outside of said pin for retaining a nut on the pin, said pin being movable through its backing spring, to penetrate the bore of a wrench-enclosed nut in said retainer, said outwardly acting spring being adapted to hold such nut after it and the wrench have passed between the separated receiver sections.

4. In a nut driving machine, a fixed frame piece, a slidable and rotatable spindle therein, a spring-backed pilot pin slidably mounted in the working end of said spindle, a wrench on said spindle and surrounding said pin, a block slidable relatively to said spindle, a resilient cushion between said block and said frame piece and normally holding said block against sliding on the working stroke, a pair of fingers pivotally suspended from said block, nut receiving sections carried by said fingers and forming a nut receiver normally disposed axially adjacent to said pin, whereby said block slides against the pressure of said cushion through pressure of said wrench on a nut seated in said receiver, a fixed cam block adjacent to said fingers and having opposed sloping cam shoulders, pins on said fingers and engageable with said shoulders to spread said fingers and separate said sections on pressure of said wrench on a nut seated in said receiver, said pin being movable with said spindle, through its backing spring, to penetrate the bore of a wrench-enclosed nut in said retainer, and means on said pin for holding such nut after it and the wrench have passed between the separated receiver sections.

5. In a nut driving machine, a fixed frame piece, a slidable and rotatable spindle therein, a spring-backed pilot pin slidably mounted in the working end of said spindle, a wrench on said spindle and surrounding said pin, said pin having lateral play in said spindle and wrench, a block slidable relatively to said spindle, a resilient cushion between said block and said frame piece and normally holding said block against sliding on the working stroke, a pair of fingers pivotally suspended from said block, nut receiving sections carried by said fingers and forming a nut receiver normally disposed axially adjacent to said pin, whereby said block slides against the pressure of said cushion through pressure of said wrench on a nut seated in said receiver, a fixed cam block adjacent to said fingers and having opposed sloping cam shoulders, pins on said fingers and engageable with said shoulders to spread said fingers and separate said sections on pressure of said wrench on a nut seated in said receiver, said pin being movable with said spindle, through its backing spring, to penetrate the bore of a wrench-enclosed nut in said retainer, and means on said pin for hold-

5

ing such nut after it and the wrench have passed between the separated receiver sections.

6. In a nut driving machine, a fixed frame piece, a slidable and rotatable spindle therein, a spring-backed pilot pin slidably mounted in the working end of said spindle, a wrench on said spindle and surrounding said pin, said pin having lateral play in said spindle and wrench, a block slidable relatively to said spindle, a resilient cushion between said block and said frame piece and normally holding said block against sliding on the working stroke, a pair of fingers pivotally suspended from said block, nut receiving sections carried by said fingers and forming a nut receiver normally disposed axially adjacent to said pin, whereby said block slides against the pressure of said cushion through pressure of said wrench on a nut seated in said receiver, a fixed cam block adjacent to said fingers and having opposed sloping cam shoulders, pins on said fingers and engageable with said shoulders to spread said fingers and separate said sections on pressure of said wrench on a nut seated in said receiver, said cushion being resilient and compressible, whereby to exert a force on said receiver to insert the nut in the wrench, and an outwardly acting spring mounted lengthwise on said pin for retaining a nut on the pin, said pin being movable through its backing spring, to penetrate the bore of a wrench-enclosed nut in said retainer, said outwardly acting spring being adapted to hold such nut after it and the wrench have passed between the separated receiver sections.

7. In a nut driving machine, a slidable and rotatable spindle, a spring-backed pilot pin slidably mounted in the working end of said spindle, a wrench on said spindle and surrounding said pin, said pin having lateral play in said spindle and wrench, a pair of nut receiving sections supported axially adjacent to said pin and forming a nut receiver, said sections having bottom parts adapted to support a nut loosely in the receiver, means operable by pressure of said wrench on a nut seated in said receiver for separating said sections to permit passage of said wrench between them, said pin being movable with said spindle, through its backing spring, to penetrate the bore of a wrench-enclosed nut in said retainer, and means on said pin for holding such nut after it and the wrench have passed between the separated receiver sections.

8. In a nut driving machine, a slidable and rotatable spindle, a spring-backed pilot pin slidably mounted in the working end of said spindle, a wrench on said spindle and surrounding said pin, a pair of nut receiving sections supported axially adjacent to said spindle and forming a nut receiver, means operable by pressure of said wrench on a nut seated in said receiver for separating said sections to permit passage of said wrench between them, and spring means resisting movement of said receiver by spindle pressure, whereby to exert a force on said receiver to insert the nut in the wrench, said pin being movable with said spindle, through its backing spring, to penetrate the bore of a wrench-enclosed nut in said retainer, and means on said pin for holding such nut after it and the wrench have passed between the separated receiver sections.

6

9. In a nut driving machine, a slidable and rotatable spindle, a spring-backed pilot pin slidably mounted in the working end of said spindle, a wrench on said spindle and surrounding said pin, said pin having lateral play in said spindle and wrench, a pair of nut receiving sections supported axially adjacent to said spindle and forming a nut receiver, means operable by pressure of said wrench on a nut seated in said receiver for separating said sections to permit passage of said wrench between them, and spring means resisting movement of said receiver by spindle pressure, whereby to exert a force on said receiver to insert the nut in the wrench, said pin being movable with said spindle, through its backing spring, to penetrate the bore of a wrench-enclosed nut in said retainer, and means on said pin for holding such nut after it and the wrench have passed between the separated receiver sections.

10. In a nut driving machine, a slidable and rotatable spindle, a spring-backed pilot pin slidably mounted in the working end of said spindle, a wrench on said spindle and surrounding said pin, a pair of nut receiving sections supported axially adjacent to said pin and forming a nut receiver, said sections having bottom parts adapted to support a nut loosely in the receiver, means operable by pressure of said wrench on a nut seated in said receiver for separating said sections to permit passage of said wrench between them, and an outwardly acting spring mounted lengthwise on the outside of said pin for retaining a nut on the pin, said pin being movable through its backing spring, to penetrate the bore of a wrench-enclosed nut in said retainer, said outwardly acting spring being adapted to hold such nut after it and the wrench have passed between the separated receiver sections.

11. In a nut driving machine, a slidable and rotatable spindle, a spring-backed pilot pin slidably mounted in the working end of said spindle, a wrench on said spindle and surrounding said pin, said pin having lateral play in said spindle and wrench, a pair of nut receiving sections supported axially adjacent to said spindle and forming a nut receiver, means operable by pressure of said wrench on a nut seated in said receiver for separating said sections to permit passage of said wrench between them, spring means resisting movement of said receiver, whereby to exert a force on said receiver to insert the nut in the wrench, and an outwardly acting spring mounted lengthwise on the outside of said pin for retaining a nut on the pin, said pin being movable through its backing spring, to penetrate the bore of a wrench-enclosed nut in said retainer, said outwardly acting spring being adapted to hold such nut after it and the wrench have passed between the separated receiver sections.

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