

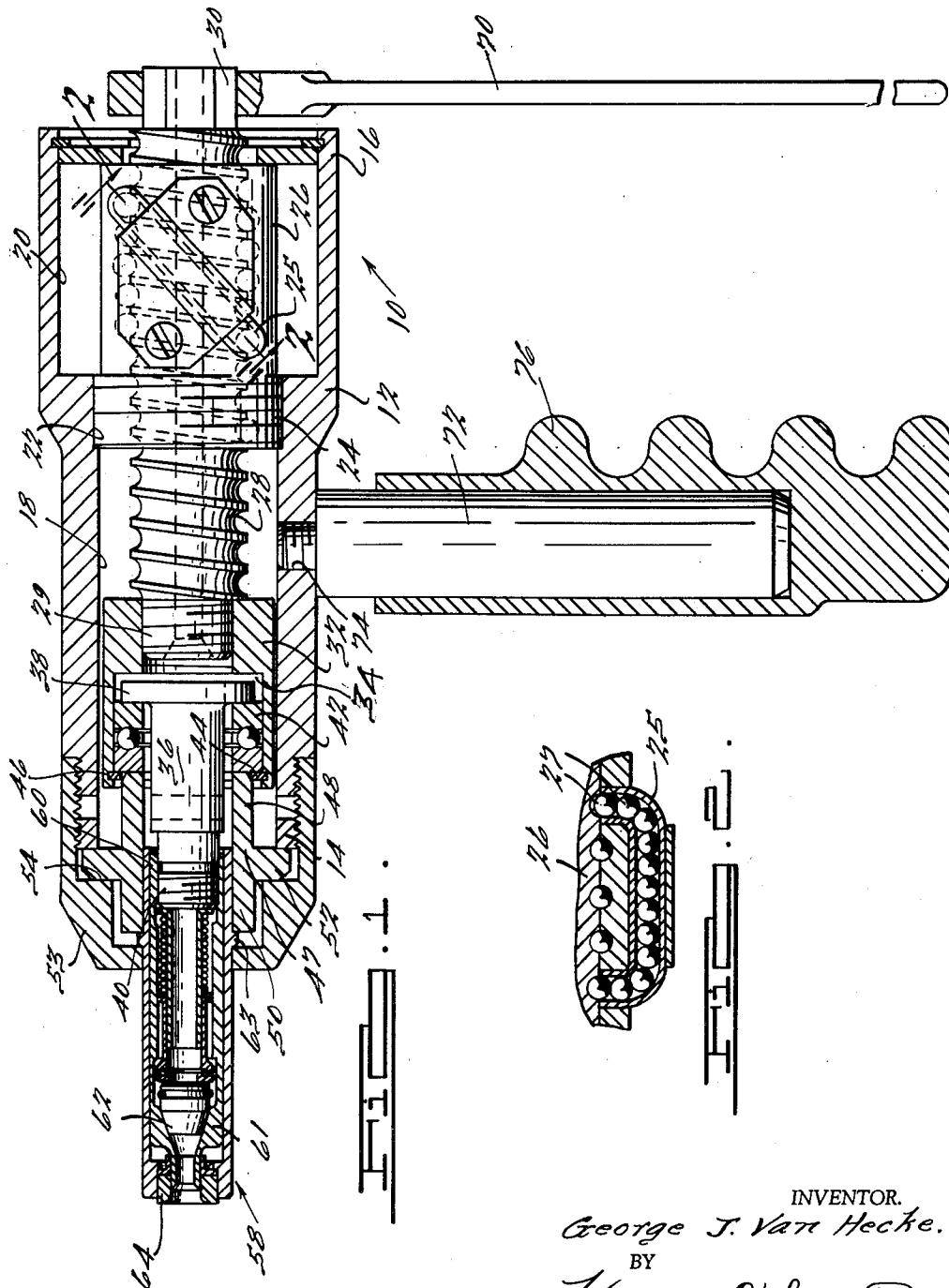
April 10, 1962

G. J. VAN HECKE

3,028,987

TOOL FOR DRIVING FASTENERS

Filed Nov. 7, 1958



INVENTOR.

George J. Van Hecke.

BY

Harness, Pichey & Pichey
ATTORNEYS.

1

3,028,987

TOOL FOR DRIVING FASTENERS

George J. Van Hecke, Detroit, Mich., assignor to Huck Manufacturing Company, Detroit, Mich., a corporation of Michigan

Filed Nov. 7, 1958, Ser. No. 772,466

5 Claims. (Cl. 218-42)

This invention relates generally to apparatus for applying fasteners and more particularly to an improved hand-operated tool for installing fasteners of the pin and collar type.

An object of this invention, therefore, is to provide a hand tool for applying fasteners which is simple in construction, economical to manufacture, and capable of applying high pulling loads to a fastener.

Further objects, features and advantages of this invention will become apparent from a consideration of the following description, the appended claims, and the accompanying drawing in which:

FIGURE 1 is a side elevational view of the tool of this invention, with some parts broken away and other parts shown in section for the purpose of clarity; and

FIG. 2 is a transverse sectional view looking along the line 2-2 in FIG. 1.

With reference to the drawing, the tool of this invention indicated generally at 10, is illustrated in FIG. 1 as including a body 12 having an end 14 and an end 16, hereinafter referred to as the front and rear ends, respectively, of the body. The body 12 is generally tubular in shape, having a first bore 18 which extends inwardly from the front end 14 of the body and a second larger bore 20 which extends inwardly from the rear end of the body. The rear end portion of the bore 18 is threaded, as indicated at 22, for receiving the threaded inner end 24 of a recirculating ball type nut 26. The larger bore 20 accommodates the return conduit 25 for the balls 27 in the nut 26.

A screw 28 extends axially through and is threadably supported in the nut 26 and has an externally threaded front end 29 and a hex shape rear end 30 which is disposed rearwardly of the rear end 16 of the body 12. A block member 32 is fixedly threaded at its rear end onto the threaded end 29 of the screw 28 and has an axial cavity 34 which extends inwardly from its front end. A stem member 36 has a head 38 at one end which is disposed within the cavity 34 and at its opposite end the stem 36 is provided with threads 40. A thrust bearing 42 is inserted in the cavity 34 at a position in which it extends about the stem 36 and engages the head 38 for maintaining the head 38 within the cavity 34. The thrust bearing 42 is in turn retained within the cavity by a retainer ring 44 disposed in a groove 46 at the front end of the block member 32.

A holder collar 47, positioned about the stem 36, has an inner end portion 48 positioned within the front end 14 of the body 12 and abutting the outer end of the thrust bearing 42. The collar 47 also has an outer portion 50 which projects outwardly of the body 12 for a purpose to appear presently. Intermediate its ends the collar 47 is provided with a radial flange 52 which extends outwardly and abuts the front end 14 of the body 12. A hollow retainer sleeve 53 is threaded onto the front end 14 of the body member 12 to a position in which a shoulder 54 on the sleeve 53 engages the radial flange 52 and clamps it between the shoulder 54 and the adjacent end 14 of the body 12.

A conventional nose assembly 58 of well-known type is mounted on the threaded end 40 of the stem 36 and projects forwardly therefrom. The nose assembly 58 includes a reciprocally movable collet 61 which has its rear end threaded onto the threaded end 40 of the stem 36.

2

The nose assembly 58 has the usual expandable and contractible jaw mechanism 62 which is engageable with a fastener to be pulled and a swaging anvil 64 engageable with the fastener collar or head. An external flange 63 on the assembly 58 is clamped between the sleeve 53 and the collar portion 50 for retaining the nose assembly on the tool 10.

A wrench 70 or any other tool capable of rotating the screw 28 is applied to the outer end 30 thereof, as shown in FIG. 1. To facilitate handling of the tool 10 during rotation of the wrench 70, the body 12 is provided with a handle member 72 which is threaded into an opening 74 in the underside of the body 12, as shown in FIG. 1. A hand grip 76 is applied to the handle member 72.

In the use of the tool 10, the operator grasps the hand grip 76 in one hand and by moving the body 12 forwardly engages the nose assembly 58 with a fastener to be pulled. The operator then utilizes his other hand to rotate the wrench 70 in a direction to move the screw member 28 rearwardly in the recirculating ball-type nut 26 to in turn retract block member 32 and stem head 38 to contract and draw the jaw assembly 62 rearwardly to thereby upset the fastener. By virtue of the fact that the nut and screw assembly is of the frictionless type, very high pulling loads can be applied to the nose assembly 58 by manual rotation of the wrench 70. Consequently, the hand tool 10 is readily usable on large size fasteners.

Rotation of the wrench 70 is continued until the fastener has been fully driven. At this time the screw 28 must be returned to its forward position illustrated in FIG. 1 before a subsequent fastener-applying operation can be commenced. The operator rotates the wrench 70 in an opposite direction to move the screw member 28 forwardly so that the block member 32 engages the stem head 38 and moves it in a direction to return the jaw assembly 62 to its initial position. The thrust bearing 42 engages the holder collar 47, as shown in FIG. 1, to signal a return of the jaw assembly 62 to its initial position. By virtue of the location of the collar 47, the pushing force exerted thereon by the thrust bearing 42 is transferred through the retainer sleeve 53 to the body member 12. Consequently, there is no danger of accidentally damaging some part of the tool 10 when the operator returns the screw 28 to its forwardmost position. It can be appreciated that because little manual effort is required to actuate the screw 27, it is possible for the operator to actually damage the tool 10 in moving it to its "stop" position when he does not realize that it has reached its "stop" position.

From the above description, it is seen that this invention provides a very simple hand tool 10 which is capable of developing very high pulling loads. It can, therefore, be economically produced and is usable with large size fasteners.

It will be understood that the specific construction of the improved tool for driving fasteners which is herein disclosed and described is presented for purposes of explanation and illustration and is not intended to indicate limits of the invention, the scope of which is defined by the following claims.

What is claimed is:

1. In a fastener applying tool of the type having a body and a nose assembly mounted on one end of said body and adapted to be engaged with a fastener for applying a pull to the fastener; a recirculating ball-type nut mounted in a fixed position on the end of said body opposite from said one end, a screw member supported in and extending through said nut so that one end of said screw member is located in said body and another end is located outwardly of said body, a block assembly comprising a block member directly supported on the end of said screw member in said body for rotation there-

3

with, a stem member having a head disposed within said block member and having its reduced diameter portion extending from said head toward said one end of said body, said stem member being secured to a slidable member of said nose assembly, a thrust bearing in said block member extending about said stem member and being engageable with said head, and retainer means secured to said block member and engageable with said thrust bearing for limiting the forward axial movement of said thrust bearing relative to said block member so that on rotation of said screw member in one direction a pulling force is transmitted to said thrust bearing and to said head of said stem member to move said head away from said one end of said body member.

2. In a fastener applying tool having a body and a nose assembly mounted on said body and adapted to be engaged with a fastener for applying a pulling force to the fastener; a recirculating ball-type nut mounted in a fixed position on said body, a screw member supported in and extending through said nut, first means for transmitting an axially rearward movement from said screw member to a slidable member of said nose assembly, said first means including a block member secured to one end of said screw member, a thrust bearing disposed within said block member and means operatively associated with said block member and said thrust bearing for limiting the forward axial movement of said thrust bearing relative to said block member, said first means also including a stem member having one end secured to said slidable member of the nose assembly and having an opposite end grippingly engageable between said block member and said thrust bearing.

3. The fastener applying tool of claim 2 further including a stop collar mounted in a fixed position on said body adjacent said one end thereof and disposed about said reduced diameter portion of said stem member and engageable with said thrust bearing to limit movement of said stem member in a direction toward said one end of said body.

4. The apparatus of claim 3 further including a stop

4

collar mounted in fixed position on said body adjacent to said one end engageable with said thrust bearing to limit movement of said stem member in a direction towards said one end of said body, said stop collar having means thereon in engagement with an outer member of said nose assembly for clamping said outer member to said body and for reacting the pulling force causing the axially rearward movement of said slidable member of said nose assembly.

5. In a fastener applying tool of the type having a body and a nose assembly mounted on said body and adapted to be engaged with fastener for applying a pulling force to the fastener, a recirculating ball-type nut mounted in a fixed position on said body, a screw member rotatably supported in and extending through said nut and movable axially upon rotation in said nut, a thrust bearing, first means operatively associated with said screw member and said thrust bearing and engageable with said thrust bearing for moving said thrust bearing axially rearwardly responsively to the axial movement of said screw member, said first means including a block member having a cavity at its forward end for housing said thrust bearing and being secured at its rearward end to one end of said screw member and a retaining member secured to said block member at said forward end and engageable with said thrust bearing for limiting the forward axial movement of said thrust bearing relative to said block member, and second means secured to a slidable member of said nose assembly and including a portion engageable between said thrust bearing and said block member for transmitting rearward axial movement from said thrust bearing to said slidable member of said nose assembly.

References Cited in the file of this patent

UNITED STATES PATENTS

610,044	Glenn	Aug. 30, 1898
2,333,418	Fischer	Nov. 12, 1943
2,400,354	Jensen	May 14, 1946
2,406,949	Huck	Sept. 3, 1946

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,028,987

April 10, 1962

George J. Van Hecke

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 33, for the claim reference numeral "2"
read -- 1 --; line 40, for the claim reference numeral "3"
read -- 2 --; column 4, line 12, after "with" insert -- a --.

Signed and sealed this 22nd day of January 1963.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents