July 9, 1957 A. S. F. RANDOLPH 2,798,392

STUD DRIVER AND REMOVER

Filed May 24, 1955 2 Sheets-Sheet 1

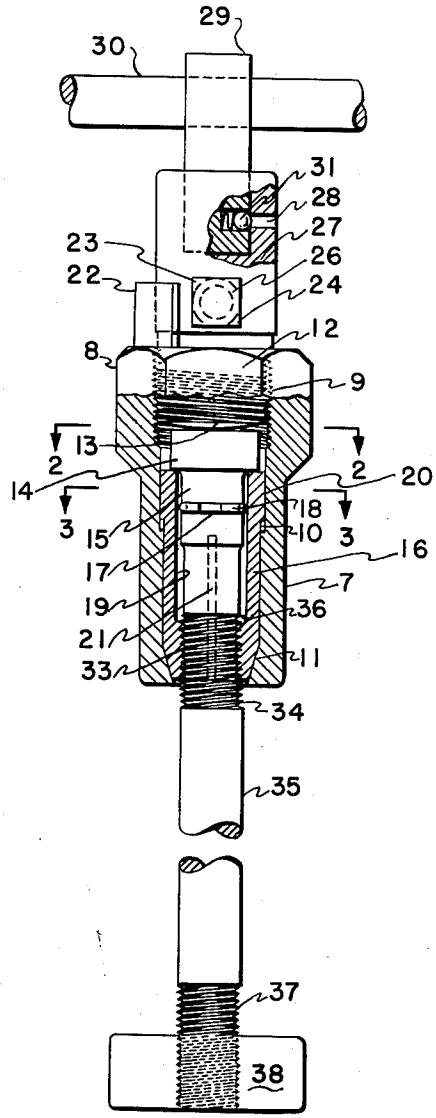


FIG. 1

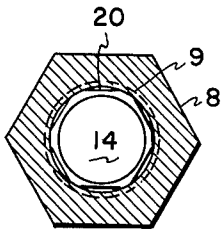


FIG. 2

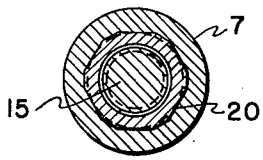


FIG. 3

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STUD DRIVER AND REMOVER

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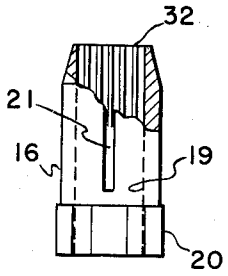


FIG. 4

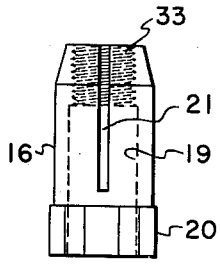


FIG. 5

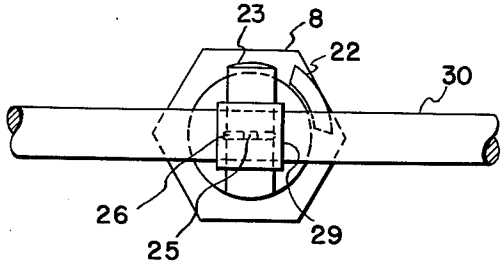


FIG. 6

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STUD DRIVER AND REMOVER

Andrew S. F. Randolph, Westfield, N. J.

Application May 24, 1955, Serial No. 510,739

4 Claims. (Cl. 81—53)

My invention relates to means for driving or removing threaded or unthreaded studs or taps and is an improvement on my Patent No. 2,488, 933, granted November 22, 1949.

It is my object to provide an improved type of stud driver and extractor all in one self contained tool which does not need the application of any other auxiliary tool for either the driving or the removal of studs or taps.

Another object of my invention is to provide a stud or tap driver and remover which is economical to manufacture, having a minimum of parts to produce a maximum of results.

Further objects and advantages will be apparent from the specification and drawings in which:

Fig. 1 is a view partly in vertical section and partly in elevation of a tool constructed in accordance with this invention.

Fig. 2 is a horizontal cross sectional view of the tool taken on the line 2—2 of Fig. 1.

Fig. 3 is a horizontal cross sectional view of the tool taken on line 3—3 of Fig. 1.

Figs. 4 and 5 are elevations of two different types of collets which may be used in the invention.

Fig. 6 is a top view of the handle of the tool showing the shift lock.

Referring to the drawings, 7 is the body or barrel of the tool, which is hollow throughout its length to form a tube whose bore decreases in size and in steps as shown at 9 and 10, terminating in a graduated decrease 11. The purpose of this graduated decrease will later be explained. Where the bore decreases at 9 it is female threaded to accommodate and mesh with a left hand thread male drive cylinder 12 whose lower extremity terminates in a slightly beveled drive face 13 adapted to abut on the enlarged head 14 of collet pin 15. Collet pin 15 is held within collet 16 by means of groove 17 and collar spring 18, the latter providing frictional contact with the interior bore 19 of the collet 16. Collet 16 is fitted into the tube by means of its hexagonal head 20 fitting into the inside of the tube which is hexagonally cast at decrease 10. This prevents any turning of the collet within the bore or tube. It will be noted that collet 16 is slit partway up its length in several places at 21 to provide for contraction and expansion of its bore as will later be explained.

Referring to Figs. 1 and 6 it will be seen that the top of tube 7 is cut away to form a lip or projection 22 for the purpose of engaging and restraining from rotation stop pin 23. Stop pin 23 is slidably held in orifice 24 in drive cylinder 12 by means of indentation 25 adapted to hold spring clip 26 engaging the sides of orifice 24.

The top of cylinder 12 is cast with a square bore 27 closed at its lower end and having an orifice 28 piercing its side so that a handle base 29, having handles 30 protruding from its sides, may be inserted in the bore 27 and be held therein by the spring loaded ball 31.

It will be noted that stop pin 23 is just long enough so that if pushed in one direction it will abut on projection 22 while its opposite end will be flush with the outer surface of cylinder 12.

Operation

A collet 19 is selected with a thread corresponding to the thread of the stud to be driven or removed. If the stud has no thread a collet having serrations 32 is selected, such as the collet shown in Fig. 4.

After selection of the collet it is placed in the tube so that it's hexagonal top 20 fits snugly into the hexagonal provided by the narrowed portion 10 of tube 7. Next the cylinder is threaded into the tube by means of the left hand threads and turned up until face 13 abuts on the head 14 of collet pin 15. The interior threads 33 of collet 16 are now meshed with threads 34 of stud 35 until stud 35 abuts on base 36 of collet pin 15.

We are now ready to drive threads 37 of stud 35 into the female threads of block piece 38 or to remove them as the case may be.

If we wish to drive stud 35 into block 38 the handle base 29 is inserted into closed bore 27 until ball 31 frictionally locks into orifice 28. Stop pin 23 is now pushed so that it assumes the position shown in Fig. 6, or to be more specific, so that a clockwise turn of handle 30 will bring stop 23 to bear on the left side of projection 22. Further turning of handle 30 in a clockwise direction will advance the stud threads 34 into the female threads 33 of collet 16 until the head of the stud attempts to move collet pin 15 upwards. Since collet pin 15 cannot move upwards because it is blocked by the base 13 of cylinder 12 the collet is therefore forced downward and in being so forced the bevel 11 of tube 7, acting on the collet, forces it to constrict by means of the slots 19 causing gripping of the stud threads 34 firmly and in a ratio to the turning pressure applied to handle 30. As a consequence of this built up pressure the stud is driven into the block its required distance no matter how great the difficulty encountered.

When the stud has been driven into the block the required distance stop 23 is pushed inwardly until it is no longer in contact with 22. Because of the left hand threads at 9 further turning of the handles 30 in a clockwise direction will back head 13 off cylinder 12 and away from head 14 of collet pin 15 thereby releasing the pressure of the collet threads 33 on the stud threads 34 so that the entire tool may be removed by turning the barrel in a counterclockwise direction by easy hand pressure, with switch 23 bearing on the right side of projection 22.

In order to remove a stud from a block 38 collet 16 is threaded on the threads 34 by turning handle 30 in a clockwise direction bringing enough pressure to bear so that the collet threads 33 are jammed tightly into threads 34. Now the handle 30 is turned in a counterclockwise direction and because of the left hand threads at 9 collet pin head 14 is forced downwardly putting pressure on the hexagonal head 20 of collet 16 forcing the collet downwardly so that tapered portion 11 causes constriction of the collet in a ratio to the pressure applied to handle 30, backing stud 35 out of block 38. It will be noted that the more pressure applied to handle 30 the tighter the collet 16 grips the threads to the extent that the shaft of the stud will fracture rather than release the grip of the collet.

With reference to Fig. 4 of the drawing the collet shown with serrations 32 is used in exactly the same manner as the threaded collet shown in Fig. 5, except that the barrel is hand held and the handle rotated in a counterclockwise direction until the collet grips the stud snugly. The collet of Fig. 4 is used where the stud

threads have been corroded away or where it is desirable to have a stud with a smooth head.

It will be apparent to those skilled in the art that certain changes in the construction of my invention may be made without departing from the scope of my invention in which I claim:

1. In a stud driver and remover of the character described, a main tube having a central opening of varying dimensions, a projection at the top of said tube and a graduated decreased portion at its bottom, a slotted collet having a hollow interior and a graduated exterior at its base adapted to conform to the graduations of said tube, a collet pin having a head larger than its body held within said collet, a driving cylinder having left hand male threads adapted to intermesh with similar female threads in said tube, stop means held for longitudinal movement within and protruding from said cylinder to make contact with said projection and a handle connected to said cylinder whereby, when a stud or the like is inserted into said collet, clockwise rotation of said handle will drive a stud and counterclockwise rotation of said handle will remove said stud.

2. In a stud driver and remover of the character described, a main tube having a central opening of varying dimensions, a vertical projection at the top of said tube and a graduated decreased portion in proximity to its bottom, a collet having a female threaded circumferential interior and a graduated exterior at its base adapted to one of the graduations of said tube and in so conforming to decrease the circumference of its interior, a collet pin having a head larger than its body held within the upper portion of said collet, a driving cylinder having left hand male threads adapted to intermesh with similar female threads in proximity with the upper portion of said tube, stop means held for longitudinal movement within and protruding from said cylinder to make contact with said projection and a removable handle connected to said cylinder whereby when a stud or the like is inserted into said collet, clockwise rotation of said handle will drive a stud and counterclockwise rotation will remove said stud.

3. In a stud driver and remover of the character described, a main tube having a central opening of varying dimensions, a projection at the top of said tube

and a graduated decreased portion at its lower end, a slotted collet having a hollow interior and a graduated exterior at its base adapted to conform to the graduations of said tube, means on said collet and the interior of said tube to prevent rotation of the collet in the tube, a collet pin, having a head larger than its body portion, held within said collet, a driving cylinder having left hand male threads adapted to intermesh with female threads in said tube, stop means held for longitudinal movement with and protruding from said cylinder adapted to make rotational contact with said projection, a handle connected to said cylinder whereby a stud inserted in said collet will be held in a ratio proportional to the rotational pressure applied to said handle no matter which direction said handle is turned.

4. In a stud driver and remover of the character described, a main tube having a central opening of varying dimensions, a projection at the top of said tube and a graduated decreased portion at its lower end, a slotted collet having a threaded interior and a graduated exterior at its base adapted to conform to the graduations at the base of said tube, hexagonal means on said collet and the interior of said tube to prevent rotation of the collet within the tube, a collet pin having a head larger than its body portion held partially within said collet with its head abutting the top of said collet, a driving cylinder having left hand relatively steeply pitched male threads adapted to intermesh with female threads in said tube, a stop pin held for longitudinal movement with and protruding from said cylinder to make rotational contact with said projection, a handle removably connected to said cylinder whereby a stud inserted into said collet will be gripped and held no matter which direction said handle is turned.

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