

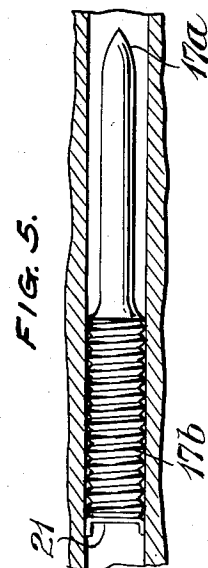
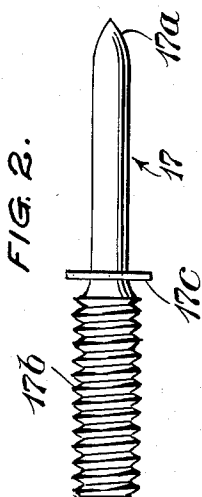
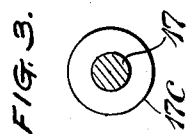
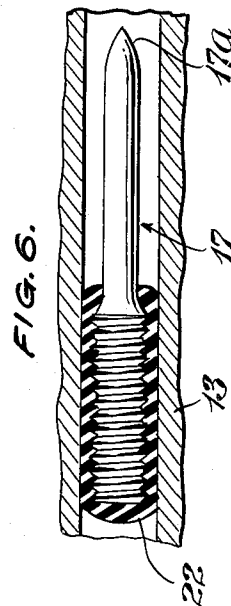
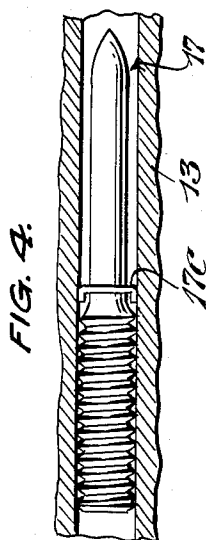
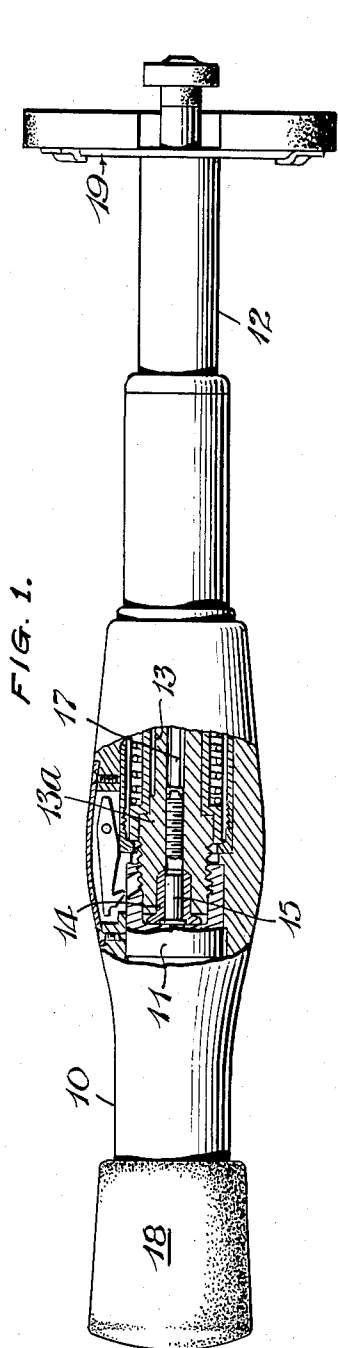
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C. R. WEBBER ET AL

2,722,004

METHOD FOR EXPLOSIVE INSTALLATION OF STUDS

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INVENTORS
 CHARLES R. WEBBER
 VIRGINIUS R. ERICKSON
Harper Allen
 ATTORNEY

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2,722,004

METHOD FOR EXPLOSIVE INSTALLATION OF STUDS

Charles R. Webber and Virginius R. Erickson, Portland, Oreg., assignors to Powder-Power Tool Corporation, Portland, Oreg., a corporation of Oregon

Original application December 31, 1949, Serial No. 136,186. Divided and this application December 8, 1952, Serial No. 324,748

1 Claim. (Cl. 1—60)

This application is a division of co-pending application Serial No. 136,186 filed December 31, 1949, for Stud for Explosive Installation, now Patent No. 2,637,241.

The present invention relates to stud driving tools of the type employed for installing studs by explosive action in wall surfaces, such as concrete and steel, and is concerned more particularly with the provision of an improved method of holding a stud in a tool to facilitate such driving and which facilitates the controlling of the effective power or force applied to the stud from a standard explosive charge.

In accordance with the instant invention the stud is provided with a frictional portion or element preferably of a destructible material to hold the stud at a selected position along the barrel of the tool so that the desired effective force from a standard explosive charge will be applied to the stud. At the same time the frictional element being of a removable or destructible character, is readily destroyed so that it is no longer a part of the stud at the time the stud is installed in the wall surface.

The above and other objects of the invention are attained in a preferred embodiment of the invention as described in connection with the accompanying drawings, in which:

Figure 1 is an elevational view of a stud driving tool employing the invention, with a portion of the tool adjacent the combustion chamber broken away and shown in section to illustrate details of construction.

Figure 2 is a detailed enlarged view of a stud embodying the invention.

Figure 3 is a transverse sectional view of the stud taken as indicated by the line 3—3 in Figure 2.

Figure 4 is an enlarged view of the stud as mounted in the barrel of the tool.

Figure 5 is a view of a modified form of stud mounted in the barrel.

Figure 6 is a sectional view of a second modified stud construction also being shown as mounted in the barrel.

Referring to Figure 1, there is shown a stud driving tool of the character described and claimed in the co-pending applications of Smith and Daugherty, Serial No. 124,078, filed October 28, 1949, for Stud Driving Tool, and Erickson and Bullwinkle, Serial No. 130,818, filed December 2, 1949, for Stud Driving Tool, now Patent No. 2,679,645. In general, stud driving tools of this character are adapted to be separated or broken into two halves including a rear half 10 which contains the various firing control parts including, for example, a firing pin carrier 11, and a front or barrel half 12 of the tool in which the barrel 13 is included. The barrel 13 is provided with an enlarged rear end 13a which has a threaded connection within the end of the firing pin carrier 11 to connect the two halves of the tool. The barrel 13 is also provided with an enlarged bore to receive a removable breech plug 14 in which the explosive cartridge 15 is mounted for impact by the firing pin of the firing mechanism. With the parts disassembled, the breech

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plug 14 is removed and the selected stud 17 is installed in the barrel, the cartridge 15 is placed in the breech plug 14, and the parts are reassembled as shown in Figure 1 for a firing operation. Firing is accomplished by placing the end of the barrel 13 against the surface into which the stud is to be driven and pressing or telescoping the barrel assembly 12 and the firing pin carrier 11 back into the other portions of the tool until a firing position is reached, as disclosed in said applications, and then effecting relative turning movement of the central housing and the end grip 18 to fire the tool. At this time the deflector pad structure 19, yieldably mounted about the barrel 13 is engaged with the surface about the area of engagement of the end of the barrel so as to provide protection from flying particles of the wall surface upon explosive installation of the stud.

Referring in particular to Figures 1, 2 and 3, the stud 17 is of special construction and carries with it a frictional portion or element which is used to frictionally hold or secure the stud in a selected adjusted position in the barrel in accordance with the disclosure of the co-pending application of Virginius R. Erickson and Benjamin B. Bullwinkle, Serial No. 135,744 filed December 29, 1949, for Stud Driving Tool and Method of Power Control.

The stud 17 includes the usual sharpened hardened point 17a and the head, which in this case is threaded as indicated at 17b. Immediately adjacent its head the stud is provided with a frictionally mounted plastic ring 17c whose internal diameter is such to fit snugly on the shank of the stud and whose external diameter is such as to be deformed as shown in Figure 4 when installed in the barrel of the gun. This ring 17c not only serves as a frictional retainer for the stud but also serves initially as a seal against which the explosive gases impinge upon trying to pass between the threaded portion of the stud and the barrel. The plastic ring 17c may be constructed of any suitable material such as paper, plastic, rubber or the like, to be readily removable or destructible, but is preferably of resilient sheet plastic material such as cellulose acetate which is readily combustible so that the ring will be destroyed by burning during the expelling of the stud from the tool.

In the modification of the invention shown in Figure 3, a disc or ring 21 is shown attached by glue or by any suitable adhesive to the head end of the stud. Other than its location, the disc 21 has the same characteristics as the ring 17c of Figures 1-3.

In the Figure 6 modification of the invention, a layer or coating 22 of material of deformable character is molded or otherwise secured about the entire head of the stud to engage within the barrel over a substantial length thereof. The layer 22 is of sufficient diameter to be compressed slightly upon installation in the barrel to provide frictional positioning of the stud in the desired location along the barrel. The coating 22 may be of suitable rubber material, or of a plastic, such as cellulose acetate.

In connection with all modifications of the invention, the material of the frictional retainer is preferably such that it is either completely consumed by the heat of the explosion, or is charred or carbonized sufficiently thereby as to be friable and easy to remove from the stud.

From the preceding, it is seen that the method of holding a stud in place in the bore of the stud driving tool is carried out by effecting frictional engagement between the stud, preferably the shank thereof, and the bore of the tool, and this frictional engagement may be effected by securing a frictional retainer of the character disclosed in the drawing, on the stud prior to the time of installation in the bore of the stud driving tool. This installation is preferably carried out by pushing the stud with the retainer thereon into the bore so that the re-

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tainer which is in the form of a collar, serves to hold the stud in place against sliding movement in either direction until the time of firing of the tool; and in the preferred embodiment the stud is held firmly at two spaced locations, namely at the head which is the portion of largest diameter and at the location where the frictional retainer is engaged between the bore and the stud. While the studs are usually supplied by the manufacturer with the frictional retainer in place thereon, such frictional retainers may be supplied separately and placed by the worker on the stud just prior to the time of installation in the bore of the tool.

While we have shown and described certain preferred embodiments of the invention, it will be apparent that the invention is capable of both modification and variation from the form shown so that the scope thereof should be limited only by the scope of the claim appended hereto.

We claim:

The method of holding a stud against sliding movement in either direction in the bore of an explosively actuated stud driving tool wherein the bore has a breech end and a muzzle end and wherein the stud comprises a body having a cylindrical head at its rearward end providing the portion of greatest diameter of the body and a shoulder corresponding to the desired depth of penetration of said stud into a surface, and also having a

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penetrating shank at its forward end terminating in a sharpened point, which comprises securing a resilient frictional element on said stud extending outwardly beyond the largest diameter of said stud a sufficient distance as to slidably engage said bore, inserting said stud with the frictional element thereon into said bore forward end first through the breech end of the bore by applying force to said stud, and terminating the application of said force to place said stud in a location spaced from said breech end and said muzzle end and to cause the stud to be held against sliding movement in either direction by frictional engagement of said frictional element between the stud and said bore.

References Cited in the file of this patent

UNITED STATES PATENTS

1,656,333	Lund	Jan. 17, 1928
2,061,835	Haines	Nov. 24, 1936
2,221,157	Temple	Nov. 12, 1940
2,380,204	Turechek	July 10, 1945
2,499,227	Miles	Feb. 28, 1950
2,637,241	Webber	May 5, 1953

FOREIGN PATENTS

47,431	Germany	June 22, 1889
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