EXPLOSIVE OPERATED FASTENER DRIVING TOOL

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This invention relates to a fastener driving tool and more particularly to a tool of the powder actuated type.

One method of driving fasteners such as pins, studs and the like into materials such as wood, steel, concrete, or masonry involves the use of explosive powder actuated tools of the type disclosed in U.S. Patent No. 1,365,869 and various modifications and improvements thereof. Tools of this general nature are made up of two main assemblies: one of which is a rear assembly also known as a holder or handle which serves as a means for grasping the tool and the other of which includes a barrel at the front end of said holder. One common type of such tools is characterized by telescoping movement between the holder and the barrel which is housed telescopically in the holder so as to be slidable therein a protruding position of the barrel and a retracted position at which trigger elements in the holder are in operative position with respect to the explosive cartridge carried at the breech end of the barrel. The tool barrels are further characterized by a certain amount of bulkiness because of the extendability of the barrel and its considerable thickness as compared to the barrel of a conventional firearm and also because of a housing structure which protectively surrounds the barrel either as an extension of the holder or as a separate body mounted on the barrel concentrically.

While for most fastener driving uses, hereetofore available tools of this type are adequate, for certain special uses the ordinary tool can not be used because it will not fit. For example, it is often necessary to place the muzzle of the tool in a rather narrow space cross-wise between two opposed walls. More specifically in installing overhead type door frames and tracks for such doors, it is necessary to drive a fastener through a steel angle forming the jamb of a door and into a supporting wall structure such as steel, masonry or concrete on a line which nearly passes through obstructing portions of the installation. Obviously it would be of advantage, if this could be done with explosive driven studs.

Therefore, a general object of the present invention is to permit the use of a stud driving tool in confined installations where use of such tools has been heretofore not feasible because of the location and the size of the parts which prevent entry of the tool into such installations. Another object is in providing of a fastener driving tool of the type described adapted to be readily extricated from such installations. Another object is the provision of an explosive actuated fastener driving tool of a safe construction especially suited for operation in hard to reach places. Other objects and advantages will be apparent from the accompanying drawing and description of the same in which drawings:

Figure 1 is a side partially sectional view of a tool in accordance with one embodiment of this invention in the normal safety position;

Figure 2 is a side view partly in cross section showing the tool of Figure 1 with the barrel shown in the ready-to-extricate position and its relationship in a confined installation a part of which is also shown;

Figure 3 is a cross-sectional view taken on line III--III of Figure 1; and

Figure 4 is a transverse cross-sectional view of the barrel of Figure 1 taken on line IV--IV.

In accordance with this invention there is provided an explosively actuated tool portions of which are shaped as to enable the tool to be manipulated with ease in the close quarters of a severely confined installation. Portions of the tool including the barrel which are in juxtaposition with, for instance, protruding and overhanging parts of installations are reduced to leave no more than a severely reduced barrel wall thickness on a side in such a way as to be of adequate strength in such portions. In addition parts of the tool mechanism retracted relative to the tool housing which is mounted to advance on those parts, and specifically the barrel are adapted to be locked in substantially completely retracted position, i.e. with the housing completely advanced, so as to permit portions of the tool to pass obstructions encountered in the installations without deranging the tool unsafe. It has been found that when the fastener driving barrel is reduced in thickness adjacent the muzzle only on the side of the barrel which must be butted with certain installation obstructions such as protruding and overhanging flanges while of relatively increased thickness on all other sides the tool is of adequate strength and can be entered into installations too confined for the usual tool. This shaping of the barrel by thinning on one side can be accomplished by milling a flat side on an otherwise circular barrel. This provides a constraining C-frame barrel section on the other sides capable of preventing rupture of the thin section at pressures at which rupture of the unconstrained section is likely to occur. It has also been found that by temporarily immobilizing the barrel with respect to the almost completely advanced housing of a telescoping type of tool the extrication of the tool from the installation is considerably facilitated.

For example, and especially where an outwardly extending protective and positioning shield is part of the tool, the fastening operation closely along side of a laterally recessed part of the work is considerably facilitated as can be seen from Figs. 1 and 2 of the drawings. In other installations where the tool is to be used cross-wise between spaced walls, this invention provides a shortened tool movement. These are advantages which the tool operator will readily appreciate particularly during tool extraction subsequent to driving of a fastener under the circumstances of a closely confined installation.

The specific embodiment of the stud driving tool of this invention illustrated in the drawing has a handle or holder 1 including an initiating or firing mechanism and a breech closure structure of the type disclosed in the pending application of Kofl, Henning and Marsh, Serial No. 355,034, filed May 14, 1953. The tool also has a reciprocable barrel 2, a firing pin and breech housing structure 3, a barrel guard channel 4, a front grip 5, and a front aligning and muzzle guard plate 6. The handle 1 is provided with a trigger 7 while the front grip 5, which is mounted on the barrel channel 4, carries a latch lever 8. The tool can be described with reference to two main parts, namely, the breech or handle assembly, housed largely in handle 1 and associated with it, and the barrel assembly, which is disposed generally ahead of the breech assembly. The breech assembly includes the handle 1, the firing pin and breech housing structure 3, a firing pin 9 and a trigger 7 for releasing the firing pin. The barrel assembly includes the barrel 2, a barrel collar 10,
a barrel spring 11, the barrel channel 4, the aligning plate 6, a rear grip 5, and the breech collar 8. The handle portion is hinged detachably to the barrel assembly so as to permit separation of these parts for the purpose of loading the tool with a suitable fastener and an explosive powder load.

The tool assembly parts may be described in general by reference to the drawings, where the front of the tool comprises a receiver housing 12 integral with a hand grip 13 and a trigger guard 14. In the bore of the receiver housing 12 there is inserted a firing pin and breech housing mechanism 3 held therein by screw 15. The front portion of firing mechanism housing 3 extends out of the receiver housing 12 and includes an external circumferential flange 16 spaced from the front end of receiver housing 12 leaving a circumferential groove in which the hinge ring 17, of split construction, is seated rotatably so as to permit ring oscillation limited by the projection of a register pin 18, carried in the hinge ring, into an arcuate slot or of about 45° formed circumferentially in housing 3 which is fixed in the receiver 12. This mounting permits handle 1 to be turned back and forth with respect to the hinge ring over an arc of about 45°. Opposite register pin 18 hinge ring 17 is split and is formed from a first pair of forwardly extending on each side each of which is slotted longitudinally at 20 and slidably receives a hinge pin 21. When assembled the ears 19 of the hinge ring 17 are in abutment and are adapted to pass into a slot formed in a hinge bracket 22 carrying at the end of the slot the hinge pin 21. The other end of hinge bracket 22 is assembled with the rear end of barrel guard channel 4 and barrel collar 10 by means of a barrel grip guide screw 23 passing through the hinge bracket 22 and channel 4 to be threadedly carried by the collar 10. Slidably carried in the collar is the breech breech block 2, which is longitudinally reciprocatable in collar 10. Threadedly mounted on the front end of the exterior of collar 10 is the channel-shaped barrel guard 14 which partially surrounds the barrel. Attached to the exterior of barrel guard 14 is the front handle grip 5. Also attached to the front end of the barrel guard 4 is the aligning and front safety plate 6 which is orificed to permit passage of the muzzle of barrel 2 squarely therethrough.

The barrel assembly includes a barrel spring 11 mounted coaxially about the barrel 2 and disposed between it and the barrel channel 4. One end of spring 11 butts up against the front end part of breech block 2 and the other end of the spring butts up against a split collar ring 24 carried in a circumferential groove about the barrel 2. Barrel spring 11 is mounted in compression and biases the barrel 2 forwardly so that the muzzle of the barrel extends normally to protrude ahead of the aligning front plate 6. The rear end of the barrel is of enlarged diameter and is formed with interrupted male threads 38. Adjacent the rear end portion, the barrel 2 is also provided at one side with a barrel guide slot 25 for reception of the end of the barrel guide screw 23. The purpose of the barrel guide slot 25 is to prevent unduly excessive turning of the barrel 2 about the axis while permitting necessary axial movement. The rear end of the barrel 2 is also provided with a short longitudinally extending flat 26 which is in effect a two shouldered cam slot for coaction with one leg of an L-shaped interlock pin 19 and a longer leg of which is slidably carried in collar 10 so as to be extendible into the opening between a pair of circumferentially spaced and outwardly extending lugs such as 28 which is one of four equally spaced lugs formed integrally with the collar 10 and also between a second pair of over latch lugs such as 29 which is also one of four lugs circumferentially spaced and extending radially inwardly from and formed integrally with fired mechanism housing 3. Lugs 28 when engaged with lugs 29 make a type of bayonet connection between the barrel assembly and the breech assembly.

The first leg of interlock pin 27 is adapted to be acted upon by ends of the flat 26 in the barrel 2. When the lugs 28 of collar 10 are properly assembled with the lugs 29 of the housing 3 the other leg of pin 27 may be moved to interlock the barrel and breech assemblies when the barrel is pushed back for firing so that the front end of the flat 26 moves the pin rearwardly. After the barrel is released, the other end of the flat 26 pulls interlock pin 27 out of the space between the engaged lugs and permits the bayonet connection to be broken preparatory to detachment of the breech or handle assembly from the barrel assembly. The bore of the barrel 2 is enlarged at the breech for reception of an externally flanged breech plug 30 the flange of which is knurled to permit handling of the plug for loading it with an explosive powder load or cartridge 31 and placement of the loaded plug into the breech after a faster 32 has been positioned in the bore of the barrel 2.

In firing mechanism housing 3 there is mounted for relative axially movement but no rotational movement a breech block 33 having a radially extending breech block screw 34 the head of which travels in an axially extending slot 35 formed in the firing mechanism housing 3. Slot 35 is slotted to engage integrally with the breech housing 3 but only partially axially. Block 33 is biased forwardly in the bore of housing 3 by means of firing mechanism spring 36. The front portion of breech block 33 is recessed and the recess is provided with an interrupted female thread 37 having four spaced sections at 90° intervals which is complementary to the four-part interrupted male thread 38 of the barrel 2. This construction adapts the breech block 33 to be threadedly turned down with a twist of about 45° on the breech of the barrel 2 so as to clamp the breech plug 30 with its included powder cartridge 31 therebetween. Interrupted threads 37 and 38 constitute means for detachably securing the breech of barrel 2 to the breech block 33, while collar 10 is detachably secured at the same time to firing mechanism housing 3 by means of the lugs 28 and 29 of collar 10 and housing 3, respectively, as set forth in the aforementioned copending application, Serial No. 355,034.

The aforementioned hinge construction, formed by the abutted slotted ears 19 of hinge ring 17 which are extendable into a slot of the hinge bracket 22 where connection is made by means of the hinge pin 21 passing through the spaced ends of the hinge pin 23 and, through the slots 20 in the ears 19, is admirably adapted to readily permit engagement and disengagement of the main halves of the tool. It is to be noted that with the afore-described general construction of the tool the barrel assembly and the breech assembly are hingedly connected at hinge pin 21 with limited slidable motion, which permits the assembly to be engaged and disengaged longitudinally, and with limited rotational motion, which permits the assembly halves to be locked together or unlocked.

The breech block 33 is provided with a firing pin hole 39 in alignment with the conical point of the firing pin 9 which in turn is slidable mounted in aligned bores in the firing mechanism housing 3 and the handle 1 and is biased forwardly by means of firing pin spring 40 until the shoulder 41 of the firing pin 9 encounters the internal shoulder 42 of the firing pin bore in firing mechanism housing 3. Firing pin 9 carries a firing pin pawl 43 slidably so as to be protrudable laterally from firing pin 9 under the bias of a firing pin pawl compression spring 44 into the slot 45 which extends longitudinally in the bottom of the firing mechanism housing 3 where protruding portion of the pawl 43 may move longitudinally with firing pin 9 over and opposite the trigger 7 and the trigger sear 46. Trigger 7 is pivotally mounted in handle 1 at the pin 47 so as to enable the trigger sear 46 to be moved toward or away from the slot 45 against the bias.
of trigger spring 48 which tends to hold trigger 7 forwardly and rear 46 down. From the rear of breech block 33 there is a trigger 7 which is adapted upon relative movement of breech block 33 with respect to the firing mechanism housing 3 as the tool is pressed forwardly with the barrel muzzle against the work to engage with the protruding pawl 43 thereby forcing the firing pin 9 against the firing pin spring 40 so as to cock the firer 9. It will be noted that at the cocking position of the firing pin 9, which is to say at the ready-to-fire position of the tool, firing pin 43 is in alignment with the trigger rear 46 so that a pull on the trigger by the tool operator causes the pawl 43 to be retracted or depressed into pin 9 by rear 46 sufficiently so as to enable the pawl 43 to clear the end of cocking rod 49 at which position firing pin 9 is free to shoot forward forcefully into firing pin hole 39 in the breech block 33 thereby striking the primer portion of the cartridge 31 which is thus set off to drive the fastener 32.

The barrel 2, which is slidably mounted with respect to collar 10 and biased forwardly by means of spring 11 with respect to collar 10, is of a heavy construction but is cut away on one side to form a longitudinally extending flat 55 for a major part of its length adjacent the muzzle of the barrel. At one part opposite the cut away portion the barrel is transversely grooved as at 56. The shallower groove portion 51 at the front includes a square portion or shoulder 52 at the back and is adapted to coat with a latch rod 53 slidably carried in front grip 5 so as to be biased by means of latch springs 54 to tend to move the upper end of rod 53 into the transverse groove 59 which is shaped so that it offers no hindrance to movement of the barrel rearwardly and channel and the end of rod 53 with respect to barrel 2 from the front or completely extended safety position at which firing of the tool can not occur. However, the square shoulder 52 of the groove 50 is adapted to lock the barrel 2 in a nearly fully telescoped ready-to-excite position against the tendency of barrel spring 11 to move the barrel 2 into a fully extended position. At the cut away portion 55 of the otherwise extremely heavy barrel only an extremely small portion of the circumference of the barrel is of a severely reduced thickness as is shown in Figure 4. For example, a tool barrel having a bore of about 0.25 of an inch is provided with a heavy barrel wall of about 0.270 of an inch except adjacent flat 55 where the barrel wall is thinned to about 0.050 of an inch. Although a barrel thickness of this order might be ordinarily considered intolerable especially in an explosive actuated fastener driving tool where pressures higher than those of comparable firearms are encountered, it has been found that the particular barrel cross section shown is capable of safely containing the high pressure explosive gases of the fastener charge. It is to be noted that the barrel cross section is in effect an extremely heavy 6-frame so that the tensile forces at the reduced portion 55 are held within tolerable limits and the danger of rupture of the barrel at this portion is substantially completely eliminated. It will be further noted that this construction enables the fastener to be driven in very close alignment with obstructions which could otherwise not be cleared by an ordinary tool barrel.

After the fastener 32 with an ordinary protruding threaded rear portion is driven so as to leave the rear end protruding from the face of the work an appreciable distance as shown in Figure 2, it is desirable that the tool be adapted to ready extrication from the installation so as to make it feasible for use by a driving tool operator. For this purpose the tool is provided with a latch mechanism consisting of the transverse groove 50 in barrel 2 and the latch rod 53 with a laterally extending latch lever or thumb piece 8 extending outwardly through slot 6 in the forward portion of the breech block 33. The latch mechanism is actuated by spring 54 seated in a recess in grip 5 and in the bore of the hollow end of rod 53, all of which together prevent the barrel from protruding forwardly as it normally would after the tool has been fired to drive a fastener. The latch rod 53 holds the barrel captive in a rearward ready-to-excite position, which is interlocked with the safety extended position of the barrel and a second or rearwardly depressed ready-to-fire position. At the ready-to-excite position the muzzle of the barrel is largely retracted relative to the advanced housing and it is not necessary to move back the tool housing a great distance including spring back 50 in order to pull the tool barrel off the protruding threaded rear end of a driven stud or fastener 32. It will be appreciated that excessive movement of the tool especially during extraction is likely to result in interference between portions of the tool, such as the aligning shield 6, and portions of the installation, such as door track 57, for example. It will be further noted that at the partially retracted ready-to-excite position shown in Figure 2 the cocking rod 49 and the firing pin pawl 43 are not in a position at which actuation of the trigger 7 might cause firing of the tool inadvertently. In other words at the ready-to-excite position the tool is entirely impervious as it is at the first or fully extended position of the tool barrel.

In order to prepare the tool for operation it is first opened by longitudinally separating the handle assembly from the barrel assembly to the extent permitted by the rotatable and slidable joint, defined by the hinge pin 21 operating in the slots 20 of the ears 19 and also by the hinge ring 17, after which the handle assembly is turned or swung away from the barrel portion thereby uncovering the breech plug 30 which may now be removed so as to be loaded with an explosive cartridge such as 31 and so as to open the breech of the bore of the tool so that a fastener such as 32 may be loaded therein. The breech plug 30 containing the cartridge 31 is now reinserted into the enlarged portion of the bore of the barrel 2 at the breech and the handle portion of the tool is swung about hinge pin 21 into alignment with the barrel portion and pushed into engagement therewith. The breech assembly is locked by merely giving the handle portion a turn of about 45° thereby bringing the interrupted female threads 37 of the breech block 33 into engagement with the interrupted male threads 38 carried about the breech of the barrel 2.

In operation, the tool, grasped at the handle grip 1 and at the front grip 5, is employed with the installation such as the overhead door track installation shown in Figures 1 and 2 consisting typically of the jamb 58, the angle iron 59 to be fastened to the jamb 58 and the track 57 mounted on angle 59 which forms an obstruction and which together with angle 59 defines a closely confined installation. The muzzle of the barrel 2 is placed against the angle 59 as shown while the thin or cut-away lateral portion 55 of the barrel is held against the edges of the track 57 in order that a fastener 32 may be fired through angle 59 and the jamb 58 into the supporting wall on a line at a distance sufficiently away from the open side edge of the jamb 58.

To put the tool in condition for firing, the operator pushes at the grip 5 and handle 1 until the entire tool has been moved forwardly with respect to the barrel 2 and the aligning shield 6 is in substantial contiguity with the surface of angle 59 so as to insure substantial perpendicularity of the axis of the tool barrel with respect to the angle 59.

If the barrel is not held perpendicular to the surface into which the fastener is to be fired, it will be recognized that the fastener ejected at an angle may ricochet and create a hazardous condition in the vicinity of the operation of the tool. However the tool structure, as pointed out in the example hereinbefore mentioned, is essentially designed to prevent operation of the tool, if the barrel is not at least within a few degrees of being square with the work surface inasmuch as lack of perpendicularity permits the
barrel 2 and the cocking rod 49 to be moved ahead from the fully retracted condition under the force of compressed barrel spring 11 and the compressed firing mechanism spring 36 which permits the firing pin 9 to move ahead taking with it the firing pin pawl 43 out of operative alignment with the sear 46 of the trigger 7. Thus it is evident that a pull on the trigger will not fire the cartridge if the barrel is not completely retracted in line square with the work, i.e. unless the housing is substantially completely advanced with respect to the barrel.

With the tool properly positioned, when the trigger 7 is pulled so as to cause sear 46 to push the firing pin pawl 43 sufficiently to clear the cocking rod 49, firing pin 9 shoots ahead, striking grip firing the cartridge 31; and the fastener 32 is explosively driven into the installation as shown in Figure 2.

It will be appreciated that with the rear end of the fastener projecting from the work as shown in Figure 2 it is more difficult to remove the tool from the work than it was to employ it in position for firing. In all installations, it is necessary that the tool be pulled back until the muzzle of the barrel 2 can be extracted from the projecting end of the fastener 32 before the tool itself can be extracted from the installation and be prepared for the next fastener operation. With installations of certain size this cannot be done all at once, if the barrel is permitted to emerge ahead of the aligning shield or plate 6 to its fully extended position because track 57 will interfere with aligning plate 6 when the latter is moved with the tool rearwardly so as to permit the muzzle of the barrel to clear the fastener 32. This difficulty is avoided with the present tool automatically because at the completion of the fastener driving operation the forwardly biased barrel 2 is held in almost completely retracted position by means of the spring loaded locking latch or latch rod 53 which under the impetus of spring 54 retracted from the rearward grip 5 to end into the transverse groove 50 of the barrel 2 where abutment of the square shoulder 52 of the groove against the end of the rod 53 prevents further forward movement of the barrel 2. It is to be noted however that in the ready-to-extricate position the partially advanced barrel housing is not positioned to permit inadvertent firing of the tool into space, if the muzzle of the barrel 2 were not pressed against a work surface. Such condition could occur, if the tool had been placed into the work installation and the barrel housing completely advanced for firing but for some reason the loaded tool had not been fired and were removed from the installation surface. If in the ready-to-extricate position the barrel housing were completely advanced, the tool might be inadvertently freely fired as if it were a weapon rather than a tool.

With the tool in the ready-to-extricate position shown in Figure 1, it may be readily withdrawn from the work installation. To prepare the tool for the next fastening operation it is necessary only to pull the latch lever 8 on the front grip 5 so as to withdraw the latch rod 53 from the transverse groove 50 of the barrel thereby permitting the barrel to be moved forward by the barrel spring 11 to the first or fully extended safety position. In this position the interlock pin 27 is automatically removed from between the interrupted threads 37 and 38 so as to allow the rotation of the handle 1 which rotation disengages these threads and permits the breech of the tool to be opened for ejection of the spent cartridge and reloading of the tool. Since many other embodiments of this invention may occur to those skilled in the art, it is to be understood the foregoing is intended by way of illustration of a preferred embodiment and not as a limitation of the scope of the present invention except as set forth in the appended claims.

What we claim is:

1. An explosive operated fastener driving tool having a fastener ejecting barrel and a housing mounted on said barrel to advance said barrel to advance about it with respect to the muzzle of the barrel, said barrel being thinner at a side at a portion adjacent the muzzle than on all other sides, said barrel housing being cut away at said portion adjacent said side in a manner permitting the tool to be operated while said barrel is placed in lateral abutment at said side with an installation into which a fastener is to be driven.

2. An explosively operated fastener driving tool having a housing and a barrel in telescopic assembly, said barrel housing a bore and muzzle for ejecting fasteners which when driven have an end portion still remaining in said muzzle of the barrel, said bore being inwardly biased and movable relative to the barrel in a manner tending to extend the muzzle of said barrel forwardly from said housing and said housing containing a firing mechanism for discharging an explosive cartridge chambered at the breech of said barrel when the housing is in an advanced position to be said cartridges into a ready-to-fire proximity with said firing mechanism, and means for locking the housing in partially advanced position relative to the barrel after the housing has been fully advanced and said cartridge fired in order that the tool as a whole may be readily removed from said portion of the installation.

3. An explosively operated fastener driving tool having a housing member and a barrel member through the bore of which the fastener is driveable for projection into a surface of a closely confined installation engaged by the muzzle of the barrel member when said housing is thrust toward said surface to advance with respect to said barrel, a firing pin mechanism carried by said housing for discharging an explosive driving cartridge chambered in the breech of said barrel when said housing is completely advanced with respect to said barrel, said barrel being of heavy thickness except at one side where the barrel is cut away to a reduced thickness at which side the barrel is adapted to be placed in lateral abutment with portions of said confined installation only slightly spaced from the bore of said barrel, thereby enabling the fastener to be driven into said installation on a line in close proximity with said portions of the installation, and means for holding the housing after said housing advance in partial nearly completely advanced position thereby constraining the tool as a whole in nearly completely axially contracted condition and enabling it to be readily extracted axially from said closely confined installation charactarized by spaced lateral abutments such as to prevent interference to full axial movement of said tool.

4. The tool of claim 3 wherein said holding means comprises a retractable detent mounted on one of said members to engage with a transverse groove in the exterior of the other of said members, said groove having one side normal to the axis of the barrel so as to engage lockingly with said detent and also having an opposite side so sloped as to offer no hindrance to the advance of said housing member with respect to said barrel member.

5. An explosively operated fastener driving tool comprising a tool housing movably mounted on a barrel provided with a breech in which an explosive driving cartridge is received and the muzzle of which is projectable ahead of the housing so as to adapt it to be placed into engagement with a surface of a closely confined installation into which a fastener is to be driven with an end portion remaining in the barrel muzzle, said barrel being of heavy wall thickness except at one side adjacent the muzzle at which the barrel thickness is reduced and a portion of said housing adjacent said one side also being correspondingly cut away flush with said side of the barrel thereby adapting the barrel housing to be placed in lateral abutment with certain portions of a closely confined installation only slightly spaced from the bore of said barrel, said housing being mounted relative to said barrel for
axial movement between a safety normally extended first position, to which said housing is rearwardly biased with respect to said barrel, and a ready-to-fire second position, a firing pin carried on said housing for discharging said explosive cartridge, said explosive cartridge being located in close operable proximity with said firing pin in said second position and in a remotely spaced inoperable relationship therewith in said first position, an outwardly extending barrel-aligning safety member carried on the front end of said housing, and means for preventing return of said barrel from said second position to said first position and for holding said barrel in an intermediate position adjacent said second position without causing interference with the movement of said housing from said first position to said second position, thereby obtaining an effective shortening of the tool as a whole to enable it to be readily extricated axially from said rear end portion of a fastener driven in said installation which is characterized by spaced laterally extending surfaces offering interference to full axial movement of said tool.