Sept. 6, 1949. A. E. BINNS 2,481,190

TACK DRIVING DEVICE

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Fig. 2

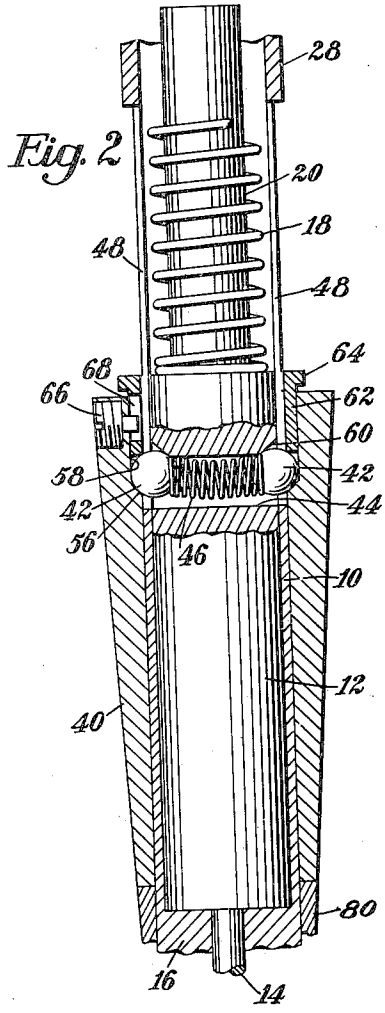


Fig. 1

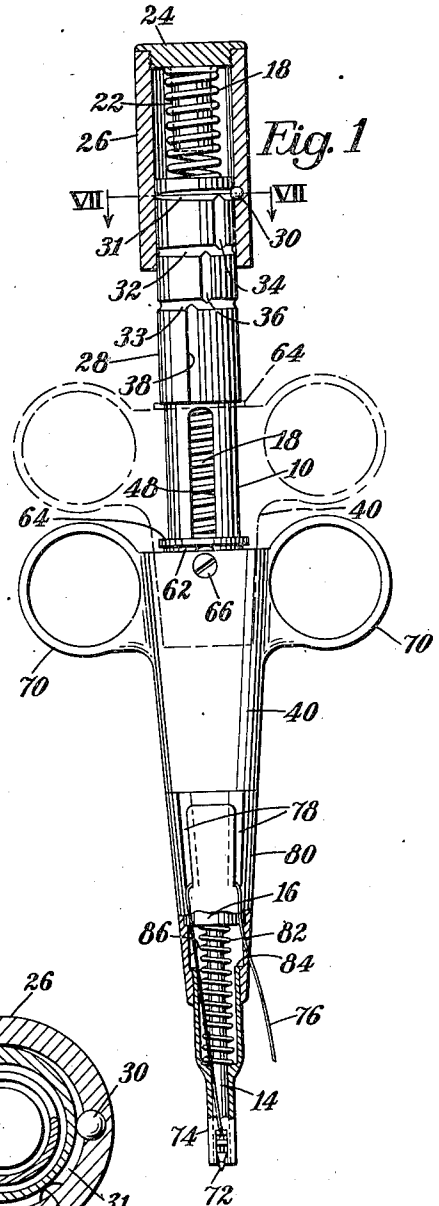


Fig. 7

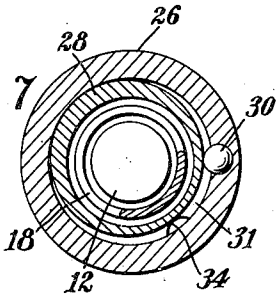


Fig. 8



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Fig. 3

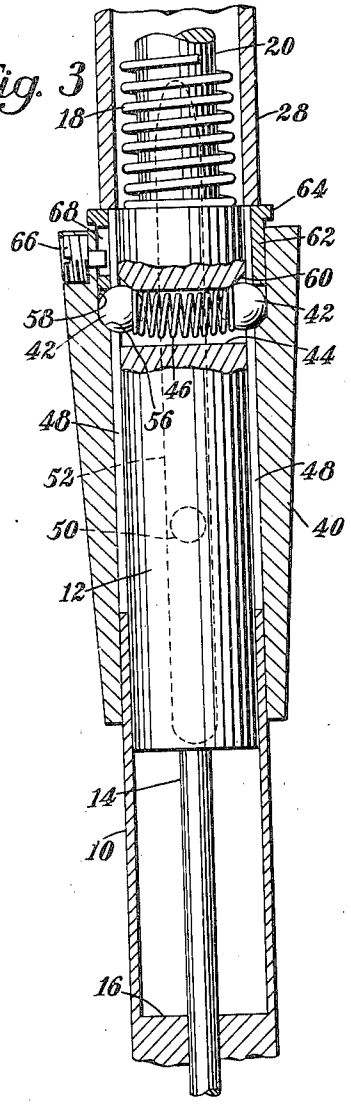


Fig. 5

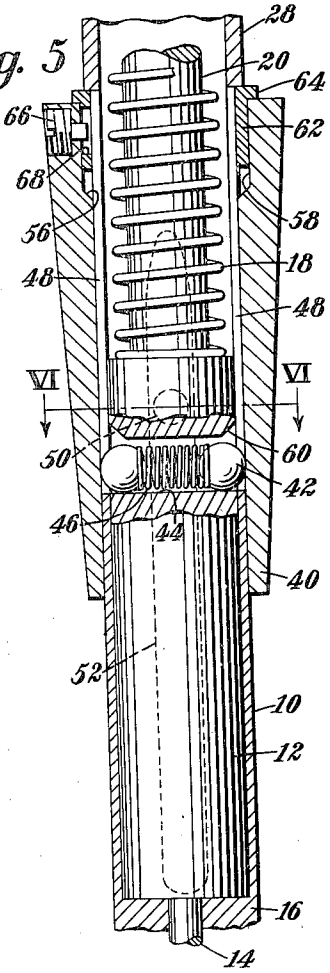


Fig. 4

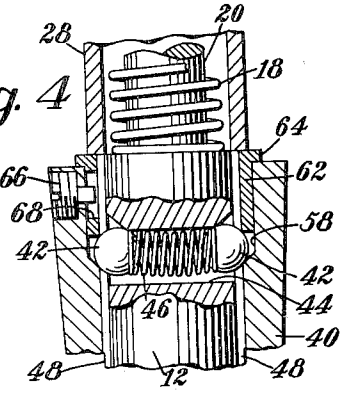
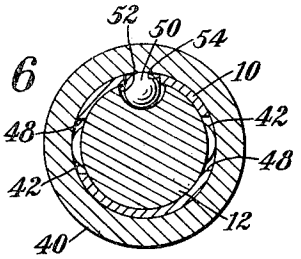


Fig. 6



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UNITED STATES PATENT OFFICE

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TACK DRIVING DEVICE

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Application September 21, 1946, Serial No. 698,462

6 Claims. (Cl. 1—47)

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This invention relates to fastening inserting means and is herein illustrated in its application to manually operated devices adapted to drive a fastening having a wire attached thereto. It is to be understood however that the invention is not limited in scope to such devices but is applicable as well to other types of fastening inserting means.

In United States Letters Patent No. 2,212,339 granted August 20, 1940 on an application filed in the name of Arthur V. Cullen there is disclosed a manually operated device for driving a fastening with a wire attached thereto into the jaw bone of a corpse. The use of this device over a considerable period of time has indicated certain weaknesses inherent in its construction and features which should be improved to make the device reliable in operation.

It is an object of the present invention to provide a fastening inserting device of the type above described that is reliable in operation and constructed for continuous service over a long period of time. It is a further object of the invention to provide, in a fastening inserting means, an improved means for energizing a source of power and releasing it for operation on a driver.

With the above objects in view the present invention, in one aspect thereof, consists in the combination with a driver, a barrel within which the driver operates and an actuator slidably mounted on the barrel, of a ball carried by the driver and positioned between the driver and the actuator. The driver and the actuator are so constructed and arranged that when the ball is lodged between them the driver engages the ball at a point inwardly offset from an axis of the ball parallel to the axis of the driver and holds the ball in its lodged position until it is forcibly dislodged therefrom and moved inwardly into a position in which the driving spring forces the ball into the recess in the driver and actuates the driver.

For dislodging the ball the invention provides a member herein illustrated as a sleeve mounted on the barrel and arranged to engage the ball at a point between its axis above referred to and the inner wall of the actuator.

In accordance with a further feature of the invention a cap is arranged on the barrel to provide an abutment for the driving spring, and follower and groove connections are provided between the cap and the barrel to permit longitudinal adjustment of the cap on the barrel to vary the force of the spring. Said follower is

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herein illustrated as a ball mounted in the cap and positioned in a longitudinal groove in the barrel. To permit the cap to be secured in adjusted position said longitudinal groove communicates with circumferential grooves eccentric to the surface of the barrel. The relation of the ball to said eccentric grooves is such that the ball may be caused to bind therein in order to secure the cap in adjusted position. In order to hold the cap against separation from the barrel the longitudinal groove terminates at a point spaced from the end of the barrel and thus limits the longitudinal movement of the cap.

The invention will now be described with reference to the accompanying drawings and pointed out in the appended claims.

In the drawings,

Fig. 1 is a front elevation of a device embodying the present invention, certain parts being shown in section on a plane common to the longitudinal axis of the device;

Fig. 2 is an enlarged view illustrating a portion of the device shown in Fig. 1 with the actuator at the limit of its downward movement, certain parts being shown in section on a plane common to the longitudinal axis of the device;

Fig. 3 is a view similar to Fig. 2 showing the actuator and the driver near the limit of their upward movement;

Fig. 4 is a view similar to Fig. 3 showing only the structure adjacent to the balls and showing the balls dislodged preparatory to the driving operation;

Fig. 5 is a view similar to Fig. 3 showing the actuator at the limit of its upward movement and the driver at the end of its driving stroke;

Fig. 6 is a cross section on the line VI—VI of Fig. 5;

Fig. 7 is a cross section on the line VII—VII of Fig. 1; and,

Fig. 8 illustrates the forward portions of the jaws of a corpse into which fastenings have been driven by the illustrated device.

In the following description that portion of the device in which the fastening is mounted is considered the lower end portion and the opposite end the upper end portion.

The fastening inserting device shown in the drawings is similar in its general organization to the device illustrated in the Cullen patent hereinbefore referred to. Referring to Figs. 1 and 2 the numeral 10 indicates a casing or barrel in which there is slidably mounted the head 12 of a driver having a downwardly extending pin 14 which is guided in a hole drilled through the

center of a head 16 at the lower end of the barrel 10. The head 16 also serves to terminate the driving stroke of the driver. The driver is actuated by a spring 18 mounted in the upper portion of the barrel and centrally positioned therein by a stud 20 projecting from the upper end of the head 12 and a similar stud 22 projecting from the head 24 of a cap 26 mounted on an enlarged upper portion 28 of the barrel 10.

In order to vary the driving force of the spring 18 the cap 26 is mounted for longitudinal sliding movement on the enlarged portion of the barrel and is retained in any one of three positions thereon by the engagement of a follower, herein illustrated as a ball 30 partially embedded in the cap, in any one of three circular grooves 31, 32, and 33 in the enlarged portion of the barrel. To provide for the movement of the cap longitudinally of the barrel the circular grooves are interconnected by longitudinal grooves 34 and 36. In order to facilitate the location of the cap in its intermediate position on the barrel the grooves 34 and 36 are offset from each other circumferentially to cause the cap to be arrested by the intermediate groove 32 upon movement from either extreme position. A third longitudinal groove 38 is provided in the enlarged portion 28 of the barrel, said groove extending to the lower extremity of said enlarged portion and serving to permit the assembly of the cap on the barrel by longitudinal movement of the cylindrical portion of the cap upwardly from the lower end of the barrel. It will be understood that the head 24 of the cap is assembled with the cylindrical portion thereof after said cylindrical portion has been mounted on the barrel. From the foregoing description it will be seen that I have provided a cap which is longitudinally adjustable into any one of three positions to vary the driving force of the spring 18 but is reliably held against accidental separation from the barrel by the upper wall of the groove 31. To permit the cap 26 to be securely held against accidental movement from its longitudinal position on the barrel the grooves 31, 32, and 33 are eccentrically cut so that in each case the depth of the groove decreases from the junction with the longitudinal grooves 34 and 36 in both directions circumferentially of the barrel. Thus it will be seen that the ball 26 may be tightly wedged in any one of the grooves 31, 32, and 33 by a turning movement of the cap. See Fig. 7.

The spring 18 is energized for the fastening inserting operation by upward or retracting movement of the driver. In the illustrated device this is effected by upward movement of an actuator 40 mounted for sliding movement upon the outer surface of the barrel 10. The upward movement of the actuator is transmitted to the driver through two members or balls 42 (Fig. 2). During such upward movement the balls are lodged between the actuator and the driver, as shown in Figs. 2 and 3, causing the actuator and the driver to move upwardly as a unit from their position illustrated in Fig. 2 to their position in Fig. 3. The balls 42 are freely mounted in a diametrical bore 44 formed in the head 12 near its upper extremity, and are continually urged outwardly or away from each other and into engagement with the inner surface of the actuator by a spring 46 positioned between said balls, the barrel 10 being provided with longitudinal slots 48 arranged diametrically opposite each other to permit egress of the balls into actuator engaging position. In order to prevent a relative rotation of the barrel 10 and the head 12 of the driver and so to maintain the alinement of the bore 44 in the head with the slots 48 in the barrel a ball 50 (Figs. 5 and 6) is retained by the actuator in a longitudinal groove 52 in the driver and confined in a hole 54 in the barrel. The hole 54 is so positioned longitudinally of the barrel that the ball 50 is retained in the groove 52 by contact with the inner surface of the actuator throughout the entire extent of the stroke of the actuator. To provide for lodgment of the balls 42 between the actuator and the driver a beveled surface 56 (Fig. 3) is formed to extend about the entire periphery of the actuator at the base of a counterbore 58 formed therein and a beveled or countersunk surface 60 is formed in the head of the driver, there being two such countersunk surfaces, one at each end of the bore 44. The balls are moved into their lodged position by the expansion of the spring 46 which forces the balls outwardly into contact with the counterbore 58 in the actuator, and they are retained in this position by the downward force of the driving spring 18 which brings the countersunk surfaces 60 of the head of the driver to bear against the balls. A force is thereby applied to each ball at a point inwardly offset from an axis of the ball parallel to the axis of the driver thus urging the balls outwardly and causing them to be forcibly lodged at the base of the counterbore 58.

In order to dislodge the balls from their position above described and thus release the driver for operation by the spring 18 a member herein illustrated as a sleeve 62 is slidably mounted between the barrel 10 and the counterbore 58 in the actuator and so arranged that its lower edge engages the balls. As the actuator 40 nears the limit of its upward movement, the sleeve is arrested by the enlarged portion 28 of the barrel and the remaining movement of the actuator dislodges the balls and forces them inwardly into their position illustrated in Fig. 4. After the balls have been moved into this position the force of the spring 18 against the driver forces the balls further inwardly into their position relatively to each other illustrated in Fig. 5 and operates the driver. The relative movement of the sleeve and the actuator is limited by an outturned flange 64 in the sleeve which engages the upper edge face of the actuator. The flange 64 so locates the sleeve relatively to the actuator that when the actuator is in its position shown in Fig. 2 outward movement of the balls by the spring 46 will displace the sleeve upwardly from its position in Fig. 4 to its position in Fig. 2. The sleeve is held against disengagement from the actuator by a screw-headed pin 66 mounted in the actuator and projecting inwardly therefrom into a suitable opening 68 in the sleeve.

In the operation of the illustrated instrument the operator inserts two fingers into rings 70 projecting outwardly from the actuator and moves the actuator downwardly into its full line position in Fig. 1. In this position the actuator is arranged to receive the balls 42 in the counterbore 58, as shown in Fig. 2. The operator now places his thumb on the head 24 of the cap and by a closing movement of his hand moves the actuator upwardly into its broken line position in Fig. 1. During the latter part of the upward movement of the actuator the sleeve 62 forces the balls inwardly from their position in Fig. 3 to their position in Fig. 4 and the driving spring 18 forces the driver downwardly into its position

shown in Fig. 5 to drive a fastening 72 (Fig. 1).

The illustrated instrument is constructed and arranged to drive fastenings into the jaws of a corpse, as shown in Fig. 8, said fastenings carrying wires which are twisted together to hold the jaws closed. The fastening 72 is manually inserted into a holder 74 which is substantially the same in its construction and operation as the holder illustrated and described in the Cullen patent hereinbefore referred to, and identified by the numeral 20b in Figs. 1 and 2 of said patent. The holder 74 is bored at its lower end to provide a pocket for the fastening 72 and a bearing for the end portion of the driving pin 14, and is counterbored at its upper end to receive a spring 82 surrounding the pin 14. The end portion of the pin forms the seat of the pocket for the fastening, and a wire 76 attached to the fastening is arranged to retain the fastening in the pocket by drawing it upwardly through an open ended slot in the holder, pulling it taut, and passing it through two open ended slots 78 in a head 80 secured to the barrel 10. The holder 74 is slidably mounted in a bore in the lower end portion of the head 80, and said head is counterbored at 86 to provide clearance for an outturned lip 84 at the upper end of the holder, said lip being normally seated at the base of the counterbore 86 by the action of the spring 82.

In the operation of the tool a fastening having a wire attached thereto is inserted into the pocket provided by the holder 74, and retained by passing the wire through the slots 78 in the head 80, as above described. At this time the actuator would normally be in its position indicated by broken lines in Fig. 1. In order to permit the balls 42 to move outwardly into their lodged position illustrated in Fig. 2 the actuator is moved downwardly into its full line position in Fig. 1. The operator then grips the tool by inserting two fingers into the rings 70 in the actuator and placing his thumb on the head 24 of the cap 26. The operator then brings the tool into fastening driving position and applies pressure with his thumb to cause the tip end of the fastening projecting from the holder to penetrate the gum. The operator then draws up the actuator thus retracting the driver and loading the driving spring 18, and at the same time, the operator forces the tool forwardly to cause relative longitudinal movement of the holder 74 and the head 80 to bring the fastening within the range of movement of the driver. Such relative movement of the holder and the head is limited by the engagement of the lip 84 on the holder with the head 16 of the barrel 10.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a fastening inserting means the combination with a driver, a barrel within which the driver operates and an actuator slidably mounted on the barrel, of a ball carried by the driver, means for forcing the ball outwardly through an opening in the barrel and into a recess provided in the actuator, said driver having a ball-engaging surface which engages the ball at a point inwardly offset from an axis of the ball parallel to the longitudinal axis of the driver when the ball is seated in said recess.

2. In a fastening inserting means the combination with a driver, a barrel within which the driver operates and an actuator slidably mounted on the barrel, of a ball carried by the driver, means for forcing the ball outwardly through an opening in the barrel and into a recess provided in the actuator, said driver having a ball-engaging surface which engages the ball at a point inwardly offset from an axis of the ball parallel to the longitudinal axis of the driver when the ball is seated in said recess, and means for displacing said ball from said recess.

3. In a fastening inserting means the combination with a barrel having a longitudinal slot formed therein, a driver slidably mounted in the barrel, said driver having a bore formed therein, and a recessed actuator slidably mounted on the barrel, of a ball mounted in the bore in the driver, a spring for forcing the ball outwardly through the bore in the driver and the slot in the barrel and into the recess in the actuator, means for maintaining the alinement of the bore in the driver and the slot in the barrel, and a sleeve mounted on the barrel, said sleeve being actuated by relative movement of the actuator and the barrel to displace the ball from the recess in the actuator.

4. A fastening inserting means comprising a driver, a driving spring, a barrel containing the driver and the spring, said barrel having a groove extending longitudinally thereof and terminating at a point spaced from the upper end of the barrel, a cap mounted on the barrel, and a follower mounted in the cap and extending into said groove.

5. A fastening inserting means comprising a driver, a driving spring, a barrel containing the driver and the spring, said barrel having a groove extending longitudinally thereof and terminating at a point spaced from the upper end of the barrel and having circumferential grooves communicating with said longitudinal groove, a cap mounted on the barrel, and a follower mounted in the cap and extending inwardly for engagement in said grooves.

6. A fastening inserting means comprising a driver, a driving spring, a barrel containing the driver and the spring, said barrel having a groove extending longitudinally thereof and terminating at a point spaced from the upper end of the barrel and circumferential grooves eccentric to the surface of the barrel and arranged to communicate with said longitudinal groove, a cap mounted on the barrel, and a follower mounted in the cap and projecting inwardly therefrom to an extent such that it binds in said circumferential grooves.

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