Feb. 10, 1925. 1,526,274

A. C. FITZSIMONS ET AL

WELL CASING TORPEDO

Filed July 24, 1924 2 Sheets-Sheet 1

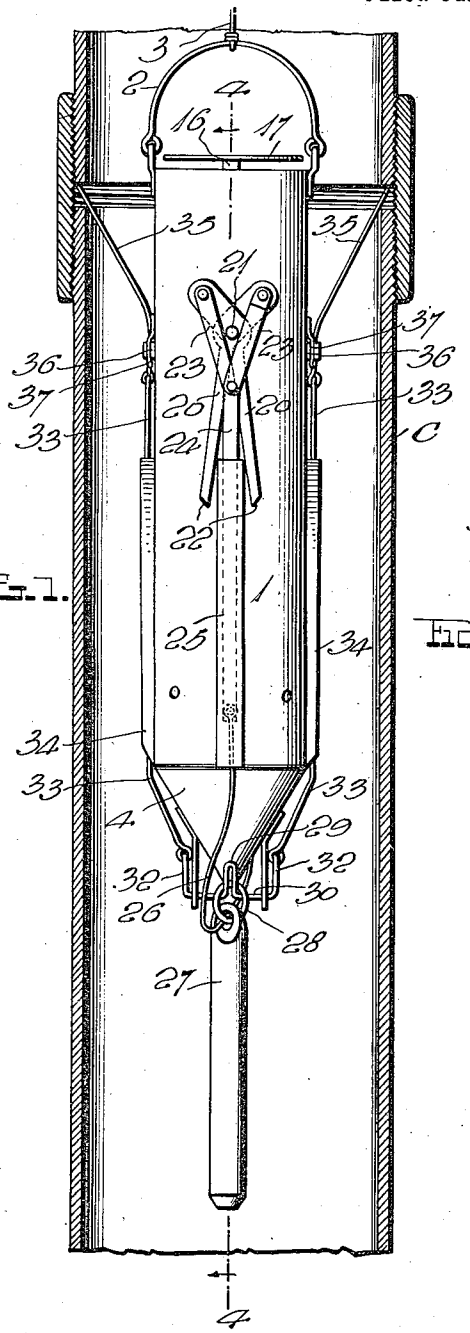


FIG. 1.

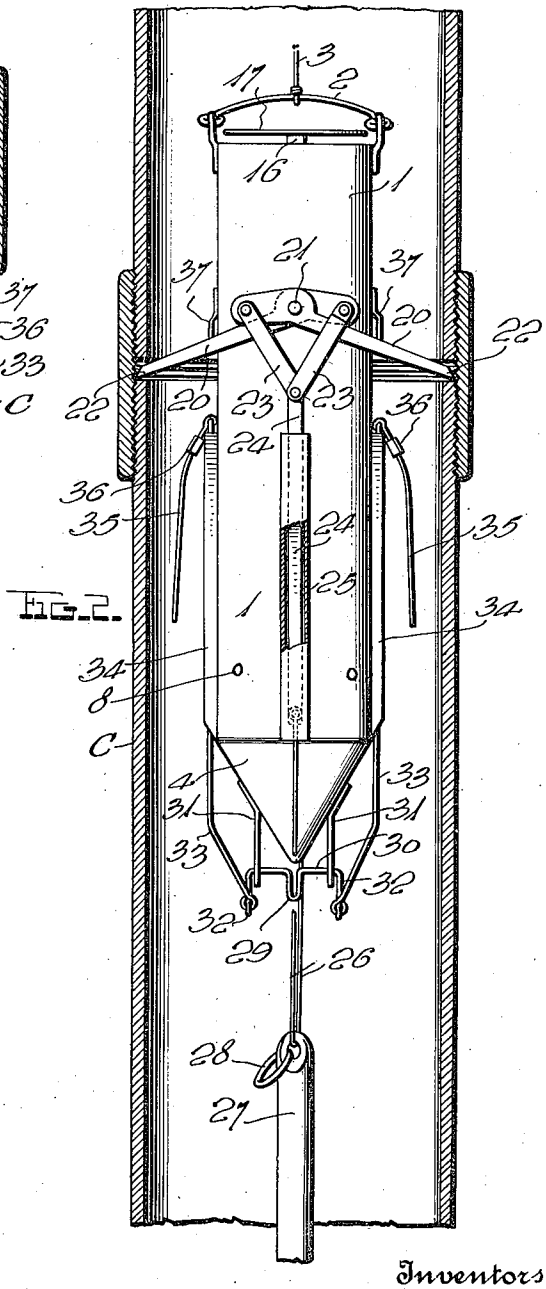


FIG. 2.

Witness
H. Woodard

Inventors
A. C. Fitzsimons
C. T. Wise

By A. B. Wilson & Co
Attorneys

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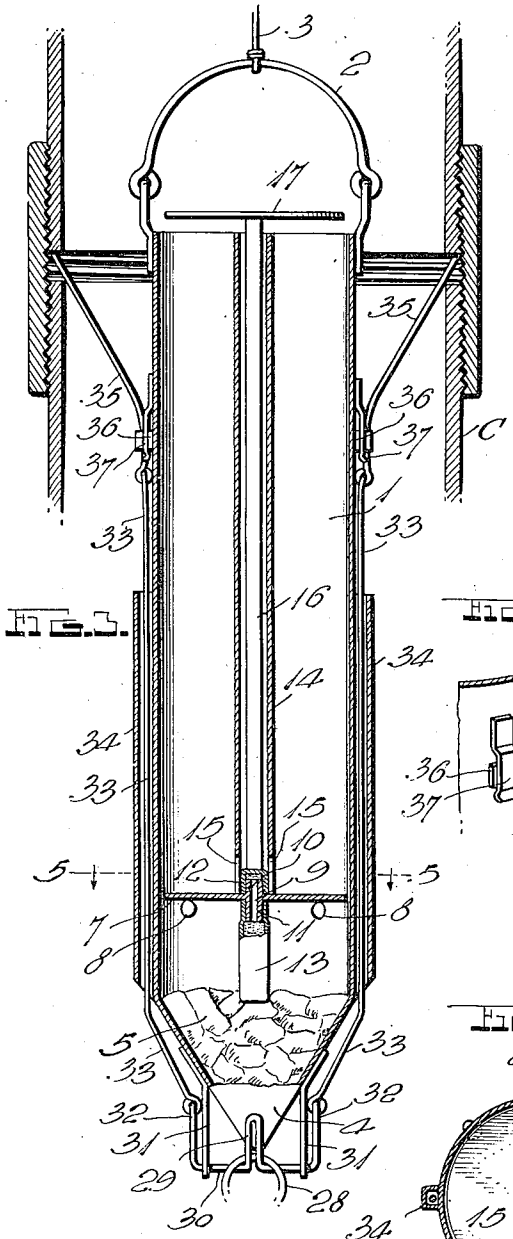


FIG. 3.

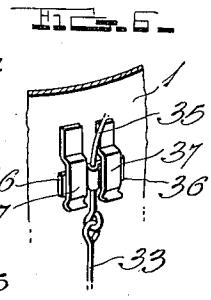


FIG. 6.

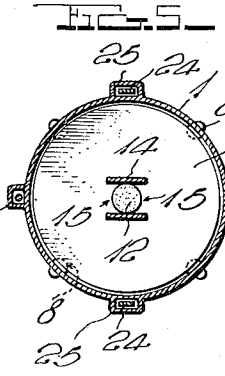


FIG. 5.

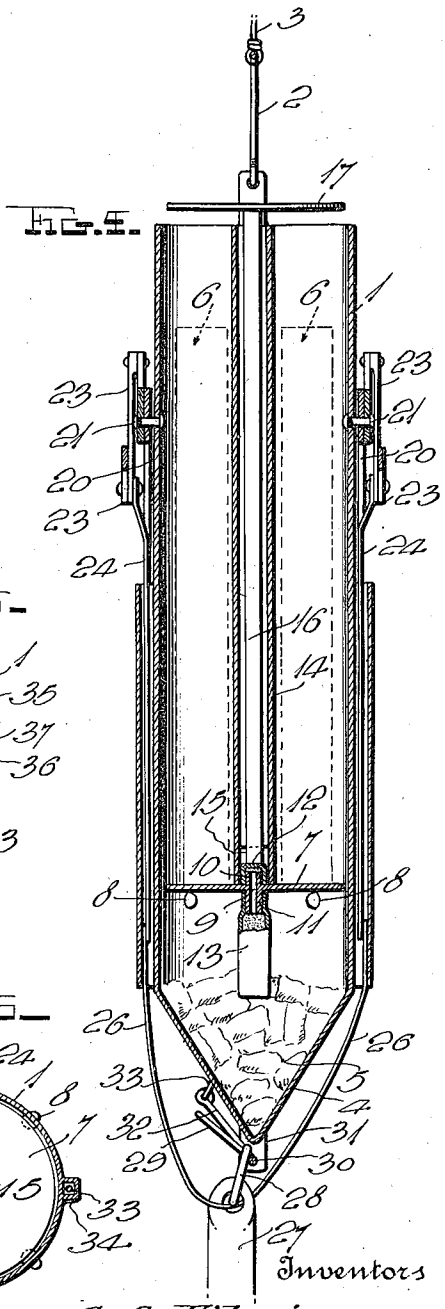


FIG. 4.

Witness
H. Woodard

Inventors
A. C. Fitzsimons
C. T. Wise

By A. B. Williamson & Co
Attorneys

Patented Feb. 10, 1925. 1,526,274

UNITED STATES PATENT OFFICE.

ALBERT C. FITZSIMONS AND CHARLES T. WISE, OF INDEPENDENCE, KANSAS.

WELL-CASING TORPEDO.

Application filed July 24, 1924. Serial No. 727,925.

To all whom it may concern:

Be it known that we, ALBERT C. FITZSIMONS and CHARLES T. WISE, citizens of the United States, residing at Independence, in the county of Montgomery and State of Kansas, have invented certain new and useful Improvements in a Well-Casing Torpedo; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

When removing oil well casings, it is often necessary to "cut" them by the use of a blasting charge lowered and fired in the well. Commonly, nitro-glycerine is used for this purpose and a rather expensive and elaborate equipment is necessary for firing and lowering the charges. It is the principal object of our invention however, to provide an extremely simple and inexpensive device to perform the desired work, preferably by the use of dynamite, although nitroglycerine might, in some instances, be used.

In carrying out the above end, we provide a container for the explosive adapted to be lowered into a well casing, and a further object is to provide normally held, self-projectable means, releasable by an upward pull on the explosive container, for engagement with the well casing, to support said container in the well, where the casing is to be cut.

A further object is to provide novel means for firing the charge of explosive, operable by dropping of a piece of pipe or other weight into the well casing.

With the foregoing in view, the invention resides in the novel subject matter hereinafter described and claimed, the description being supplemented by the accompanying drawings.

Figure 1 is a side elevation of the invention lowered into a well casing, the supporting means for the explosive container being held in retracted position.

Figure 2 is a view similar to Fig. 1 but showing the container supporting means extended for supporting the container in the well casing.

Figure 3 is a vertical longitudinal sectional view of the device in the condition shown in Fig. 1.

Figure 4 is a vertical sectional view on the plane of line 4—4 of Fig. 1.

Figure 5 is a horizontal sectional view on line 5—5 of Fig. 3.

Figure 6 is a fragmentary perspective view.

In the drawings above briefly described, the numeral 1 designates a vertically elongated tubular container for explosive material, said container being adapted to be lowered into a well casing C, for which purpose it is preferably provided with a pivoted bail 2 for connection with a wire or line 3. The lower end of the container 1 is preferably conical as indicated at 4 and is closed, while the upper end of said container is open. In the construction shown, the conical lower end of the container 1 is adapted to contain a quantity of crumbled dynamite or the like 5, and several sticks of dynamite 6 are intended to be supported in the container, upon a removable horizontal partition 7 which is supported near the lower end of said container, for instance, by rivet heads 8 at the container wall. A vertical passage 9 is formed through the center of the partition 7 and at the upper and lower ends of this passage, said partition is provided with bosses 10 and 11 for holding a pair of caps 12 and 13. Rising from the partition 7 is a tubular guide 14 whose lower end surrounds the boss 10 and is provided with openings 15 through which the cap 12 may be inserted for application to said boss, said guide 14 slidably receiving a firing rod 16 having a strike plate 17 at its upper end, exposed at the upper end of the container 1. The rod 16 may either rest directly on the cap 12 or may be normally supported by some yieldable or frangible means, a slight distance above said caps.

By the construction above described, after the loaded container 1 has been lowered into the well casing and is supported at the proper point, the dropping of a weight, such as a piece of pipe, will cause such weight to strike the plate 17, driving the rod 16 downwardly and firing the cap 12. This cap, by means of the passage 9, fires the cap 13, thus exploding the crumbled dynamite or the like 5, which fires the main charge 6, producing the power necessary to "cut" the casing. Obviously, the charge 6 may be packed in any desired manner before the device is lowered into the well, to exclude moisture or water.

Novel means are provided to support the

container 1 at any desired position in the well casing C. In the form of construction shown, two crossed levers 20 are fulcrumed between their ends at 21 to each of two opposed sides of the container 1, said levers having pointed ends 22 which normally extend downwardly as shown in Fig. 1, but when the levers are swung outwardly as indicated in Fig. 2 will engage the casing to support the loaded container. Links 23 converge downwardly from the upper ends of the levers 20 and are pivoted to vertical rods 24 mounted in appropriate guides 25 at the exterior of the container 1, the lower ends of the rods being connected to the ends of a wire or cable 26, which is provided with a weight 27 below the container 1. This weight is normally supported by a releasable hook member so that it cannot act to spread the levers 20, while lowering the device into the well, but novel provision is made, operated by an upward pull on the container, for releasing the weight 27, permitting it to drop as shown in Fig. 2, thus pulling upon the wire or cable 26 and causing projection of the levers to engage the well casing.

In the preferred construction, the upper end of the weight 27 is provided with a ring 28 through which a hook 29 at the center of a rock shaft 30, normally passes, said rock shaft being mounted in appropriate bearings 31 which project downwardly from the container 1. The ends of this rock shaft are provided with arms 32 to which vertical rods or wires 33 are pivoted, these rods or wires being slidably mounted in appropriate guides 34 at the outer side of the container 1 and being provided with loosely pivoted, upwardly diverging, upper ends 35. In the construction illustrated, each of the end portions 35 is provided with a pair of lateral wings 36 which are normally held by spring fingers 37 against the outer side of the container 1 as illustrated in Fig. 1. Thus, the rods 33 are held against descent and the rock shaft 30 can not turn to permit the hook 29 to release the ring 28 and weight 27.

When the device is lowered into a well casing, the arms 35 yieldably drag along the inner side of said casing and they will snap outwardly at the lower ends of the several casing sections, as will be clear from Fig. 1. When the device has been lowered to the desired extent, an upward pull is exerted on the line 3, and as soon as the rod ends engage one of the casing sections, the rods are held against further upward movement, so that a continued upward pull on the line or the like 3, will cause release of the wings 36 from the spring fingers 37. The weight 27 then immediately turns the hook 29 to a released position, permitting said weight to descend and project the levers 20 as shown in Fig. 2. A further upward pull is then exerted on the line or the like 3, so that the lever 20 will engage a joint of the well casing, as shown in Fig. 2. The line 3 is then slackened to permit the bail 2 to fall to one side, as indicated in Fig. 2, and the dropping of a weight will then cause firing of the charge, as above set forth, cutting the casing at the desired point.

Excellent results may be obtained from the simple and inexpensive construction shown and it is therefore preferably followed, but within the scope of the invention as claimed, modifications may of course be made.

We claim:—

1. A well casing torpedo comprising an explosive container adapted to be lowered into a well, self-projecting means carried by the container for engaging the well casing to support said container, means for normally holding said container supporting means against projection, casing engaging means carried by the container for releasing said holding means upon an upward pull on the container, and explosive firing means carried by said container.

2. A well casing torpedo comprising an explosive container adapted to be lowered into a well, projectable means carried by the container for engaging the well casing to support said container, a weight connected with said projectable means for projecting the same when said weight is permitted to drop, means carried by the container for normally supporting said weight, including a casing engaging releasing trigger adapted to be actuated by an upward pull on the container, and explosive firing means carried by said container.

3. A well casing torpedo comprising an explosive container adapted to be lowered into a well, projectable means carried by the container for engaging the well casing to support said container, a weight connected with said projectable means for projecting the same when said weight is permitted to drop, a pivoted hook member at the lower end of the container normally supporting said weight, a rod pivoted to said hook member and rising therefrom at the outer side of said container, a connection between said rod and container normally holding the former to prevent release of said hook member, said connection being adapted to break upon an upward pull on the container with respect to the rod and the latter being adapted to engage the well casing upon such upward movement of the container, and explosive firing means carried by said container.

4. A well casing torpedo comprising an explosive container adapted to be lowered into a well, projectable means carried by

the container for engaging the well casing to support said container, a weight connected with said projectable means for projecting the same when said weight is permitted to drop, a pair of bearings extending from the lower end of said container, a rock shaft mounted in said bearings and having a central hook and two lateral arms, said hook normally supporting the aforesaid weight, rods pivoted to and rising from said arms, connections between said rods and the container for normally holding the former, said connections being adapted to break upon an upward pull of the container with respect to the rods and the latter being adapted to engage the well casing upon such upward movement of the container, and explosive firing means carried by said container.

5. A well casing torpedo comprising a vertically elongated explosive container adapted to be lowered into a well, a pair of crossed levers fulcrumed between their ends to each side of said container and having pointed ends normally extending downwardly, downwardly converging links pivoted to the upper ends of said levers for spreading the latter to engage their pointed ends with the well casing when said links are pulled downwardly, normally held but releasable means for so pulling said links, and explosive firing means carried by the container and operable by dropping of a weight when said container is held by said levers.

6. A well casing torpedo comprising a vertically elongated tubular container for an explosive, a removable horizontal partition plate in said container having a vertical passage and means for holding caps at the upper and lower ends thereof, a tubular guide rising from said plate, a cap firing rod slidable in said guide and having a plate at its upper end adapted to be struck by a descending weight, and means whereby said container may be supported in a well casing.

In testimony whereof we have hereunto affixed our signatures.

ALBERT C. FITZSIMONS.
CHARLES T. WISE.