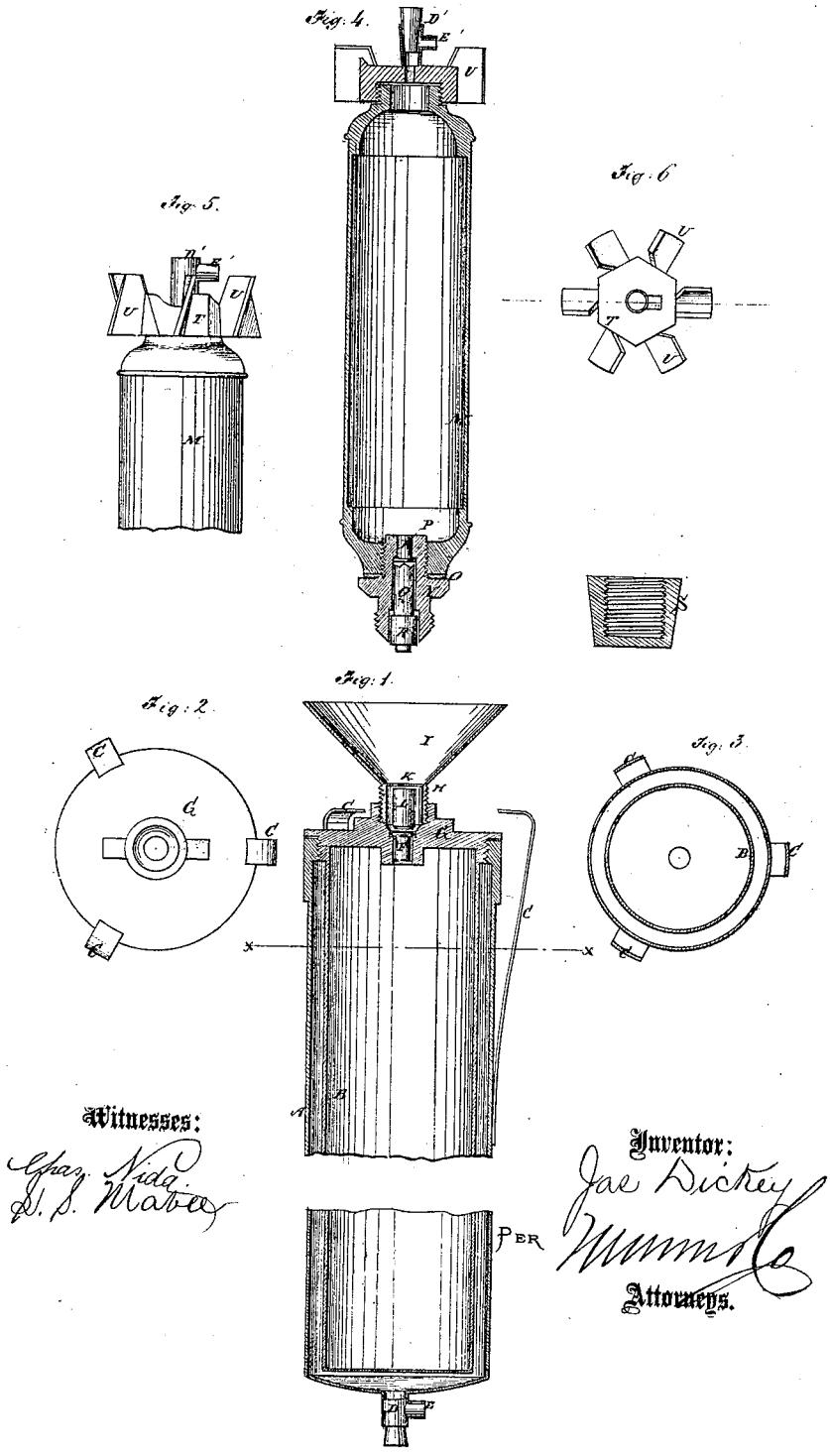
J. DICKEY.

TORPEDO FOR OIL WELLS.

No. 106,794. Patented Aug. 30, 1870.



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Letters Patent No. 106,794, *dated August* 30, 1870.

IMPROVEMENT IN TORPEDOES FOR OIL-WELLS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JAMES DICKEY, of Venango City, in the county of Venango and State of Pennsylvania, have invented a new and useful Improvement in Torpedoes for Oil-Wells; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

This invention relates to improvements in torpedoes for oil-wells, and consists in the application to the exteriors of the shells of spring guides for centering them in the wells after passing below the iron casing, or in open wells.

It also consists in an improved arrangement of charging and stopping-nozzles, for charging the torpedoes, such as patented to me September 14, 1869, with oxygen gas.

It also consists in an improved mode of firing the torpedoes by means of a bomb or secondary torpedo dropped upon the primary one.

The invention also consists in an arrangement of a guide-funnel on the top of the torpedo, to cause the guides of the bomb to strike the spindle of the torpedo, and a spiral guiding apparatus on the bomb, for imparting a spiral motion to it in its descent, by action on the water or oil below the case, by which it is kept in the center of the well, and caused to strike properly on the top of the torpedo, which is held in the center by its springs.

Figure 1 is a sectional elevation of my improved torpedo;

Figure 2 is a section of the same, taken on the line *x x* of fig. 1;

Figure 3 is a top view, with the funnel removed;

Figure 4 is a sectional elevation of my improved firing-bomb or secondary torpedo;

Figure 5 is a partial elevation of the same;

Figure 6 is a plan of the spiral guiding apparatus; and

Figure 7 is a section of a cap which I apply to the lower end of the bomb, to protect the spindle previous to firing the torpedo.

A is the outer shell, and

B, the inner shell of a torpedo arranged according to the improvements set forth in my aforesaid patent, for containing, besides the explosive material, a quantity of oxygen-gas, the same being forced in and confined under pressure, and occupying the space between the two cylinders; also penetrating, if required, the space containing explosive matter.

C represents the guiding and centering-springs attached to the outer shell, for action on the walls of the well below the casing, or on the walls of the casing, when made materially larger than the shell, for guiding and centering the torpedo in its descent.

D E represent the arrangement of the tubes for charging the torpedo with the oxygen gas. The lateral tube E, leading into the side of the plugging-tube D, receives the end of a small flexible tube connected to the vessel containing the gas, while the other is plugged, as shown, the plug being withdrawn sufficiently to let the gas pass into the cylinder, but sufficiently tight to prevent the escape of the gas. When the shell is sufficiently charged, the plug is drawn in past the opening of tube E, preventing the escape of the gas thereat. This arrangement admits of first exhausting the air from the shells by an air-pump connected to the pipe to be attached to E, and having cocks for closing its connection when the gas is to be let in. Another advantage of this arrangement is, that, when the gas in the vessels from which the torpedoes are to be charged is under very great pressure, much more than the torpedoes can bear, if, by any reason, a greater amount is let into the torpedo-cases than should be, and which might explode the case, the flexible tube attached to the tube E will be forced off under less tension of the gas than would be required to explode the case, thereby preventing its explosion.

F is the percussion-cap or cartridge, placed in a seat in the cap G, and communicating, through a hole in the cap, with the interior of the inner case B, which is attached to the said cap, the latter screwing into the top of the case A.

The opening to the seat for the cap is enlarged above it, and the wall is screw-threaded for the reception of a nozzle, H, of a funnel, I, having a diaphragm, K, of thin metal, extending across the hole of the nozzle at its junction with the bottom of the funnel.

L is a metal spindle, placed above the cap E within the nozzle, and below the diaphragm K. This spindle is to be struck by the spindle in the lower end of the bomb, (to be presently described,) for firing the cap, the said spindle cutting through or forcing the diaphragm down upon the spindle L.

This nozzle H and the diaphragm K protect the spindle against anything which might come in contact with and cause it to explode the cap prematurely; also, from loss while handling, and prevents the penetration of water to the explosive contents of the shell.

This torpedo is designed to be let down into the well by a cord or wire attached, so that a slight jerk will disengage it, to allow the cord to be drawn up again out of the way.

M represents a bomb, such as I employ for firing the torpedo A B, also as a secondary torpedo. It consists, preferably, of a single hollow cylinder filled with oxygen gas and explosive compounds, or it may

be arranged internally like the torpedo shown in fig. 1, and has a hollow shouldered plug, N, screwed into the lower end, the shoulder being forced against the end, with suitable packing, O, between, for insuring a tight joint.

The top of this plug is provided with a detonating-cap or cartridge, P, and a spindle, Q, is fitted in the hole below, projecting from the lower end sufficiently to be forced in against the cartridge when struck a heavy blow.

This spindle is retained in its place by flexible packing, R, fitted into the hole of the plug, or on the end thereof, and arranged to be bent over or packed around the end of the plug after it is put in place.

S is a screw-threaded cap, fitted to screw on the end of the plug N, for the protection of the spindle previous to use in handling, storing, and transporting.

The spindle Q is intended to strike on the diaphragm K, or the spindle L, when the bomb M is let fall from the top of the well, after the torpedo A B has been let down, to cause the explosion both of the torpedo and the bomb; and the funnel I is designed to guide it to the spindle K in case the bomb should, for any cause, not descend in the same axial line.

I propose, in some cases, to make this funnel, together with the cap G, in one piece; or it may be formed in any other preferred way, in which case a screw-threaded cap may take the place of the nozzle. In this case I prefer to use nitro-glycerine as the explosive compound, as it may be exploded without the use of the spindle and cap, which, being dispensed with, favor this construction. The blow of the bomb will be sufficient to explode the nitro-glycerine.

T represents a guiding-wheel, with spiral vanes, U, attached to it, and placed on the bomb M preferably at the upper end, which is intended for action on the inner wall of the casing, and on the water, for imparting a spiral motion to the bomb as it goes down, which has the effect to keep it in the center of the well, and insure its striking the firing apparatus of the torpedo.

D′ and E′ represent filling-tubes, similar to those shown at D and E for supplying the oxygen gas to the bomb.

The torpedoes are, at the present time, fired, after being dropped in the wells, either by fuse pulled by wires from the top of the well, electricity communicated by wires, or by lead or iron weights strung on cords or wires, and let fall from the top. When they explode, the wires or cords are forced upward great distances, and are frequently doubled, twisted, and knotted and packed in the iron cases above the place of the explosion so compactly as to prevent the escape of the gases, water, or oil forced up, which, in such cases, bursts or destroys the casings below to the great damage of the well, which must then be cleared out and re-cased before it can be used. These cords and wires, in such cases, are destroyed, and the expense of them lost. The cords or wires are also frequently cut or broken by the descending weights, and fail to guide them properly.

By my improved mode of firing the torpedoes, the wells cannot be obstructed above the point of explosion, and, consequently, no damage can occur to the casing, and I save the expense of the wires and cords.

It is not absolutely essential that the bomb be provided with the firing-spindle and the cartridge, as it will no doubt be exploded by the concussion of the torpedo; but I prefer, in order to make the explosion of both more nearly simultaneous, to apply the firing apparatus to the bomb.

This mode of firing is applicable as well to torpedoes of ordinary construction as to my improved oxygen-gas torpedoes, and I propose to employ it with torpedoes of any construction.

Having thus described my invention,

I claim as new and desire to secure by Letters Patent—

1. A torpedo for oil-wells provided with the guiding and centering-springs C, substantially as specified.

2. The combination, with the shell of a torpedo, of the filling and plugging-tubes D E, substantially as specified.

3. The combination, with the torpedo and the firing-spindle L, of a funnel arranged at the top, to guide the spindle or point of the bomb to the said spindle L, for delivering the blow thereon, substantially as specified.

4. A bomb or secondary torpedo, in combination with the primary torpedo previously placed in the well for firing it by being let fall thereon, substantially in the manner described.

5. The combination of the bomb or secondary firing-torpedo M, having the spiral vanes U, with the primary torpedo, substantially as specified.

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