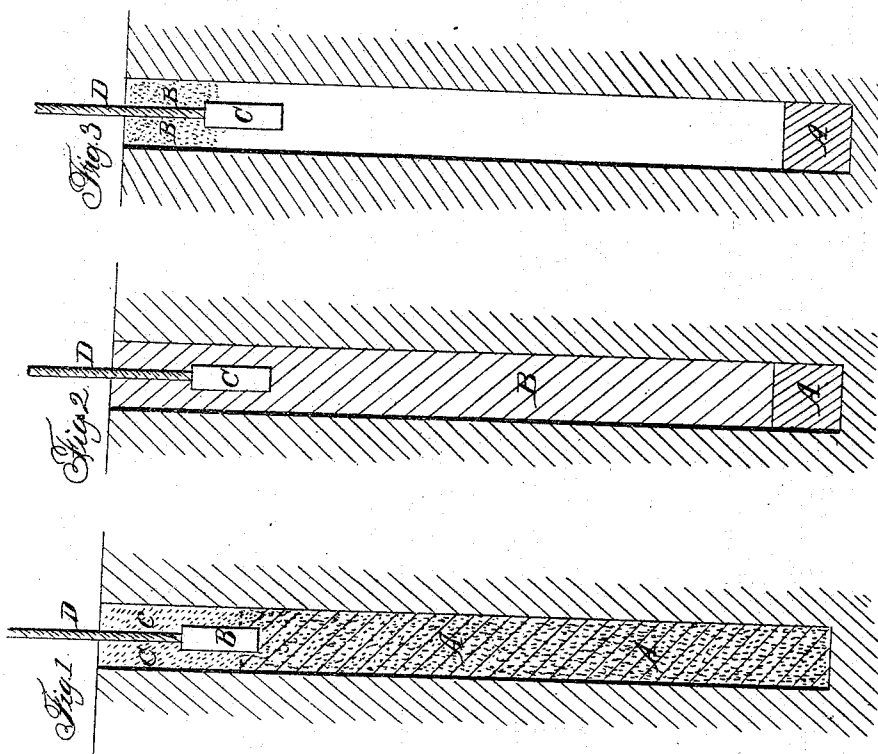


T. P. SHAFFNER,
Torpedo.

No. 60,573.

Patented Dec. 18, 1866



Inventor
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UNITED STATES PATENT OFFICE.

TAL. P. SHAFFNER, OF LOUISVILLE, KENTUCKY.

IMPROVEMENT IN METHODS OF BLASTING WITH NITROLEUM.

Specification forming part of Letters Patent No. 60,573, dated December 18, 1866; application filed November 12, 1866.

To all whom it may concern:

Be it known that I, TALIAFERRO P. SHAFFNER, of Louisville, Jefferson county, and State of Kentucky, have discovered or invented a new and Improved Mode of Blasting with Nitro-leum; and I do declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The nature of my discovery or invention consists in dividing the charge of nitro-leum, making one for blasting and the other for tamping, the same being an improvement upon my patent No. 51,674, dated 19th December, 1865.

To enable others skilled in the art to make and use my invention or discovery, I will proceed to describe the process employed by me.

Blasting with nitro-leum—a liquid substance commonly called nitro-glycerine, but named by me “nitro-leum”—has occasioned an observance of new conditions of tamping. When powder is used a very strong tamping of sand or other suitable material is employed. The sand is placed in the drill-hole over the powder in small quantities, and compactly pressed by a tamping-iron and hammer. Gun-cotton requires the same conditions of tamping. Nitro-leum cannot be tamped solidly; being a liquid, the sand would mix with it, and the tamping-iron might produce a premature explosion. If it be placed in a metal or other kind of cartridge, the concussion might produce a similar effect. The usual process observed has disregarded any tamping whatever of the nitro-leum; but a given amount is used to keep the fuse-plug in its place to prevent its recoil before the nitro-leum is exploded. The fuse-plug is charged with powder, which is ignited by an ordinary train-fuse, and the plug must lie in part in the liquid. Over the fuse-plug is poured sand or earth, and no tamping is usually given to the sand or earth. When the fuse-plug explodes, the force or heat given by the powder explodes the nitro-leum. The force produces percussion and the 360° of heat the temperature required to explode nitro-leum. Water has been employed for tamping, and it has served some good, but only to a limited extent.

To tamp nitro-leum according to any of the

hitherto-known modes of tamping is too dangerous, as an explosion would be inevitable.

It is a fixed law in philosophy that explosive substances, when confined, have a disruptive force in proportion to the degree of confinement, quantity and resistance being respectively considered. So it is with nitro-leum.

With a view to obtain the whole force of a charge of nitro-leum placed in a drill-hole for a blast, I have invented a new mode of tamping, which has been very effective in blasting.

I pour the nitro-leum into the drill-hole, or I place a tin canister filled with it into the bottom of the hole; and near the top of the hole I place a tin canister with a small charge of nitro-leum, which is to be ignited by a fuse. Suppose the drill-hole to be five feet deep. The blasting-charge will occupy one foot at the bottom. Above will be three feet of space; then four inches for the tamping-charge. Above will be eight inches of sand, slightly packed, so as to hold the fuse and tamping-charge in the position desired. The explosion of the upper or tamping-charge will explode the lower or blasting-charge. The tamping-charge confines the lower to its place, and the disruption of rock will be vastly greater. By this arrangement the gases act upon the rock at the bottom of the hole, though to a certain extent the tamping-charge helps to disrupt the rock at or near the top of the hole.

Sometimes I pour the nitro-leum into the drill-hole, and then fill the hole with water. The former, being the heaviest, will lie at the bottom. At the top of the hole I place the tamping-charge, and, on its explosion, the blasting-charge at the bottom of the hole beneath the water will be exploded and completely tamped. The explosion of the tamping-charge forces the column of water against the lower charge, and thus, as a whole line of force, and by particle acting against particle, the required percussion and heat are produced, thus effecting the explosion of the blasting-charge at the bottom of the hole beneath a column of four feet of water.

Again, I sometimes use sand to distribute the force throughout the whole drill-hole. I pour the nitro-leum into the hole alternately with sand, and in this manner fill the hole.

An explosion of powder or gun-cotton in the sand thus mixed with the nitro-leum will produce an explosion throughout the drill-hole.

From the preceding it will be observed that I have three modes of blasting with nitro-leum, viz: First, placing the charge at the bottom of the hole, with tamping-charge near the top, space existing between the blasting and tamping charges; second, instead of the space, as in the first case, a column of water is substituted; third, instead of the space or water, I fill the hole with sand saturated with nitro-leum from bottom to top.

The drawings accompanying as parts of this specification illustrate these respective modes.

Figure 1 represents a drill-hole in rock prepared with tamping and blasting charges. A A is nitro-leum mixed with sand. B is a tin canister filled with nitro-leum, with fuse D attached. The former is the blasting-charge, and the latter the tamping-charge. C C is sand tamping to keep the canister B in its place. Unless this sand be placed over the canister the explosion of the fuse combination will cause a recoil of the canister-plug before the nitro-leum can be ignited. Instead of the sand, however, a wedge or other means may be employed to hold the canister in its proper place.

Fig. 2 represents the drill-hole with the blasting-charge A at the bottom, and above the hole is filled with water B. The tamping-charge C is held in its place by any convenient means.

Fig. 3 represents a drill-hole with blasting-charge A at bottom, with space above to tamping-charge C. Above C is sand, B, to hold the tamping-charge in its place.

In case the holes are placed in such manner that the nitro-leum cannot be poured therein, a tin canister can be employed, which, when filled and corked, can be placed at the bottom of the hole, and, if necessary, held there with clay, sand, or other suitable material.

Having now fully described the nature and process of my discovery or invention, sufficiently full and distinct to enable one skilled in the art to execute the same, what I claim, and desire to secure by Letters Patent as my discovery or invention, is—

1. The combination of nitro-leum with sand, for the purpose of blasting and distributing the explosive force throughout the drill-hole or space where the same are employed, in the manner and for the purposes described.

2. For blasting-purposes, the use and interposition of a column of water between the tamping and blasting charges, when the same is arranged in the manner and for the purposes described.

3. As a method of blasting in rock, the adjustment and arrangement of the tamping and blasting charges, in such manner that the former shall be placed at or near the surface or upper part of the drill-hole, while the latter is located at the bottom thereof, or in such a manner as that the gases of the two charges may be united, disrupting the rock in the manner and for the purposes hereinbefore described.

TAL. P. SHAFFNER.

Witnesses:

W. M. SHAFFNER,
EDM. F. BROWN.