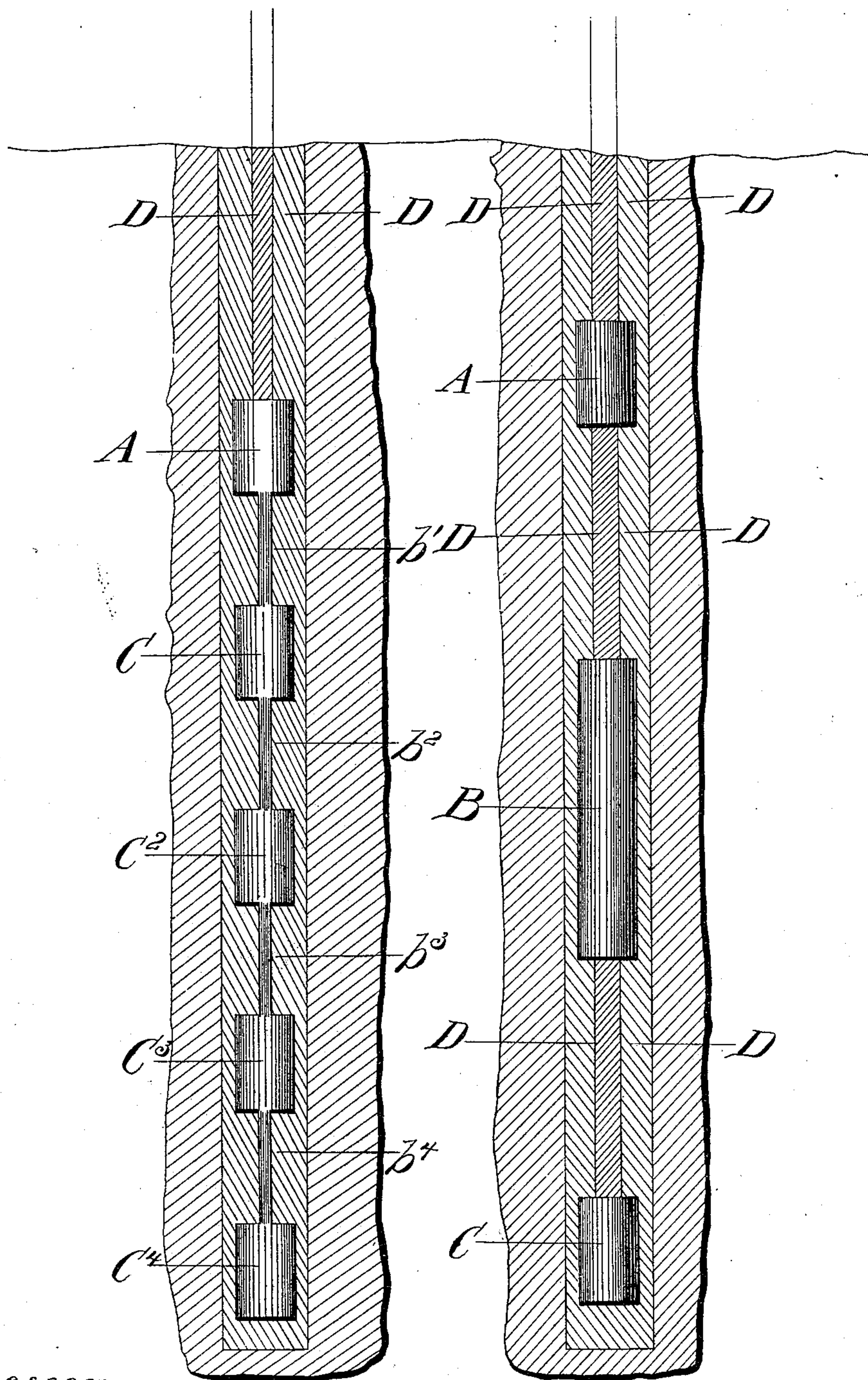


T. P. SHAFFNER  
Blasting in Oil Wells,

No. 87,372.

Patented March 2, 1869.



Witnesses:  
W. M. Shaffner.  
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Inventor:  
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# United States Patent Office.

TALIAFERRO P. SHAFFNER, OF LOUISVILLE, KENTUCKY.

Letters Patent No. 87,372, dated March 2, 1869.

## IMPROVEMENT IN BLASTING IN OIL-WELLS, &c.

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, TALIAFERRO P. SHAFFNER, of Louisville, Jefferson county, and State of Kentucky, have discovered a new and improved Mode of "Blasting in Oil-Wells;" 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 invention consists in the arrangement and combination of explosive charges in oil-wells, artesian wells, deep crevices in rock, or earth, &c., for the purpose of distributing the forces of the gases of the respective charges on and against the greatest possible and desirable surface of matter. By preference, I employ electricity to explode the charges, and by preference I use nitroleum (nitro-glycerine) as the explosive substance.

Gunpowder is the most common explosive substance used for blasting, having a force of thirteen thousand pounds per cubic inch. There have been employed various modes for exploding the whole of any given charge to attain the above development of force, but that desideratum was never successfully accomplished until by me, the particulars of which may be found in my patents, Nos. 51,671, 51,672, and 51,674, issued in 1865.

These respective patents refer to my mode of igniting gun-cotton, but the principles apply to powder, having employed them with gunpowder in the Danish war early in 1864.

My patent, No. 51,674, refers to my mode of acting upon a given rock by the simultaneous discharge of the different blasts or charges, each to act conjunctive with the other in effecting the greater disruption of the rock. In this application, I apply the same principles, only placing the respective charges in the same drill-hole, precisely as represented in my patent, No. 51,671, representing my mode of producing the instantaneous ignition of a given quantity of gunpowder.

The object of this patent, or application therefor, being an improvement on patent, No. 51,674, has especial reference to the application of nitroleum, or other equivalent substances, in oil-wells, artesian wells, &c.

The explosive force of powder is upward; that of nitroleum is in all directions.

In the use of explosive substances in oil-wells, it is desirable not to disrupt the sides or walls above or below the oil-bearing strata. I effect this object by employing three classes of charges, namely, the "tamping-charge," "blasting-charge," and "resisting-charge."

First. The "tamping-charge" has for its object the confinement of the blasting-force below it. In a well of three inches in diameter, the "tamping-charge" may be only two ounces of nitroleum, and its downward force will be about eighty-five thousand pounds.

Second. The "blasting-charge" or charges, to be placed in that part of the well desired to be bro-

ken, should be at least ten times the cubic area of the tamping-charge.

Third. The "resisting-charge" should be about two ounces. The lines of forces will be up and down. The gases upward from the "resisting-charge," and those downward from the "tamping-charge," hold within their forces the gases of the "blasting-charge," thereby causing the whole of the blasting-forces to act upon and against the walls of the well. These forces will amount to about three million three hundred and eighty thousand pounds.

The "tamping-charge" should be placed near the top of the strata to be acted upon, the "blasting-charge" in the middle of the strata, and the "resisting-charge" at the bottom thereof.

Reference may be made to the drawing accompanying.

Figure 1 represents an oil-well, or a part thereof, being the oil-bearing strata:

A is the "tamping-charge;"  
B, the "blasting-charge;" and  
C, the "resisting-charge."

Each of these charges is in a canister, held in its respective position by the electric wires D D, by which the charges are ignited.

Figure 2 represents another arrangement of the charges for disrupting the walls of the well.

The charges A and C<sup>1</sup>, C<sup>2</sup>, C<sup>3</sup>, and C<sup>4</sup>, are connected by tubes, or pipes, b<sup>1</sup>, b<sup>2</sup>, b<sup>3</sup>, and b<sup>4</sup>.

The canister-charge A is connected with a voltaic battery, or with any other known generator of electricity, by means of the wires D D. If the canisters and connecting-tubes be charged with nitroleum, the explosion of the charge in A will produce the discharge of the nitroleum in the tubes and other canisters.

Having now fully described the nature and process of my invention, sufficiently full and distinct to enable one skilled in the arts to execute the same,

What I claim, and desire to secure by Letters Patent as my invention, is—

1. As a method of blasting in oil-wells, artesian wells, &c., the arrangement of the "tamping," "blasting," and "resisting"-charges, within the strata to be acted upon, the former to be at or near the top thereof, the latter to be at the bottom of the strata, and the blasting-charge to be within the part desired to be disrupted, the whole to be exploded simultaneously, in the manner and for the purposes herein described.

2. The connection of the tamping and blasting-charges, by means of tubes, or pipes, and exploding the same at the same instant, in the manner and for the purposes described.

TAL. P. SHAFFNER.

Witnesses:

EDM. F. BROWN,  
F. W. HOWARD.