T. P. Shaffner,

Blasting by Electricity,

No. 51,671. Patented Dec. 19, 1865.

Fig: 1

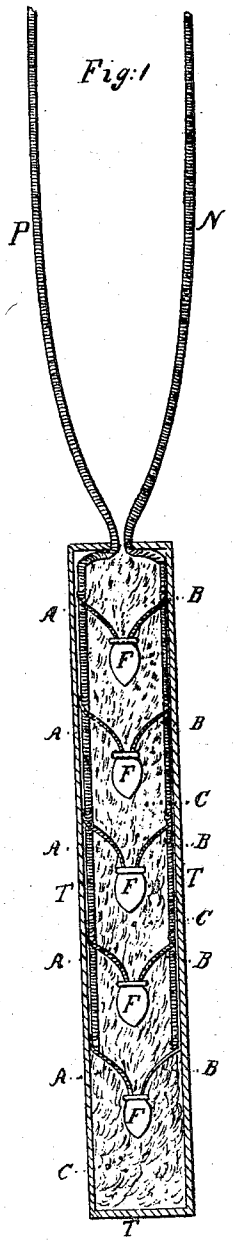
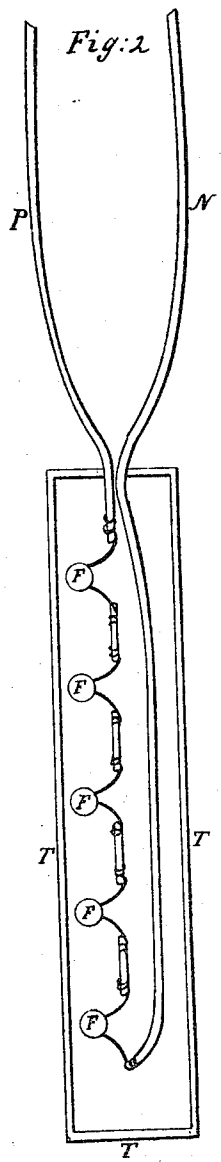


Fig: 2



Witnesses

Edward H. Knight

C. D. Smith

Inventor

T. P. Shaffner

UNITED STATES PATENT OFFICE.

T. P. SHAFFNER, OF LOUISVILLE, KENTUCKY.

IMPROVEMENT IN BLASTING BY ELECTRICITY.

Specification forming part of Letters Patent No. **51,671**, dated December 19, 1865.

To all whom it may concern:

Be it known that I, TALIAFERRO P. SHAFFNER, of Louisville, in the county of Jefferson and State of Kentucky, have made new and useful Improvements in means for Exploding Combustible Materials, which I term a "Divisional Electric-Circuit Exploder;" and I do hereby declare the following to be a full, clear, and exact description of the nature, construction, and operation of the same, sufficient to enable one skilled in the art to which my invention appertains to construct and use the same, reference being had to the accompanying drawings, which are made part of this specification, and in which—

Figure 1 shows a view of the invention when applied to explode a charge of combustible material by the application of fire at several points. Fig. 2 shows a view of the former or known method of connecting two or more fuses in a single circuit, the fuses being placed consecutively upon the wire.

The invention consists in connecting the main wires by lesser branch wires to the fuses, which contain an explosive composition of less conductivity as to quantity electricity, so that the volume of electricity generated by the battery and transmitted through the main wires will be more than can be conducted by the branch wires and the composition of the fuses as a whole.

The objects are, first, to insure certainty of ignition of the explosive compound, supposing that it will not be possible for all the fuses to fail to ignite, as the non-combustion of one will not interfere with the ignition of the others.

Secondly, the great end attained by this arrangement, especially in artillery practice, will be the instantaneous explosion of any required quantity of gunpowder or other combustible materials, by the simultaneous ignition of the same at any required number of points—an object hitherto unattained.

In Fig. 1, P and N are the main wires, the former being positive, and the latter negative. These wires are passed into the torpedo T, or any other vessel or chamber which may contain the charge to be exploded.

To the wires P N are respectively attached the smaller branch wires A and B, which pass into the fuses F, and their points are connected in the fuse by an inferior conductor compound susceptible of explosion by the presence of electricity, the terminals in each fuse not being in contact. This compound may consist of oxide of copper, soot, sulphide of copper, plumbago, carbon, &c., either of them mixed with chlorate potassa or ordinary gunpowder, to produce ignition.

In Fig. 2, P N are the positive and negative wires leading into the torpedo T or other charged chamber, and upon the wires are the fuses F, being consecutively attached thereto.

It will be seen that the failure of one to ignite or to continue the current to the next in series is fatal to the whole; and, further, the first in series will explode before the others, there being an interval of time between the actual explosion of each. The maximum electric force which can be passed on this circuit is limited by the fuse of greatest resistance. My invention avoids both these difficulties, for in the first place the safety of the whole series does not depend upon the perfections of the arrangement in each fuse; and, secondly, the force of the charge which can pass through any one is not limited by the fuse of greatest resistance.

In the device Fig. 2, if any one of the fuses is worthless, all the others are useless; and whatever may be the average character, they are all brought down to the standard of the least efficient one of the series; and in all cases the number of fuses that may be possible to be ignited under the most favorable circumstances heretofore has not exceeded twenty, that probably being four times the average number on a circuit of one mile in length. By the arrangement in Fig. 1 the number is not limited by any of the considerations or casualties attendant on the plan Fig. 2; but I have exploded three hundred without attaining a maximum.

The branch wires have been described as comparatively smaller than the main wires, and by preference I construct them in that manner; but without bearing this proportion the point of resistance in the fuse has the effect of distributing the main charge to the other points at which it may pass.

Having described my invention, what I claim therein as new, and desire to secure by Letters Patent, is, not the use of branch circuits for separate charges of powder, but

The use of branch circuits in separate fuses with a single charge of explosive material for the purpose of simultaneous ignition of the same at several points, as set forth.

TAL. P. SHAFFNER.

Witnesses:

ALEXR. A. C. KLAUCKE,

EDWARD H. KNIGHT.