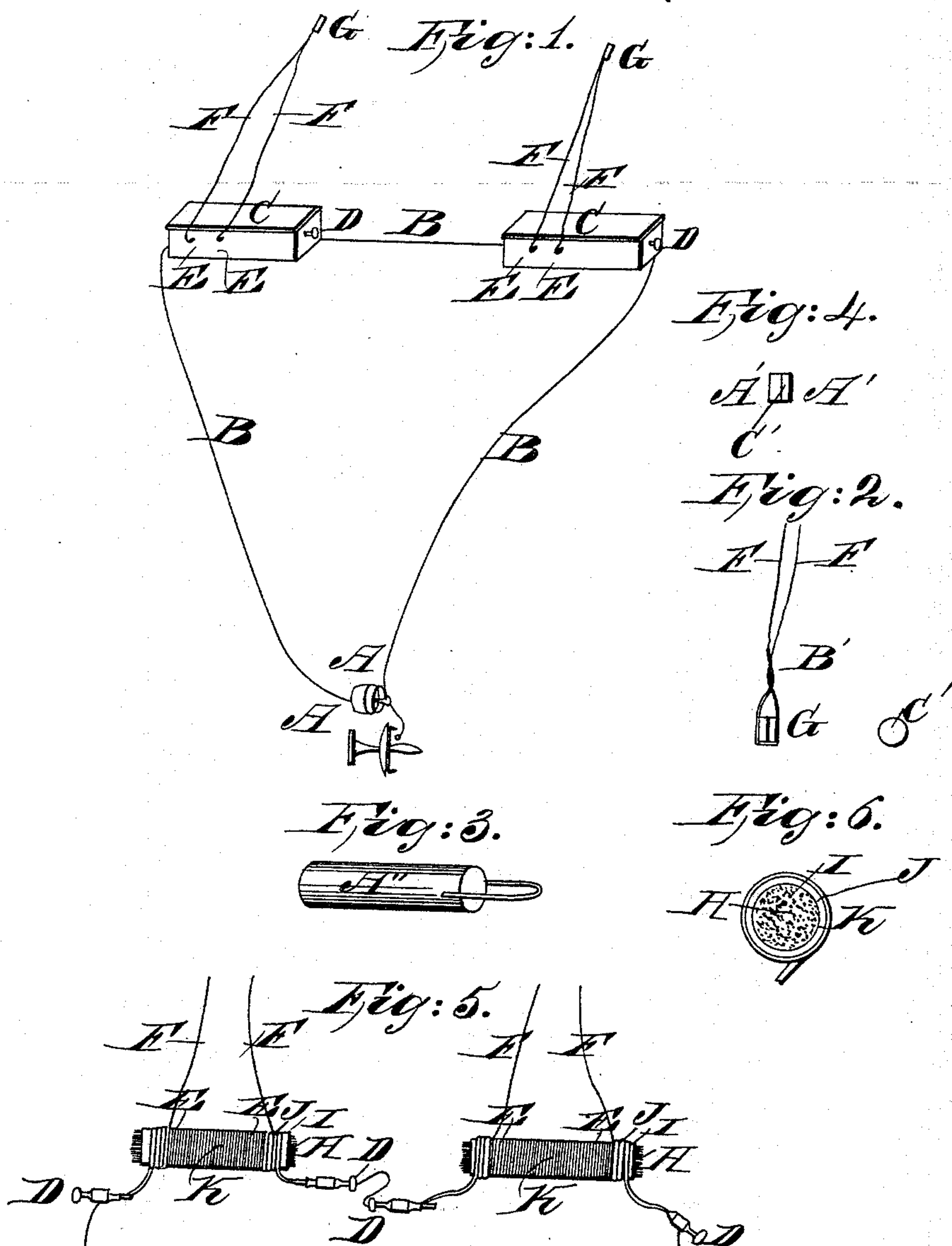


J. B. DOWSE.

Apparatus for Exploding by Electricity.

No. 68,055.

Patented Aug. 27, 1867.



Witnesses:
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JABEZ B. DOWSE, OF LOCKPORT, ILLINOIS.

Letters Patent No. 68,055, dated August 27, 1867.

IMPROVEMENT IN APPARATUS FOR EXPLODING BY ELECTRICITY.

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

Be it known that I, JABEZ B. DOWSE, of Lockport, in the county of Will, and State of Illinois, have invented a new and useful apparatus, by me named the "Electric Compound Exploding Apparatus," and discovered a new and useful explosive compound, by me named "Copper Amalgam," by means of which apparatus and compound explosive material may be fired by electricity, and more than one charge of such material can be simultaneously fired by the inductive agency of one shock or current of electricity, and the rapid and complete combustion of such material can be attained; and I do hereby declare that the following is a full, clear, and exact description of the construction, operation, and combination of the same, reference being had to the annexed drawings, which form a part of this specification, in which—

Figure No. 1 is a view of the electric compound exploding apparatus, containing two inductors and two matches.

Figure No. 3 is a view of the match-case.

Figure No. 2 is a view of the match.

Figure No. 4 is a view of the igniter.

Figure No. 5, a plan view of the electric compound exploding apparatus detached from the protections C C to show more clearly its construction and arrangement.

Figure No. 6, a transverse sectional elevation of one of the inductors, fully showing its construction.

To enable others to use my invention I will proceed to describe its construction, combination, and operation.

Construction of the Electric Compound Exploding Apparatus.

Fig. No. 1. The main conductors B B B should be insulated. Gutta percha is the best insulator for that purpose. The protections C C, made of wood, cover the inductors with a thickness of at least three inches in any direction. The top is four inches thick, and projects so as to cover the metallic connections with the coils. The inductors consist of a bundle of soft iron wires, H H, figs. 5 and 6, enclosed in a cylinder of soft iron, I, which cylinder is surrounded by a coil of large insulated copper wire, J, and the whole surrounded by a secondary coil of fine insulated copper wire, K K, of great length. The inductors are cemented into the protections C C, fig. 1, with a composition composed of one part resin, melted with one part fine sand. The wires F F, figs. 1 and 5, which connect the secondary coils K K, figs. 5 and 6, to the matches G, figs. 1 and 2, need not be insulated, unless required to pass through water, in which case painting with common paint is generally sufficient.

Construction of the Igniter.

Fig. No. 4. Forty one-hundredths ($\frac{40}{100}$) grains of copper amalgam, containing about fifteen per cent. of water, are inserted between the polished leaden disks A' A', and the whole placed in a die and submitted to a pressure of about six hundred pounds. The igniters thus formed are removed while still moist, and corked up in a bottle for two days for the purpose of preventing the too rapid evaporation of the moisture. The combined influence of the mechanical pressure and the chemical action of the wet amalgam upon the lead secures a more perfect contact of the disks with the amalgam, and facilitates the passage of the electric current by increasing the conductive capacity of the igniter.

Construction of the Match.

Fig. No. 2. The wires F F of the match should be twisted together, and insulated at B'. The ends of the wires F F should be brightened, and metallic contact secured to the igniter, fig. 4, by means of a silk thread.

Construction of Match-Case.

Fig. No. 3. A', a small hollow metal cylinder, insulated on the inside with a coating of resinous matter.

Combination of Match-Case, Match, and Bursting Charge.

Insert the igniter of the match, Fig. No. 2, in the match-case A', Fig. No. 3, and introduce as a bursting charge a small quantity of fulminate of mercury, or gun-cotton which has been saturated in a solution of nitrate of potassa or gunpowder. Close the ends with cement.

Production of Finely-divided Copper.

The best article is that which has been in chemical combination with other element or elements, and has been reproduced, or partially so, without fusion. It may be produced from any combination of copper which can be reduced to the suboxide or protoxide. Intimately mix finely-divided carbon, such as lamp-black, with the suboxide or protoxide of copper in such proportions as to form carbonic acid gas with the oxygen in combination with the copper. Heat to redness in a vessel, excluding the air.

Combination of "Copper Amalgam" for Charging Igniters.

Three parts finely-divided copper to one part fulminate of mercury; add about thirty per cent. of water; elevate temperature to about 212° Fahrenheit; intimately mix. When it contains about fifteen per cent. of water, charge igniters.

Combination of "Copper Amalgam" for Explosive Purposes.

About one hundred and ninety parts of finely-divided copper to one hundred parts of fulminate of mercury; intimately mix with about thirty-five per cent. of water; elevate temperature to about 212° Fahrenheit; dry as quickly as possible.

All proportions given are by weight. The manufacture of copper amalgam requires the utmost caution. I advise no person to attempt it unless he has been accustomed to handle the fulminates. The danger lies in the mixing, when it contains grit.

The "electric compound exploding apparatus" may consist of two or more inductors, and as many matches may be fired simultaneously. When one explosion only is required at a time, the wires of the match are connected to those leading from the apparatus which generates the shock or current. Such apparatus may be the magneto-electric machine or galvanic battery. The wires carrying the induced currents to the matches should not be in contact, unless they are insulated. A single match may be fired by a shock which cannot be felt in passing through the human system. The most effective shock for exploding a number of matches with the electric compound exploding apparatus is that from a Leyden jar, A A, fig. 1, or Rumkroff coil. When exploding with the electric compound exploding apparatus, Fig. No. 1., the main conductors B B B are in metallic connection with the binding-screws D D D D, which communicate with the primary coils of the inductors, forming an entire metallic circuit for the primary shock or current. The matches G G, figs. 1 and 2, are placed into the explosive material, and the wires F F F F, leading from the matches, are attached to the metallic connections of the secondary coils K K, figs. 5 and 6, of the inductors E E E E, figs. 1 and 5. On sending a shock or current of great power through the main conductors, secondary shocks are induced and communicated simultaneously to the matches G G by the wires F F F F, by means of which a compound explosion is effected. Copper amalgams will explode when composed of five parts of copper to one of fulminate of mercury, and will do so with any smaller proportion of copper.

I do not claim the construction of the inductors contained in the protections C C, Fig. No. 1.

I do not claim the firing simultaneously of more than one charge of explosive material by one primary shock or current of electricity acting directly upon each of such charges.

I do not claim the firing simultaneously of more than one charge of explosive material by causing one primary shock or current to induce one secondary shock or current, which secondary shock or current acts directly on each and all of such charges.

I do not claim the firing simultaneously of more than one charge of explosive material by causing one shock or current of electricity to be divided into several shocks or currents, and so divided to act respectively on the several charges of explosive material.

I do not claim the firing simultaneously of more than one charge of explosive material by connecting a separate electrical apparatus which generates the shock to each separate charge to be fired, and by simultaneously closing the circuits of all such electrical apparatus, produces the simultaneous explosion of all the charges.

Claim 1. The mode of firing simultaneously by electricity two or more charges of explosive material by the application of two or more inductors, so arranged that one shock or current of electricity, in passing simultaneously through the primary coils of such inductors, induces in the secondary coils of such inductors, simultaneously, separate secondary shocks or currents of electricity, each of which said separate secondary shocks or currents is made to fire separate charges of explosive material simultaneously.

Claim 2. The explosive compound "copper amalgam," consisting of finely-divided copper and fulminate of mercury, intimately mixed together with a liquid such as water.

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Witnesses:

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