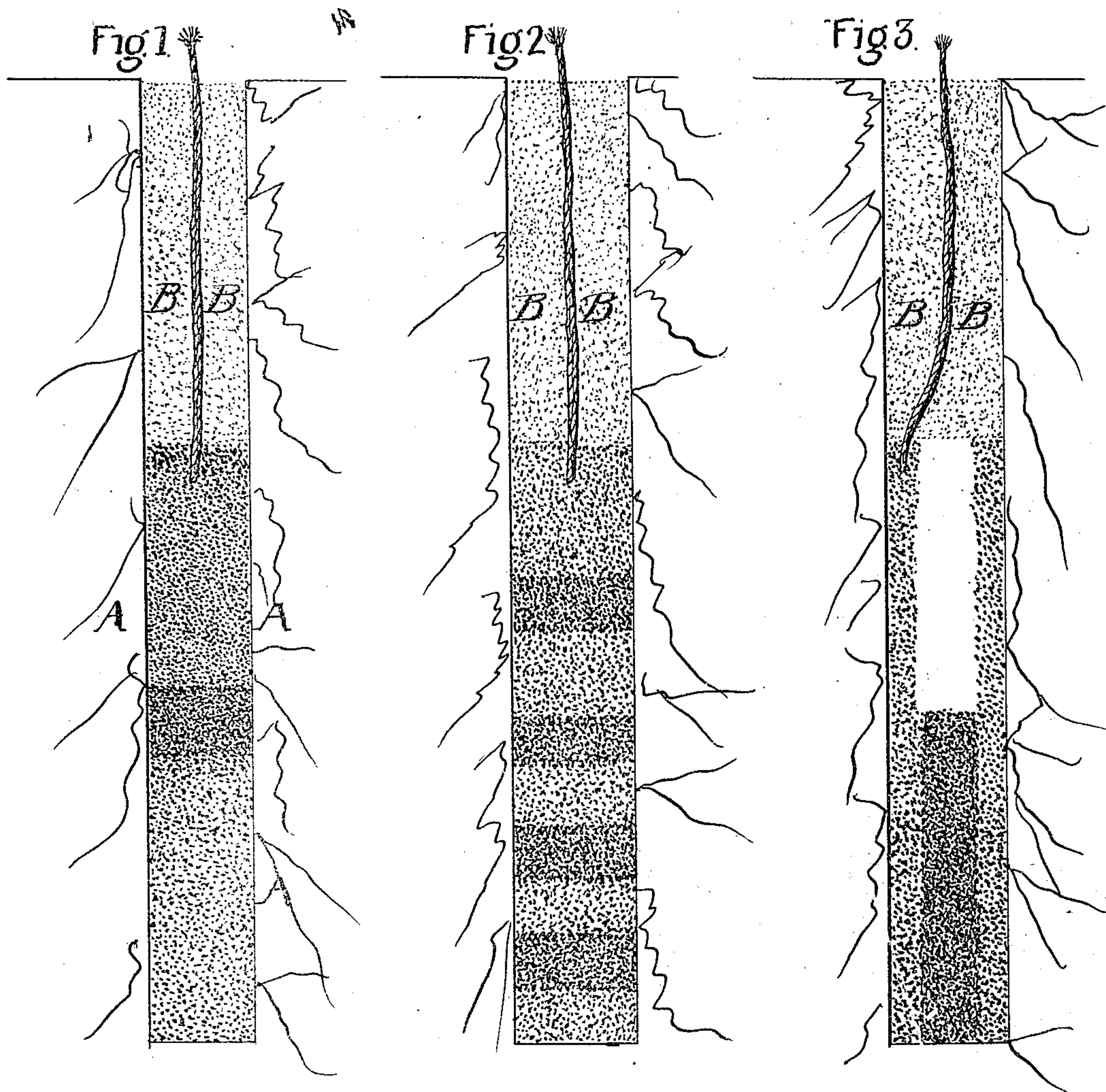


T. P. Shaffner
Gun-Powder
No 93,757 *Patented Aug. 17, 1869.*



Witnesses:

Chas. C. Wilson

E. W. Brown

Inventor:

T. P. Shaffner

United States Patent Office.

TALIAFERRO P. SHAFFNER, OF LOUISVILLE, KENTUCKY.

Letters Patent No. 93,757, dated August 17, 1869.

IMPROVED METHOD OF BLASTING WITH GUNPOWDER AND OTHER EXPLOSIVE SUBSTANCES.

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 the city of Louisville, county of Jefferson, State of Kentucky, have invented a new and improved Mode or Method of Blasting with Gunpowder and other Explosive Substances, by compounding, mixing, or treating gunpowder, gun-cotton, and explosive substances commonly used for blasting or disrupting purposes, with non or partial-explosive materials, for the purpose of effecting greater success than possible to attain by the said explosive substances when not mixed as hereinafter described; and, in order to enable others skilled in the arts to which it belongs, to make and use the same, I do hereby declare the following to be a clear and exact description of the same.

Figures 1, 2, and 3, show the modes of arranging the said mixture in drill-holes.

Fig. 1 shows the gunpowder to be mixed with rotten-stone, plaster of Paris, nitrated carbon, &c., throughout the whole charge, A A being the tamping, and B B the charge.

Fig. 2 represents the gunpowder placed in layers, and may have, or may not use the gunpowder mixed as in fig. 1, as one of the layers, as shown in the drawing by the coloring.

Fig. 3 represents another arrangement of the mixed and unmixed parts, practically the same as the figs. 1 and 2, before mentioned.

My invention consists in applying gun-cotton, gunpowder, or any explosive substance, whether in fibre, granulated, meal, caked, compressed, or otherwise, in combination with non or partial-explosive substances, inflammable or non-inflammable matter, whether solids or liquids, for the purpose of adjusting the disruptive force of the said explosive substance, to accomplish any desired object. For example—

First, in the use of gun-cotton, or analogous explosive substances, mixed with tow of hemp or flax, grass, bark, wild or other cotton, cat-tail, (*Typha latifolia*), or other fibrous material. The gun-cotton may be mixed with any one or more of the said materials, one-half proportions of each, or otherwise proportioned, the said mixture to be either loose or compressed, of any desired density.

Secondly, in the use of gunpowder, (made of, say, seventy-six parts of saltpetre, twelve parts charcoal, and ten parts sulphur,) or explosive powder of whatsoever kind, mixed with pulverized or granulated calcined plaster of Paris, Navassa phosphate, rotten-stone, or silicious matter generally, pulverized or granulated coke, rosin, or carboniferous substances generally, metallic oxides, filings, ores, or metals, in other conditions.

The practical effect realized in blasting, (or otherwise using the said gun-cotton or other nitrated fibre,

mixed with non or partial-explosive or inflammable substances,) will be according to a sliding-scale adjustment of the explosive force upon any desired cubic space.

The gases liberated or evolved by the explosion will act upon an increased surface.

The non-explosive materials may be made partial explosives by a quick submersion in a liquid composed of one part nitric acid of 48° Baumé, specific gravity, and two parts sulphuric acid of 66° Baumé, specific gravity, and then subjected to washing with pure water and soda, or other alkali, or the said materials may be steeped for a few hours in a solution of saltpetre or nitrate of soda, chlorate of potash, &c.

By preference, I employ a hydraulic press to force the said solution into the said material, as specified in my Letters Patent, No. 60,570, granted on the 18th day of December, 1866; also, No. 60,571, dated 18th December, 1866.

In regard to the using of gunpowder, or other kinds of explosive powders, mixed as before mentioned, the effect will be the same as that mentioned with respect to gun-cotton.

The rapidity of the explosion is graduated to conform to the requirement of the case; for example, in squib or seam-blasting, the gases evolved upon the explosion, expand *pari passu* with the yielding of the disrupting matter.

In blasting coal, it does not pulverize it or break it into small pieces, nor blow out, only collaring the hole, but, on the contrary, the gases expand as the coal disrupts, and yields to the pressure of the gases evolved.

The non or partial explosive substances mentioned, may be used simple, or may be treated with a solution of saltpetre, nitrate of soda, chlorate of potash, &c., and, by preference, I would use a hydraulic press to force the said nitre or other substances into and throughout the said materials.

In the case of rosin, and the like materials, such treatment with nitre is unnecessary, but with respect to blasting-powder, of whatsoever kind, I would prefer using pulverized coke or granulated calcined plaster of Paris, introduced as before mentioned. Neither of these give off smoke or poisonous gases. And further, by their use there will be no delay or decomposition of the explosive powder or mixture when in store or transportation, as might be the case in the use of matter holding acid or water.

The said gunpowder, or other explosive substance or substances, either in part or in whole, may be mixed or compounded, as above described, at the manufactory, upon the field or works, where and when used.

It may be placed, in alternate layers, in a drill-hole or cavity, in rock or other substance.

Having thus described the nature of my invention,

What I desire to secure by Letters Patent is as follows:

I claim the interposition of non or partial-explosive materials between the fibres of gun-cotton, the grains of gunpowder, or other kinds of powder or nitrated or explosive materials, calculated to spread the action of the gases evolved by the explosion of gun-cotton, gunpowder, or other explosive substances, over a greater

cubic space than would be realized by the said gun-cotton, gunpowder, or other explosive substances, when not mixed in the manner and for the purposes substantially as hereinbefore described.

TAL. P. SHAFFNER.

Witnesses:

JAMES DEVEAU,
T. SCHEITLIN.