

# UNITED STATES PATENT OFFICE.

JOHN S. BICKFORD, OF TUCKINGMILL, COUNTY OF CORNWALL, ENGLAND,  
ASSIGNOR TO HIMSELF AND JOSEPH TOY, OF SIMSBURY, CONNECTICUT.

## IMPROVED FUSE FOR BLASTING, &c.

Specification forming part of Letters Patent No. 47,677, dated May 9, 1865.

*To all whom it may concern:*

Be it known that I, JOHN S. BICKFORD, of Tuckingmill, in the parish of Cambourne and county of Cornwall, in the United Kingdom of Great Britain and Ireland, have invented a new and useful Improvement in Fuses for Blasting and Other Purposes; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention consists in the substitution, for the central train or core of gunpowder in a fuse, of a core or strand of gun-cotton, which enables the fuse to be more easily manufactured, and renders it less liable to injury. The gun-cotton may be prepared for the purpose in various ways, but I prefer to prepare it as follows: Take cotton yarn and twist it into a strand of any suitable size. Steep the said strand or twist for a few minutes in nitric acid contained in a stoneware vessel; squeeze it, and thoroughly wash it in water which is allowed to fall upon it from a pipe set at a height of several feet; then squeeze it and dry in a room heated to about 120° Fahrenheit, and when dry place it in a mixture composed of equal parts of nitric acid of a specific gravity of 1.52 and sulphuric acid of a specific gravity of 1.14, contained in a covered glass or earthenware vessel, allowing the said mixture to stand for twenty-four (24) hours before inserting the strand or twist, and allowing the strand or twist to remain about forty-eight (48) hours in the mixture, stirring occasionally. When the strand or twist has been re-

moved from the above mixture, it is to be again squeezed, washed for several hours in running water, and dried again, and after this it is soaked for a short time in dilute silicate of potash, squeezed, washed again, and dried, and is then fit for use. This mode of preparation makes gun-cotton which emits but little smoke, and which is not subject, like common gun-cotton, to explode by percussion. The strand or twist, after having been converted into gun-cotton, is passed through one or more machines like that or those employed in the manufacture of fuse with a filling or core of gunpowder, except that the apparatus for feeding or conducting the gunpowder among the yarns or strands is dispensed with. The gun-cotton strand or twist is conducted into the center of the series of covering yarns or strands, which are wound around it by means of the revolving bobbins or spools. The fuse may be varnished and covered with tape in the same manner as gunpowder-fuse.

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

The employment, in a fuse, as a substitute for gunpowder, of a central strand or core of gun-cotton, substantially as and for the purpose herein described.

J. S. BICKFORD.

Witnesses:

T. HARRY TILLY,  
*Notary Public, Falmouth.*

NICH. S. TRESIDDER,  
*Accountant, Falmouth.*