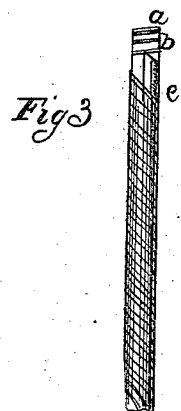
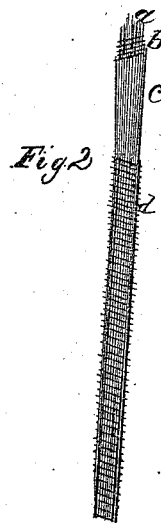
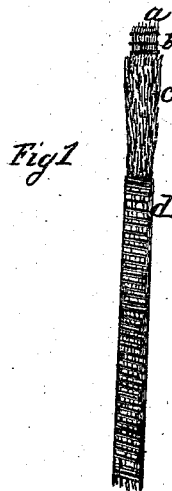


CHASE & TOY
Blasting Fuse.

No. 45,140.

Patented Nov. 22. 1864.



Witnesses:
Geo. Suach
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UNITED STATES PATENT OFFICE.

J. E. CHASE AND JOSEPH TOY, OF SIMSBURY, CONNECTICUT.

IMPROVEMENT IN SAFETY-FUSES.

Specification forming part of Letters Patent No. 45,140, dated November 22, 1864.

To all whom it may concern:

Be it known that we, J. E. CHASE and JOSEPH TOY, of Simsbury, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in Safety-Fuses; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figures 1 and 2 represent pieces of safety-fuse constructed after our invention. Fig. 3 represents a piece of safety-fuse constructed after our invention patented June 30, 1863.

Similar letters of reference indicate corresponding parts.

This invention consists in covering the body of fuse, in making water-proof safety-fuse, with a covering made of fiber when it is in the condition known as "sliver."

The letters *a* in the several figures represent the strands which form the tube for the reception of the gunpowder or other fuse composition, and *b* is the covering-yarn which is wound spirally about the strands *a* to keep them together, so as to form them into a body. When the fuse is so far completed, it is coated with varnish or other suitable material in the usual way. We then cover the fuse with a sliver of cotton, jute, or other fibrous material, laid longitudinally along its sides without twisting the fibers of the sliver and without winding them about the body of the fuse. This may be accomplished in any suitable way, one convenient and suitable way being to pass the sliver, as it comes off the carding-machine, through a trumpet-shaped tube in such a manner as that the sliver shall be spread over the sides of the interior of the tube, thus forming a tube of sliver, and then passing the fuse through the same, and thereby causing it to be covered by the fibers of the sliver as they both emerge from the smaller end of the trumpet-shaped tube, at which point the cord or yarn *d* is to be wound about the sliver to confine it to the fuse. The fuse is then ready to be immersed in the varnish or other substance used for coating it, so that the central

strands containing the powder shall be fully protected and the fuse made completely water-proof.

We have shown the fuse described by Fig. 3 for the purpose of illustrating some of the advantages of the invention described in Figs. 1 and 2. That shown in Fig. 3 has an outer covering, *c*, composed of a fabric of peculiar structure wound spirally about the fuse. This fabric is made of a lap of cotton or other fibrous material inclosed between two warps, to which they are united by sizing. It is cut into strips or tapes, which are wound spirally around the fuse. The covered fuse is then coated with varnish to make it water-proof.

Among the advantages which our invention described in Figs. 1 and 2 has over a fuse constructed like that shown in Fig. 3 are the following: The coating *c* is applied longitudinally and parallel with the sides of the fuse. Its strands are independent one of the other, not being twisted together or formed into a fabric. It does not contain any starch or other sizing, the effect of the starch being to resist the absorption of the varnish. It will absorb the varnish more quickly and readily than any other coating, and will take a larger quantity at a single immersion, thereby saving the necessity of many successive immersions. It will not be so liable to crack in cold weather or in cold situations. It will not spring away from the sides of the fuse when bent, as in the case of a coating formed of a tape whose edges will open when the fuse is bent out of a straight line.

Any fibrous material before it is spun and when it is in a condition similar to sliver can be used to form the coating *c*.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent in safety-fuses, is—

Inclosing the body of the fuse within a covering of loose fibers in the condition of sliver or its equivalent, substantially as and for the purpose above described.

JOHN E. CHASE.
JOSEPH TOY.

Witnesses:

DUDLEY B. McLEAN,
CHARLES A. McLEAN.