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R. MALLET

DETONATING FUSE

Filed April 22, 1924

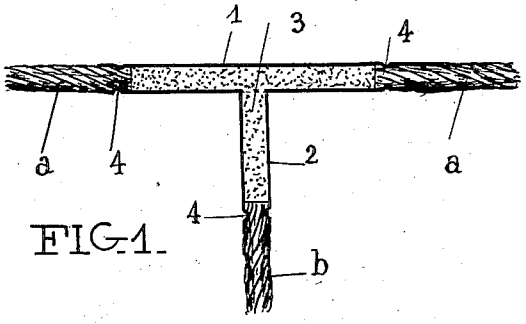


FIG. 1.

FIG. 2.

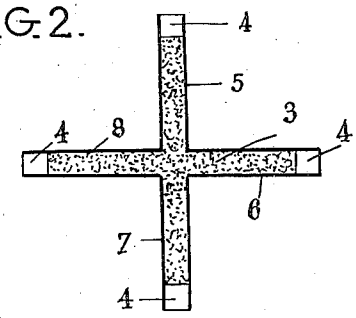
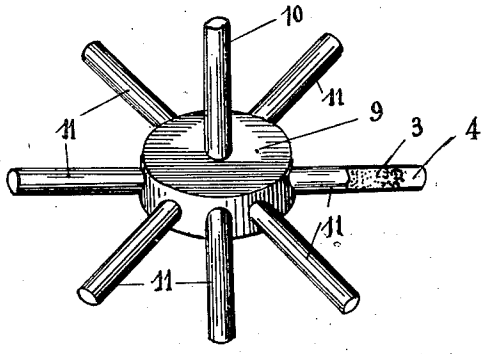


FIG. 3.



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DETONATING FUSE.

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The difficulty of connecting a secondary fuse branch to the main detonating fuse, so as to give good results, is well known, i. e., it is difficult to transmit an explosive wave from the main fuse to the secondary fuse with certainty, especially when a fuse prepared with an explosive which is not very sensitive in its action, such as trinitrotoluene, is used.

Good uniform results have been obtained by a process which needs very careful execution by a trained and reliable operator, and in which the union is difficult to protect against damp. Such process has also the defect that it is not reversible, i. e., the explosive wave cannot be transmitted from the secondary branch to the main fuse.

It has also been proposed to mount at the end of each secondary fuse a detonator, fixed to the contact of the main fuse. This arrangement, though it may be sure in its action, is very dangerous, since it leaves exposed on the ground a large number of detonators which the least shock may cause to explode.

The object of this invention is a system of branching which has the advantage of being uniform in its action, not difficult to use, absolutely safe, easily protected against damp, and also reversible.

According to this invention a union of any suitable shape is provided with as many branch tubes as there are fuse lines or fuse sections to be joined, and preferably only partly filled with high explosive, so as to leave room for the insertion of the fuses into their open ends.

If it is desired, for instance, to join a secondary fuse to the main fuse, the latter is cut at the desired point, and a three-way union is inserted in the shape of a T, for example, and filled with high explosive; the two ends of the main fuse may, for example, be inserted into the ends of the cross piece of the T, and the end of the secondary into the vertical.

When several secondary fuses are to be connected to the one main fuse, or two main fuses are to be connected together, or other connection is to be made, a union of suitable shape and with the required number of tubes is provided.

By this means the explosion effected at the end of one of the leading in tubes is instantaneously and simultaneously transmitted to the other leading out tubes and so to the fuse lines.

Any suitable high explosive, such as trinitrotoluene or melinite, may be used to fill the union piece and its sensitiveness need not necessarily be greater than the explosive contained in the fuse lines.

The explosive wave is transmitted with absolute certainty and uniformity if care is taken so to fill the union piece that the average density of the charge is lower than that of the branched fuse lines. This condition is important if it is desired to obtain a very sensitive union while employing a very insensitive explosive.

It is also necessary to see that the union tubes have an internal diameter at least equal to the external diameter of the covering of the fuse lines which should be able to enter the tubes. The section of explosive in the tubes should also be greater than the core of the fuse lines; this is also a factor for aiding uniform transmission of the explosion.

The fuse lines, which should be preferably cut off at right angles to their axes, when once introduced into the free space in the ends of each of the tubes and brought into contact with the high explosive, are held in place by contracting the end of the tube on to the fuse, or by any other suitable means.

As can be seen, the use of these union pieces is simple and quick, and within the scope of an unskilled workman.

To protect the union from damp, each fuse, where it enters the union tube, may be surrounded with a piece of insulating tape.

If the union is filled with an explosive less sensitive than that of the fuse, it has the advantage of being absolutely immune from external shocks, such as are caused by the fall of stones.

As set out above, a wave produced at the end of any one tube will be transmitted to all the tubes of the union, i. e., an explosion may be transmitted in any direction.

The invention is illustrated in the accompanying drawings, Figure 1 of which shows the invention in its most simple form, i. e., T union.

Fig. 2 is a plan view of the invention in the form of a cross; and Fig. 3 is a perspective of a further modification.

In this figure, 1 is a straight metal tube and 2 a tube led in at right angles thereto; tubes 1 and 2 are so filled with an explosive 3 that the end of each tube has a free portion 4 into which the ends of the fuses *a b* are introduced.

The union piece shown in Figure 2 is in the form of a cross, its four branches 5, 6, 7, 8, being similarly filled with explosive.

When several secondary fuses, all situated in the same plane at right angles to the main fuse, have to be connected to the one main fuse, the union piece shown in Figure 3 may be used.

This consists of a body 9 provided on one face with a tube 10 (or on two faces, according as to whether the main fuse stops at the union or is prolonged beyond the union) and circumferentially with as many tubes 11 as there are secondary fuses.

A union of this type may be used when it is desired to fire rapidly a number of charges at the bottom of a gallery in construction, each head being primed by a detonating fuse situated laterally to the charge and extending to the bottom of the head.

The union may be given any shape suitable for the number and arrangement of the fuses.

What I claim is:—

1. A fuse union composed of a plurality of interconnected refractory tubes filled with a detonating explosive, except at the ends thereof.

2. In a fuse union, the combination with a plurality of interconnected refractory tubes, of detonating explosive in the tubes and fuses inserted in the ends of the tubes, the density of the charge being lower than that of the branched fuses.

3. A fuse union composed of a single tube and a plurality of interconnected tubes equally spaced from the single tube filled with a detonating explosive, except at the ends thereof.

4. In a fuse union, the combination with a single tube and a plurality of interconnected tubes, equally spaced from the single tube, of detonating explosive in the tubes and fuses inserted in the ends of the tubes, the density of the charge being lower than that of the branched fuses.

In testimony whereof I have affixed my signature.

RICHARD MALLET.