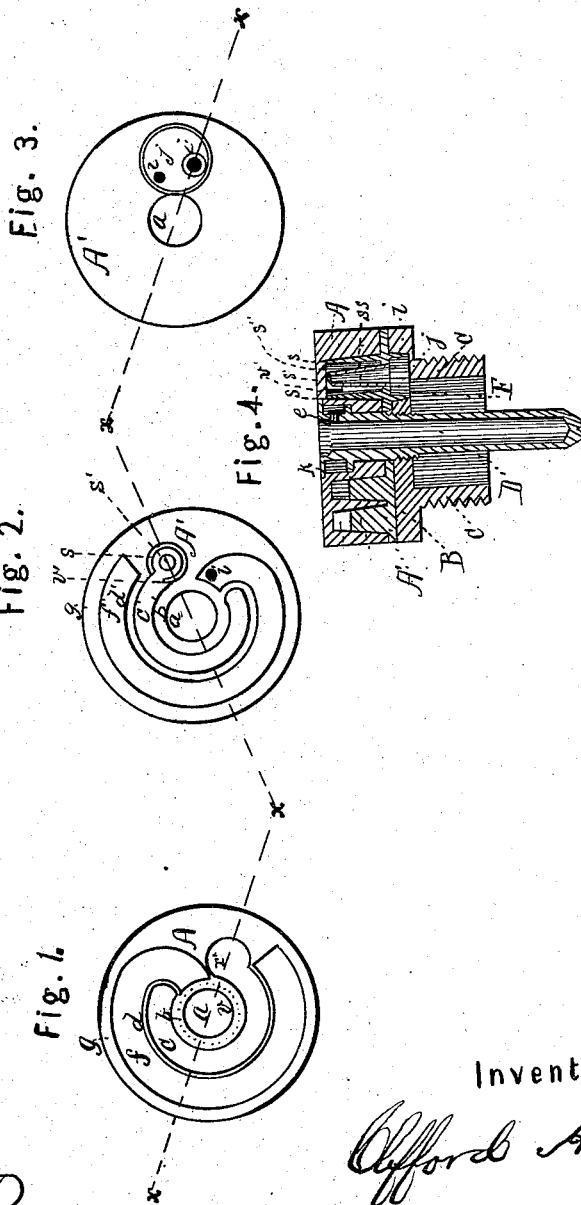


C. Arick.
Shell Fuse.

N^o 45/28.

Patented Nov. 22. 1864



Witnesses:

Prof. Smith
C. Haylett

Inventor:

Clifford Arick

UNITED STATES PATENT OFFICE.

CLIFFORD ARICK, OF ST. CLAIRSVILLE, OHIO.

IMPROVEMENT IN COMBINED TIME AND CONCUSSION FUSE FOR SHELLS.

Specification forming part of Letters Patent No. 45,128, dated November 22, 1864.

To all whom it may concern:

Be it known that I, CLIFFORD ARICK, of St. Clairsville, in the county of Belmont, in the State of Ohio, have invented a new and Improved Mode of Igniting the Bursting-Charge of a Hollow Projectile; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, made a part hereof, and the letters of reference marked thereon.

My invention relates to that class of improvements having for their object the ignition of the bursting-charge of ordnance-shells at any desired moment of their flight, or at the moment of impact, as the gunner may on the instant determine.

The invention in the present case relates more particularly to certain improvements in the construction and operation of the crescent fuse and the improved crescent fuse secured to me by Letters Patent of the United States, bearing date, respectively, September 6, and October 11, 1864; and it consists in the means used of introducing into that combination, for concussion effects, the Spingard concussion, or other analogous concussion-fuse.

It also consists in the means used of introducing into said combination a novel concussion-fuse of my own design, or any of the approved forms of percussion-fuse known to the art. These means consist, chiefly, in the establishment, in the crescent fuse case, of a hollow tube, for the purpose of fabricating therein any of these forms of concussion or percussion fuse. These means further consist in communicating the two ends of an annular or curved fuse by independent vents to a common magazine, one of such vents operating on time in the usual way and the other by concussion or percussion. These means further consist in communicating, by analogous means, the air or fire chamber in the crescent fuse to its magazine by an independent vent, the final communication being produced by concussion or percussion; and, lastly, these means consist in the establishment of a magazine or magazines on the packing-disk of the crescent fuse communicable to the chambers within the fuse-case by concussion and percussion.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation; and, as

I have shown in my said former application, the general arrangement of the crescent fuse, and as it is more fully described in my said Letters Patent than I need set forth herein, reference thereto for more particular description is here made. I will describe only such necessary parts thereof as have undergone the necessary modification to adapt them to the present combination.

Figure 1 is a plan view of the inside and bottom of the crescent-fuse case A, exhibiting an annular enlargement, r' , of the air or fire chamber c , provided for the reception of the vertical tube s in the disk A', as shown in Fig. 2. Fig. 2 is a plan or top view of the packing-disk A', used for packing the fuse and closing the air or fire chamber c in the crescent-fuse case, exhibiting, among other things, the vertical tube s , wherein I propose to fabricate a concussion or percussion fuse, as hereinafter more particularly described. Fig. 3 is a bottom view of said packing-disk A', exhibiting an additional vent, i' , to the magazine j . Fig. 4 is a vertical section of the crescent-fuse case and packing-disk, its central hollow pin, D, and parts B and C, taken in the line $x x$, Figs. 1, 2, and 3, and wherein is shown, among other things, a vertical section of the tube s , the important feature in my present improvement.

The tube s is shown in the drawings in connection with the annular cover c' and the air or fire chamber c ; but it is evident that the same arrangement can be made in connection with the annular cover f' and the groove or chamber f , and I have therefore not reproduced it in the drawings. The tube s is cast with the disk A', and is in rigid combination with the annular cover c' . It is, however, given the same vertical depth of the groove or chamber c , and that portion of it projecting above the cover c' is provided with an opening or vent, v , as shown in Figs. 2 and 4. The aperture of the tube s is through and through, including the disk A', and presents itself within the area of the magazine j , as shown at i' , Figs. 3 and 4, and increases therefrom in diameter upwardly as rapidly as possible. The conical tube s' , adapted at its base to the aperture of the tube s at i , may be of plaster-of-paris, as in the case of Spingard; or of cast zinc, as in the case of Suoeck; or it may be a jointed metallic tube, as in the case of some

more recent suggestions; and it is among the means contemplated for securing concussion effects herein, as will be more fully hereinafter set forth. This conical tube s' is inserted in the tube s at i' , in the top of the magazine j , and it proceeds at a taper upward until nearly of a length with the tube s , and its aperture $s s$, Fig. 4, is made correspondingly at a taper. Its walls are given the least practicable thickness, so as to admit within it a suitable charge of rifle-powder. It is of course closed at its upper end. I, however, here allege that in this present arrangement this tube s' is not necessary to the contemplated concussion effect, and that an arrangement of packing only will be found sufficient. It is evident that the concussion at the impact would start from its place in the tube s any unconsumed portion of the composition with which it had been packed, so that, especially at a point on impact, the debris would be broken up, whereby the fire would be instantly communicated to the whole of it, including the charge in the magazine. To assist this latter operation, after the tube s should be suitably packed, as hereinbefore indicated, a portion of the composition may be drilled out at u' ; or there may be embedded within the tube, near its base, a solid conical tube, small leaden bullets, or other analogous weights, to assist at the impact by their superior momentum in breaking up the unconsumed portion of the composition, or to cause a perforation thereof, into which parts of the charge in the magazine j would follow, and, being ignited, would communicate to the remainder, whereby the desired effect would be obtained. When the tube s is arranged in combination with the cover f' and the groove or chamber f , it may be constructed in all respects the same as described, the necessary modification being with reference only to the subsequent packing of the annular fuse; but when thus arranged I contemplate constructing it of the same depth only of the annular cover f' , so that it shall, when packed, follow this cover and become a part thereof in confining the fuse. By this arrangement it is evident that the composition in the tube would be ignited when that end of the fuse is being consumed. Nor do I confine myself to the use of a single magazine, as each vent may be readily provided with one of its own, excepting, however, when the only means used for igniting the fuse is the windage flame. I do not propose to make such an arrangement in any case.

The process of putting up my improvement is as follows: When using the conical tube s' , it is first inserted in its place in the top of the magazine j , and is made throughout its length to assume a central position in the tube s , forming about it an annular chamber, s'' . This annular chamber s'' is then charged and packed according to the formula, substantially, for charging and packing the Splingard fuse, taking care to have the lower strata of such slow-burning composition as to

be unconsumed during the flight of the projectile, while its upper strata is of such quick-burning composition as almost instantly to uncover a considerable portion of the tube s' . When adopting the plan of packing referred to, dispensing with the tube s' , the tube s is packed substantially in the same manner; and when the weights are used they are introduced with the lower strata and packed with it; or it is otherwise charged and packed and drilled, as hereinbefore described. It is evident that a percussion-plunger may be provided and as securely operated as in any other case within this tube s ; and as these several modifications are but evident differences, I have not reproduced or multiplied the figures in the drawings in order to exhibit them all therein. The tube s in the packing-disk A' being thus suitably charged, the process of charging the fuse-case A is the same in every respect as in the crescent and improved crescent fuse; and when charged and packed it is combined with the part B , tubular plug C , and central hollow screw-pin, D , as therein.

The operation of my invention is as follows: The fuse, when ignited by the windage-flame alone, must necessarily be of that form having the tube s in combination with the cover f' ; and in that case, when the fuse is burned away from beneath the tube, its composition is ignited and the quick-burning strata of it quickly consumed, and the effect is then the same as in the case shown in the drawings; but I do not contemplate relying on the windage-flame for ignition in any case, unless in that of spherical shells. The fuse, when ignited by independent means, as in the case of the crescent and improved crescent fuse, has generated or injected into the chamber c the flash or flame of a detonating substance in the manner therein described; and in the case of the improved crescent fuse the vent v , as herein also shown at v , under the dotted lines, Fig. 1, is in close proximity to the vent v' of the tube s , so the composition in the tube would probably be first ignited by the flame from the primer, and the quick-burning strata of it, consuming rapidly, would escape at the cut and assist in igniting the fuse, so that should the projectile receive the impact before the burning of the fuse reached its zero, it would be instantly exploded by concussion in the same manner as in the Splingard concussion and other analogous fuse. Should no other effect be sought than the explosion of the shell at the impact, the fuse is not cut, a sufficient vent being made in the top of the chamber c to allow the flame from the primer and that escaping from the tube s to escape from the fuse-case without igniting the fuse. In case of ignition by the windage-flame alone, in order to secure concussion effects, it is only necessary to provide a sufficient length of fuse to allow, when ignited at its greatest distance from the zero, the desired range to be made before it reaches it.

It is evident that by an increase of diameter (of the fuse-case) or the increased reduction of

the fuse-composition (in the case herein shown) or by both means, any desirable length of fuse may be obtained.

In case a percussion arrangement is mounted in the tube *s*, the vent *v'* would be dispensed with and the walls of the tube be more appropriately adapted thereto, and given such thickness and distance from the burning composition as to protect the fulminate used from its influence.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The construction of a soft-metal fuse-case having an annular chamber or groove for the

reception of an annular time-fuse, and a vertical or other independent chamber or tube for the reception of a concussion or percussion fuse.

2. The union, in a single magazine, to an annular fuse, of the two ends of the fuse by independent vents, one operated in the usual way, on time, and the other by concussion or percussion.

October 15, 1864.

CLIFFORD ARICK.

Witnesses:

C. HAZLETT,
R. D. O. SMITH.