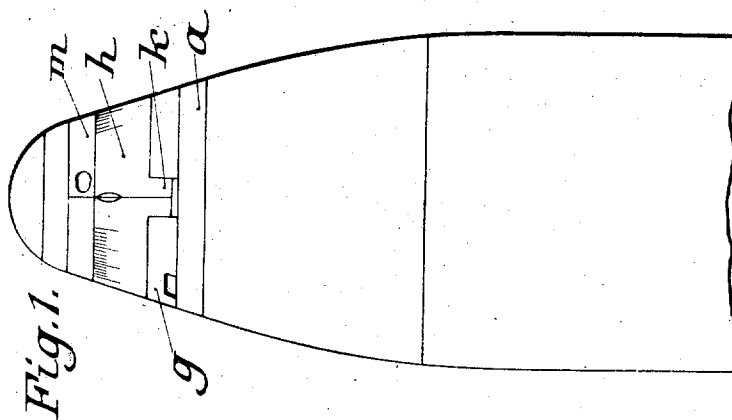
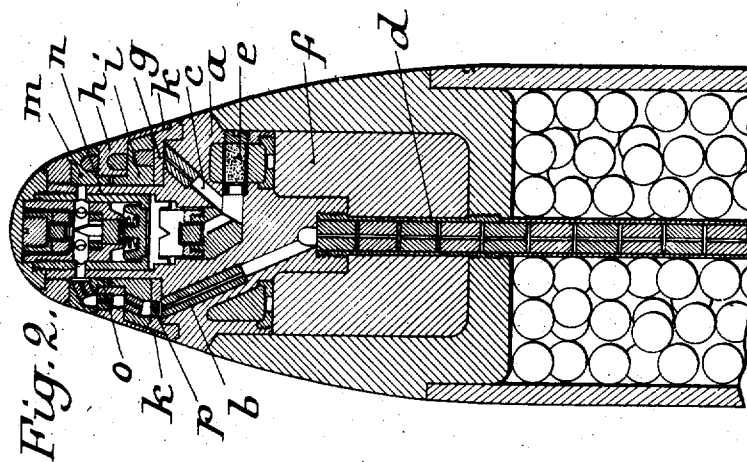


K. VÖLLER.
COMBINATION FUSE FOR UNIVERSAL PROJECTILES.
APPLICATION FILED NOV. 23, 1911.

1,061,887.

Patented May 13, 1913.

2 SHEETS—SHEET 1.



WITNESSES

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2 SHEETS—SHEET 2.

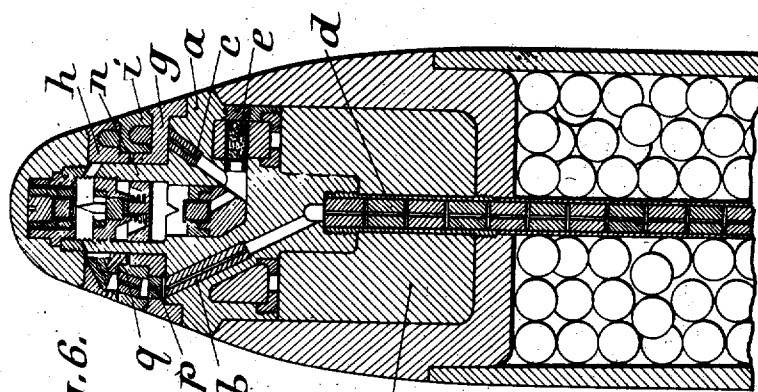


Fig. 6.

Fig. 3.

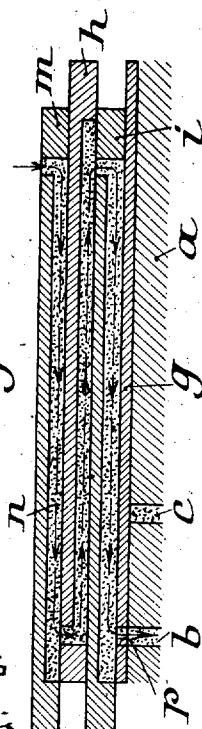


Fig. 4.

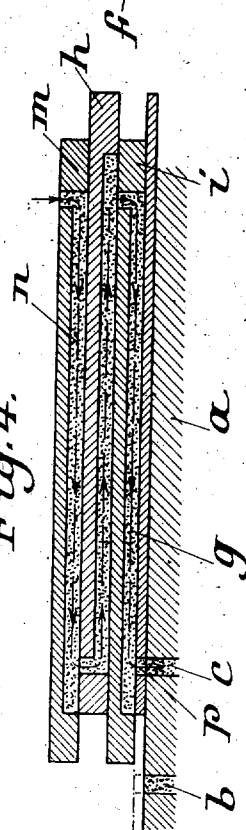
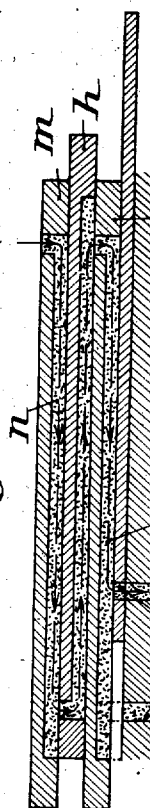


Fig. 5.



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UNITED STATES PATENT OFFICE.

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COMBINATION-FUSE FOR UNIVERSAL PROJECTILES.

1,061,887.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed November 23, 1911. Serial No. 662,022

To all whom it may concern:

Be it known that I, KARL VÖLLER, a subject of the German Emperor, residing at 12 Scharnhorststrasse, Dusseldorf, Germany, have invented certain new and useful Improvements in Combination-Fuses for Universal Projectiles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Combined fuses for "universal" projectiles (combined shrapnel and high explosive shells) are known in which the bursting and driving charges are separated and in which the igniting flash of the time fuse can be led either to the driving or bursting charges. For this purpose the fuse body has been provided with two channels, of which the one leads to the bursting and the other to the driving charge, and above the fuse body there has been employed a special change-over plate with a single channel which can be brought into connection alternately with each of the channels of the fuse body. This construction has the drawback, that the fuse must be provided with two scales or at least with two different zero points, and this may lead to mistakes in setting the fuse.

The present invention obviates this drawback by the arrangement by which the adjustable change-over plate which has a single passage is so connected to the timing ring, which is stationary during the setting of the fuse and is usually attached to the fuse socket, that both the change-over plate and timing ring as well as the other timing rings remain unaltered; and therefore only one scale need be provided and the possibility of the mistakes is obviated.

The construction is preferably such, that the adjustable timing ring, which is between the change-over plate and the fixed timing ring, turns with the change-over plate, when the latter is shifted but can be set independently of the change-over plate and of the other timing ring. In this arrangement when the fuse has been set to a given range, and it is required to change it suddenly from the shrapnel fire to the high explosive fire, it is only necessary to alter the change-over plate *g*, and with it the timing rings, while the setting of the fuse remains the same as before.

The invention is illustrated by way of example in the accompanying drawings, in which—

Figures 1 and 2 show the invention applied to a combination fuse with three timing rings. Figs. 3, 4 and 5 represent diagrammatically the action of the arrangement, and Fig. 6 shows the invention applied to a fuse with only two timing rings.

The fuse body *a* is provided with two channels *b*, *c*, of which *b* leads to the primer *d*, while the second channel *c* is connected with the exploder *e* and through that with the high explosive charge *f*. Above the fuse body *a* is the change-over plate *g*, which is coupled with a middle timing ring *h* by a claw *k*, extending into a recess on the outer face of the plate *g*.

When the change-over plate is rotated from shrapnel to high explosive fire the timing ring *h* is rotated at the same time. Interposed between the timing ring *h* and the change-over plate *g* is a lower timing ring *i* which is connected with an upper timing ring *m*, by sleeve formed claws *o*, surrounding a fuse socket *n*. By this construction, when the change-over plate *g* is turned, the timing rings *i* and *m* also turn with the timing ring *h*, since the frictional surfaces and hence the frictional resistance between the rings *m*, *i* and *h* are greater than between the rings *i*, *m* and the socket *n*.

The setting of the fuse is effected by gripping the upper ring *m* by an adjusting key while the ring *h* is held fixed and the timing rings *i* and *m* are set at the same time relatively to the middle timing ring *h* and the change over plate *g*.

The arrangement is represented diagrammatically in Figs. 3 and 4. The timing rings with their powder channels are shown developed in a straight line. It is evident from the figures that the length of the combustible fuse column which is represented by the communicating channels and is indicated by the arrows, remains unaltered, if the timing rings *m*, *i* on the one hand and the change over plate *g* and the timing ring *h* on the other hand have the same relative setting, whether the opening *p* in the change over plate is opposite the channel *b* for igniting the primer *d* (as in Fig. 3), or connected with channel *c* for firing the high explosive through the exploder *e*, (as in Fig. 4).

If contrary to the present invention the middle timing ring would not be rotated with the change-over plate *g*, the length of the combustible fuse column would differ by the distance between the two channels *b* and *c*. This is clearly shown in Fig. 5, in which the timing rings *i*, *h* and *m* have the same relative positions as in Fig. 3, but the change-over plate is displaced, so that its opening *p* is moved from *b* and *c*. The fuse column is different according as the fuse is set for the driving charge or the bursting charge, while the setting of the scale between the upper and lower timing rings, has the same value in each case.

The second form of construction shown in Fig. 6 differs from the former, since the change-over plate *g* is not coupled to the timing ring *h* by the external claws, but by a claw coupling *q*, whose sleeve surrounds the fuse socket *n* and can be rotated about this socket. The timing ring *i* lies between the change-over plate *g* and the timing ring *h*, and the setting of the device is effected by moving the ring *i* relatively to the change-over plate *g* and timing ring *h*. In changing from shrapnel to high explosive fire the timing rings *i* and *h* will be moved with the change-over plate *g*, the friction between the ring *i* and the ring *h* and plate *g* being sufficient to move the ring *i*.

While I have shown the preferred means of carrying out the invention, it is to be understood that the same is not to be limited to the particular parts shown and described, since changes may be made without departing from the spirit of my invention.

I claim as my invention:

1. In a combination fuse for a high explosive and shrapnel having separate fuse channels, a plurality of relatively adjustable rings, and a single member located between the fuse body and said rings whereby all of the rings may be adjusted, without changing their relative positions, by the adjustment of said single member in shifting from one channel to the other.

2. In a combination fuse for a high explosive and shrapnel having separate fuse channels, a plurality of timing rings, one being relatively stationary while the other or others are being adjusted, a change-over plate located between the fuse body and said rings, and means connecting said plate to said relatively stationary ring, all of the rings being adjusted, without changing their relative positions, by the adjustment of said plate in shifting from one channel to the other.

3. In a combination fuse for a high explosive and shrapnel having separate fuse channels, spaced-apart timing rings connected together so as to move in unison, a third timing ring interposed between the first mentioned rings, a change-over plate located between the fuse body and one of said spaced-apart rings, said plate and said third ring being relatively fixed while said spaced-apart rings are being set, and all of said rings being moved, without changing their relative positions, in shifting the plate from one channel to the other.

4. In a combination fuse for a high explosive and shrapnel having separate fuse channels, spaced apart timing rings connected together so as to move in unison, a third timing ring interposed between the first mentioned rings, a change-over plate located between the fuse body and one of said spaced-apart rings, said plate and said third ring being connected together and held relatively fixed while said spaced-apart rings are being set, and all of said rings being moved, without changing their relative positions, in shifting the plate from one channel to the other.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

KARL VÖLLER.

Witnesses:

WM. TACK,
C. SIMONSEN.