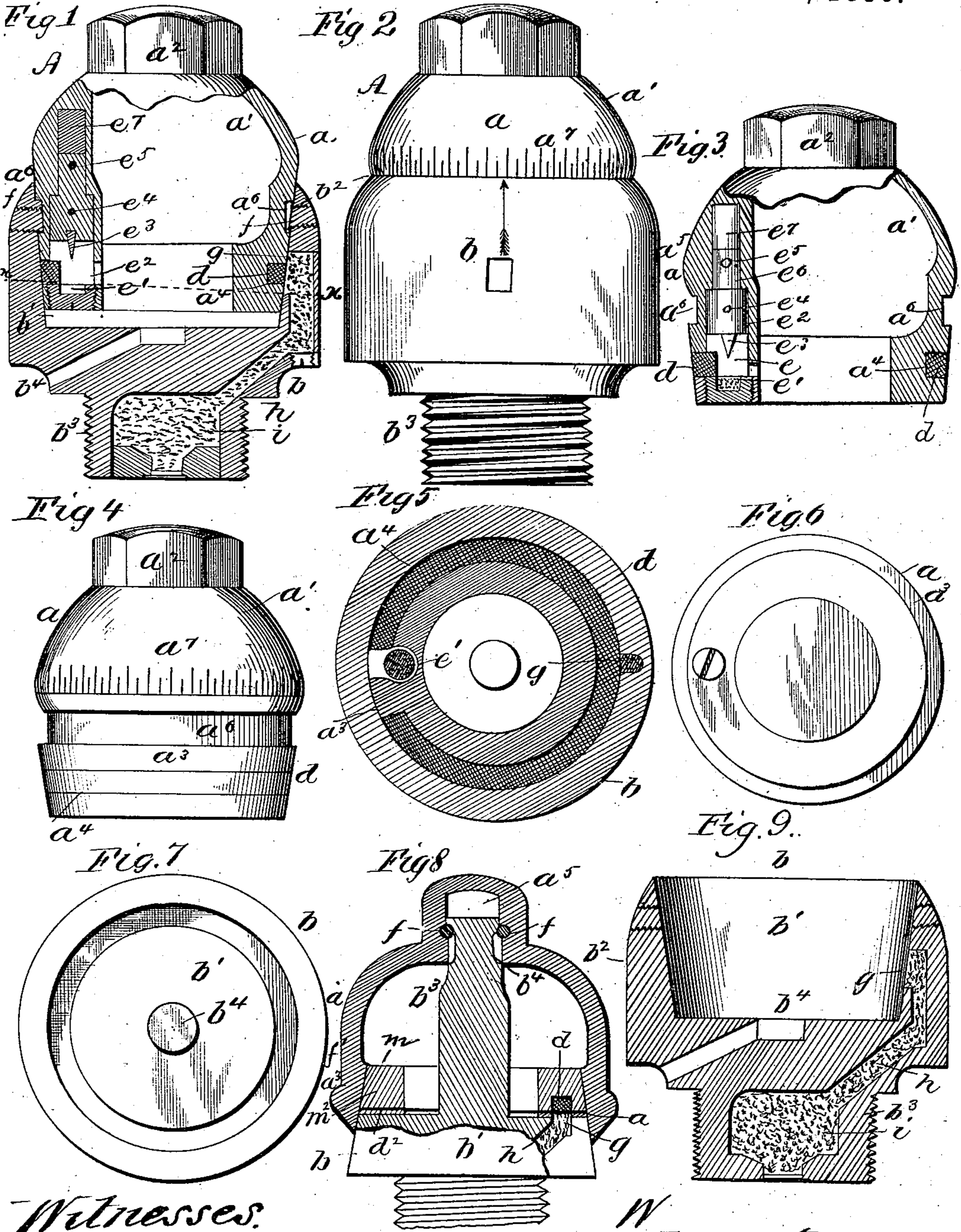


(No Model.)

H. TOLLEY.  
TIME FUSE FOR SHELLS.

No. 557,454.

Patented Mar. 31, 1896.



*Witnesses:*

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# UNITED STATES PATENT OFFICE.

HENRY TOLLEY, OF BIRMINGHAM, ENGLAND.

## TIME-FUSE FOR SHELLS.

SPECIFICATION forming part of Letters Patent No. 557,454, dated March 31, 1896.

Application filed February 6, 1894. Serial No. 499,253. (No model.). Patented in England May 9, 1893, No. 5,098.

*To all whom it may concern:*

Be it known that I, HENRY TOLLEY, manufacturer, a subject of the Queen of Great Britain, residing at Weaman Street, in the city of Birmingham, England, have invented a certain new and useful Time-Fuse; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification, and for which invention Letters Patent of Great Britain have been granted, dated the 9th day of May, 1893, No. 5,098.

This invention relates to improvements in time-fuses or combined time and percussion fuses to be used primarily in connection with hollow projectiles, whereby the fuse is hermetically sealed until the moment of withdrawing the coned safety-pin, and is also adapted to ignite the bursting charges of them at a predetermined time after firing.

My invention also relates to that class of fuses having sectional casings fitted with a composition ring and with scale of time-markings upon one of the parts, which is in communication with the magazine. Now the time-settings of such fuses are apt to become disarranged owing to the shock of discharge—that is to say, the shock received upsets the time-setting by loosening and disarranging the position of the composition ring relative to the flash-hole—so that there is no guarantee that the exploding charge of the shell will be ignited at a predetermined period after discharge, as arranged by the setting.

My invention has for its object primarily the rendering of the time-setting unchangeable, whereby the shell is fired true to the setting.

Figure 1 of the accompanying drawings represents, partly in vertical section and partly in elevation, a time or percussion fuse constructed according to or having improvements made according to one form of my invention.

It will be seen that the fuse, which is attached to the fore part of a shell, is composed of two primary parts—viz., a head or dome part and a body part, with the base part of the former coned or made alike unto an annular wedge, which takes a firm bearing and fits tightly within a like-shaped coned socket

made within the middle of the fore part of the body.

Fig. 2 represents a side elevation of the said self-clamping time-fuse, Fig. 1, and which view shows the time-markings upon the head and also the arrow upon the body part which indicates the position of the flash-hole in the said body, so that when the head is turned more or less round relative to the base the composition ring is also turned with the time-markings, and so a greater or less amount of composition is allowed to burn before the powder in the magazine is ignited from a flash-hole. Fig. 3 represents in vertical section the primary parts of the said time-fuse separately, showing more clearly the taper or wedge-shaped outer walls at the base of the head part and also the like wedge-shaped inside walls of the socketed body part. When the said parts are together, as in Figs. 1 and 2, the concussion due to the shock of the discharge on firing tightens or further jams and hermetically seals the one component part within the other, hence no liability of derangement of the said parts relative to each other after setting, although the said parts when put together are capable of being turned for setting by a key being applied to the nut-shaped crown of the head. Fig. 4 represents an elevation of the head or dome part separately, showing the ring of composition lying within a nearly annular recess formed around the periphery of the coned base of the head. Fig. 5 is a horizontal section of Fig. 1 upon the dotted lines *xx*, showing the nearly annular groove wherein the composition lies and also the position of the flash-hole relative to the detonating fulminate at the commencement of the ring of composition. Fig. 6 is an inverted plan of Fig. 4, showing the coned base. Fig. 7 represents a topside plan of the body part, showing the chambered interior with a coned seating or socket for the reception of a like-shaped base or foot of the head part. Figs. 8 and 9 are vertical sectional views of modifications.

The same letters of reference indicate corresponding parts in all the figures of the drawings.

A is the time-fuse, fitted to or screwed into the fore part of a shell. The said fuse consists of two primary parts—viz., a head *a* and

a body part *b*. The head *a* consists of a hollow dome *a'*, having a solid and nut-shaped crown *a<sup>2</sup>* and a coned or annular wedge-shaped base or foot *a<sup>3</sup>*, adapted to take and fit tightly  
 5 within a like cone-shaped annular socket or seating *b'*, formed or sunken within the middle of the fore end part *b<sup>2</sup>* of the said body part *b*, which has a screwed tail end or shank *b<sup>3</sup>*, by which the same is connected to the fore  
 10 part of the shell *c*.

Referring back to the head part, the same is fitted with a nearly annular recess *a<sup>4</sup>* for the reception of the composition *d*, which starts from the detonating fulminate *e'*, located at the bottom of a detonating chamber  
 15 *e*, having fitted and working within it a plunger *e<sup>2</sup>*, having a needle *e<sup>3</sup>*, and kept in its back position, when not in use, by a shearing-pin *e<sup>4</sup>*, while the said plunger is kept in a  
 20 back position during transit by a coned safety-pin *e<sup>5</sup>*, taking through the stem *e<sup>6</sup>* and through the solid metal *a<sup>5</sup>* of the head. The latter, *e<sup>5</sup>*, is removed at the moment of loading. Lying  
 25 at the back of the plunger is a lead plug *e<sup>7</sup>*, which, besides assisting the plunger in shearing the pin *e<sup>4</sup>*, also closes the hole in the metal *a<sup>5</sup>* vacated by the safety-pin on the said  
 plunger being thrown forward when fired.

The head part *a* is attachedly connected to  
 30 the body part *b* by keep-screws *f* passing through screwed holes in the sides of the said body part, and with the inner ends of the same taking into the annular groove or chan-  
 35 *a<sup>6</sup>*. This channel *a<sup>6</sup>* has a clearance sufficient to admit of the coned base of the head going fully home into the cone-shaped socket of the  
 body part. Now this body has a flash-hole *g* made through the walls of its inner side  
 40 and before which the arrow comes and which passes to a powder-charged channel *h*, leading to a powder-charged magazine *i* in communication with the interior of the shell.  
 It has also a vent *b<sup>4</sup>* for escape of gas from  
 45 the composition *d*, and by the burning of a greater or less portion of which the time for the bursting of the shell is regulated, so that  
 as the time-markings *a<sup>7</sup>* are turned relatively to the position of the arrow so a greater or less  
 50 amount of composition *d* is allowed to burn before the same reaches the flash-hole *g*. The position of the composition is represented by the markings.

Fig. 8 represents a further form of my invention. In this arrangement the composition  
 55 is embedded within a nearly all-round channel of a supplementary ring coming upon the top side of the head, and with the boundary edges made taper in common with the

outside walls of the body, and kept clamped  
 60 fully home by the inside coning of the mouth of the head.

*a* is the head, consisting of a dome-shaped fore part having a turning-nut *a<sup>2</sup>* at its crown and with the base or mouth *a<sup>3</sup>* inside coned  
 65 at *a'*, which takes in common upon the coned sides or edges *m<sup>2</sup>* of a composition-carrying ring *m* and upon the coned sides *b<sup>2</sup>* of the head *b*, having a flash-hole *g* and channel  
 70 *h* leading from it to the magazine, which is in communication with the bursting charge of the shell. The nearly all-round composition ring is marked *d*, and *d<sup>2</sup>* is an interposed  
 washer or wad. The ring *m* is prevented  
 75 from rotating by a keep-screw *f'*, while the said head is attachedly connected to the body part  
 by the upper end of the stock *b<sup>3</sup>* of the latter taking into a recess *a<sup>5</sup>* in the inside crown of  
 the former, and with pins or screws *f* taking  
 80 laterally through the walls of the said head and through an annular recess *b<sup>4</sup>* cut around  
 the stalk *b<sup>3</sup>*, thus admitting of the inside contact-surface of the head being slightly re-  
 moved from the body when required for time-  
 85 setting.

I wish it to be understood that I lay no claim  
 to the composition ring, time-burning scale,  
 detonating adjuncts, and other parts found in  
 fuses now in use; but,

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

1. In a time or percussion fuse, the combination with the primary and component sections, one of which is formed with a cone-  
 95 shaped socket while the other is cone-shaped to fit said socket, of a composition ring fitted into an annular space on the coned face of  
 one of said sections and retained in position and hermetically sealed by the wedging ac-  
 100 tion of the said sections, substantially as described.

2. In a time or percussion fuse, the combination of the body part *b*, having a cone-  
 105 shaped socket and retaining-screws *f, f'*, with the head part *a*, cone-shaped to fit said socket and having the annular groove *a<sup>6</sup>*, for the reception of said screws, said groove having  
 sufficient clearance to admit of the head part going fully home in said socket, substantially  
 110 as described.

In testimony that I claim the foregoing I have hereunto set my hand this 9th day of  
 January, 1894.

HENRY TOLLEY.

Witnesses:

HENRY SKERRETT,  
 ARTHUR T. SADLER.