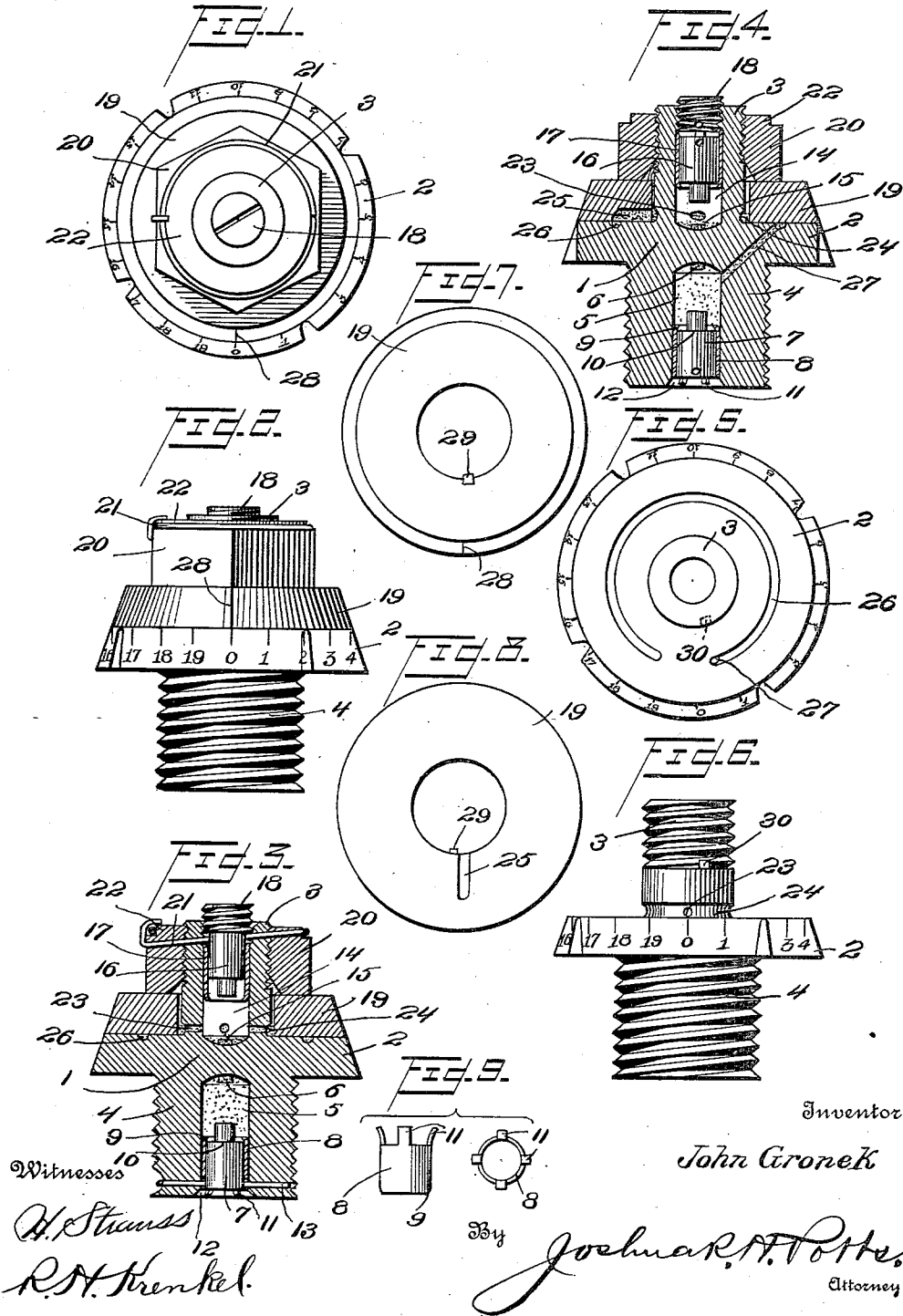


J. GRONEK.
COMBINATION TIME AND PERCUSSION FUSE.
APPLICATION FILED APR. 3, 1911.

1,022,075.

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UNITED STATES PATENT OFFICE.

JOHN GRONEK, OF PHILADELPHIA, PENNSYLVANIA.

COMBINATION TIME AND PERCUSSION FUSE.

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Specification of Letters Patent.

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Application filed April 3, 1911. Serial No. 618,680.

To all whom it may concern:

Be it known that I, JOHN GRONEK, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Combination Time and Percussion Fuses, of which the following is a specification.

My invention relates to improvements in combination time and percussion fuses, more particularly adapted for use in connection with the shells of heavy ordnance, the object of the invention being to provide a fuse of this character which may be manufactured at a comparatively low cost, which may be assembled and positioned in a shell with practically no danger whatever of accidental explosion, and which may be utilized as a combined time and percussion fuse, or merely as a percussion fuse as desired.

A further object is to provide improved spring cylinders for holding the hammers against accidental movement, and provide improved means for setting the fuse to explode at a predetermined time.

With these and other objects in view, the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described and pointed out in the claim.

In the accompanying drawings: Figure 1, is a view in end elevation illustrating my improvements. Fig. 2, is a side elevation of Fig. 1. Fig. 3, is a view in longitudinal section of the parts arranged as in Figs. 1, and 2. Fig. 4, is a view in longitudinal section at right angles to Fig. 3, but showing the fuse set for firing as a time fuse. Fig. 5, is an end or plan view of the casting 1. Fig. 6, is a side elevation of Fig. 5. Fig. 7, is a plan view of the ring 19. Fig. 8, is a bottom view of ring 19. Fig. 9, illustrates one of the hammer holding spring sleeves.

1, represents a casting which is provided between its ends with a circular disk-like enlargement 2, and at both ends with screw-threaded extensions 3 and 4 respectively, extension 4 being of appreciably greater diameter than the extension 3, and adapted to be screwed into the shell (not shown). The extension 4 is made with a central cylindrical pocket 5 adapted to receive in one end a percussion cap 6, which is exploded by means of a hammer 7. This hammer 7

is normally held against movement by means of my improved spring sleeve 8. This spring sleeve has an internal flange 9, which engages over a shoulder 10 on the hammer, and outwardly flaring spring tongues 11 on the outer end of said spring sleeve engage the walls of pocket 5, and hold the spring sleeve and the hammer in set position. These spring tongues 11 are of sufficient strength to prevent any possibility of movement of the hammer caused by the ordinary manipulation of the shell, and as a further precaution the open end of the pocket 5 is beveled as shown at 12 against which the spring tongues 11 bear.

To prevent any possible movement of the hammer while the parts are being assembled, a wire key 13 is positioned through registering openings in the extension 4, and hammer 7, as shown in Fig. 3, and this wire key 13 is removed when the fuse is screwed into the shell. The outer extension 3 is provided with a cylindrical recess or pocket 14 adapted to receive in one end, a cap 15 which is adapted to be exploded by a hammer 16 similar to hammer 7. Hammer 16 is held against accidental movement by means of a spring sleeve 17, which is precisely like spring sleeve 8 above described, and a screw plug 18 is screwed into the outer end of the pocket 14, and normally closes the pocket.

19, represents a ring which is mounted to turn on extension 3, and this ring 19 and the circular enlargement 2, are made with beveled registering faces for a purpose which more fully hereinafter appear.

A nut 20 is screwed onto extension 3, against ring 19, and in order to prevent any possibility of movement of hammer 16, a wire frame 21 is employed. This wire frame comprises a circular portion which is adapted to fit around a circular raised portion 22 of nut 20, and a straight portion which is projected through registering openings in nut 20, extension 3, and hammer 16. By reference to Fig. 3, it will be noted that the straight portion extends out beyond the circular portion, so that it may be bent upward over the circular portion onto the nut, and hence absolutely preclude any possibility of the release of the frame until such time as it is desired to do so. The extension 3 is provided with a circular series of openings 23, which connect the pocket 14 with an annular groove 24 in the out-

side of the extension. Ring 19 is provided on its under face with a radially projecting groove 25, which is adapted to connect the groove 24 with a curved groove 26 in the upper face of enlargement 2. An opening 27 connects one end of this groove 26 with pocket 5, and the openings 23, groove 24, groove 25, groove 26, and opening 27 are adapted to be filled with combustible material, as for example, powder, gun cotton, or other explosive. Both of the pockets 14 and 5 are also to contain some portion of such explosive, but not enough to retard the movement of the hammers. It will be sufficient, however, to compel a passage of the fire therethrough, and the length of time it takes for the fire to pass from pocket 14 into pocket 5 is determined by the position of ring 19 on enlargement 2. To facilitate the adjustment of such parts, a scale is provided on enlargement 2, with which a mark 28 on ring 19 registers. As the groove 26 does not extend all the way around the enlargement, there is one point where groove 25 will not communicate with groove 26, and at such point the zero mark of the scale is indicated, for at this point there can be no communication between the pockets.

The length of time which will be consumed between the firing of the gun, and the explosion of the shell, can be accurately measured and indicated by the scale in accordance with the position of the ring, for by moving the ring on the enlargement 2, the length of the path which the fire must take from pocket to pocket is varied, because the distance is increased or decreased as the groove 25 is moved away from, or toward the open end of groove 26.

The operation of my improvements is as follows: When the fuse is assembled and ready for connection with the shell, key 13 and wire frame 21 are both in the position shown in Fig. 3, and the ring 19 is turned so as to be at zero and close communication between the pockets. This rotary movement of ring 19 is limited by means of shoulders 29 and 30 on ring 19 and extension 3 respectively. Before screwing extension 4 into the shell, key 13 is removed, but wire frame 21 is not removed until it is desired to fire the shell, and give it a time explosion. If the shell is to be fired, and percussion only relied upon, frame 21 need not be removed at all, because hammer 7 will effectually explode the shell when it meets with resistance. If, however, the shell is to be fired and exploded at any desired

distance, frame 21 is removed and ring 19 turned so as to register on the scale the distance in hundreds of yards that it is timed to explode. When so positioned, and the shell fired out of the gun, the initial momentum of the gun will cause hammer 16 to strike percussion cap 15, and the fire will pass through the openings 23, grooves 25 and 26, and opening 27 into pocket 5, and from thence into the shell to explode the same.

My improvements are in no wise limited to any particular shell, but may be used in connection with any well known form, and various slight changes might be made in the general form and arrangement of parts described without departing from my invention, and hence I do not limit myself to the precise details set forth, but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claim.

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

A device of the class described, comprising a single casting consisting of a disk having a beveled edge and threaded extensions projecting from opposite faces of said disk in axial alinement, one of said extensions comprising a shank for attaching the device to the end of a shell and each of said extensions being provided with percussion cap chambers, there being an annular groove in the outer projection adjacent its base and a perforation extending from said groove to the adjacent cap chamber, a ring rotatably mounted upon the base of the outer projection and surrounding said annular groove, the periphery of said ring being beveled to register with that of said disk, there being registering arcuate grooves in the adjacent faces of said disk and said ring also being provided with a radial groove extending from the arcuate groove in its face to the annular groove in said projection, a nut rotatably holding said ring in position, means for locking said nut, and co-acting timing symbols on the peripheries of said disk and ring, substantially as described.

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

JOHN GRONEK.

Witnesses:

R. H. KRENKEL,
CHAS. E. POUS.