F. H. MILLER & R. DE S. BROWN.

SIGNAL FUSEE.

APPLICATION FILED SEPT. 11, 1917.

1,273,260. Patented July 23, 1918.

Fig. 1.

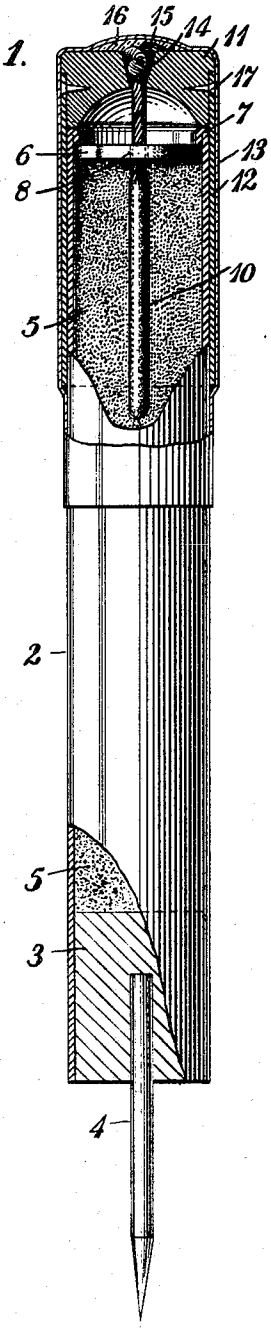


Fig. 2.

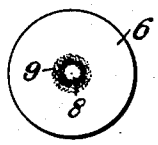


Fig. 3.

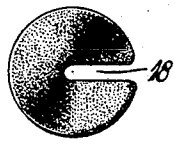
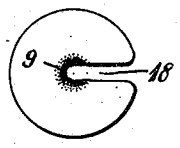


Fig. 4.



WITNESSES:

O. W. Kennedy

W. E. McCoy.

INVENTORS

Frederick H. Miller &

Robson De S. Brown

BY

Robson De S. Brown

ATTORNEY

UNITED STATES PATENT OFFICE.

FREDERICK H. MILLER, OF WILKINSBURG, AND ROBSON DE S. BROWN, OF PITTSBURGH, PENNSYLVANIA, ASSIGNORS OF ONE-THIRD TO SAID MILLER, ONE-THIRD TO SAID BROWN, AND ONE-THIRD TO HERBERT L. STITT, OF PITTSBURGH, PENNSYLVANIA.

SIGNAL-FUSEE.

1,273,260. Specification of Letters Patent. **Patented July 23, 1918.**

Application filed September 11, 1917. Serial No. 190,856.

To all whom it may concern:

Be it known that we, FREDERICK H. MILLER, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, and ROBSON DE S. BROWN, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Signal-Fusees, of which the following is a specification.

Our invention relates to fusees or torches for railway signaling and for similar purposes, and it has for its object to provide a fusee of simple construction in which the combustible material is effectively protected from moisture, but is automatically ignited when the end of the fusee is exposed preparatory to use.

More specifically, our improved signal fusee consists of a tubular container filled with combustible material of any usual or desired composition, one end of the container being permanently closed and the other end being surrounded by a removable cap. This general construction is usual in signal fusees. Our fusee is additionally provided with means for automatically igniting the fusee when the cap is removed therefrom, such igniting means comprising a cord or rod attached to the fusee cap and impregnated or coated with abrasive material or with a match composition which is adapted to be ignited when brought into frictional contact with another match composition, as in ordinary safety matches. The cord or rod is inclosed not only within the tubular container but within a substantial body of the combustible fusee material itself, and is thereby protected from moisture. It extends through a perforated retaining disk which is secured within the container just above the combustible fusee material and which is coated or impregnated with an igniting compound that coöperates with the igniting material carried by the cord or rod to produce a flame. The disk is composed of readily combustible material, preferably of such a nature that it will maintain the flame for a considerable time, so as to insure the proper ignition of the main body of combustible material in the container. When it is desired to ignite the fusee, the cap is removed, and the act of pulling away the cap draws the cord or rod through the perforated disk, thereby rubbing the cord or rod firmly against the ignition material on the disk and consequently igniting the disk and the fusee.

In the accompanying drawing, Figure 1 is a longitudinal central sectional view, with parts in elevation, of a signal fusee constructed in accordance with our invention. Fig. 2 is a plan view of one form of ignition disk for the fusee of Fig. 1, and Figs. 3 and 4 are plan views of modified forms of ignition disks.

The fusee shown in Fig. 1 comprises a tubular container 2, of paper, cardboard or the like, which is closed at one end by means of a plug 3 provided with the usual spike 4 and which contains a quantity of finely divided flaming material 5. This flaming material may consist of any of the well known pyrotechnic compositions which are employed in signal fusees of this kind, and is packed tightly within the container 2. A disk 6, of cardboard or other combustible material, is disposed above the flaming material 5, and may suitably be held in place by crimping the upper edge of the container, as shown at 7.

The disk 6 also serves as one member of the igniting device, and is provided, for this purpose, with a central aperture 8, as shown in Fig. 2, and with a small amount of frictionally ignitible material 9, which is placed around the central opening 8 so as to closely engage a cord 10 that extends through the opening 8 and into the body of flaming material 5. The cord 10 may, with advantage, be thicker below the disk than above it, and is secured at its outer end to a cap consisting of a plug 11, suitably of wood, to which is also attached, by means of pins or tacks 17, a paper tube 12 that is adapted to fit closely over the end of the container 2, forming a protective cap therefor. A strip of paper or cloth 13 may be pasted around and over the cap, and the entire end of the fusee, carrying the cap, may be coated with paraffin or other moisture-excluding substance.

The cord 10 may be attached to the plug 11 in a variety of ways. As shown, the plug is provided with a downwardly tapering opening 14, and the upper end of the cord 10 is formed into a knot 15 which is re-

ceived in the opening 14, the space above the knot being filled with a small amount of sealing wax or cement 16. Wooden or metallic pegs and other devices may be employed instead of the knot 15 for attaching the cord to the cap plug, the only requirement being that the cord shall be attached to the plug firmly enough to resist a considerable pull when the cap is removed from the fusee.

A solid rod may be employed instead of the cord 10. The cord is preferably used in conjunction with a relatively rigid disk composed, for example, of stiff cardboard, the compressibility and flexibility of the cord being admirably adapted to effect a snug and broad surface-contact engagement without danger of abrading the ignitible material before igniting it. A rod may be advantageously used in conjunction with a flexible disk composed of canvas, felt or the like and impregnated with frictionally ignitible material. As indicated above, the cord or rod should be impregnated or coated with an abrasive substance or with a match composition, in accordance with the nature of the igniting material carried by the disk 6.

For convenience in assembling the fusee, the opening in the disk 6 may extend to the edge of the disk, forming a slot 18, as shown in Figs. 3 and 4, the cord or rod 10, in this case, being passed laterally through the slot 18 instead of being threaded through the opening 8, as in the modification of Fig. 2.

Either form of disk may be of cardboard, canvas, felt or the like coated near its aperture with ignitible material or composed entirely of ignitible material, as shown in Fig. 3.

In manufacturing the fusee which we have shown and described, the container 2, with the plug 3 and the spike 4, are secured together by means of tacks or pins in the usual manner, and the container is filled with the flaming material 5. The impregnated cord 10 is placed in the upper end of the mass of flaming material 5, either during the filling operation or after the container is filled, and the free end of the cord is passed through the opening 8 of the disk 6, the disk being then forced into the open end of the container 2 and the edges of the container being crimped down to hold the disk in place. The end of the cord is then attached to the cap plug 11, the tubular cap member 12 is tacked or pinned to the plug, and the outer coatings of paper, cloth or paraffin are then applied.

When the fusee is to be used, the lower part of the container 2 is grasped with one hand, and the cap is loosened, if necessary, by twisting it with the other hand, and is then pulled from the fusee. This movement of the cap draws the cord 10 firmly through the disk 6 and, by the frictional engagement between the igniting materials carried by these members, ignites the disk 10 and the flaming material 5. This frictional engagement is sustained for a relatively long time in accordance with the length of the cord 10, and is effected between relatively large surfaces, in contradistinction to ordinary match ignition which is substantially an engagement between one surface and a point. It will be observed that the igniting device of this fusee is protected from moisture as effectively as the flaming material itself, since the igniter 10 is embedded within the flaming material. In fusees which have heretofore been provided with igniting devices intended to operate automatically, the igniting devices have been either exposed on the surfaces of the fusees or have been protected by only a thin covering of paper or the like. Consequently, automatic fusees have not heretofore been satisfactory in use.

The construction shown in the drawing and described above may be variously modified without omitting the essential features of our invention, and we therefore desire that no limitations be imposed upon our invention except such as are indicated in the appended claims.

We claim as our invention:

1. A signal fusee comprising a container, a body of combustible material therein, a removable closure for the said container, and means, attached to the said closure and extending into the said container, for automatically igniting the said combustible material when the said closure is removed from the said container.

2. A signal fusee comprising a container, a body of combustible material disposed therein, a removable closure for the said container, and an igniting member, attached to the said closure and extending into the said body of combustible material, for automatically igniting the said combustible material when the said closure is removed from the said container.

3. A signal fusee comprising a tubular container, a cap adapted to fit over one end of the said container, and a frictional igniter attached to the said cap and extending into the said container, for automatically igniting the fusee when the said closure is removed from the said container.

4. A signal fusee comprising a tubular container, a body of combustible material disposed therein, a removable closure for the said container, and a flexible friction igniter, attached to the said closure and extending into the said combustible material, for automatically igniting the said combustible material when the said closure is removed from the said container.

5. A signal fusee comprising a tubular container, a body of combustible material contained therein, a perforate member dis-

posed within the said container adjacent to the said combustible material, a closure for the said container and an igniting member attached to the said closure and extending through the said perforate member into the said combustible material.

6. A signal fusee comprising a tubular container, a body of combustible material contained therein, a perforate member disposed within the said container adjacent to the said combustible material, a closure for the said container and an igniting member attached to the said closure and extending through the said perforate member into the said combustible material and adapted to coöperate frictionally with the said perforate member to automatically ignite the said combustible material when the said closure is removed from the said container.

7. A signal fusee comprising a tubular container, a body of combustible material contained therein, a removable closure for the said container, a combustible disk disposed transversely within the said container, the said disk being provided with an opening and carrying a body of frictionally ignitible material adjacent to the said opening, and an igniting member attached to the said closure and extending through the opening in the said disk into the said combustible material, the said igniting member being drawn frictionally through the said disk when the said closure is removed from the said container.

8. A signal fusee comprising a tubular container, a body of combustible material contained therein, a removable closure for the said container, a combustible disk provided with an opening and disposed transversely within the said container adjacent to the said material, the said disk carrying a body of frictionally ignitible material adjacent to the said opening, and a flexible member attached to the said closure and extending through the opening in the said disk into the said combustible material, the said igniting member being coated or impregnated with friction material and being drawn frictionally through the said disk when the said closure is removed from the said container.

9. An ignition device comprising a combustible disk having an opening, a body of frictionally ignitible material disposed on the disk and around the opening therein, a flexible frictional member extending through the opening in the disk, the said flexible frictional member being of one thickness at its portion adjacent to and on one side of the disk and of a greater thickness throughout the remainder of its length, and means for drawing the thicker portion of the flexible frictional member through the opening in the disk to ignite the body of frictionally ignitible material on the disk.

10. An ignition device comprising a combustible disk having a slot that extends from the axis to the periphery of the same, a body of frictionally ignitible material disposed on the disk and around the inner end of the slot, and a flexible frictional member that is adapted to be drawn through the slot to ignite the frictionally ignitible material on the disk.

11. An ignition device comprising a flexible friction member, a body of frictionally ignitible material disposed around the friction member in a manner to effect large surface engagement between the member and the body, and means for effecting sustained frictional engagement between the member and the body.

In testimony whereof, I have hereunto subscribed my name this 6th day of Sept., 1917.

FREDERICK H. MILLER.

In testimony whereof, I have hereunto subscribed my name this 10th day of September, 1917.

ROBSON DE S. BROWN.