

S. LILLEY.
MEANS FOR IGNITING FUSES.
APPLICATION FILED DEC. 6, 1909.

963,161.

Patented July 5, 1910.

2 SHEETS—SHEET 1.

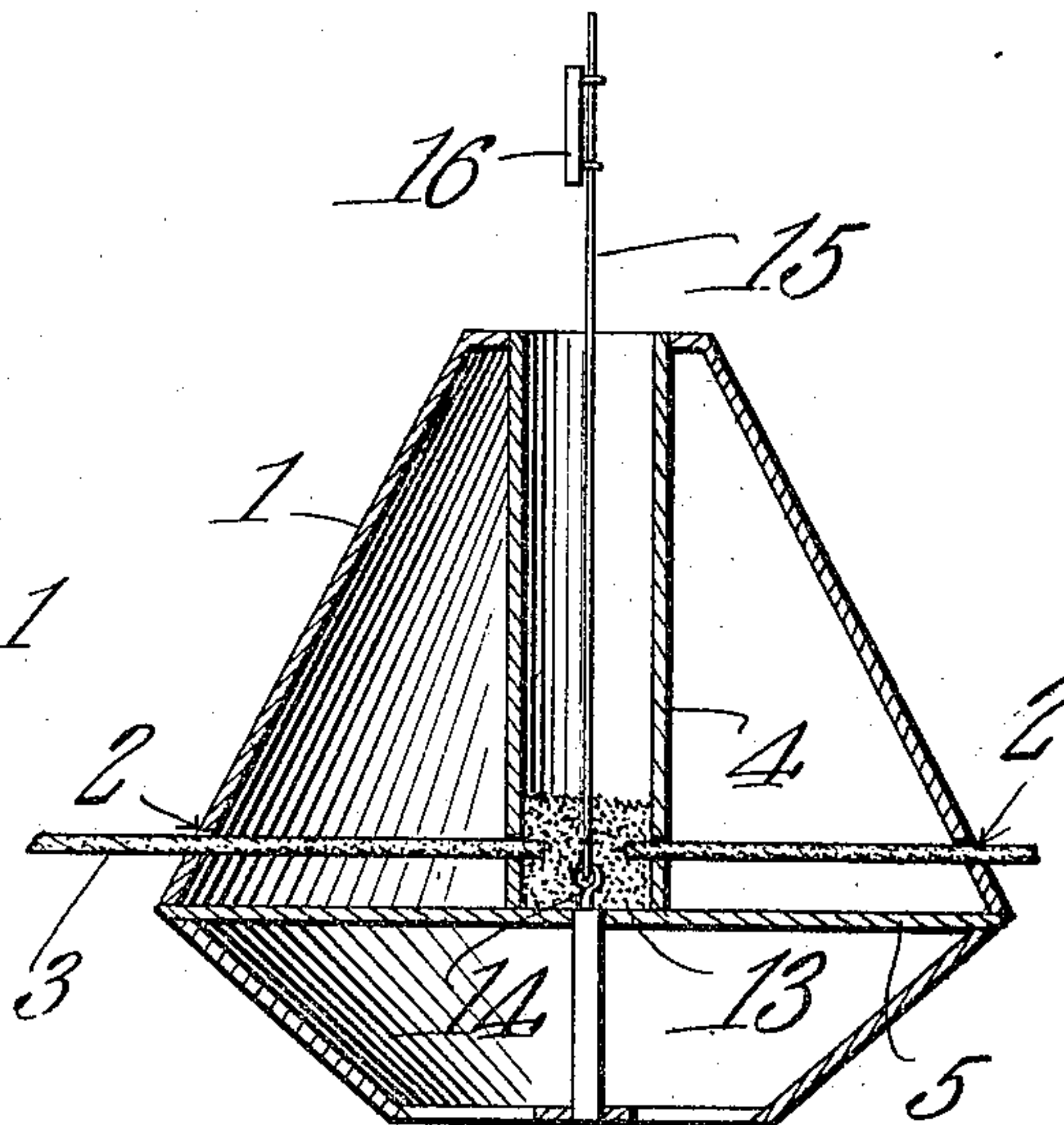
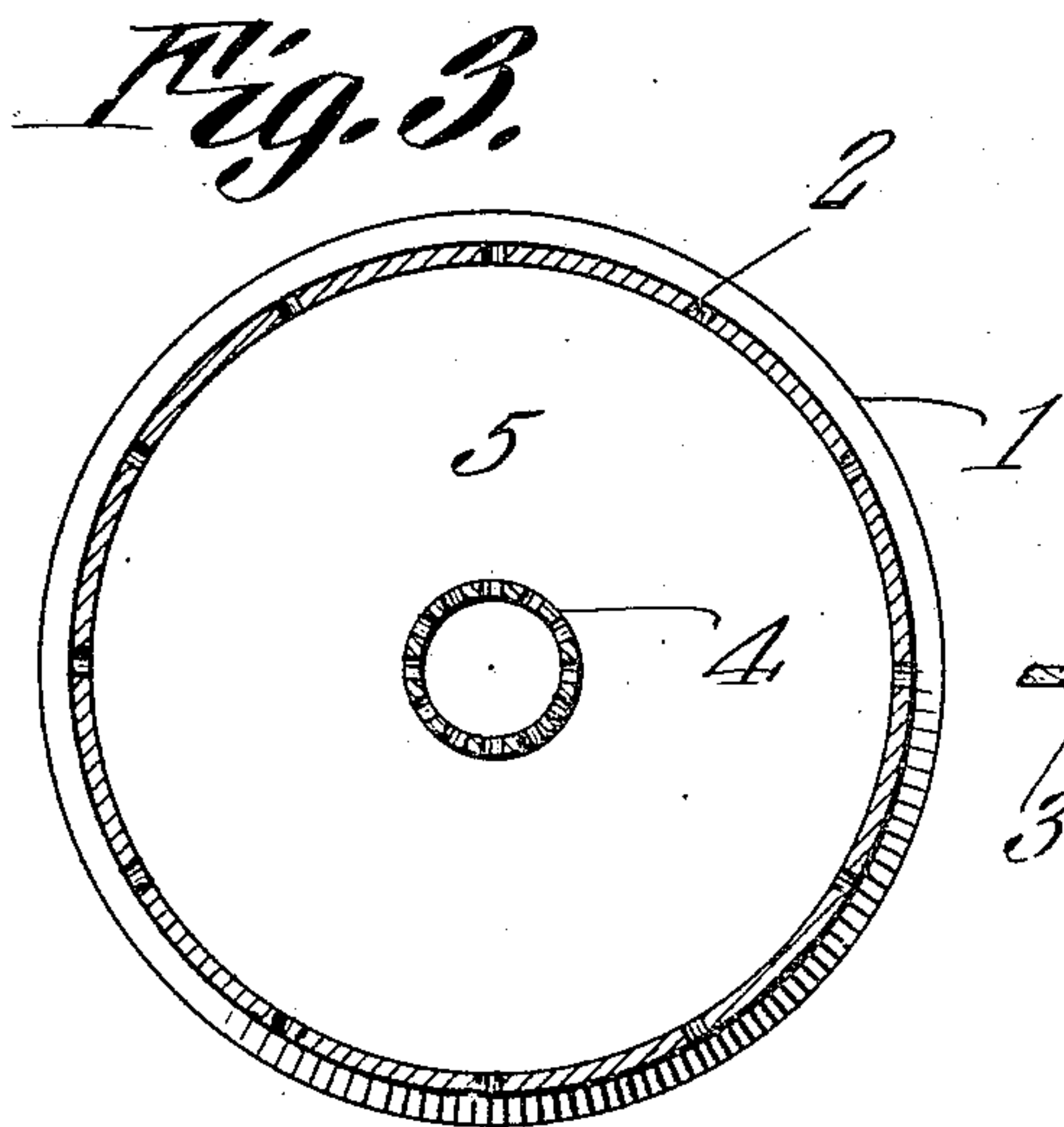
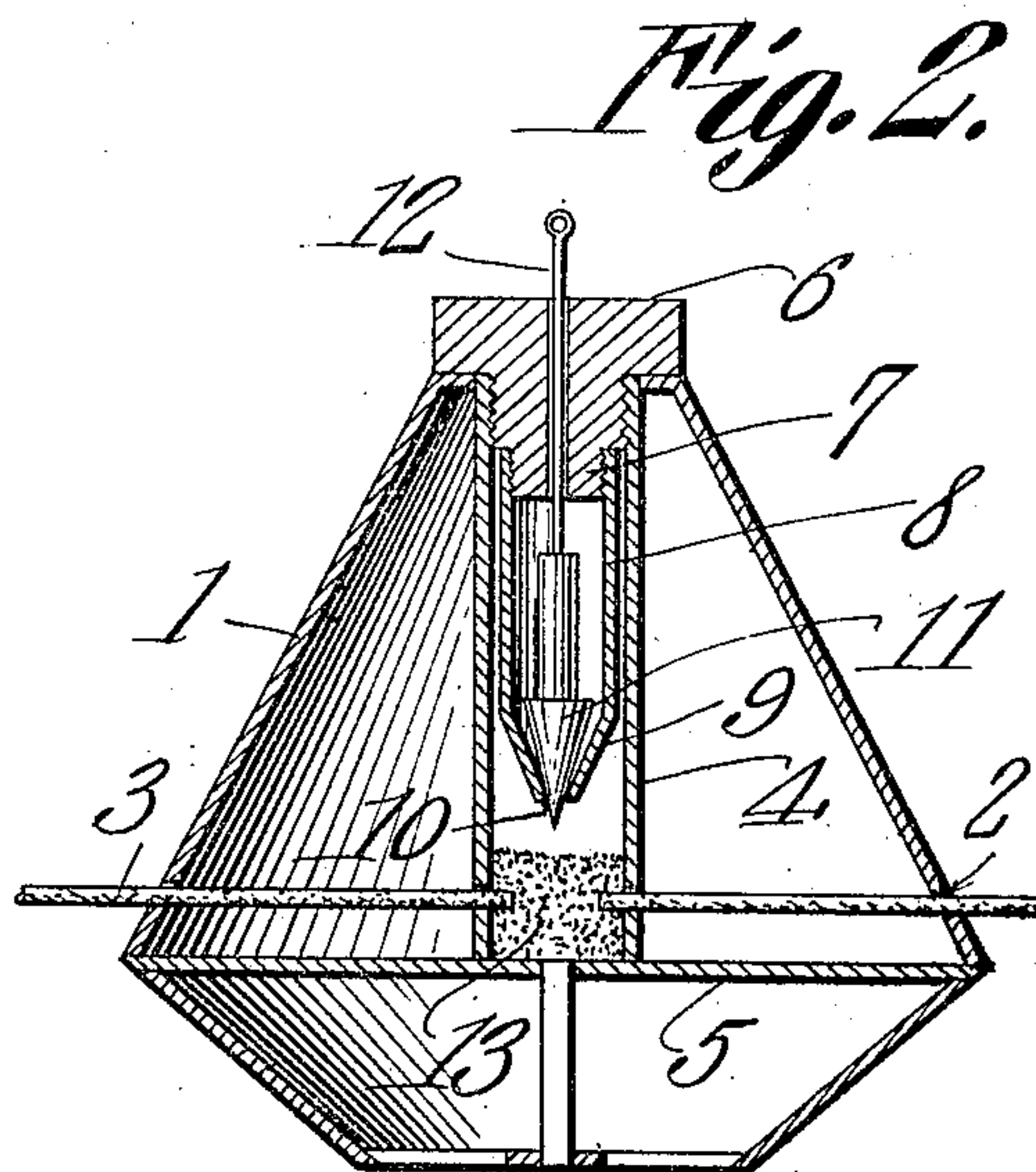
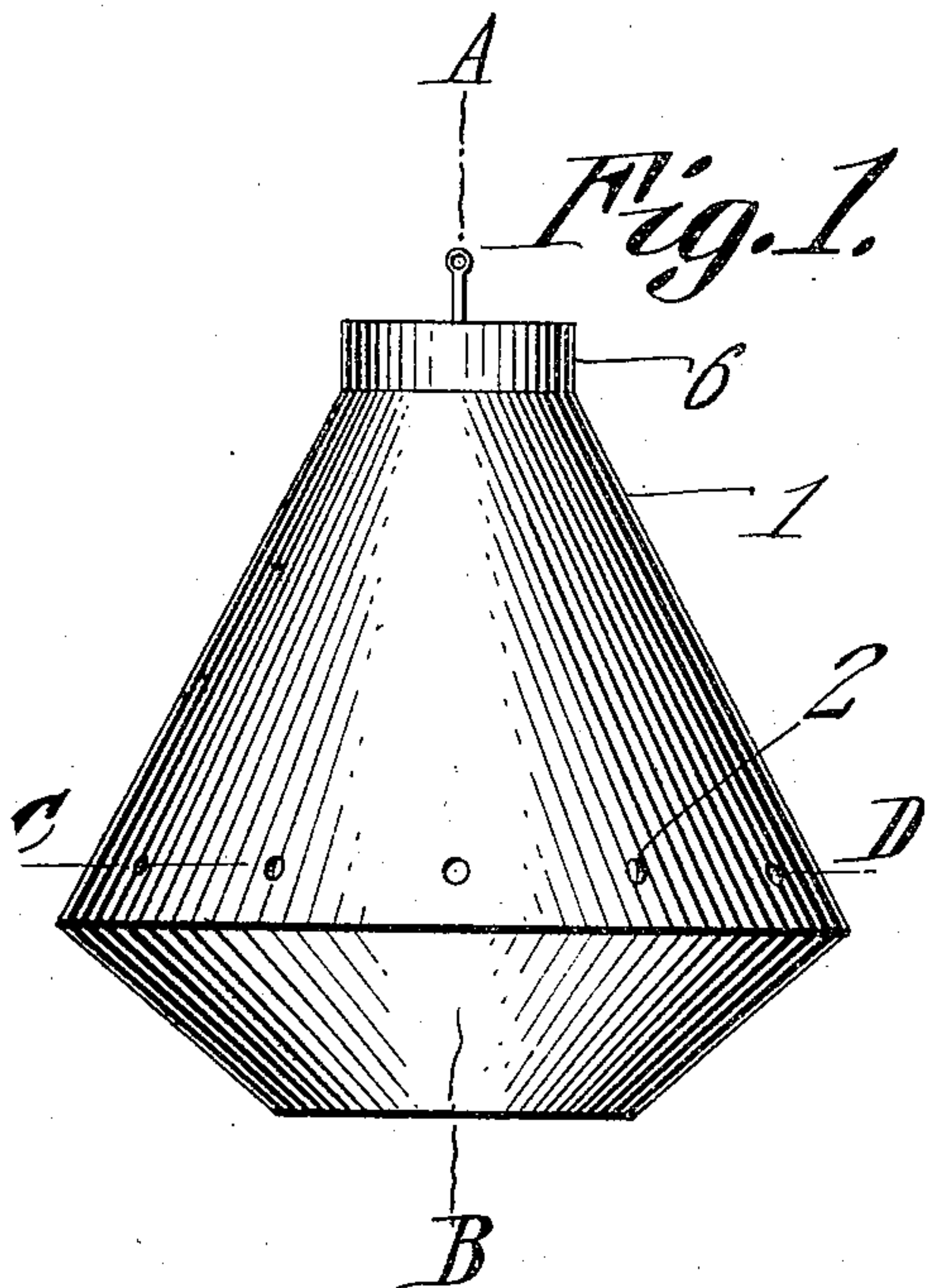


Fig. 4.

Witnesses

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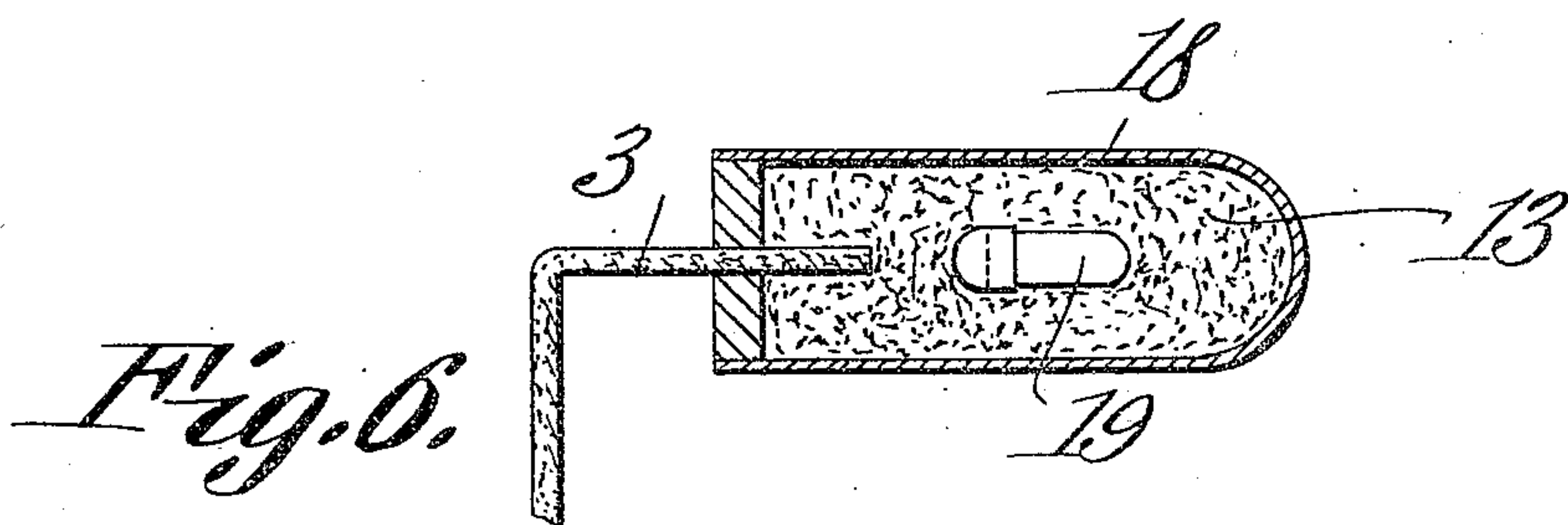
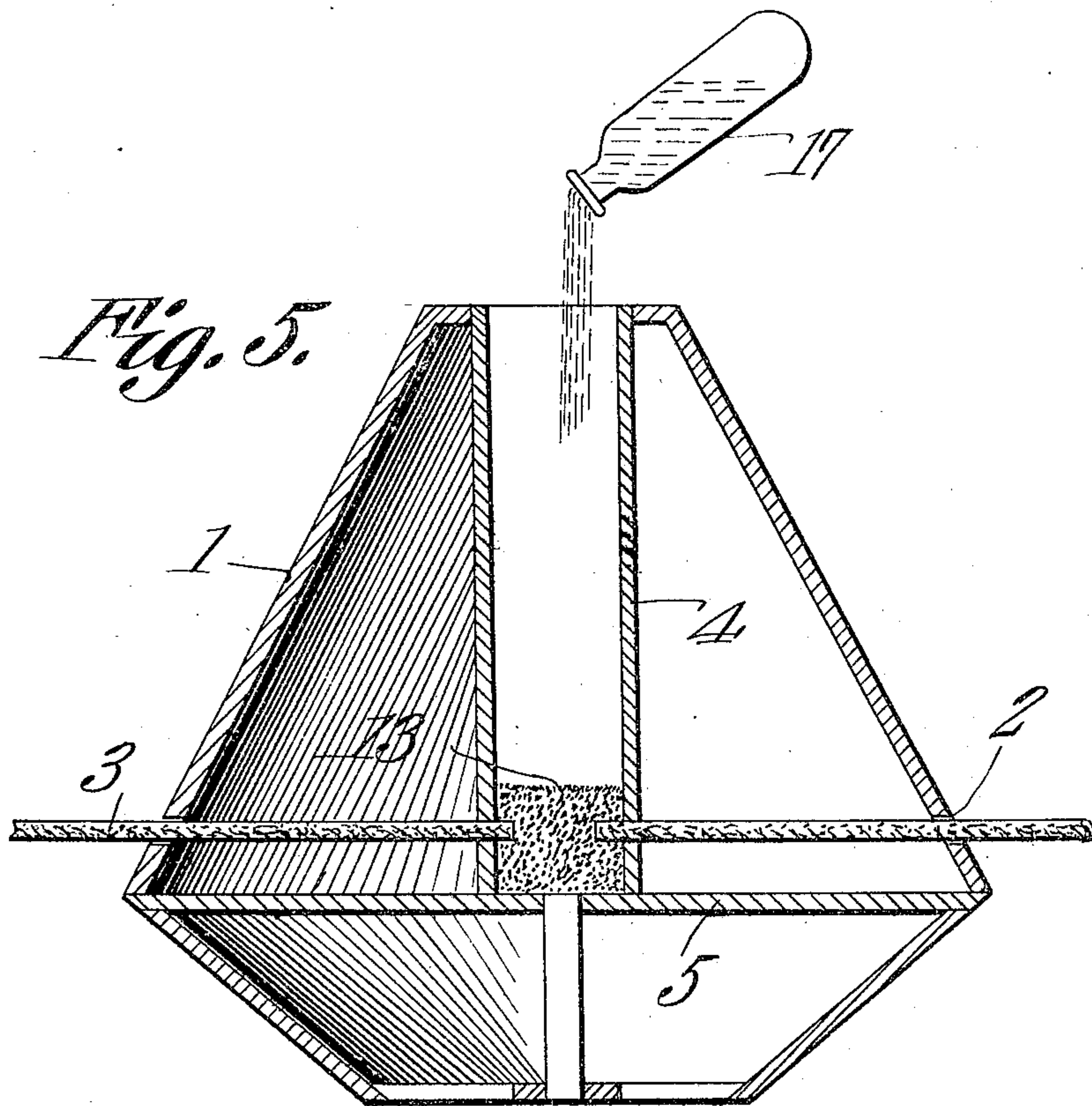
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2 SHEETS—SHEET 2.



Witnesses

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UNITED STATES PATENT OFFICE.

SIMEON LILLEY, OF DEEPWATER, MISSOURI.

MEANS FOR IGNITING FUSES.

963,161.

Specification of Letters Patent.

Patented July 5, 1910.

Application filed December 6, 1909. Serial No. 531,686.

To all whom it may concern:

Be it known that I, SIMEON LILLEY, a citizen of the United States, residing at Deepwater, in the county of Henry and State of Missouri, have invented a new and useful Means for Igniting Fuses, of which the following is a specification.

This invention has reference to means for igniting fuses and is designed to provide a device whereby a number of fuses may be ignited at one time either by an operator located at a safe distance from the igniting means or by an operator located at the igniting means in which case the fuses will be of sufficient length to permit the operator to reach a place of safety before the fuses shall burn to the explosive to be fired.

The invention is designed for use in blasting where a number of differently located blasts are to be fired and in accordance with the present invention provision is made for producing an intense heat by the ignition of a mass of material of such nature as to surely ignite the fuses which then will burn individually to the charge to which they lead.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings,

Figure 1 is an elevation of the igniting device. Fig. 2 is a section of the same on the line A—B of Fig. 1. Fig. 3 is a section on the line C—D of Fig. 1. Fig. 4 is a section similar to that of Fig. 2 but showing a slightly modified form. Fig. 5 is a section similar to Fig. 2 but showing still another modified form. Fig. 6 is a section of still another modified form.

Referring to the drawings there is shown a casing 1 which in the particular showing of the drawings is of double frusto-conical shape with the bases of the cones adjacent and the smaller end of the shorter conical section constituting the support for the device. Near the base of the upper or larger cone there is a circumferential series of perforations 2 designed to receive the ends of a suitable number of fuses 3. The double conical form of the casing provides for the elevation of the fuses above the ground or other support upon which the device is placed so that as the fuses burn away they will not drop against the side walls of the

casing with the liability of being extinguished in so doing.

Within the casing and concentric with the central longitudinal axis thereof is a tube 4 resting on a plate 5 which may be located coincident with meeting edges of the faces of the two conical portions of the casing 1. This tubular member 4 is closed at its lower end by a plate 5 and is open at the other end where it may be threaded for the reception of a screw plug 6 having the inner end reduced in diameter as shown at 7 to receive one end of a cylindrical receptacle 8 the other end 9 of which is tapered to a small opening 10 the size of which latter is exaggerated in the drawings for clearness of illustration. Within the receptacle 8 there is provided a needle valve 11 closing the opening 10 in which it normally engages by gravity. This needle valve is provided with a stem 12 extending through the plug or closure 6 so that its end removed from the valve 11 is accessible to the operator.

By placing in the tube 4 a suitable composition, preferably a mass composed of chlorate of potash and sugar and by placing a quantity of sulfuric acid in the receptacle 8, in which latter it is held by the valve 11, the several parts being made of materials unaffected by sulfuric acid, then when the operator desires to fire the fuses with their ends already introduced through suitable perforations in the tube 4 matching the perforations 2 in the casing 1 and extending to the mass of material therein indicated at 13, the operator has but to lift the valve 11 when a small quantity of sulfuric acid will find its way into the mass 13 and by the violent reaction there set up will cause the mass to inflame. The burning of the mass described is very vigorous and the heat is intense and the flame ultimately extends entirely through the mass when all the fuses are positively ignited, the ignition of the mass 13 being comparatively slow and not rapid as in the case of gunpowder.

It is at times desirable that the firing of the fuses take place from a distant point from the ignition ends of the fuses and in such instances the device forming the subject matter of the present invention is provided within the tube 4 with a hook 14 or other such device for the attachment of a wire 15 extending to the distant point desired.

For instance the casing 1 may be located at the bottom of a mine shaft and the wire 15 may extend to the surface of the ground above. In such cases a cartridge 16 which
 5 may consist of a fragile tube containing sulfuric acid is permitted to gravitate along the wire 15 and will then enter the tube 4 the outer end of the tube in this instance being free from the plug 6, and on reaching
 10 the mass 13 the cartridge 16 if of a fragile nature will engage the hook 14 and become shattered thus spilling the sulfuric acid into the mass 13 and causing the ignition of the latter. If desired the tube 16 may be similar
 15 to the receptacle 8 and contain a valve 11 which will be opened by engagement with the hook 14 or even with the mass 13 if the latter be sufficiently compact. By this means no electric current is needed nor is
 20 matter which is readily ignitable by ordinary handling or which requires the presence of a flame to cause ignition at all needed.

The materials mentioned, namely chlorate
 25 of potash, sugar and sulfuric acid must be all brought together in order to cause ignition and consequently there is no danger of premature ignition as sometimes takes place with electric current nor is there the constant
 30 danger of fire as occurs if matches or other igniting materials are employed. Again the ignition may be controlled from any desired distance without depending upon the pulling of cords or wires and
 35 only depending upon the action of gravity to cause the cartridge or receptacle 16 to move into the tube 4.

Any number of fuses 3 may be used from one to as high a number as the receptacle
 40 1 may receive and an equal number of blasts may be set off, the time between the ignition of the fuses and the explosion of the blasts depending upon the length and character of the fuses. If it be desired to discharge the
 45 blasts by short fuses then the ignition of the composition 13 may take place by permitting the receptacle 16 to move from a considerable distance into the tube 4. If however the fuses are quite long then the
 50 operator may release the sulfuric acid into the mass 13 at the casing, finding ample time to reach a safe place because of the time taken by the fuses to burn to the blast.

The operator may pour the sulfuric acid
 55 directly from a container 17 into the mixture in the tube 4, as indicated in Fig. 5, in

which case the fuses are made long enough to allow the operator to reach a place of safety.

The mixture 13 may be inclosed in a small
 60 casing 18 of suitable material say thin metal and a capsule 19 is embedded in the mixture 13, the capsule containing the acid. One end of a fuse 3 is inserted into the casing so as to reach the mixture 13. The cap-
 65 sule 19 may be made of glass or other fragile material so as to be ruptured by a sufficiently heavy blow delivered on the casing 18 to cause the ignition of the mixture 13 and by the latter the lighting of the fuse 3. The
 70 small casing 18 may be used in situations where the larger structure of Figs. 1 to 5 cannot be used.

The mixture of chlorate of potash and sugar is improved and prevented from cak-
 75 ing by the addition of powdered graphite.

What is claimed is:

1. A device for the ignition of fuses comprising a casing formed of two superposed
 80 reversed frusto cones with the bases of the cones adjacent, a plate traversing the casing at the junction of the basic ends of the cones, and a tubular member extending from the plate to and opening at the smaller end of
 85 the upper cone and closed at the lower end by the plate, the basic end of the upper cone and the lower end of the tube being provided with circular series of alined holes.

2. A device for the ignition of fuses, comprising a casing formed of two superposed
 90 reversed frusto cones with the bases of the cones adjacent, a plate traversing the casing at the junction of the basic ends of the cones, a tubular member extending from the plate to and opening at the smaller end of
 95 the upper cone and closed at the lower end by the plate, the basic end of the upper cone and the lower end of the tube being provided with a circular series of alined holes, a closure for the open end of the tubular
 100 member, a receptacle carried by the inner end of the closure and extending into the receptacle, and a valve in the receptacle having a stem extending through the closure to the exterior thereof.

In testimony that I claim the foregoing as
 105 my own, I have hereto affixed my signature in the presence of two witnesses.

SIMEON LILLEY.

Witnesses:

S. B. OSBURN,
 J. M. PIGG.