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ELECTRIC FUSE LIGHTER

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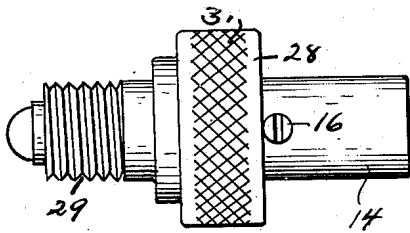


Fig. 1.

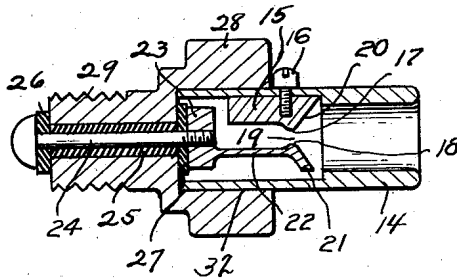


Fig. 2.

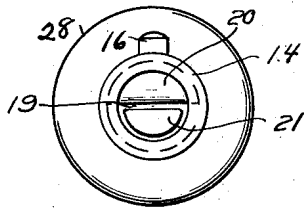


Fig. 3.

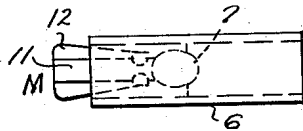


Fig. 4.

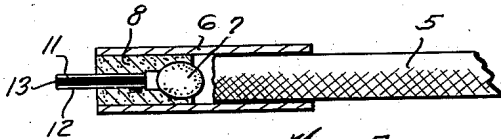


Fig. 5.

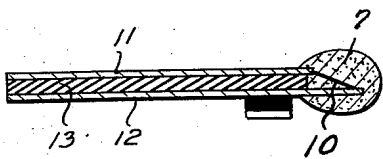


Fig. 6.

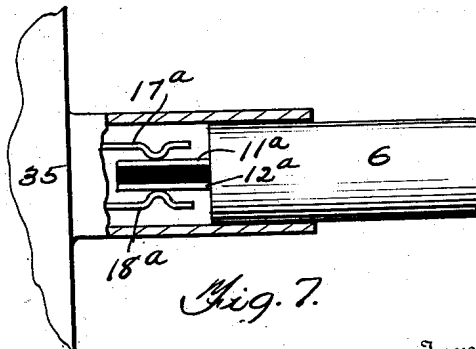


Fig. 7.

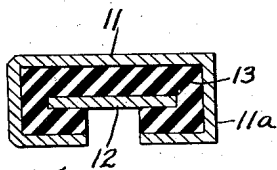


Fig. 6a

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ELECTRIC FUSE LIGHTER

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The purpose of the present invention is to provide a compact and easily handled means for electrically igniting or "spitting" a conventional blasting fuse while avoiding the use of the limber and cumbersome leg wires ordinarily employed in conjunction with devices of this nature.

A further object of the invention is to provide an igniting unit comprising a tube dimensioned to receive a short portion of the fuse to be ignited, and an electric match within the tube, said match, in turn, comprising a match head and a pair of terminals which project from that end of the tube remote from the fuse. These match terminals are of such nature and are so supported as to give them the stiffness necessary to permit them to be plugged directly into engagement with electric terminals, hereinafter described, to the end that the necessary electrical connections may be completed without the use of the limber and cumbersome leg wires referred to.

A further object of the invention is to provide an adapter one end of which is formed to receive the match terminals of the said igniting unit and the other end of which is provided with a plug shaped end dimensioned to adapt it to be screwed into the conventional lamp socket of an ordinary hand flash light, to the end that the match may be set off by the flash light current and, by its large flame and great heat, ignite the blasting fuse with certainty and speed.

Further objects and advantages of the invention will be set forth in the detailed description which follows.

In the accompanying drawing:

Fig. 1 is a side elevation, and

Fig. 2 a longitudinal sectional view of the adapter, hereinafter described.

Fig. 3 is an end elevation of said adapter.

Figs. 4 and 5 are, respectively, side and longitudinal sectional views of the igniting unit hereinafter described.

Fig. 6 is a magnified view of an electric match adapted for use in an igniter of the character employed in carrying out the invention, Fig. 6^a is a transverse section through the match of Fig. 6, and

Fig. 7 is a sectional view of a modification wherein the match of the igniting unit is plugged directly into engagement with contact elements of the current delivering element, such as a hand flash light of either the battery or hand operated generator type.

Like numerals designate corresponding parts in all of the figures of the drawing.

In the drawing, 5 designates an end portion of a

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section of fuse to be ignited by a spit of flame. The igniter comprises a tube 6, of paper or any other suitable material. A match head 7 of deflagrating material, adapted to yield a hot, fat, spit of flame, is located in the tube 6 and is suitably sealed therein by a body of sealing material 8, such as the well known sulphur composition. In the preparation of the igniting unit I preferably, though not necessarily, use an electric match of the character of that shown and described in the patent to Jessen, 1,407,157 of February 21, 1922. Such a match is illustrated in Fig. 6 and comprises a bulbous body 7 of flame producing material in which an igniting wire 19 is disposed. This igniting wire extends between contact strips 11 and 12 disposed upon opposite sides of and clipped about an interposed strip 13 of insulating material. The contact strips 11 and 12 are of metal and are relatively wide. The contact strip 11 is provided with ears 11^a which are crimped around the strip 13 of insulating material and the contact strip 12, thereby clipping all of these parts tightly together, the insulating material lying between these ears and the contact strip 12 as well as between the remaining portions of the strips 11 and 12.

When the several parts are clipped together as described the match as a whole is rendered so stiff that the outer ends of the said strips 11 and 12 which project beyond the tube 6 may be plugged directly into the adapter of Figs. 1, 2 and 3 or directly into engagement with the terminals of a current delivering medium, as hereinafter set forth. The adapter may be of many different forms. In the particular form shown the bore of a sleeve 14 is dimensioned to receive the tube 6. A contact block 15 held in sleeve 14 by screw 16 comprises one of the spaced terminals with which the match terminals engage and make electrical contact, when the tube 6 is placed in sleeve 14 and turned until the relatively wide projecting outer end M of the match is brought to position to enter the laterally elongated slot 19 which lies between the terminals 17 and 18. The surfaces 20 and 21 of the terminals are inclined with respect to the axis of the block to aid in guiding the match terminals to contacting position. The tube 6 cannot enter the full distance into sleeve 14 until the wide head M aligns with slot 19. When such alignment is reached the sudden slipping of tube 6 further into sleeve 14 apprises the user that proper contact has been effected. The terminal 18 is carried by an arm 22 the head 23 of which is held in place by a screw 24. An insulating sleeve 25 and insulating wash-

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ers 26 and 27 insulate the screw and arm from a block 28. This block comprises a threaded nipple 29 dimensioned and suitably threaded to adapt it to be screwed into the conventional light bulb socket of a hand flash light. To facilitate screwing the adapter into the said socket, as described, the block 28 is enlarged and knurled as indicated at 31. The block is recessed at 32 to receive and carry the sleeve 14. The head of screw 24 constitutes one of the parts making electrical contact with the flash light and the threads of the nipple constitute the other contact for engagement with the wall of the light bulb socket.

It will, of course, be understood that whenever a fuse is ignited by this apparatus the igniter of Figs. 4 and 5 is destroyed and that another igniter must then be plugged into the adapter of Figs. 1, 2 and 3 before the operation can be repeated. Since a miner or other user might have to ignite many fuses in a day, it will be apparent that the elimination of the use of conventional leg wires will be a boon to the user. Not only does the necessity of connecting conventional leg wires constitute a tedious, time consuming task, but such wires are troublesome, in that they often become entangled with themselves and many other objects. Further, loose connections of the leg wires often bring about misfires.

The device of the present invention insures the delivery of a hot, fat spark directly against the end of the fuse through the medium of instrumentalities which are of very low cost and are readily portable to out-of-the-way places. Further, much of the material is of conventional form, already on the market. The matches are of known form and so are the hand flash lights. Thus only an adapter is required to make it possible to plug the terminals of a stiff match into electrical connection with a flash light bulb socket. While battery operated flash lights may be employed, I take cognizance of the fact that the market offers a flash light using a small hand operated generator, and I may prefer to use such apparatus, since batteries do not stand up well in all climates, and this structure is well adapted for use in operations under widely varying climatic conditions. However, the invention is not limited to any particular source of current since utility is inherent in using a match capable of being plugged in without leg wires, irrespective of the source or character of the current. I am aware of the fact that it has heretofore been proposed to employ an igniter consisting of a sleeve dimensioned to receive through one end, the end portion of a fuse to be ignited, said sleeve carrying an igniter consisting of the bowed portion of a platinum or other resistance wire adapted to become red hot when electric current is passed there-through, thereby to ignite the fuse. Such structures as these are so expensive that they cannot be discarded after each use but must be used over and over again.

My invention differs very materially from structures such as those above described in two important respects, to wit: I employ a match composition as the igniting medium and I embody this match composition in an assembly of such nature that it may be discarded after use. Matches of the character of those described, comprising a relatively large mass of deflagrating material, yield momentarily a great burst or mass of very hot flame which is much more effective in igniting the fuse, speedily and certainly than a mere hot wire could do. Further, since the cheapness of these matches and the paper tube

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supporting the same renders it possible to use a fresh igniter each time, it follows that only clean and unobstructed surfaces are presented toward the fuse at each time of use. This might not be the case with a mere hot wire arrangement, intended to be used repeatedly, because such a wire heats gradually and charred and sticky portions of the tar impregnated fuse covering might cling thereto and interfere with close contact between the wire and the fuse next to be ignited.

In Fig. 7 I have illustrated the contacts 11^a, 12^a of the match making direct contact (and without an adapter) with the contacts 17^a, 18^a of a source of current supply such as a hand operated generator type of apparatus the casing of which is illustrated at 35. This casing could just as well be the casing of a battery flash light. It is clear that this idea of plugging the match contacts directly into engagement with the contacts of a current delivering medium (battery or generator type) may be resorted to whenever the desirability of dispensing with the adapter outweighs the expense of specially constructing a current delivering element to receive the match terminals. The advantage of using the adapter of Figs. 1 and 2 is that by its use existing forms of current delivering elements, already on the market, may be employed.

In use an igniting unit is inserted in the adapter and the fuse 5 is inserted in the open end of tube 6. The fuse is grasped with the fingers at a point about two inches away from the tube while the current is applied. As soon as the match has fired, the fuse is pulled out of the tube and left to burn while the operator makes a hasty exit taking the remainder of the apparatus with him.

As far as I am aware, I am the first to provide an igniter provided with a fuse receiving part at one end and carrying an electric match the terminals of which project from the other end of the igniter and are plugged into engagement with a hand held, hand manipulated source of current supply so that the igniter is bodily supported from and moves and is manipulated with the source of current supply.

It is clear that the invention may be embodied in many different forms. Therefore, I wish it to be understood that it includes whatever changes fairly come within either the terms or the spirit of the appended claims.

Having described my invention, what I claim is:

1. An igniting unit for spitting safety fuse, comprising a tube made of a material cheap enough to be discardable after a single use, open at one end, and internally dimensioned to snugly embrace and frictionally engage a portion of a safety fuse to be spitted, an electric match comprising a strip of insulating material, a pair of metallic contact members upon the opposite sides of said strip, a connecting wire between the contact members at the inner end of said strip adapted to become hot upon current flow, a bulbous head of deflagrating match composition enclosing said wire and yielding a considerable mass of hot flame in a quick burst when ignited, and a body of sealing composition sealing said electric match within the tube with said bulbous head disposed toward that end of the tube into which the safety fuse enters and with its metallic contact members projecting far enough out of the opposite end of said tube to permit of their being plugged into a source of current supply.

2. A structure as recited in claim 1 wherein said contact members are much wider than they are thick and are clipped together about said insulat-

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ing strip, the whole presenting a relatively wide and stiff part adapted to take the thrust and strain of being plugged into engagement with contact members of another part.

3. A structure as recited in claim 1 in combination with an adapter provided at one end with a pair of spaced contacts between which the said contact members may enter, said adapter being provided with a part shaped and dimensioned to engage with and be bodily supported by a hand carried source of current supply.

4. A structure as recited in claim 1 in combination with an adapter comprising a block having a threaded plug end for engagement in the lamp socket of a hand flash light, a tubular member carried by said block and having an open end dimensioned to receive the end of the tube of the igniting unit, and spaced electrical contact members within said tubular member between which the contact members of the match are adapted to enter and with which said match terminals make contact.

5. An electrical igniting unit for spitting fuses comprising a tube and an electric match in said tube comprising a bulbous head of deflagrating material adapted to yield a mass of hot flame in a quick burst, a body of sealing material embracing the match and rigidly supporting the same in the tube, said match comprising the flame producing head and a pair of relatively stiff contact members which project from one end of said tube, the other end of said tube projecting materially beyond the match head and being open for the reception of the fuse to be spitted, an adapter comprising a block having a threaded plug end for engagement in the lamp socket of a hand flash-light, a tubular member carried by said block and having an open end dimensioned to receive the end of the tube of the igniting unit, a contact block supported in said tubular member, a contact arm also supported in said tubular member, said block and arm being provided with spaced contact surfaces which complementally present a laterally elongated slot between them.

6. An electrical igniting unit for spitting fuses comprising a tube and an electric match in said tube comprising a bulbous head of deflagrating material adapted to yield a mass of hot flame in a quick burst, a body of sealing material embracing the match and rigidly supporting the same in the tube, said match comprising the flame producing head and a pair of relatively stiff contact members which project from one end of said tube, the other end of said tube projecting materially beyond the match head and being open for the reception of the fuse to be spitted, an adapter comprising a block having a threaded plug end for engagement in the lamp socket of a hand

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flash-light, a tubular member carried by said block and having an open end dimensioned to receive the end of the tube of the igniting unit, a contact block supported in said tubular member, a contact arm also supported in said tubular member, said block and arm being provided with spaced contact surfaces which complementally present a laterally elongated slot between them, the surfaces of the contact block and contact arm being inclined to guide the match terminals into contacting position.

7. An igniting unit for safety fuse intended to be discarded after use and comprising a paper tube, an electric match and a body of sealing material sealing said match rigidly within said tube, said match comprising a head of deflagrating material adapted when ignited to deliver a burst of very hot flame, one end portion of said tube being dimensioned to snugly embrace the end portion of a fuse to be spitted, said match head being located far enough away from said end portion of the tube to permit the end portion of the fuse to enter the tube and be supported by the tube along a portion of the length of the fuse, said match further comprising a pair of spaced metallic contact strips and an interposed body of insulating material all clipped rigidly together to form a stiff structure projecting beyond that end of the tube remote from the fuse receiving end.

8. A structure as recited in claim 7 in combination with an adapter dimensioned to receive said tube and provided with spaced contact members between which the contact strips of the match may enter, and a hand carried source of current supply adapted to receive said adapter and connections carried by the adapter for delivering current from said source of current supply to the said contact members.

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