T. C. HALLAM.

MINE FIRING DEVICE.

APPLICATION FILED NOV. 13, 1908.

936,885. Patented Oct. 12, 1909.

Fig. 1.

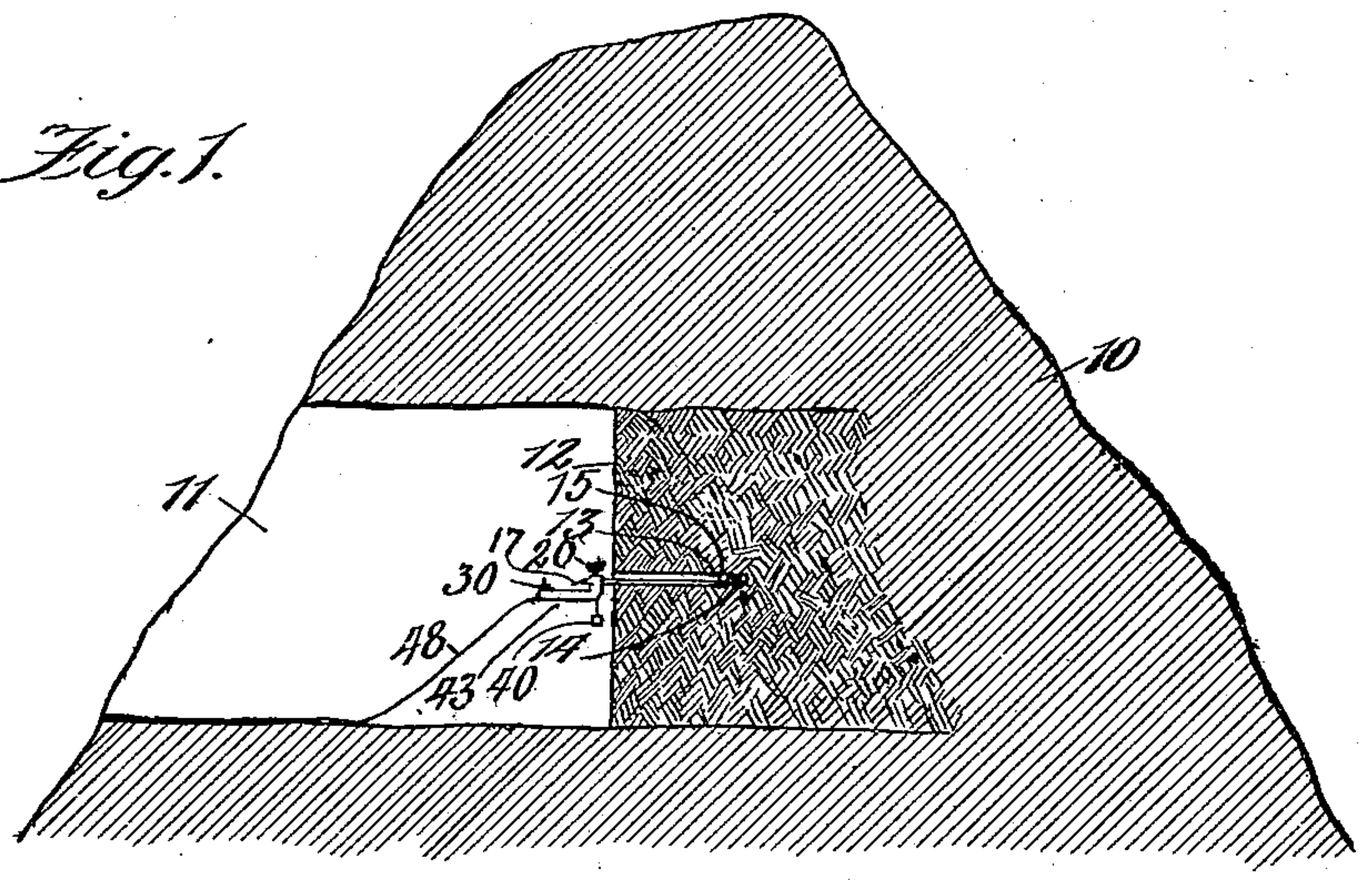


Fig. 2.

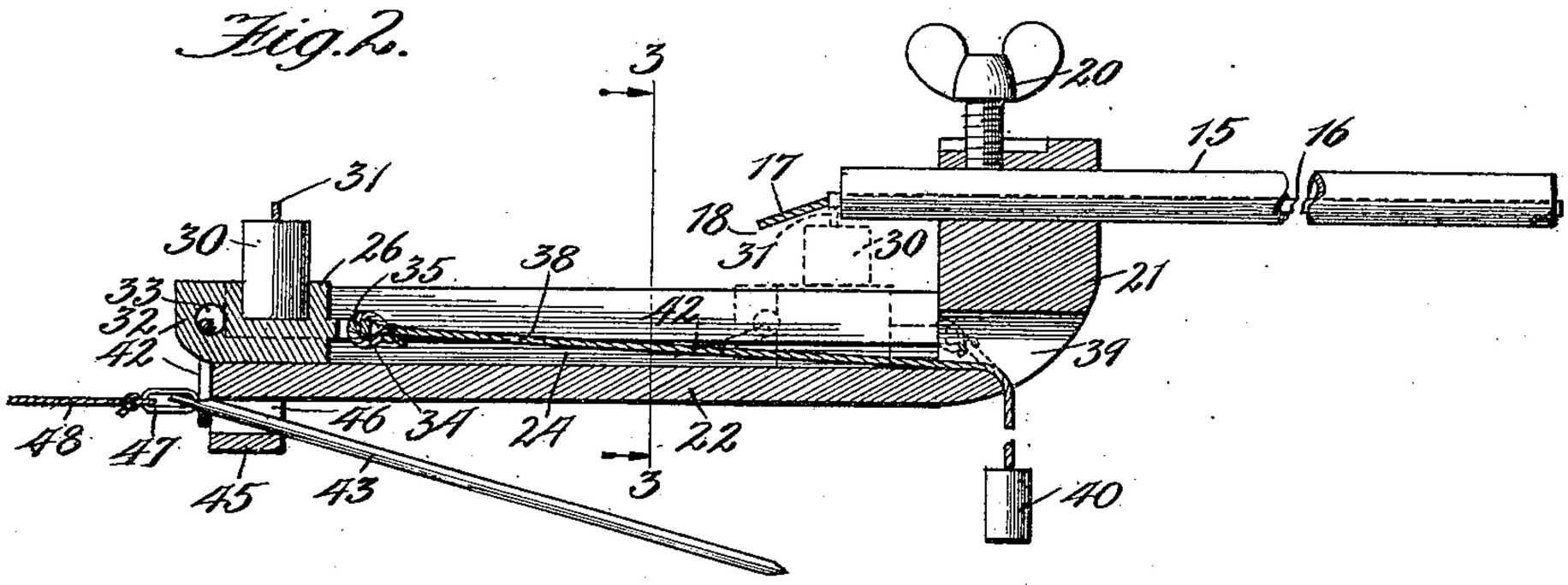


Fig. 3.

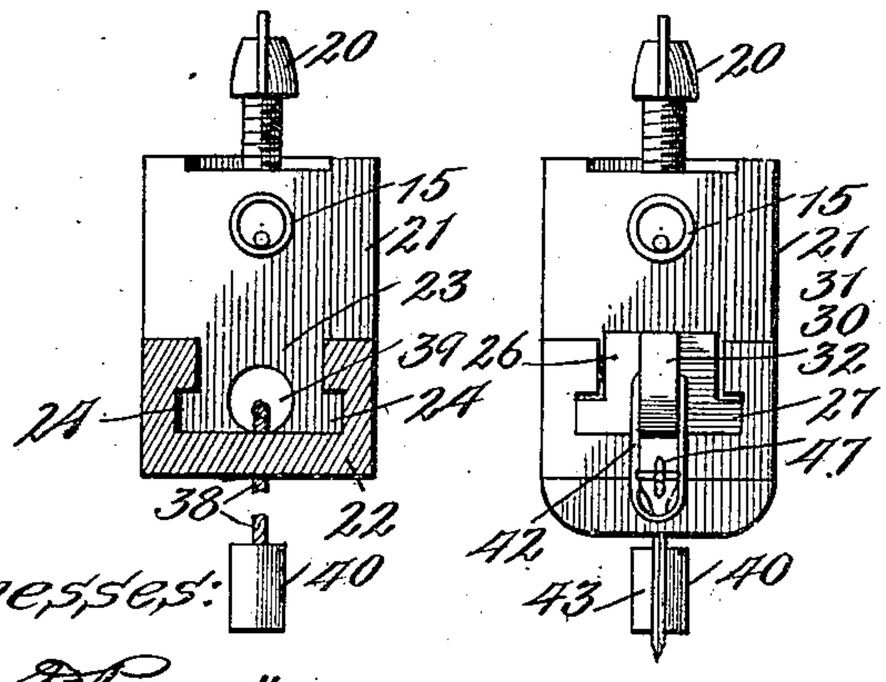
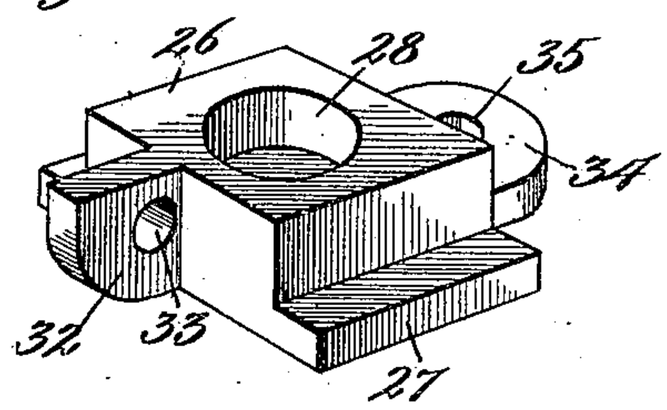


Fig. 4.

Fig. 5.



Witnesses:

Ba B Perry

Robert N. Weir

Inventor:

Thomas C. Hallam

By Cheever & Cox

Attys

UNITED STATES PATENT OFFICE.

THOMAS C. HALLAM, OF GARDNER, ILLINOIS.

MINE-FIRING DEVICE.

936,885. Specification of Letters Patent. Patented Oct. 12, 1909.

Application filed November 13, 1908. Serial No. 462,460.

To all whom it may concern:

Be it known that I, THOMAS C. HALLAM, a citizen of the United States, residing at Gardner, in the county of Grundy and State of Illinois, have invented a certain new and useful Improvement in Mine-Firing Devices, of which the following is a specification.

This invention is a device for firing squibs leading to gunpowder or other similar explosives in mines so that the same may be positively and effectually done.

The object of the invention is to provide a device which, when once set in motion, will absolutely insure the firing of the squib and consequently the powder charge thereby doing away with the great danger which exists when squibs are used owing to the fact that squib ends frequently apparently go out when they have burned about half their length, more or less, and then resume action just about the time the miner comes back to ascertain the difficulty with the result that he suffers severe injury due to the powder charge exploding when the miner is thus in too close proximity thereto.

The invention consists in the use of a squib leading to a quantity of powder to be exploded, a lamp or other device containing a considerable quantity of fire or flame normally located at a distance from the end of the squib and a mechanism, preferably automatic, operable at the desired time to bring the source of fire into positive contact with the powder in the squib body so that the squib is absolutely fired.

The invention also consists in details of mechanism embodying the broad invention which will be hereafter more fully described and claimed as the specification proceeds.

Referring to the drawings, Figure 1 is a general view partially in section showing the horizontal passageway or drift of the coal mine in which a sample device of this invention has been applied in position ready for use. Fig. 2 is an enlarged detail view of the mechanism with the preferred form of this invention in position ready for firing. Fig. 3 is a sectional detail view on the line 3—3 of Fig. 2. Fig. 4 is an end view of the device taken at the left hand side of Fig. 2. Fig. 5 is a detail view of the fire or lamp carrying car removed from the remainder of the mechanism.

Referring to the drawings again, the shaded portion 10 of Fig. 1 indicates coal or other material which is to be mined into which a side drift 11 has been run for the purpose of mining the coal or other material adjacent to the freshly made wall 12. Into wall 12 a small hole 13 ordinarily about 2″ in diameter has been drilled by any suitable mechanism and at the inner end of this has been placed a quantity of powder 14. In the hole 13 and connecting with this powder 14 is a tube 15 in which a squib body of the ordinary type 16 rests having its inner end entering the powder 14. The parts thus far described are those old in the art and of themselves form no part of the invention. At the opposite or outer end of the squib 16 is a squib end 17 being ordinarily a sulfurized piece of paper substantially similar to the stem of the ordinary fire cracker used throughout the country Fourth of July. In ordinary practice this squib and squib end is so constructed that it burns slowly for the purpose of allowing the miner time after lighting the extremity 18 of the squib end to get away from the whole mechanism before the fire travels the length of the squib end 17 to the squib proper 16 which instantly flashes the fire into the powder charge. As stated in the preamble these squibs frequently apparently go out and when the miner comes back to ascertain what the matter is, then flame up suddenly and fire the explosive charge exactly as often happens with fire crackers. In order to properly fire the squib described the mechanism of this invention is provided which will now be described.

To the outer end of the pipe 15 (the left hand end in the figures) is secured by any suitable mechanism, such for instance as the thumb screw 20, a depending block or other supporting member 21, having rigidly attached to it, by any suitable means, a horizontal and relatively long member 22 having its interior recessed from the upper side so as to form a trough 23 with the laterally extending recesses 24 forming what will be hereafter referred to as tracks. The little car 26, illustrated in Fig. 5 consists in a block as shown having side flanges 27 adapted to slide in the tracks 24. In the top of this car 26 is a recess 28 in which any suitable open flame lamp 30 having a lightable wick 13 may be placed. On one end of this car 26 is a lug 32 having therein a hole 33. On the opposite end is another lug 34 having therein a hole 35. Connected to this lug 34 through the hole 35 is a cord 38 extending

through a hole 39 bored in the member 21 and in line with the recess 23. Connected to the opposite end of this cord 28 is a weight 40 of sufficient size to when not otherwise restrained move the car 26 from the full line position of Fig. 2 where it is removed from the squib end 17 to the dotted line of said figure in which the car is in such a position that the flaming wick 31 is in direct contact with the squib body 16 and the squib end 17. On the opposite end of the mechanism just described some sort of a latch mechanism is provided for detachably securing the car in the full line position of Fig. 2. Particular details of this mechanism are wholly immaterial, the particular embodiment of the same here in use comprising a loop or hasp member 42 pivotally mounted on the lug 32 and extending down the end of the member 22 a sufficient distance so that a latch pin 43 may be inserted through the loop 42 and into a hole 46 in a block 45 secured to the underside of the member 22 so as to temporarily hold the parts in the position of Fig. 2. To the end of this pin 43 is secured, by the link 47 or any other suitable means, a rope or cord or similar mechanism 48 of such a length that it will reach to a point of safety where it may be pulled by the operator.

In the operation of the device the mine is charged with powder and the mechanism installed as shown in the full line position of Fig. 2 and the miners withdraw to a safe distance reached by the cord 48. One of the men then gives that cord a pull thereby withdrawing latch 43 entirely from all engagement with the link 42 and hole 46 thereby releasing the car which under the action of the weight 40 as heretofore described is instantly pulled to the dotted line position of Fig. 2 in which the flame of the wick 31 of the lamp 30 is brought into contact with the squib and instantly and positively fires the powder charge.

It will readily be seen that by omitting the weight 40 and pulling upon the cord 38 the device may be operated by hand instead of automatically, if so desired, but as this method of operation possesses no advantages and is in fact inferior to that shown in the drawing it is not recommended.

This mechanism makes the use of squibs entirely safe and thereby does away entirely with the use of ordinary black fuses which are much more expensive than squibs and are also unreliable.

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

1. A device of the class described comprising a suitable supporting mechanism, a squib to be fired located at one portion thereof, a source of fire at another portion thereof so mounted that it may be moved to and from the squib, means tending to move said source of fire toward the squib, a latch mechanism adapted to detachably hold the source of fire in its remote position from the squib, and means operatable at a distance from the device for releasing said latch mechanism.

2. A mine firing device comprising a tube or pipe adapted to be inserted within the material to be mined and to have a squib run therethrough, a framework or supporting member adapted to be attached to the end of said pipe which extends into the drift of the mine, a track upon said support extending away from the adjacent end of said pipe, a car slidable upon said track a source of fire upon said car, means urging said car along said track toward the end of the pipe, means detachably securing said car at a position upon said track away from the end of the pipe and means operatable from a distance for releasing said latch mechanism for the purposes set forth.

3. In mechanism of the class described, a supporting mechanism provided with means for securing it to the end of a pipe connecting with the body of explosive to be fired, a track upon said supporting member leading away from the portion of the pipe where it is secured to said supporting member, a car slidable upon said track a source of fire upon the car, means tending to urge the car toward the end of the pipe and mechanism for detachably securing the car at the opposite end of the track as and for the purposes specified.

4. In a device of the class described, the combination of a supporting member made in block form having a recess therein in which a car may slide there being lateral recesses extending into the sides of the first mentioned recess, a car slidable in said first mentioned recess having flanges entering the second mentioned recess, means for securing a source of fire to said car, means automatically tending to move said car in one direction, mechanism detachably locking said car in position resisting said moving action and mechanism at the opposite end of the track from that on which the car is secured for detachably securing the supporting member to the fuse pipe in a mine, leading to the charge of explosive to be fired.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

THOMAS C. HALLAM.

Witnesses:

DWIGHT B. CHEEVER,

C. J. CHRISTOFFEL.