Sept. 23, 1924. 1,509,110

T. I. POTTER

SIGNAL

Filed May 26, 1922

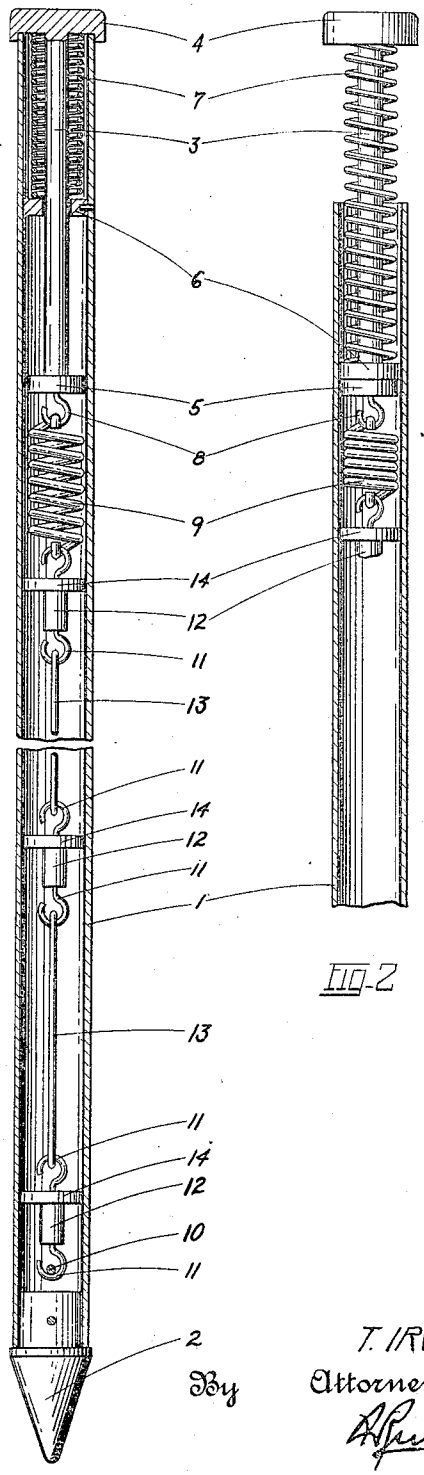


Fig-1

Fig-2

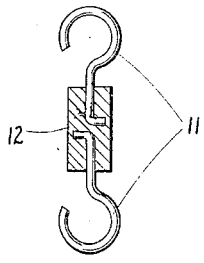


Fig-3

Inventor

T. IRVING POTTER

By Attorney

A. Russell Bond

Patented Sept. 23, 1924. 1,509,110

UNITED STATES PATENT OFFICE.

THOMAS IRVING POTTER, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO FEDERATED ENGINEERS DEVELOPMENT CORPORATION, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF DELAWARE.

SIGNAL.

Application filed May 26, 1922. Serial No. 563,916.

To all whom it may concern:

Be it known that I, THOMAS IRVING POTTER, a citizen of the United States, and a resident of East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Signals, of which the following is a full, clear, and exact description.

This invention relates to improvements in signals, an object of the invention being to provide means for operating a visible or audible warning signal when the temperature within a mass of stored material reaches a dangerous point.

The invention relates particularly to a device for use in warning the proprietors of coal piles when the temperature of the coal within the pile reaches a height which is likely to cause spontaneous combustion or a reduction in the fuel value of the coal due to the production of gases within the pile.

The danger of loss due to spontaneous combustion when materials such as bituminous coal are stored in bulk is too well known to warrant detailed comment here. A specific object of this invention is to provide a temperature controlled warning signal which will to a large extent safeguard the danger of loss from spontaneous combustion and which it is thought will serve in a great measure to overcome the reluctance of large consumers of coal to store the same in bulk.

A still further object is to provide a signal of the character stated which will be simple and practical in construction, efficient in use and capable of being manufactured with comparative economy.

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

In the accompanying drawings,

Fig. 1 is a broken view in longitudinal section through a signalling apparatus embodying my invention.

Fig. 2 is a fragmentary longitudinal sectional view through upper end of the signal casing showing the signal arm in operative position.

Fig. 3 is a sectional view through one of the blocks 12.

Referring in detail to Figures 1, 2, and 3 of the drawings, I have used the reference numeral 1 to designate a tube of some heat conducting material. A pointed entering member or ferrule 2 is secured within the lower end of the tube 1 and serves to facilitate the insertion of the tube into a coal pile, or into a mass of any other material such as grain which may be stored or heaped in bulk. The ferrule serves as a closure for the lower end of the tube.

The longitudinal movement of a signal rod 3 in the upper end of the tube is limited in one direction by the seating of a flanged cover cap 4 which is fixed to the upper end of the rod. The rod 3 is movable through a ring 6 fixed in the tube adjacent its upper end and a flange 5 fixed to the lower end of the rod 3 is engageable with said ring to limit the upward or outward movement of the rod. A coiled expansion spring 7 interposed around the rod 3 between the ring 6 and cap 4 tends to normally urge the rod to its signalling position shown in Figure 2, with the flange 5 held against the under face of the ring.

The rod 3 is normally held in retracted or inoperative position by a chain anchored to a cross pin 10 in the lower end of the casing 1 and attached to a hook 8 carried by the flange 5. Certain of the links of this chain are in the form of blocks 12 of fusible metal. These blocks carry oppositely disposed hooks 11 engageable with looped wire links 13 arranged alternately betweer the fusible blocks 12. At some point in the length of the chain I preferably provide a tension exerting member such as the coiled contraction spring 9. This spring 9 is considerably stronger than the spring 7 and tends to exert sufficient tension on the chain to maintain the cover cap 4 seated at all times upon the outer end of the signal casing.

In order to limit the circulation of air within the casing, packing rings 14 of felt or other suitable material are carried by the blocks 12 and frictionally fit the interior walls of the casing or tube 1.

The operation of the device is as follows:

The ferrule 2 facilitates the insertion of the tubular casing to any desired distance in a pile of coal or other material heaped in bulk. The signal casing being practically airtight and of heat conducting material, the fusible links of the chain are readily susceptible to temperature changes in adjacent portions of the pile. The links or

blocks 12 are of any suitable metal which will fuse at a temperature of approximately 120 degrees if the instrument is for use in coal piles. When the instrument is adapted for use with other material, the metal of the fusible links is of a character which will fuse at any temperature dangerously near the temperature at which spontaneous combustion is liable to take place with the particular kind of material.

In connection with the packing rings, it might be noted that by limiting the circulation of air and preventing convection currents in the casing, they serve to localize the heating of the air around the link nearest a hot spot in the pile, thereby expediting the operation of the device. After the signal has been sprung, the ring 6 may be removed and the upper end of the chain pulled out. An examination of the chain to see which block has fused will readily determine approximately the depth below the surface of the pile at which the center of the disturbance is located. Contact of the heated surface of the tube with the hands of an investigator as the tube is manually withdrawn from the pile will also aid materially in this connection.

I have illustrated certain of the preferred embodiments of the invention, but various slight changes and alterations might be made in the general form and arrangement of the parts described without departing from the invention and hence, I do not wish to limit myself to the precise details set forth, but shall consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of the appended claims.

I claim:

1. A device of the character described comprising an elongated signal casing of heat conducting material adapted to be inserted in a coal pile, a signal rod having limited longitudinal movement in the outer end of the casing, means carried by the rod for closing the outer end of the casing, a spring urging said rod outwardly, a chain anchored in the casing and retaining said rod in retracted position against the action of the spring, said chain including a plurality of fusible links, and means associated with the links for limiting the circulation of air in the casing.

2. A device of the character described comprising an elongated signal casing of heat conducting material adapted to be inserted in a coal pile, a signal rod having limited longitudinal movement in the outer end of the casing, means carried by the rod for closing the outer end of the casing, a spring urging said rod outwardly, a chain anchored in the casing and retaining said rod in retracted position against the action of the spring, said chain including a plurality of fusible links, and means associated with the links for limiting the circulation of air in the casing, said means comprising packing rings carried by said links and tightly fitting the interior of the casing.

3. The combination with a signal and signal casing of signal retaining means in the casing including a chain, temperature sensitive links in the chain, air tight partitions fitting the casing and interposed between the links whereby to limit the circulation and localize the heating of air in the casing.

4. The combination with a signal, of a signal casing divided into a plurality of compartments, and temperature sensitive, signal retaining means in each of said compartments.

5. In a device of the character stated, a compartmental signal casing, a signal housed therein, means normally urging said signal to signalling position, a chain holding said signal against operation and including fusible links located in said compartments, whereby said signal is released when the temperature in any compartment reaches a pre-determined point.

6. As a new article of manufacture, a device of the character described comprising an elongated hollow signal casing of heat conducting material adapted to be buried in a mass of loosely piled material, a signal concealed therein and normally urged outwardly, a signal retaining chain extending throughout the major portion of the length of the casing and including fusible links, and means for limiting the circulation of air in the casing whereby to localize the heating of air adjacent one link and expedite the fusing of a link nearest a heated portion of the mass wherein said casing is buried.

7. As a new article of manufacture, a signal of the character described comprising a tubular casing, a signal rod removably secured in one end of the casing, means normally urging said rod outwardly and a chain holding said rod against outward movement and removably anchored in the said casing, said chain including temperature sensitive fusible links.

THOMAS IRVING POTTER.