

(No Model.)

2 Sheets—Sheet 1.

F. W. BACORN.
ELECTRIC SIGNAL FOR MINE SHAFTS.

No. 454,018.

Patented June 16, 1891.

Fig. 1.

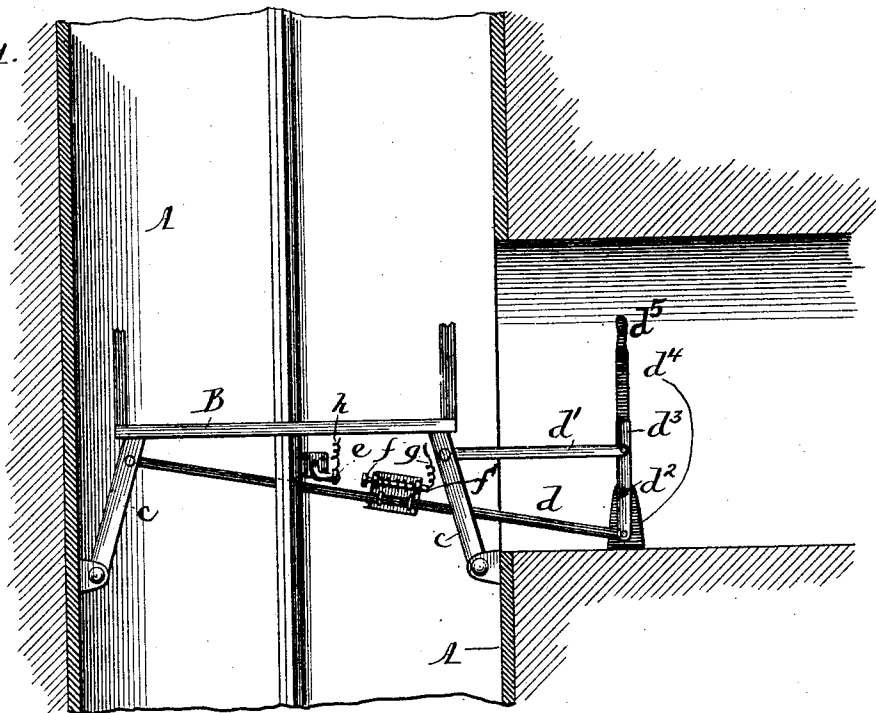
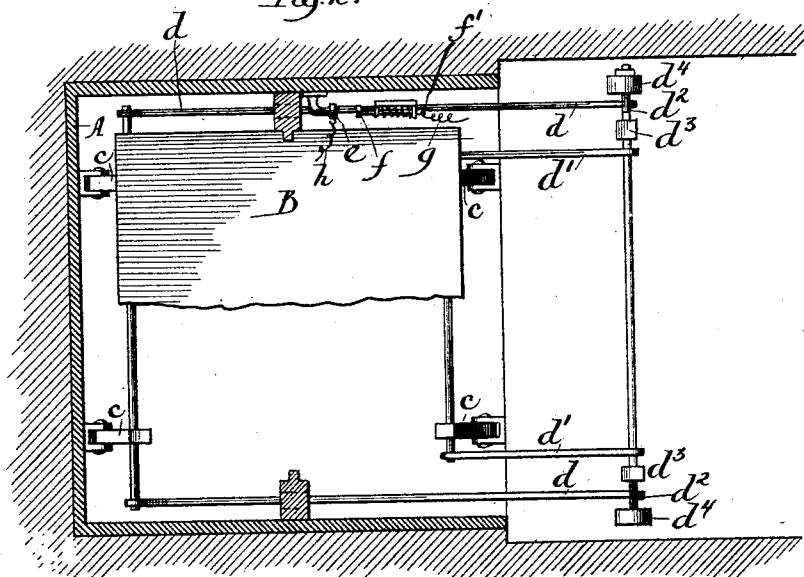


Fig. 2.



Witnesses:

Fred. Gerlach
Anthony Longner

Inventor:

Frederick W. Bacorn
by Wm. Zimmerman,
Atty.

F. W. BACORN.
ELECTRIC SIGNAL FOR MINE SHAFTS.

No. 454,018.

Patented June 16, 1891.

Fig 3.

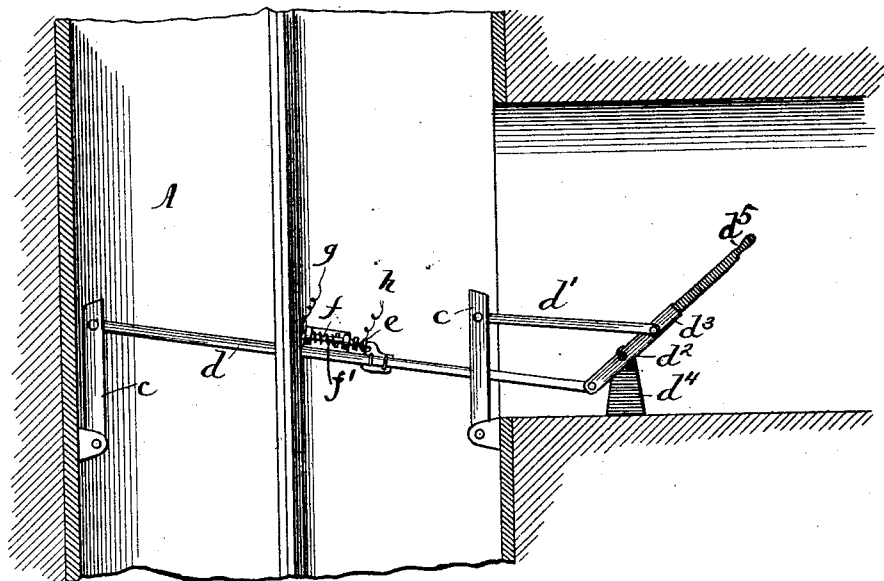


Fig 4.

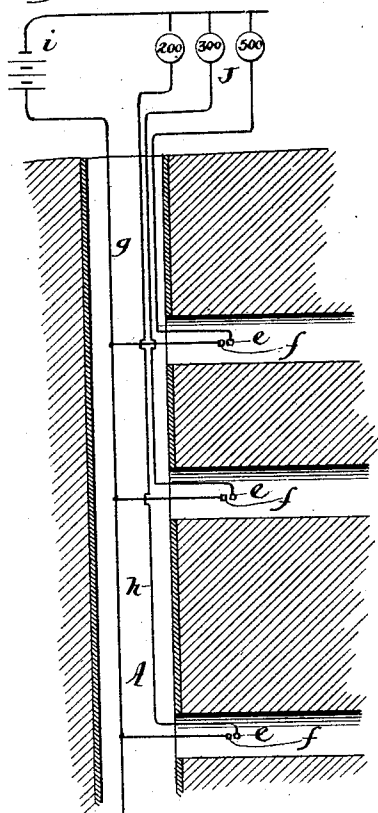


Fig 5.

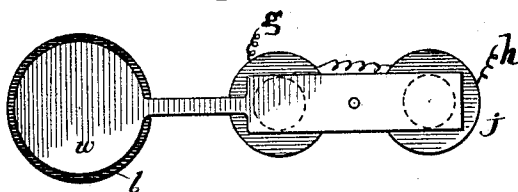
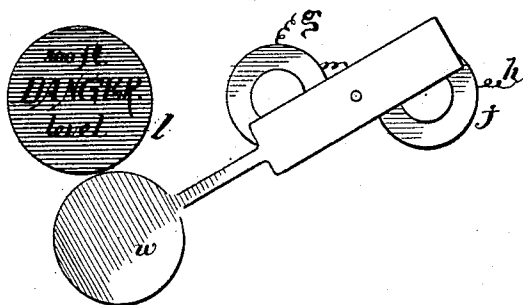


Fig 6.



Witnesses:
Fred. Seilach
Anton Langner

Inventor:
Frederick W. Bacorn
by Wm Zimmerman
att'y

UNITED STATES PATENT OFFICE.

FREDERICK W. BACORN, OF MARYSVILLE, MONTANA.

ELECTRIC SIGNAL FOR MINE-SHAFTS.

SPECIFICATION forming part of Letters Patent No. 454,018, dated June 16, 1891.

Application filed September 2, 1890. Serial No. 363,751. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. BACORN, a citizen of the United States, residing at Marysville, in the county of Lewis and Clarke and State of Montana, have invented certain new and useful Improvements in Electric Signals for Mine-Shafts, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part hereof, and in which—

Figure 1 represents a vertical section of a mine-shaft A, with its cage resting on chairs opposite a "level" with my improved electric signaling device attached, having its circuit broken. Fig. 2 shows the same in plan view below a horizontal plane, taken above the floor of the cage B, the upper part of the cage and a part of its floor being removed so as to show the chairs and their attached parts. Fig. 3 shows Fig. 1 with the electric circuit closed. Fig. 4 shows a section of a mine-shaft and three levels, each of which is provided with my circuit-closing mechanism and signaling device. Figs. 5 and 6 are semaphore-signals of my device.

Like letters refer to like parts.

The object of my invention is to provide a device which will always inform the engineer or person in charge of a mine-shaft of the condition of the chairs in the shaft—that is to say, whether such chairs are set to stop the cage or so as to allow it to pass down at any level of the mine, and thereby avoid the frequent and distressing accidents caused by the misplacement of such chairs, and in order to attain said desired ends I construct my new device in substantially the following manner, namely:

To one of a pair of bars *d*, which operates one set of chairs *c*, is attached a bracket carrying an insulated contact-surface *e*, and to a wall-bracket is attached another insulated contact-surface *f*. One of said contact-surfaces is preferably made adjustable in some such method as here shown in Figs. 1 and 2, namely: by being mounted on the end of a reciprocating rod *f'*, which is held in its forward position, as in this case, by a coiled spring surrounding said rod, and which has sufficient force to make a sure contact between said sur-

faces, but which yields to any variation in the motion of the bar *d*, which carries it.

In the known method for operating such chairs *c*, as here shown rods *d* and *d'* are attached at equidistant points from the point of support *d²* of a rocking bar *d³*, mounted on a post *d⁴*. Said mechanism is so arranged in its connection with the chairs *c* that by one motion of the attached operating-lever *d⁵* all the upper or free ends of the chairs are thrown toward the center of the shaft, and hence by reversing said lever all the chairs will be thrown out of or back from the center of the shaft. It is also evident that the contact-points *e f* may be attached to either bar *d* or *d'*, and that said contact-points may be reversed in their arrangement without either altering the principle of the construction or effect of my device. To said contact-points are connected wires *g* and *h*, forming an electric circuit from a battery *i* or a dynamo or equivalent device, and in the circuit thereof are placed one or more signals *j*, preferably a semaphore-signal such as is shown in Figs. 5 and 6, in which the former points to the sign that the shaft is clear and safe for the cage to pass below that particular level for which it is set and the latter to the sign which shows that for the same level the shaft is obstructed and therefore dangerous to attempt to pass the cage beyond such place. Each level or station of a shaft is provided with such a semaphore *j*, which is placed either in the engineer's room or other place near the person who has charge of the running of the cage, and each semaphore is marked for its corresponding level, as the "300-foot level," the "500-foot" or "600-foot level," as the case may be.

In my particular and preferred construction an armature turns on a pivot before an electro-magnet, which carries on the end of an arm extending from one end of said armature a white disk *w*, which covers a fixed red disk or surface *l* of about the same area. On said red disk is marked the particular level with which said mechanism is connected. It will be observed that this mechanism works on a closed circuit, and consequently if either the chairs are left in the position to do harm,

or any of the electro mechanism is out of order, the danger-signal will be given, which must be found and readjusted, so as to restore the mechanism to its proper working condition.

The operation of the mechanism is, from what has preceded, self-evident, but may briefly be stated to be as follows, namely: When the cage B makes a stop at any level, the chairs *c* are moved out for the cage to rest on them. By this act the contact-points *e* and *f* are separated, and thus the circuit is broken. This causes the disk *w* to fall, and thus expose the red disk behind it, which then indicates at which level the cage is stopping. After the cage has risen the chairs should be moved back to clear the shaft for its descent; but if the attendant at that level has failed to do his duty the semaphore for that level will continue to indicate danger until the chairs have been moved to their proper places. When this has been done, the circuit will be closed, and by its action the red disk will be covered by the moving or white disk, which will indicate that that point of the shaft is in a safe condition for the cage to pass, and also that all the electro mechanism is in working order.

What I claim is—

1. The combination, with cage-chairs and a lever to operate and bars to connect said lever and chairs, and a fixed electric contact-point, of an adjustable electric contact-point attached to and actuated by one of said connecting-bars, an electric circuit, and signaling devices therein, substantially as specified.

2. The combination, with an operating-le-

ver, cage-chairs and bars connecting said lever and chairs, and a fixed electric contact-point, of an adjustable electric contact-point attached to and actuated by one of said connecting-bars, an electric circuit, an electro-magnet, and an armature adapted to oscillate before the poles of said magnet and connected to and operating a signaling device, substantially as specified.

3. The combination, with an operating-lever, cage-chairs and bars connecting said lever and cage-chairs, and a fixed electric contact-point, of an adjustable electric contact-point attached to and actuated by one of said connecting-bars, an electric circuit, an electro-magnet, and an armature adapted to oscillate before the poles of said magnet, and said armature attached to a disk adapted to cover and uncover a fixed disk for signaling purposes, substantially as specified.

4. The combination, with an electro-magnet with an armature carrying a disk, of a fixed disk adapted to be covered and uncovered by the action of said armature, an electric circuit, operating-lever, cage-chairs and bars connecting said lever and chairs, a fixed electric contact-point, and an adjustable electric contact-point attached to and actuated by one of said connecting-bars, all arranged and adapted to operate an electric signaling mechanism, substantially as specified.

FREDERICK W. BACORN.

Witnesses:

WM. ZIMMERMAN,
WM. E. CLARKE, Jr.