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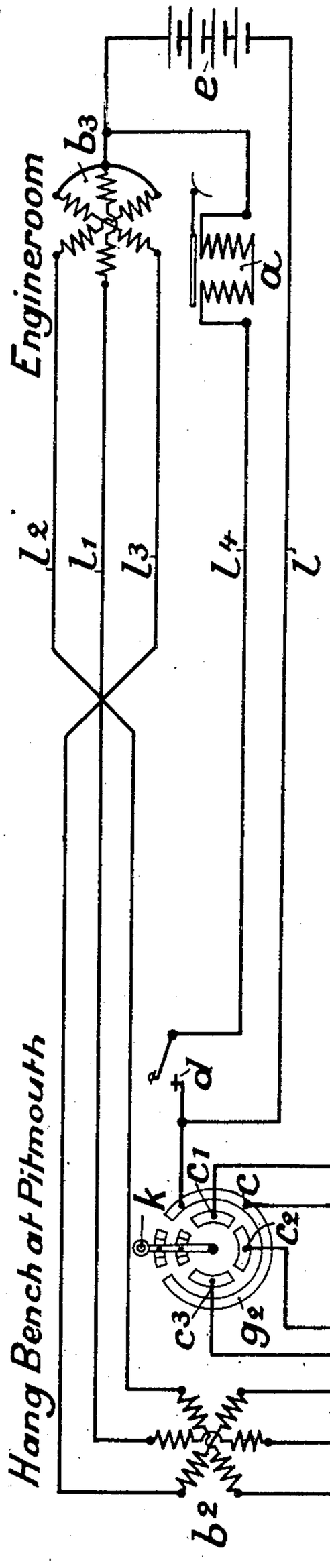
O. LÜDDECKENS.

SIGNALING APPARATUS.

APPLICATION FILED FEB. 21, 1903.

NO MODEL.



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UNITED STATES PATENT OFFICE.

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SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 754,152, dated March 8, 1904.

Application filed February 21, 1903. Serial No. 144,497. (No model.)

To all whom it may concern:

Be it known that I, OTTO LÜDDECKENS, engineer, a subject of the King of Prussia, German Emperor, residing at 51 Gartenstrasse, Breslau, Germany, have invented certain new and useful Improvements in Signaling Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in signaling apparatus, and in particular to a signaling apparatus for mines.

In mining-shafts there are usually three places between which an understanding must be kept up in order to properly control the drawing operation—namely, the bottom of the pit or sole of a gallery, the pit-mouth where the hang-bench is situated, and the drawing-engine. The engineman should not start his engine before all the necessary preparations at the bottom and at the hang-bench have been completed. For this reason the signaling apparatus was hitherto usually arranged in such a way that the operators at the sole of the pit first transmitted their orders to the pit-mouth and that the operators at the pit-mouth in their turn passed on the signal to the engine as soon as the preparations for the commencement of the drawing operation had been completed. This system, however, is subject to several disadvantages, one of which is that the double transmission of the signals naturally diminishes their reliability. Another disadvantage is that the engineman according to this system receives no warning beforehand that he will be called upon to start his engine, and therefore necessarily loses the time that is required for setting the engine to starting position.

My invention consists in a signaling arrangement which avoids these disadvantages by providing two separate signal-receiving devices in the engine-room, one of which is controlled by signal-transmitting devices located at the pit bottom and mouth, while the second is only controlled by a special auxiliary or final signal-transmitting device located at the hang-bench. Thus the engineman is in a position to follow the interchange of signals going on between the bottom and the mouth of the pit and to prepare his engine in good time for the reception of the final signal for starting.

The accompanying drawing is a diagrammatical illustration of the wire connections, signal-transmitting devices, and signal-receiving devices constituting the arrangement that forms the subject of my present invention.

In the diagram, e is a source of electricity of any usual kind.

g' and g^2 are two signal-transmitting devices situated the one at the pit-bottom and the other at the hang-bench.

b', b^2, and b^3 are three signal-receiving devices situated at the pit-bottom, the pit-mouth, and the engine-room, respectively.

l', l^2, and l^3 are electric conductors connecting the signal-receiving devices with each other and with the signal-transmitting devices g' and g^2.

k k are handles adapted in the usual way for operating the signal-transmitting devices g' and g^2 by means of the contact-pieces c, c', c^2, and c^3.

d is a separate auxiliary signal-transmitting device located at the hang-bench and preferably constructed like a telegraphing-key. a is the corresponding auxiliary signal-receiving device placed in the engine-room and preferably constructed as a single-stroke alarm-bell.

l and l^4 are conductors connecting d with a and with the battery e.

As will be seen in the drawing, the signal-transmitting devices g' and g^2 are connected in parallel to each other and in series with the three signal-receiving devices b', b^2, and b^3, and consequently all three signal-receiving devices are actuated simultaneously as soon as either of the two signal-transmitting devices is operated. On the other hand, it will be apparent from the connections shown that the auxiliary signal-receiving device a in the engine-room is only actuated when the key d at the hang-bench is depressed.

The operation of the whole system is as follows: Between pit-bottom and pit-mouth an interchange of signals takes place by means

of the signal-transmitting devices g' and g^2 and the corresponding signal-receiving devices. These may be of any known and usual type; but I prefer the three-magnet system, which is indicated in my diagram. The following are the lines taken by the current: When the operator at the bottom turns the handle k of his signal-transmitting device, the contact-piece c is brought into connection with c', c^2, and c^3, successively, and the current flows from the battery e over line l, contact-piece c, contact-pieces c', c^2, and c^3, respectively, lines l', l^2, and l^3, over the corresponding pairs of coils of the signal-receiving devices b', b^2, and b^3 and back to the battery. The armatures of the signal-receiving devices will therefore perform a rotation synchronous with the rotation of the handle k and will correspondingly actuate the pointers of the signal-receiving devices. The engineman can therefore continuously follow the proceedings at the bottom and mouth of the pit; but he should not interfere in the operation until the bell a in the engine-room is sounded by a depression of the key d at the hang-bench. When this key is depressed, the current takes the following path: battery e, line l, key d, line l^4, bell a, and back to the battery. It will be readily understood that a similar disposition can be adapted to serve arrangements in which several soles are to be connected. In this case every sole is provided with a signal-transmitting device and all signal-transmitting devices are arranged in parallel.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a signaling apparatus, the combination, with a plurality of signal-receiving devices located one at each signal-station, and a plurality of signal-transmitting devices located one at each station except one, each transmitting device being arranged to actuate all of the signal-receiving devices, of an auxiliary signal-receiving device located at the station which has no signal-transmitting device, and an auxiliary signal-transmitting device located at one of the remaining stations and arranged to operate the said auxiliary signal-receiving device.

2. In a signal apparatus for mines, the combination, with three signal-receiving devices located at the pit-bottom, pit-mouth and engine-room respectively, of two signal-transmitting devices located at the pit-bottom and pit-mouth respectively, and each arranged to actuate all of the signal-transmitting devices, an auxiliary signal-receiving device located at the engine-room, and an auxiliary signal-transmitting device located at the pit-mouth, and arranged to actuate the auxiliary signal-receiving device.

In testimony whereof I have affixed my signature in presence of two witnesses.

OTTO LÜDDECKENS.

Witnesses:
ERNST KATZ,
ALBERT SCHENK.