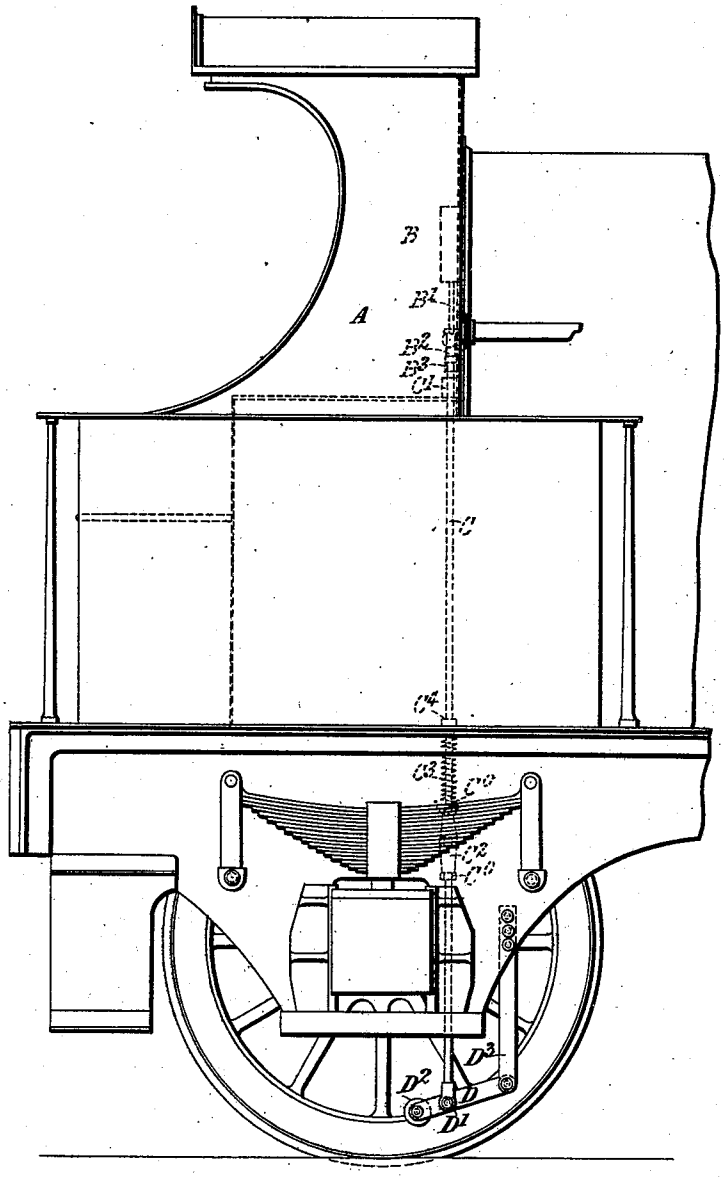
(No Model.) 6 Sheets—Sheet 1.

E. T. ZOHRAB.

RAILWAY SIGNAL.

No. 506,146. Patented Oct. 3, 1893.

Fig. 1.



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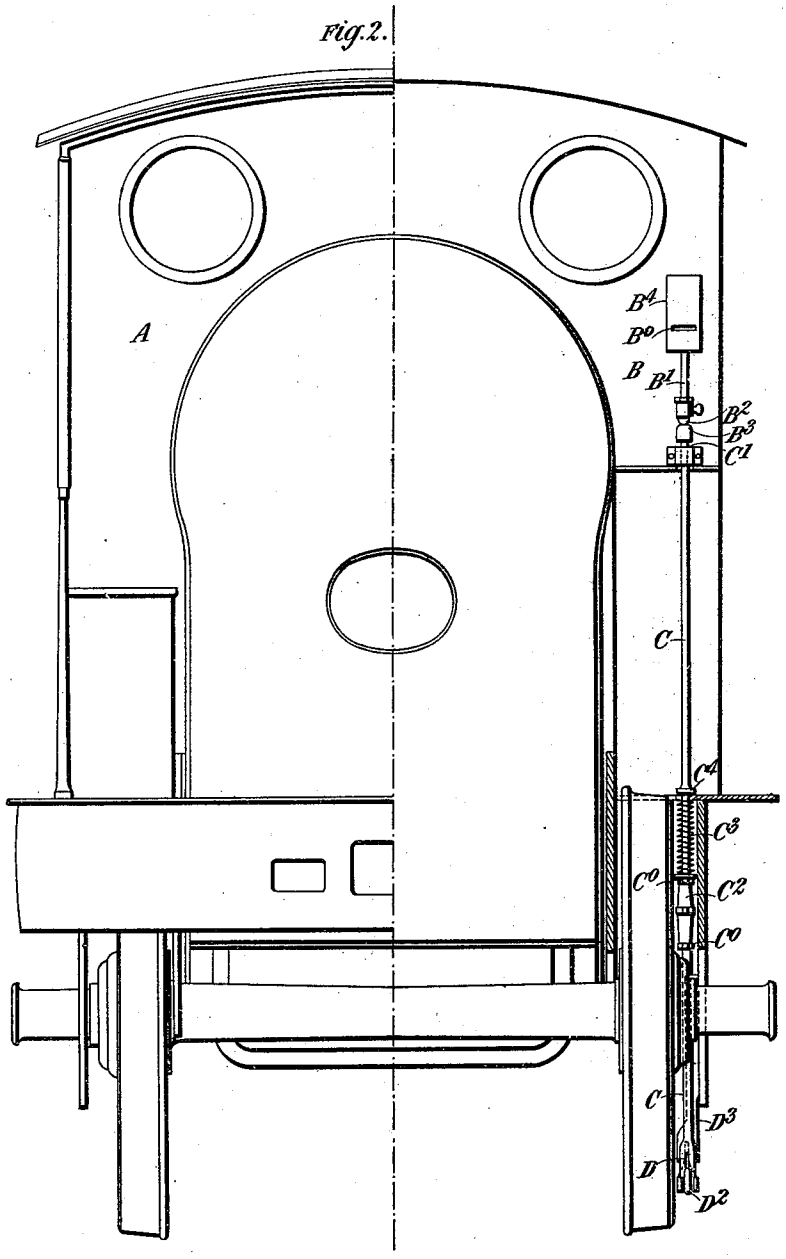
RAILWAY SIGNAL.

No. 506,146. Patented Oct. 3, 1893.

Fig. 2.



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(No Model.) 6 Sheets—Sheet 3.

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RAILWAY SIGNAL.

No. 506,146. Patented Oct. 3, 1893.

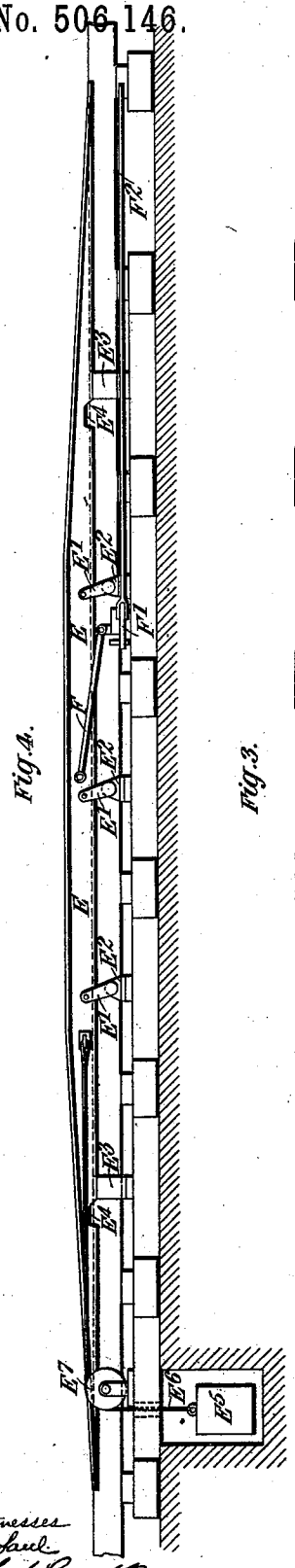

Fig. 4.

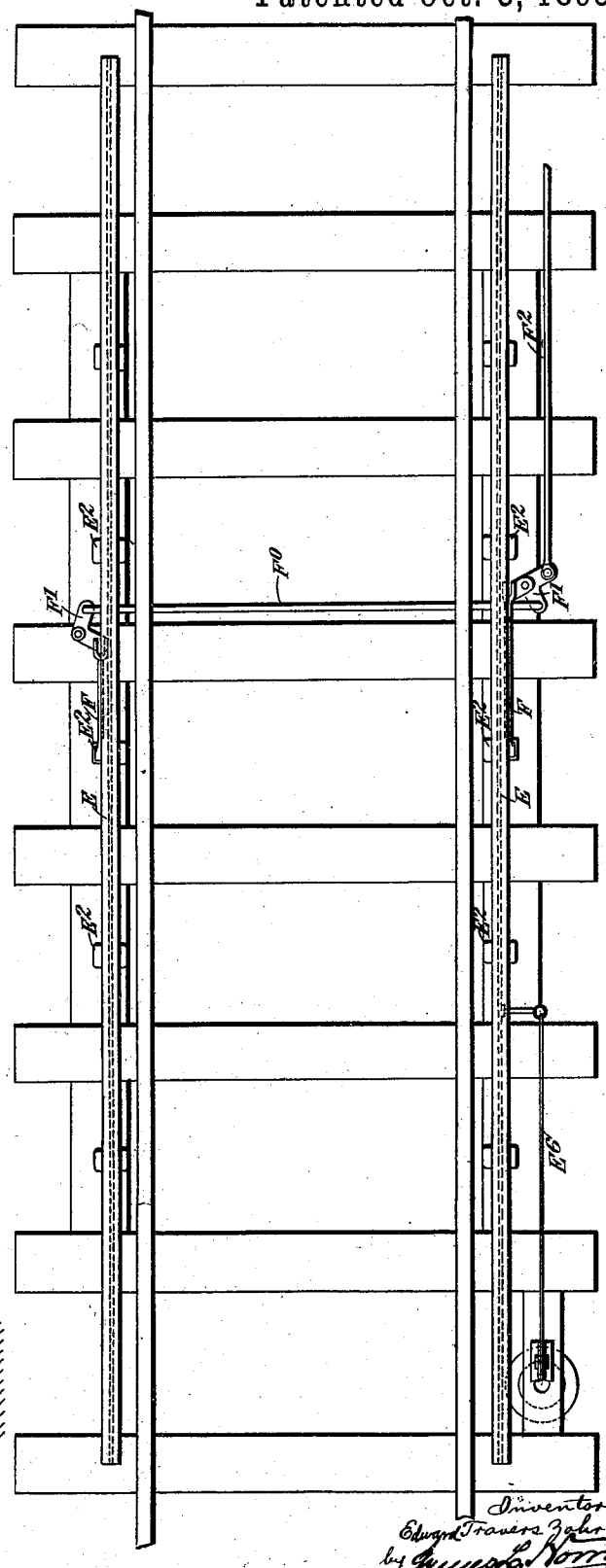

Fig. 3.

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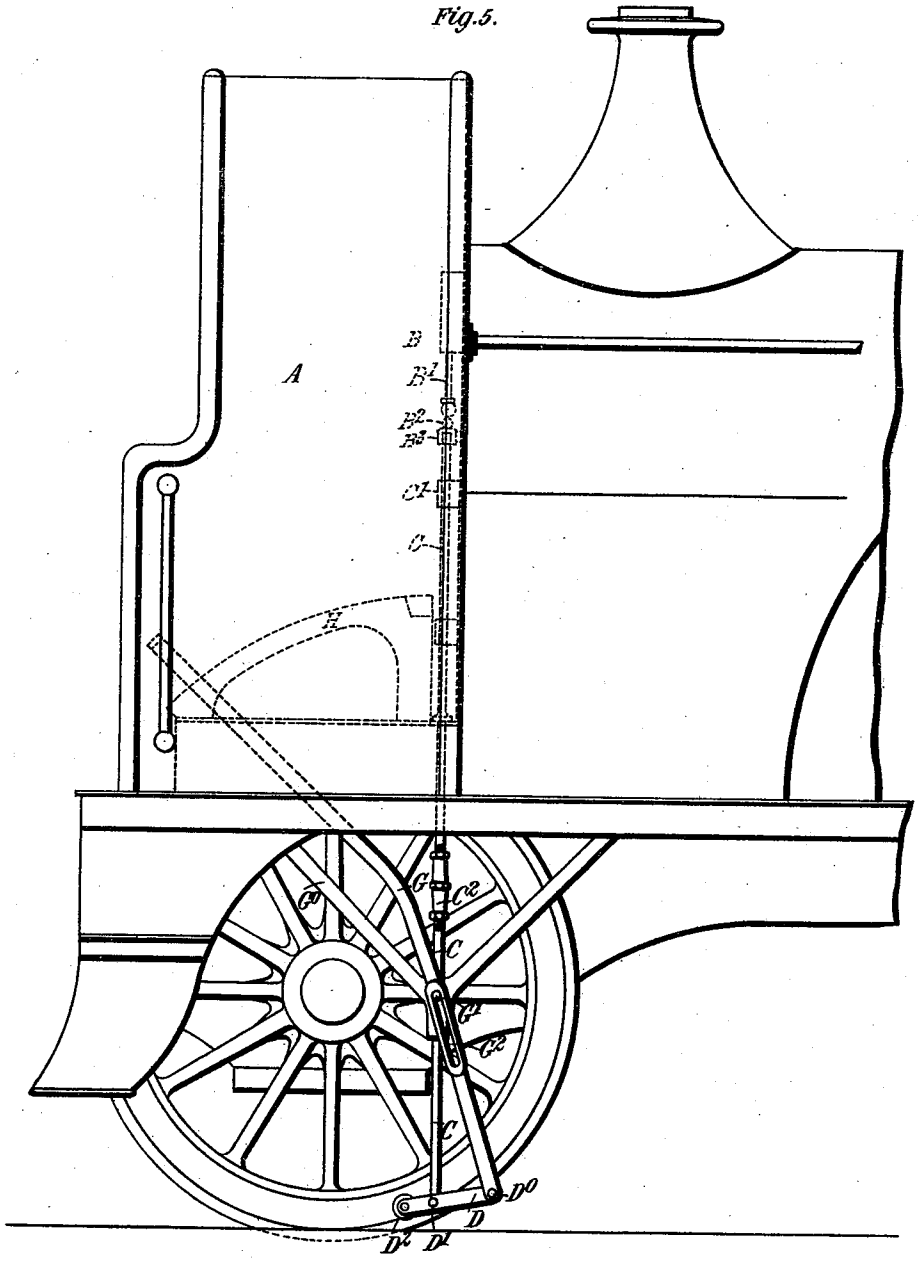
RAILWAY SIGNAL.

No. 506,146. Patented Oct. 3, 1893.

Fig. 5.



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(No Model.) 6 Sheets—Sheet 5.

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RAILWAY SIGNAL.

No. 506,146. Patented Oct. 3, 1893.

Fig. 5a

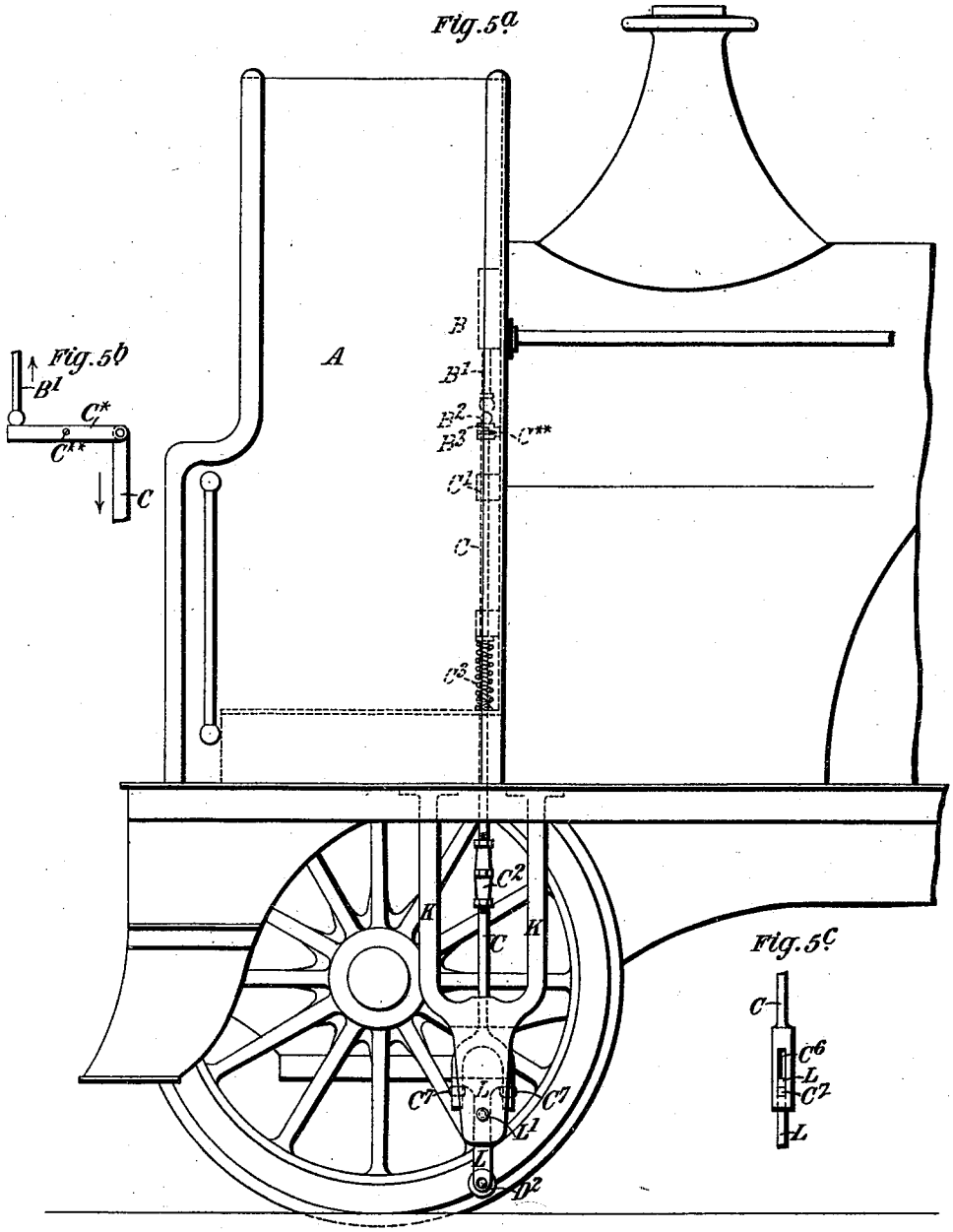

Fig. 5b

Fig. 5c

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RAILWAY SIGNAL.

No. 506,146. Patented Oct. 3, 1893.

Fig. 7.

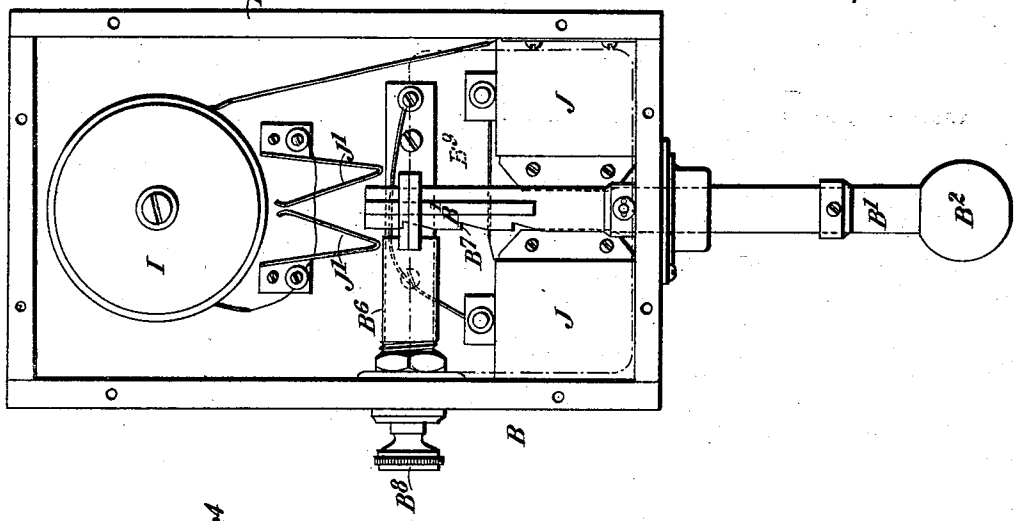


Fig. 8.

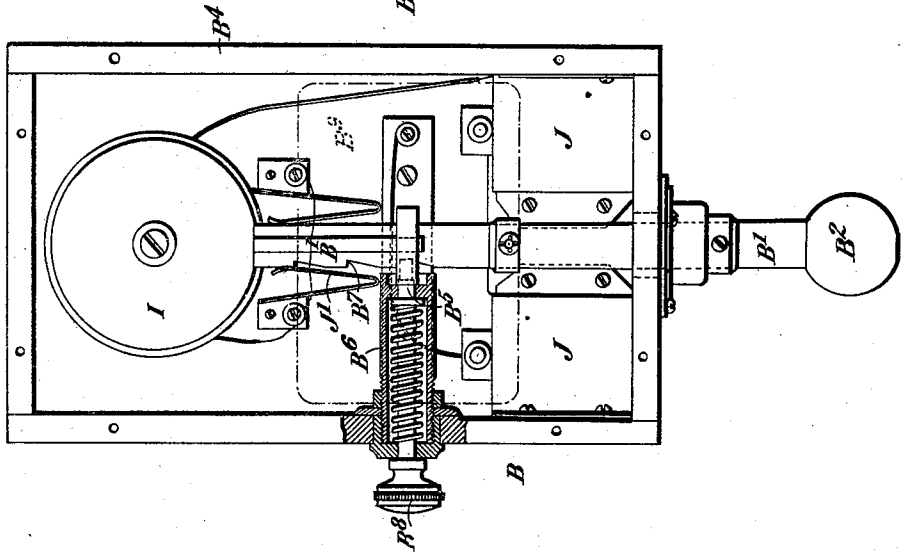
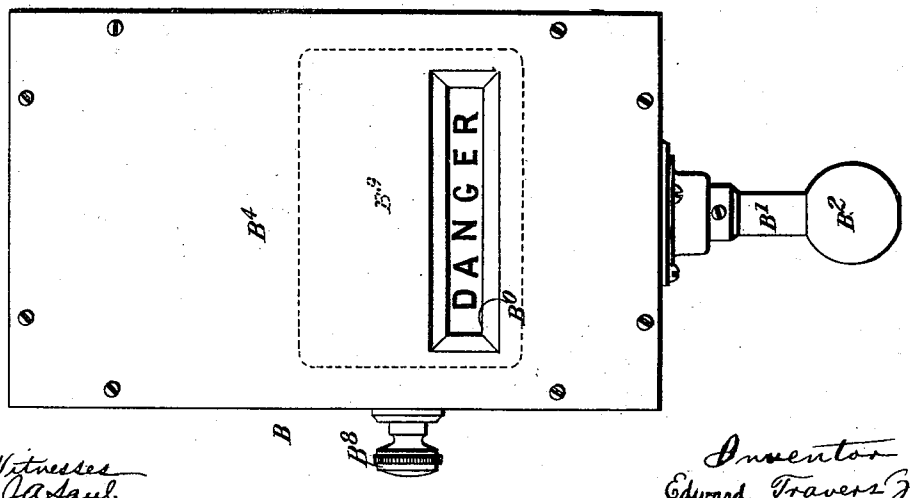


Fig. 6.



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UNITED STATES PATENT OFFICE.

EDWARD TRAVERS ZOHRAB, OF LONDON, ENGLAND.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 506,146, dated October 3, 1893.

Application filed March 21, 1893. Serial No. 467,072. (No model.)

To all whom it may concern:

Be it known that I, EDWARD TRAVERS ZOHRAB, civil engineer, a subject of the Queen of Great Britain, and a resident of 1 Pilgrim Lane, Hampstead, London, in the county of Middlesex, England, have invented certain new and useful Improvements in Signaling on Railways, of which the following is a specification, reference being had to the accompanying drawings.

This invention has for its object to provide novel means for communicating signals either visible or audible, or both visible and audible to the driver of a locomotive for indicating to the driver the state of the ordinary signals on the line before arriving at the same.

To accomplish this object my invention consists in the features of construction and the combination or arrangement of devices hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a side view of a portion of a locomotive having my improved signaling device applied thereto. Fig. 2 is a rear view of the same. Fig. 3 is a plan, and Fig. 4 is a side elevation of a pair of double inclined planes mounted on the track for controlling the locomotive signal. Fig. 5 is a view similar to Fig. 1 but showing a construction for reversing the trailing lever. Fig. 5^a is another view similar to Fig. 1 but showing a further slight modification in construction of my invention. Figs. 5^b and 5^c are views of details, of Fig. 5^a, hereinafter described. Fig. 6 is an enlarged detached view of the signaling apparatus proper. Fig. 7 is an internal view of the same, the plate B^9 which shows the visible signals being indicated by dotted lines, the signal being "off." Fig. 8 is another internal view showing the parts in a different position, that is to say, the signal being "on."

Like letters denote corresponding parts throughout the drawings.

A is the locomotive cab; B is the signaling apparatus proper placed in a convenient part of said cab so that it can be readily seen by the engine driver.

C is a rod guided in a bearing C′ through which it can slide freely up and down but cannot turn therein, it being prevented from turning by a feather, or pin or the like. The said rod C is adapted to actuate the signals in a manner hereinafter described. For the purposes of adjustment the rod C is preferably made in two parts which are connected together by an adjusting nut C^2 that has its opposite ends screw-threaded with right and left-handed threads which fit corresponding threads on the contiguous ends of the two parts of the rod. When the said nut is rotated, the two parts of the rod C are caused to approach or recede from each other in a well known manner.

C^0 C^0 are locking nuts to prevent accidental unscrewing of the two parts of the rod C from the adjusting nut C^2.

C^3 is a spring, bearing against the foot plate for example or other conveniently fixed part of the cab and pressing upon the nut C^2 or a loose collar resting thereon and serving to keep the rod C down. A collar C^4 formed on the rod C serves to limit the downward travel of the rod by resting on the foot-plate for example or other fixed part of the cab.

The lower end of the rod C is coupled at D′ to a trailing lever D which is pivoted at its forward end to a fixed bracket D^3 carried by the engine frame. The lever D extends rearwardly some distance behind its connection D′ with the rod C and carries at its rear extremity a pulley or roller D^2. The roller may be supported in simple bearings or in ball bearings. One such rod C with its appurtenances as above described may be placed on either or on both sides of the cab in such position that the roller D^2 will roll upon an inclined plane provided on the permanent way as now to be described. The said inclined plane consists of a bar E Figs. 3 and 4 mounted on short levers E′ in a manner similar to the mounting of the locking bar of ordinary interlocking point mechanism. I place such a bar E just outside either or both metals, preferably both, and parallel thereto. The upper face of each of said bars is level or horizontal at the center for a suitable distance say a few feet, and is inclined downward from said central portion to each end.

The inclination of said inclined faces is very slight so as to cause a very gradual ascent of the rod C when the roller D^2 travels up the incline. The bars E are made for example about twenty or thirty feet long. The short supporting levers E′ are pivoted to brackets E^2 secured on the permanent way, and the bars are actuated for raising and lowering the same through links F F pivoted to the bars, levers F′ F′ connected together by a link F^0, and a signal rod F^2 which may be connected with a signal lever placed on the permanent way, or it may be connected with and operated by the wire or point rod of an ordinary line signal, so that the said signal and the bars E will be operated simultaneously.

For firmly supporting the bars E in their two positions of rest corresponding with "line clear" and "danger" I provide fixed bearings E^3, and I form notches E^4 in the bars one near each bearing E^3 as indicated. When the bars are in their lowest position the notched parts thereof rest on the supports, the levers E′ being inclined in one direction from the vertical and when in their highest position of rest the lower faces of the bars rest on the said supports, the levers E′ being then inclined on the opposite side of the vertical but at a less angle than before. One end of each notch is beveled as shown to allow of the free descent of the bars on the supports. I may load the bars E by springs which tend to depress the same, or in lieu of springs I may substitute weights E^5 suspended from the bars by chains E^6 and hanging in pits provided to receive them, the chains passing over guide pulleys E^7. The inclines are so arranged in combination with the controlling weights or springs, that their normal position is that corresponding with a danger signal.

In the Figs. 1 and 2 the apparatus shown gives a visible signal. It comprises a rod B′ preferably provided with a vulcanite end piece B^2 which rests on a rubber block B^3 secured on the upper end of the rod C. The rod B′ which can slide up and down through a case B^4 carries suitable legends such as "Line clear" and "Danger" which in certain positions of the rod can be seen through a slit B^0 formed in the case B^4.

The operation of the above described mechanism is as follows: when the locomotive passes over the bars E the roller D^2 rolls up the inclined upper face of one of said bars and thus raises the rod C. The amount of such lift depends on the position of the bars E. If said bars are in their normal raised position the rod C will be lifted such an amount that the signal "danger" is brought opposite the slot. If however the bars have been pulled into their lowest position, the lift of the rod C is only slight and the signal is caused to indicate "line clear." It will thus be seen that by manipulating the bars E, the desired signal can be communicated to the driver. It is desirable that the roller D^2 shall always be at the rear or trailing end of the lever D whichever way the engine is running; or in other words that the lever shall always be a trailing lever. For this purpose I provide in some instances a suitable reversing device such as now to be described; that is to say I pivot the lever D to a movable bar G Fig. 5 which can be reversed so as to bring the pivot point D^0 to either side of the rod C. I hinge the said bar G to a pin G′ carried by a bracket G^0 fixed to the engine frame, and I extend the bar upward to form a handle which projects through a quadrant or curved guide H. The said bar is slotted at G^2 to allow it to slide on the pivot pin G′ when reversing the same. It will be seen that by raising the bar G and then pulling or pushing the same forward or backward, the pivot D^0 can be readily moved from one side of the rod C to the other side thereof. The handle of the bar G may be provided with a spring locking catch, similar to that of an ordinary locomotive reversing lever, to engage with notches in the guide H and lock the bar in either of the extreme positions to which it may be set.

In Fig. 5^a I have shown another slight modification in the application of my invention. In this construction the rod C is arranged to be drawn down when operated by the inclines. The said rod which is pressed upward by the spring C^3 is connected with one end of a lever C* shown in rear view in Fig. 5^b the other end of which lever projects immediately underneath the rod B′ of the signaling device. Said lever C* is pivoted at a point intermediate of its ends on a fixed pivot C**. K is a bracket fixed to the engine frame and forming a guide for the rod C. The said rod is forked at its lower end as shown and the two arms of the fork are slotted at C^6 as clearly shown in Fig. 5^c to receive the head of a T-shaped lever L the stem of which is pivoted at L′ to the bracket K. Between the lower ends of the slots C^6 and the head of the lever L are placed buffers or pads of india-rubber C^7. The lower end of the lever L carries a roller D^2. The said lever L takes the place of the lever D in the previously described constructions. The operation of this device is as follows, that is to say, when the roller D^2 arrives at one of the inclines and rolls up the same, the lever L is thereby turned about its pivot L′ to the position indicated in dotted lines either to the right or left according to the direction in which the engine is running, and the rod C is drawn down by the head of the lever. The end of the lever C* which is underneath the rod B′ is by this movement raised, and the rod B′ is thereby pushed up thus giving the desired signal as before described. It is obvious that the lever L will act equally well in whichever direction the engine is running.

It is obvious that I may construct my im-

proved signaling device so that it will indicate three or more signals if desired, by suitably controlling the extent of lift of the inclines or bars E. Usually however, especially when the said bars are connected to and worked simultaneously with an ordinary line signal, two indications will be sufficient.

I may place the signaling bars E at any desired distance in rear of the line signal so that the driver will receive an indication of the condition of the line, that is to say as regards the fact of its being blocked or clear before arriving at the ordinary signal. This is very useful when the ordinary signals cannot be seen by reason of curves for example. It is also specially useful in foggy weather and will dispense with the necessity of using detonating fog signals at such times.

I prefer to provide in addition to the signal or signals above described, or in lieu thereof, an audible signal such as a mechanical or electric bell which shall be controlled by the movements of the rod C. I will now describe more particularly one such device wherein I use an electric bell.

I, Figs. 7 and 8 is an electric bell worked preferably by a dry battery J. The rod B′ of the signaling apparatus is adapted when raised to make contact with the spring contact plates J′ and complete the bell circuit, thus ringing the bell. I may so arrange the plates J′ in combination with the rod B′ that the bell circuit is completed by the said rod B′ both when the latter is raised the distance corresponding with a "line clear" signal, and when it is still farther raised to correspond with a "danger" signal. Or I may arrange that the circuit shall only be completed and the bell rung when the "danger" signal is given. In the former case the bell signal is used in conjunction with a visible signal on the engine. In the latter case the visible signal may if desired be dispensed with.

I prefer that the signal when given shall remain "on" until released or put off by the driver. For this purpose I provide a spring catch B^5 which is adapted to slide laterally in a fixed support B^6 and to automatically engage with one or the other of a series of notches B^7 in the rod B′ and retain the said rod in its raised position until the said catch is withdrawn by pulling its knob B^8. Other equivalent means may obviously be substituted for the catch B^5 and notches B^7.

The ordinary guard in front of the engine for clearing the rails of obstacles may be made so wide as to cover the signal rollers D^2 above described. Or I may provide a special guard for this purpose. In case it is desired to carry this guard down as low as the roller D^2 it must be made to lift so that it can pass clear over the inclines E it being lifted by the said inclines when arriving thereat.

In some cases it may be desirable to provide a pair of such signaling devices arranged at different distances from the signal so that if for example the danger signal is operated by the first device, the driver can proceed slowly until arriving at the second device, where he will stop until the proper signal is given to proceed.

What I claim is—

1. The combination of vertically adjustable inclines mounted on the permanent way, a trailing lever D pivoted at its forward end to the engine frame and carrying a roller D^2 at its rear end which roller is adapted to roll upon said inclines, a spring controlled rod C pivoted to said trailing lever at a point intermediate of its ends, and a signal device the controlling rod of which rests upon and is actuated by the rod C but is not connected thereto, substantially as, and for the purpose specified.

2. The combination of vertically adjustable inclines mounted on the permanent way, a trailing lever D pivoted at its forward end to the engine frame and carrying a roller D^2 at its rear end, which roller is adapted to roll upon said inclines, a spring controlled rod C pivoted to said trailing lever at a point intermediate of its ends, and a visible signal device comprising a plate marked with suitable signs which plate is adapted to move in a case and expose the signs successively to view through a slit in the said case, the controlling rod of the said plate being constructed to rest upon and be actuated by the rod C but is not connected thereto, substantially as, and for the purpose, specified.

3. The combination of vertically adjustable inclines mounted on the permanent way, a trailing lever D pivoted at its forward end to the engine frame and carrying a roller D^2 at its rear end which roller is adapted to roll upon said inclines, a spring controlled rod C pivoted to said trailing lever at a point intermediate of its ends, and a combined visible and audible signal device the controlling rod of which rests upon and is actuated by the rod C but is not connected thereto substantially as, and for the purpose, specified.

4. The combination of vertically adjustable inclines mounted on the permanent way, a trailing lever D pivoted at its forward end to the engine frame and carrying a roller D^2 at its rear end, which roller is adapted to roll upon said inclines, a spring controlled rod C pivoted to said trailing lever at a point intermediate of its ends, and a combined visible and audible signal device comprising a plate marked with suitable signs which plate is adapted to move in a case and expose the signs successively to view through a slit in the said case, and a bell which is adapted to be rung by the raising of a rod connected with said signal plate, the controlling rod of said plate being so constructed and arranged as to rest upon and be actuated by the rod C but is not connected thereto, substantially as and for the purpose specified.

5. The combination of vertically adjustable inclines mounted on the permanent way, a trailing lever D pivoted at its forward end to the engine frame and carrying a roller D^2 at its rear end which roller is adapted to roll upon said inclines, a spring controlled rod C pivoted to said trailing lever at a point intermediate of its ends, and a combined visible and audible signal device comprising a plate marked with suitable signs which plate is adapted to move in a case and expose the signs successively to view through a slit in the said case, and an electric bell the circuit of which is adapted to be closed by the raising of a rod connected with said signal plate, the controlling rod of said plate being so constructed and arranged as to rest upon and be actuated by the rod C but is not connected thereto, substantially as and for the purpose specified.

6. The combination of vertically adjustable inclines mounted on the permanent way, a reversible trailing lever D pivoted at one end to a reversing bar G carried by the engine, a roller D^2 at the other end of said lever D said roller being adapted to roll on the said inclines, a spring controlled rod C pivoted to said trailing lever at a point intermediate of its ends, and a signal device the controlling rod of which rests upon and is actuated by the rod C, but is not connected thereto, substantially as, and for the purpose, specified.

7. The combination of vertically adjustable inclines mounted on the permanent way, a reversible trailing lever D pivoted at one end to a reversing bar G carried by the engine, said reversing bar being slotted at G^2 and supported by a fixed pin G′ which construction admits of the bar being raised and then turned about the pivot pin G′ to move the pivot point of the trailing lever to either side of the rod C, a roller D^2 carried by the free end of the lever D, said roller being adapted to roll on the said inclines, a spring controlled rod C pivoted to said trailing lever at a point intermediate of its ends, and a signal device the controlling rod of which rests upon and is actuated by the rod C, but is not connected thereto, substantially as, and for the purpose, specified.

In witness whereof I have hereunto set my hand this 6th day of March, 1893.

E. TRAVERS ZOHRAB.

Witnesses:
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