No. 776,748. PATENTED DEC. 6, 1904.

E. C. LAWRENCE.

RAILROAD ALARM SIGNAL.

APPLICATION FILED MAR. 30, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

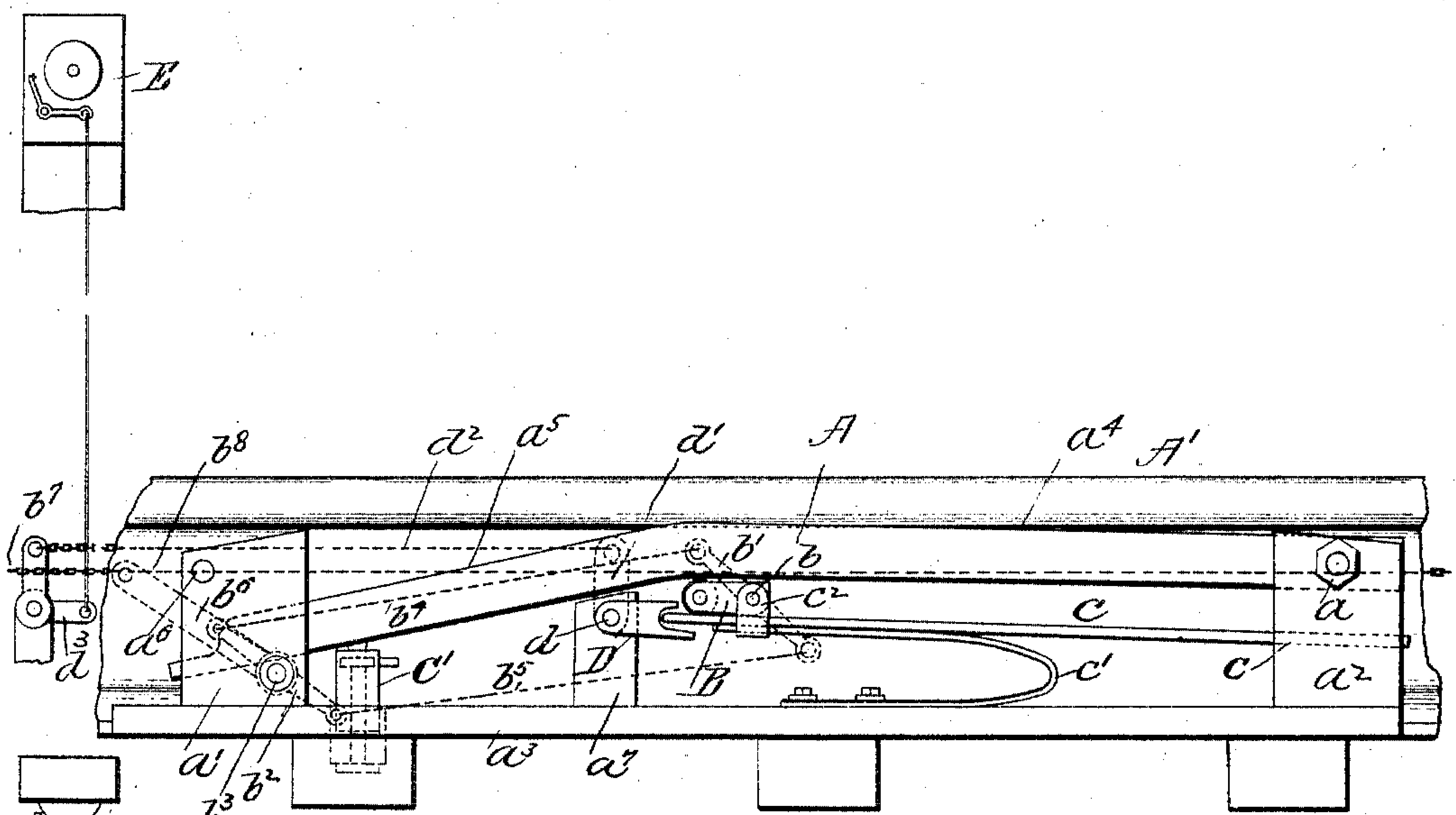

Fig. 1.

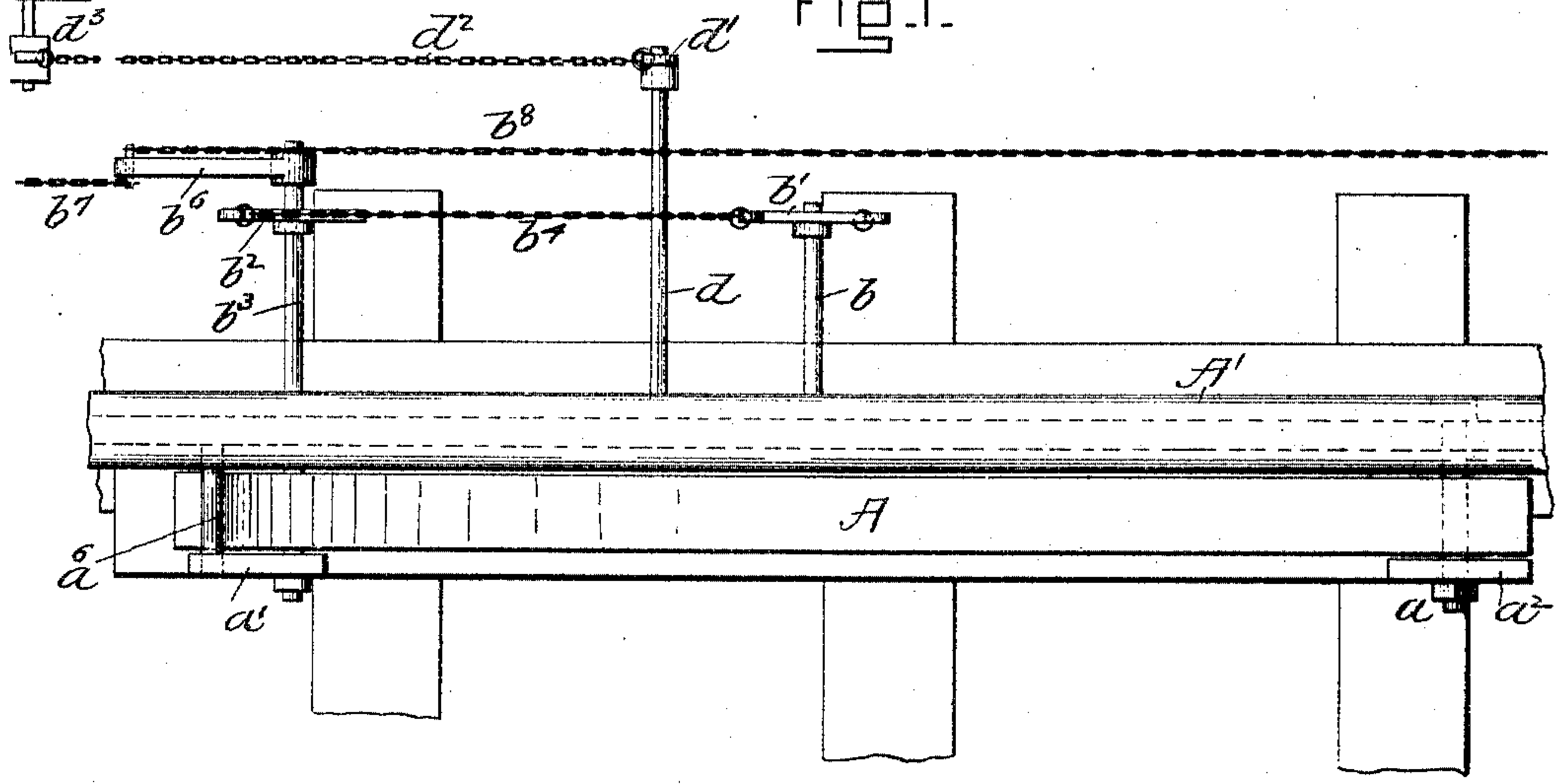

Fig. 2.

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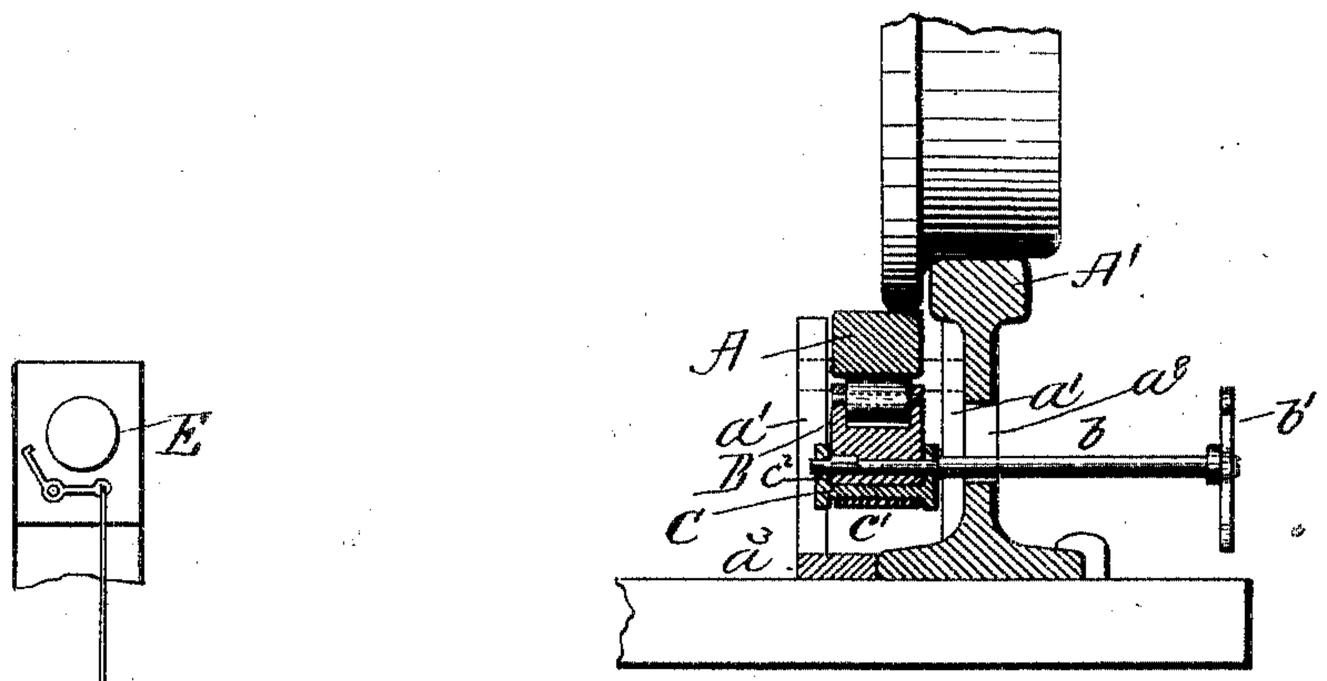

Fig. 5.

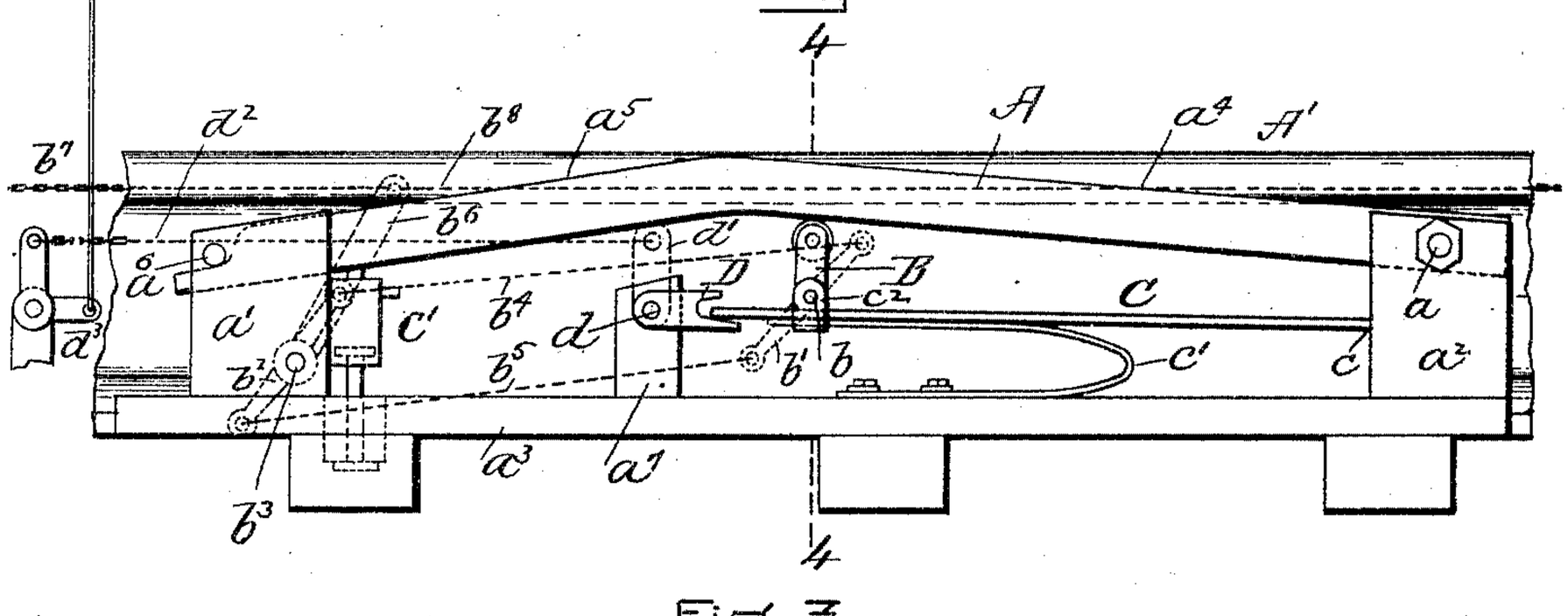

Fig. 3.

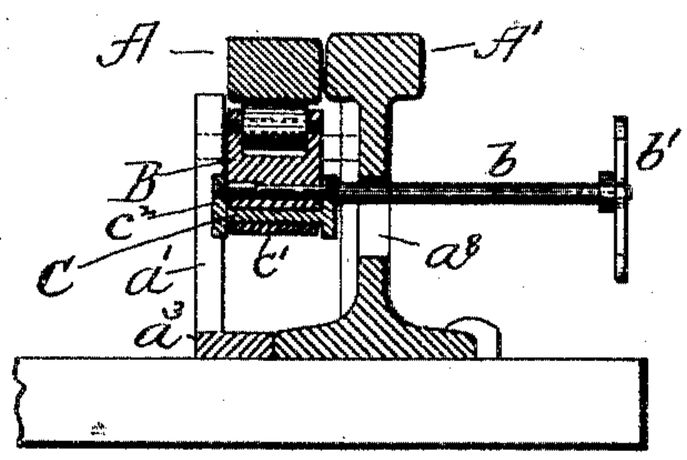

Fig. 4.

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No. 776,748. Patented December 6, 1904.

UNITED STATES PATENT OFFICE.

ELIJAH C. LAWRENCE, OF BOSTON, MASSACHUSETTS.

RAILROAD ALARM-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 776,748, dated December 6, 1904.

Application filed March 30, 1903. Serial No. 150,091. (No model.)

To all whom it may concern:

Be it known that I, ELIJAH C. LAWRENCE, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Railroad Alarm-Signals, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

My invention relates to an improved form of railroad alarm-signal of the kind that is adapted to be acted upon by the wheels of a passing train to indicate the passage thereof.

It comprises a device so constructed as to be operated upon by flanges of the wheels passing over it, when a bell or other instrumentality is excited with which the device is in connection and which excitation marks the effect of its operation. The essential feature of my invention, however, consists in so making my device that it may be thrown into or out of operatable position, whereby it can or cannot be operated upon by the flanges of the wheels passing over it. While this may not be so essential a factor, if my device be so used to mark the approach of a train to a crossing or station, when the device would naturally remain in a constant operatable position in order to mark the approach of any train, it does become of most material consequence if my device be used in connection with switches or sight-signals or the like to indicate whether or not the switch or signal be properly set, as by the non-operatable position of the device corresponding with the proper setting of the switch or signal, when the passage of the wheel over it is attended with no demonstration, and by the operatable position thereof corresponding with an improper setting of the signal, when the operation of the device in exciting a bell or other means of demonstration is indicative of such fact, the operatable or non-operatable position of the device being automatically controlled by the switch or signal or otherwise controlled to correspond therewith. Accordingly it is with this further end in view that I have so constructed my device that it can be thrown into or out of operatable position and to obtain which changes of position automatically or otherwise it is within the purposes of my invention to supply a means.

Referring to the drawings, in connection with which the various details incident to the perfection of my device can best be seen and understood, Figure 1 shows my device in elevation looking toward the inside of the rail and with the parts arranged to be in non-operatable position. Fig. 2 shows my device in plan. Fig. 3 shows my device in elevation looking toward the inside of the rail with the parts in operatable position. Fig. 4 shows a horizontal cross-section of my device on the line 4 4 of Fig. 3. Fig. 5 is practically the same cross-section as Fig. 4, the relatively different position of the parts existing by reason of the fact that they are being operated upon, as will hereinafter be explained.

Referring to the drawings, A represents a camber-lever in position to extend along on the inside of a rail A′ and pivoted at one end by a bolt a, extending through the web of the rail slightly below its tread. The lever A when in operatable position is adapted to be borne down, turning from its pivoted end, by the flange of a wheel passing along the tread of the rail. For securing the proper placement of the lever that the wheel-flange may properly engage with it and in order to guide it in its vertical movement the lever is confined in a box-like frame comprising the sides a' a' a^2 a^2 alongside its respective ends and extending up from a common base-board a^3, secured along the ties and alongside the inside flange of the rail. The lever A is of substantially the convexity shown, with relatively long and short top inclined surfaces a^4 a^5, respectively. When the lever is in operatable position, the head or apex of its arch or convexity is approximately flush with the top surface of the tread of the rail in order that the lever may receive and be operated upon by the entire flange of the passing wheel, and in this connection it is to be observed that the flange does not engage with the lever by a sudden contact, but by gradually rolling along its inclined top surfaces, the longer incline to receive the contact of a flange coming

in one and the more usual direction, while the shorter incline receives the contact of a flange coming in a reverse direction. This shorter inclined formation of the lever is provided more for the purpose of preventing my device being injured by the flanges of wheels coming in a reverse direction to the usual course, as might be the case when a train was backing up. The upward movement of the lever A, or when the lever is in a normally operatable position, as before referred to, is limited by a stop comprising the cross-pin a^6, extending between the sides a' a' and with which the free end of the lever is made to engage. The lever A is normally kept in the aforesaid operatable position by means of a roller-cam B, borne by the spring board or bar C, which extends below the long incline of the lever A and approximately parallel with it.

The spring board or bar C is held in place fixed at one end between the sides a^2 a^2 of the frame at the point c below the pivotal connection of the lever A, as before indicated. It receives, through the interposition of the cam B, whatever movement is given to the lever A as the flange of the wheel passes over it, the elasticity of the board or bar permitting of its being turned or bent downward from its fixed end and which elasticity, moreover, may be of sufficient tension to return or assist in returning the lever A to its operatable position after the wheel has passed over it, which effect must be obtained in order that the lever may remain in a normally constant operatable position to receive the contact of the flanges on a plurality of wheels. The better construction, however, is, as shown, to fortify the spring board or bar C with one or more elastic springs c', which are secured to the base-board a^3 of the frame and which springs bear up with tension against the under side of the said board or bar. In order to insure against a breakage of one of these springs, each one is made of sufficient tension in itself to throw back the lever A properly into place, or, as before suggested, the spring board or bar C in itself may be of sufficient tension to perform this function.

In C', I have shown a dash-pot arranged to be engaged by the end of the lever A and as reinforcing the tension of the spring board or bar C, and its supplementary springs act to break the sudden motion of the lever A.

For utilizing the reciprocatory motion which would thus be imparted to the lever A by the flanges of passing wheels I have provided the following means of transmission: Instead of taking the motion directly from the lever A, I take it from the spring board or bar C, which has relatively the same motion as the lever A, but which moves more uniformly or harmoniously by reason of its elasticity. The means comprises the rock-lever D, made to engage with the movable end of the board or bar C. The lever D is fixed to a shaft d, which has bearings in the stud a^7, fixed to the base-board a^3 of the frame, and which shaft is extended laterally through the web of the rail to the outside thereof, where it carries the rock-lever d'. Secured to the end of the rock-lever d' is a chain d^2 or like means of connection, which chain may be extended any necessary distance and then through any suitable lever, as a bell-crank lever d^3, may excite a bell E or other means of demonstration and which excitation marks the effect of the operation of the lever A and continues as long as the lever is operated upon by the wheel-flanges.

Thus far my invention pertains to a means complete in itself that may be used for the purpose of marking the approach of a train, as to a station or crossing, the bell or other means of demonstration being located at the station or crossing and excited by the flanged wheels of the train through the intermediary of my device and its connecting chain or chains. Inasmuch as the device thus used would remain in a constantly-operatable condition to be actuated by any train which might pass, there would be no need of a means combined with my device or of so making it that it could be thrown into or out of operatable condition, and in this connection it might be said that in so far as the perfection of my device relates to the capability just referred to the roller-cam B instead of being a movable member may as well be eliminated altogether and a fixed member in its place be used. It is my inventive purpose, however, and perhaps more essentially, to so form my device that it can be thrown into or out of operatable condition or so that it can or cannot be actuated by the wheel-flanges passing over it and to have this capability in order that the device might be used with switches, sight-signals, or such like to indicate by the ringing of the bell or other demonstration whether or not the switch or signal is properly set, as by the non-operatable condition of the device corresponding with the proper setting of the switch or signal, when the passage of the flange over it is attended with no demonstration, and by the operatable condition thereof corresponding with an improper setting of the switch or signal, when the operation of the device in exciting a bell or other means of demonstration is indicative of such fact. It is also my further purpose to so construct my device that its transformation can be accomplished from a distance and automatically, as by the setting of a switch or sight-signal or other means controlled to correspond therewith, in order that ample time may be given for correcting any irregularities or misplacement. This capability of my device I accomplish by means of changing the relative position of the camber-lever A or so that it can or cannot be operated by the flanges of the wheels passing over it, and this,

moreover, by turning the cam B. The roller-cam B, as before referred to, is interposed between the lever A and the spring board or bar C to furnish the intermediate link by which the motion of the lever is imparted to the said board or bar and is hinged to it, so as to be turned up or down, when turned up being adapted to engage with the bottom of the lever A, so as to throw it up into operatable position, (see Fig. 3,) or to be turned down, when the lever is allowed to drop and so to fall out of operatable position or where it cannot be acted upon by the flange of the passing wheel. (See Fig. 1.)

As a means for furnishing the hinged or pivotal connection of the cam B and as an instrument to assist in turning the cam I have fixed the same to a shaft b, which turns in bearings formed in ears c^2, extending from the board or bar C, and by which therefore the hinged or pivotal jointure of the cam to the said board or bar is obtained. The shaft b is then extended through the web of the rail to the outside thereof, and in this connection it is to be noted that a slot a^8 is cut in the rail at the point where the shaft b passes through it in order to permit of its vertical play, for, as before referred to, the shaft b is connected with the spring board or bar C, and so has its corresponding vertical play as it is actuated by the lever A.

Mounted upon the end of the shaft b, which is of any suitable extension, I have arranged a double-acting lever b', which lever is supplemented by a like lever b^2, arranged upon the end of a shaft b^3, extending through the web of the rail and the frame sides a' a', as before indicated. The levers are arranged longitudinally in the same plane (see Fig. 2) and are also parallelly arranged in pairs. The corresponding ends of the levers b' b^2 are connected by chains b^4 b^5, respectively, whereby the levers are simultaneously moved in parallel planes. Upon the shaft b^3 beyond its lever b^2 is fixed a lever b^6, to the end of which are secured chains b^7 b^8, running in reverse directions that the lever may be thrown in either direction, resulting, of course, in a relatively corresponding movement of the cam B, or by its being turned up or down, when the lever A will be raised into an operatable or lowered into an inoperatable position. The chains b^7 b^8 may come from any degree of distance, and they are designed to be operated either manually or they may be engaged with a switch or sight-signal or like devices to be automatically controlled by it, as before referred to.

The cam B of course could be actuated by a more direct means than what I have shown and still be within the scope of my invention; but I much prefer to use the means like as I have described, because thereby I am best able to control its movement. The cam is operated by chains coming usually a long distance. If these chains were to directly hold the cam in place, they might become alternately slackened or tightened, dependent upon the relatively changing positions of the cam as the spring board or bar C, which carries the cam, is moved up and down by the operation of the lever A. It is therefore to guard against any trouble of this kind that I secure the chains b^6 b^7 to the lever b^2, and then by means of the chains b^4 b^5 I secure the adjustment of the cam B, for these chains receive whatever slackening may result from the vertical motion of the cam, the lever b^2 therefore remaining in fixed position and the chains b^7 b^8 inflexible.

The operation of my device is obvious from the foregoing description. Its practical utility needs no special mention, especially when the device is used in connection with switches or sight-signals to warn by this operation or non-operation their misplacement or other irregularity.

It is very evident that the special mechanical construction of my device may be changed in various particulars without departing from the essence of my invention, and to this fact I would call especial attention in construing the claims.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a railroad alarm-signal of the character specified, a lever pivoted to the track-rail to extend along its inside edge and in position to be operated upon by the contacting flange of a passing car-wheel, a spring board or bar connected with said lever for holding the same in a normally operative position, and to which board or bar the said lever transmits its own motion, and means adapted to be acted upon by said spring board or bar for transmitting the motion of said lever so transmitted to it, substantially as and for the purposes set forth.

2. In a railroad alarm-signal of the character specified, a camber-lever pivoted at one end to the track-rail to extend along the inside edge thereof and in position to be operated upon by the contact of a passing wheel, a stop for limiting the upward movement of said lever and for defining its operatable position, a board or bar connected with said lever to have a simultaneous motion therewith, a yielding means for holding said board or bar and so said camber-lever in a normally operative position, a rock-lever for receiving the motion of said board or bar imparted to it by the camber-lever and means for transmitting the motion of said rock-lever, substantially as described

3. In a railroad alarm-signal of the character specified, the combination of a lever pivoted to extend along inside the track-rail and in a position to be operated upon by the contact of a passing wheel, of a cam movable with said lever and adapted to throw the same into

and out of operative position, and means for turning said cam from outside the track-rail through a slot therein.

4. In a railroad alarm-signal of the character specified, the combination with a lever pivoted to extend alongside the track-rail and in a position to be operated upon by a passing wheel, of a cam adapted by engagement to throw said lever into and hold the same in its said operative position or when turned to release the lever whereby it may assume a non-operative position, a support for said cam moved by and in a direction with said lever, and means for turning said cam.

5. In a railroad alarm-signal of the character specified, the combination with a lever pivoted to extend alongside the track-rail and in a position to be operated upon by the contact of a passing wheel, of a cam adapted to throw said lever into and out of its said operative position, and means for actuating said cam comprising a cam-shaft, a pair of double-acting levers chain-connected, and means for actuating the same, substantially as described.

6. In a railroad alarm-signal of the character specified, the combination with a lever pivoted to extend alongside the track-rail and in a position to be operated upon by contact of a passing wheel, of a cam movable with said lever and adapted to throw the same into and out of its operative position, a movable support for said cam, means for pivotally securing said cam to said movable support, and means for turning said cam from a distance upon its movable support to control said lever as aforesaid, substantially as and for the purposes set forth.

7. In a railroad alarm-signal of the character specified, the combination with a lever pivoted to extend alongside the track-rail and in a position to be operated by contact of a passing car-wheel or flange thereof, of a cam adapted to throw said lever into and out of its said operative position, a support for said cam comprising a board or bar movable with and by said lever aforesaid, and between which lever and said board or bar the said cam forms a connecting-link, means for hinging or pivoting said cam to said board or bar, and means for turning the cam from a distance, substantially as described.

ELIJAH C. LAWRENCE.

Witnesses:
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