(No Model.)

M. S. CONLY.

TRACK INSTRUMENT FOR RAILWAY SIGNALS.

No. 446,403 Patented Feb. 10, 1891.

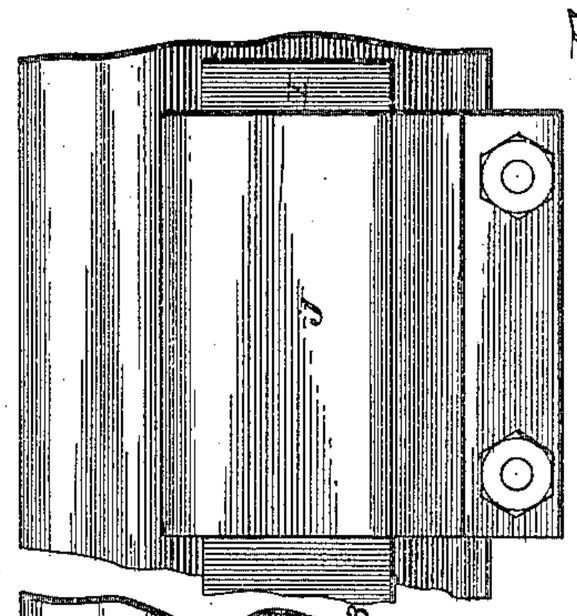


Fig. 1.

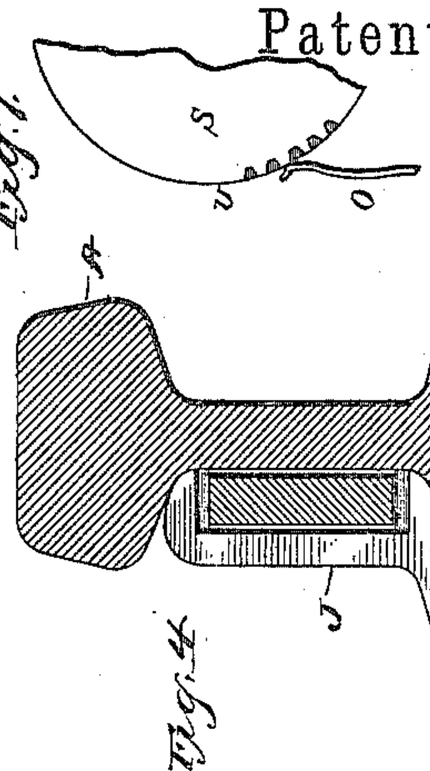


Fig. 4.

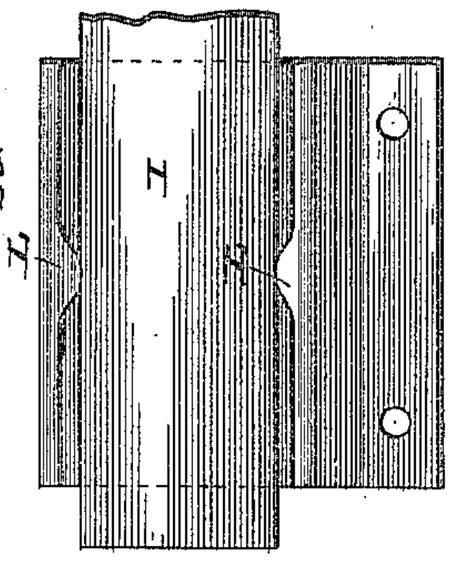


Fig. 5.

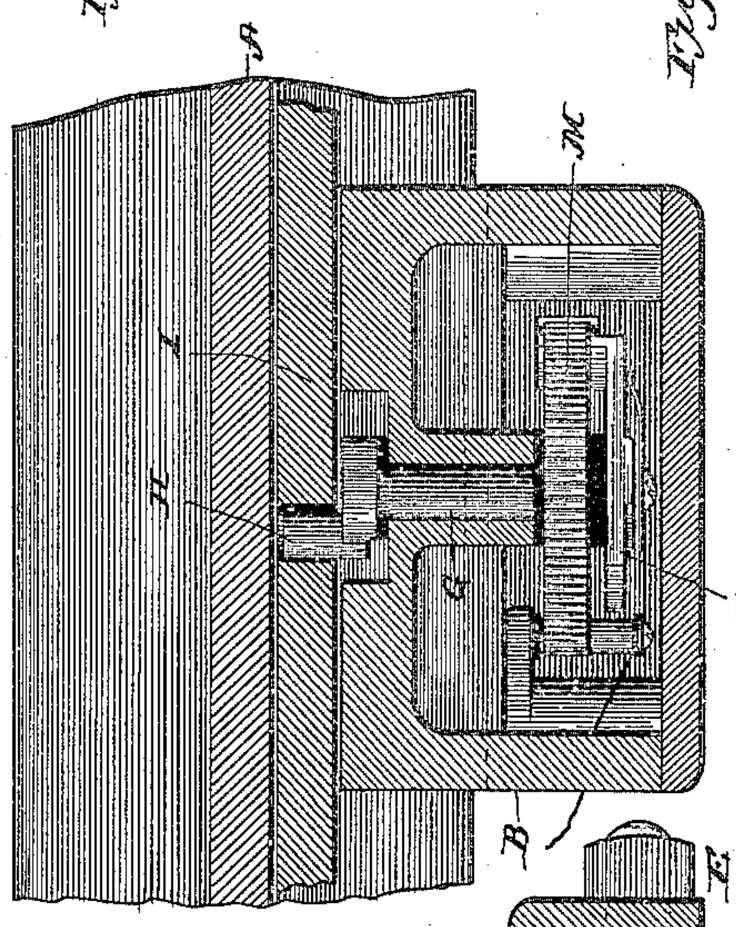
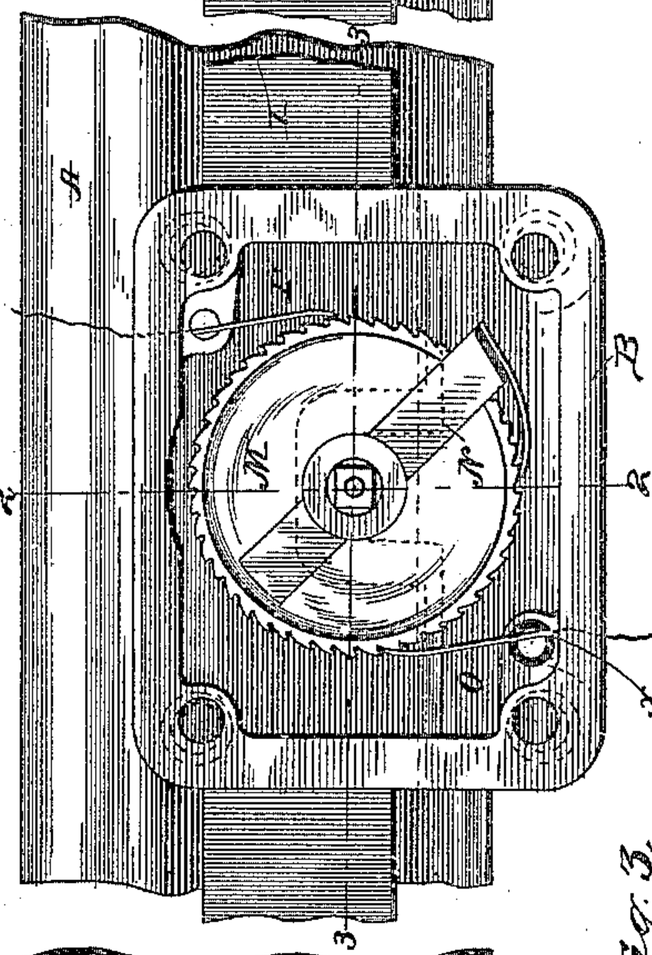


Fig. 3.



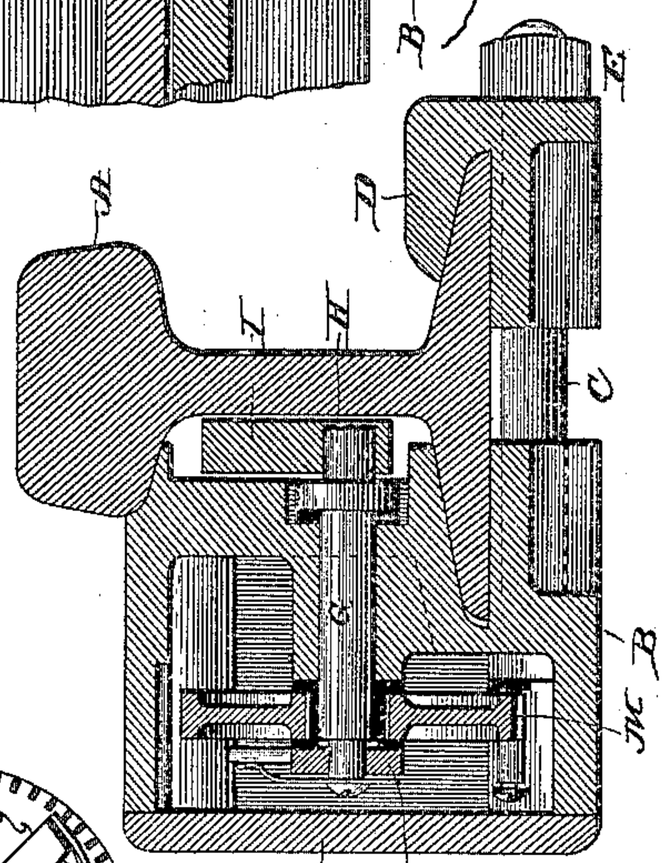


Fig. 2.

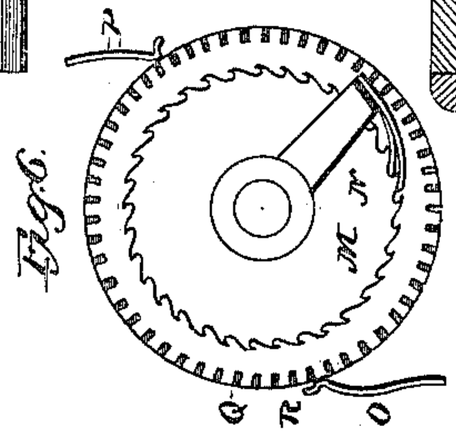


Fig. 6.

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UNITED STATES PATENT OFFICE.

MAHLON S. CONLY, OF CHICAGO, ILLINOIS.

TRACK-INSTRUMENT FOR RAILWAY-SIGNALS.

SPECIFICATION forming part of Letters Patent No. 446,403, dated February 10, 1891.

Application filed June 5, 1890. Serial No. 354,309. (No model.)

To all whom it may concern:

Be it known that I, MAHLON S. CONLY, a citizen of the United States, residing in the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Track-Instruments for Railway-Signals, of which the following is a specification.

This invention relates to improvements in track-instruments especially designed for use in connection with electric railway-signals in which an electric current is either made or broken by the action of the passing train through the instrumentality of a track-instrument, but is more especially designed as an improvement upon the invention set forth in my application for Letters Patent of the United States, Serial No. 313,937, filed June 11, 1889, and allowed December 3, 1889, in which the track-instrument is secured direct to the rail and operated by a vibrating bar, also secured to the rail at one end thereof.

The prime object of this invention is to dispense with the employment of a vibrating bar in operating a track-instrument secured directly to the rails and to utilize the difference in movement between two parts of the rail through the instrumentality of a bar, also rigidly secured to the rail, for operating a track-instrument.

Another object is to operate a track-instrument attached to the rail by a bar, also attached to the rail, at each side of the track-instrument, whereby the movement of that portion of the rail to which the track-instrument is secured between the ends of the bar may be utilized for operating the instrument.

Further objects are to have the instruments of such a character that the circuit therethrough may be either made or broken, to have the instrument positive and direct in its operation, and to provide durable, self-adjustable, economical, and efficient means for accomplishing these important objects, all as illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation of a rail, showing devices applied thereto embodying my invention; Fig. 2, a transverse vertical section through the rail and track-instrument on the line 2 2 of Fig. 1; Fig. 3, a horizontal section through the same parts, taken on the line 3 3 of Fig. 1; Fig. 4, a transverse vertical section through the rail and the bar-clip, taken on the line 4 4 of Fig. 1; Fig. 5, an inner face view of the bar-clip, showing the disposition of the bar therein; and Figs. 6 and 7, modified forms of circuit makers or breakers.

Similar letters of reference indicate the same parts in the several figures of the drawings.

Referring by letter to the accompanying drawings, A indicates the rail, and B a casing secured thereto below the top of the rail, and preferably on the outer side thereof, in order to avoid the flange, as well as the tread of the car-wheels, by means of stud-bolts C, (more clearly shown in Fig. 2,) projecting beneath the rail and through a hook D, engaging the opposite flange of the rail and held in position by means of nuts E, the casing itself being recessed, as shown, for the reception of one flange of the rail; but obviously the manner of fastening the casing to the rail may be varied as desired. This casing is provided with a removable cap or cover F for convenience of gaining access to the mechanism inclosed therein, and has journaled therein a rock-shaft G, provided with a crank H on the inner end thereof, engaging a corresponding perforation in a bar I, lying parallel with the rail and between it and the casing, and secured rigidly to the rail at its ends, respectively, by means of suitable clips J, bearing against the rails at one side and secured in position by hook-bolts K or in any other convenient manner. These clips are recessed on their inner faces, as shown in Figs. 4 and 5, and provided with lugs L at the upper and lower sides of the recesses, between which rest the ends of the bar, so as to permit of the desirable movement of the bar, which in practice is found to best answer the intended purpose by having a length of five or six feet, although the length thereof is not arbitrary and may be varied at will.

The opposite or outer end of the rock-shaft has loosely mounted thereon a ratchet-wheel M, insulated therefrom, as shown in Figs. 2 and 3, and a pawl N, rigidly secured thereto, and preferably consisting of a crank-arm having a spring-tooth attached thereto, but insulated therefrom, for engaging the teeth of

the ratchet-wheel, as shown. With the teeth of the ratchet-wheel also engage suitable contact-springs O P, one of which is insulated, and both of which constitute the terminals of an electric circuit extending through and operating suitable devices contained in the signaling apparatus (not shown) for operating the signals upon the making or breaking of the electric circuit through the track-instrument, or one of the contact-springs may be grounded, so that the instrument is adapted for use in connection with either a closed or open metallic or grounded circuit.

In the drawings the circuit is shown as permanently closed, so that the instruments may be operated upon the breaking thereof, the ratchet-wheel forming a part of the circuit, the breaking of which latter is accomplished by the snapping of either one of the contact-springs O or P from the point of a tooth onto the base of the next tooth, the teeth being so shaped that the spring will not make contact in passing from the point of one tooth to the base of the next tooth. It will therefore be understood that while the bar I is rigidly secured at its ends, respectively, to the rail on each side of the track-instrument casing it has no other connection with the track-instrument, except through the crank H of the rock-shaft G, and is therefore not affected by the movements of the track-instrument and that portion of the rail to which the instrument is attached. Hence when the wheels of a locomotive or of a car, if of sufficient weight, come directly over the casing the track at that point will be deflected, while the bar which is supported on the rails at some distance to each side of the casing will remain practically at a standstill. The result of this action is that the engagement of the crank with the bar will produce a partial rotation of the rock-shaft, which is carried down by the casing swinging about the crank as a pivot, which causes a corresponding movement of the crank-pawl N, which, engaging the tooth of the ratchet-wheel M, causes the latter to make a partial rotation, sufficient to cause one or the other of the spring-contacts to snap off of a tooth, and thus cause an instantaneous break of the electric circuit, as before described. After the wheel passes off of that portion of the track immediately above the casing the track will resume its normal position, and the crank-pawl by this action, through the medium of the rock-shaft and crank, will be restored to its normal engagement with the next tooth, ready for another operation.

While my invention is adapted for use in connection with either an open or a closed circuit, greater certainty is secured in connection with the latter, because no matter what degree of movement the instrument makes under varying pressures to which it is subjected, if it is sufficient to break the circuit—that is, to move the pawl one tooth—the successful operation of the instrument is assured, because the circuit will be instantly reclosed, the breaking of the circuit being instantaneous and only lasting during the time it requires for the pawl to spring from one tooth to the next, besides which, in connection with either circuit, no adjustment of the device is required, it being self-adjustable to all the varying conditions to which it may be subjected.

In practice it is designed that the instrument shall be so arranged that only the weight of the locomotive, or rather that portion thereof supported by the drive-wheel, will be sufficient to operate the instrument. To avoid making the teeth of the ratchet-wheel objectionably small, it is preferred that when one of the spring-contacts—say the one O—engages a tooth of the ratchet-wheel the other one B will be midway the length of another tooth, so that a movement of the wheel equaling half the length of the tooth will be sufficient to insure the operation of the instrument, thereby enabling the employment of half the number of teeth which would otherwise be necessary. The certainty of operation of the track-instrument may further be insured by splitting the spring-tooth of the pawl into two parts, as shown in Fig. 1, one part engaging a tooth while the other half overlaps the next tooth in advance, for by this means a movement of the pawl of only half the length of the tooth will be sufficient to produce the desired result. These details of construction, however, are mere matters of choice and convenience and are not absolutely essential to the successful operation of the instrument, and I do not desire to limit myself to the construction herein shown and described, for obviously this may be varied in many ways and still accomplish the object of my invention, which, broadly stated, is the utilization of the bodily movement of a track-instrument for making or breaking the electric circuit through itself, or, in other words, for its own operation.

As an instance to which the apparatus for carrying out my invention is subject reference is made to Fig. 6, in which the ratchet-wheel, instead of being employed as the direct means for making or breaking the circuit, is utilized as a means for operating a wheel, provided with alternate insulated and conducting peripheral surfaces Q R, with either one of which the contact-springs O P may be normally in contact, moving across the intermediate portion so as to either make or break the electric circuit, as the case may be, whenever the wheel is actuated, as before described; or, as illustrated in Fig. 7, the ratchet-wheel M and crank-pawl N may be entirely dispensed with and the circuit making and breaking disk S substituted therefor, rigidly mounted upon the rock-shaft G, so as to rock back and forth therewith, the contact-springs O and P engaging the edge of the disk, which, like the wheel illustrated in Fig. 6, is provided with alternate insulated and conducting surfaces T U, respectively, as shown, with either

of which the contacts O P may be normally in engagement, so that upon partial rotation of the disk the electric circuit therethrough will be made or broken, as the case may be. By supporting the bar I upon the lugs L in the clips that portion of the rail to which the clips are secured may have the slight movement necessary upon the passage of the train, in order to conform to the flexure of that portion of the rail between the clips to which the instrument is attached without materially affecting the vertical position of the bar. It is also probable that in the case of old or very flexible rails the depression of either end of the bar before or after the instrument itself is depressed may serve to operate the instrument in the same manner as if that portion of the rail to which the instrument itself or the casing thereof is attached were depressed and the ends of the bars held stationary, it being immaterial which way the result is produced so long as it is due to the movement of one part relative to the other, and I may here state that I have had this instrument in practical and successful operation for several months and that the desired result is produced thereby, but whether through the movement of the bar or the casing I am as yet unable to positively determine, believing it, however, to be principally due to the movement of the casing.

This instrument is direct and positive in its operation, and by reason of the multiplying of the movement of the crank-arm, due to the greater diameter of the ratchet-wheel, or rather to the radial position of the teeth thereof with relation to the crank, produces the successful operation of the instrument with the slightest depression of either the rail or bar, as the case may be, to which the instrument is secured, and which may obviously be increased by removing the ties or other supports of the rail adjacent to the instrument.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a track-instrument for electric railway-signals, the combination, with the rail and a track-instrument secured thereto, of a bar rigidly secured at both ends to the rail and connected with the track-instrument, so as to operate said instrument by the movement of one of said members relative to the other, substantially as described.

2. In a track-instrument for electric railway-signals, the combination, with the rail, a track-instrument secured thereto, and circuit making and breaking devices carried by said instrument, of a bar rigidly secured at its ends, respectively, to said rail at each side of the instrument, a rock-shaft for operating the circuit making and breaking devices, and a crank on said shaft connected with said bar, substantially as described.

3. In a track-instrument for electric railway-signals, the combination, with the rail and a bar secured thereto at its ends, respectively, of a track-instrument secured to the rail between the ends of said bar, the rock-shaft thereof, a crank connecting one end of said shaft with the bar and a ratchet-wheel loosely mounted on said shaft, a crank-pawl fixed upon and operated by said shaft and in turn engaging and operating the ratchet-wheel, and spring contact-plates also engaging the teeth of said wheel, substantially as described.

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