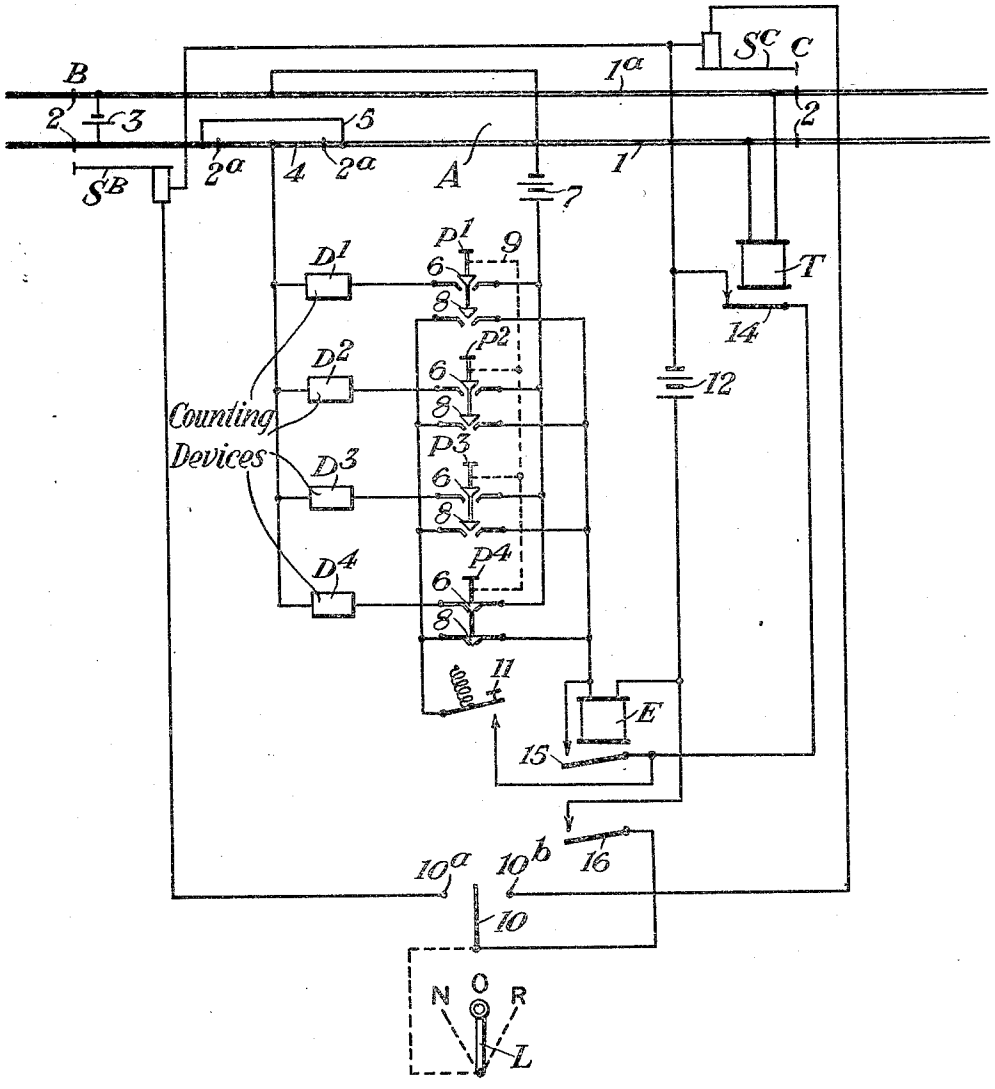
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WHEEL COUNTING APPARATUS

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WHEEL COUNTING APPARATUS

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My invention relates to wheel counting apparatus.

In certain localities, the trains of a number of different railroads traverse the same stretch of track, and the cost of operation and maintenance of the stretch is divided among the several railroads on the basis of the total number of car wheels in the trains of each railroad using the stretch during the same period of time. Heretofore, it has been customary to determine the number of car wheels in the trains of the several railroads by employing men to count the wheels. One object of my present invention is to provide means for automatically counting the number of car wheels in the trains of each railroad by electrical means.

Another object of my invention is to coordinate the control of the wheel counting apparatus and the signals which govern the entrance of traffic into the stretch in such manner that the signals cannot be cleared unless the wheel counting apparatus has been properly set for counting the car wheels of a train which is about to enter the stretch.

I will describe one form of apparatus embodying my invention, and will then point out the novel features thereof in claims.

The accompanying drawing is a diagrammatic view illustrating one form of apparatus embodying my invention.

Referring to the drawing, the reference characters 1 and 1^a designate the track rails of a stretch A of railway track over which the trains of several different railroads travel in both directions. The rails 1 and 1^a are divided, by means of insulated joints 2, to form a main track section B—C, and this track section is provided with the usual track circuit comprising a suitable source of current, here shown as track battery 3, connected across the rails adjacent one end of the section, and a track relay T connected across the rails adjacent the other end of the section.

The lower rail 1 of the main track section B—C is divided by means of additional insulated joints 2^a to form an auxiliary track section 4, and the track circuit current for the main track section B—C is carried around the auxiliary section 4 by a conductor 5. The length of the auxiliary section is preferably such that only one pair of car wheels, that is to say, the wheels on a single axle can occupy the section at one time.

Associated with the auxiliary section 4 are a plurality of counting devices, one of which is provided for each railroad whose trains traverse the stretch A and each of which is arranged to count the impulses of electrical energy supplied thereto. As here shown, there are four such counting devices, each designated by the reference character D with a suitable distinguishing exponent. The operating mechanism of these counting devices forms no part of my present invention, and is therefore not illustrated in the drawing. One well known form of counting device suitable for this purpose comprises an electromagnet which is arranged to advance in step-by-step fashion a suitable counting or registering mechanism, such for example as the usual graduated dials which indicate the total number of impulses received by the electromagnet.

Each counting device is connected with the rails of the auxiliary section 4 over a circuit which includes a suitable source of current, here shown as a battery 7, and the contact 6 of a push button designated by the reference character P with the same distinguishing exponent as the exponent for the reference character of the associated counting device. As here shown, each push button is provided, in addition to the contact 6 which controls the associated counting device, with another contact 8, the function of which will be described hereinafter; and the push buttons are all interconnected mechanically by suitable mechanism, indicated in the drawing by the dash lines 9, in such manner that when a push button is operated to close its contacts 6 and 8, this push button will subsequently remain in the position in which its contacts are closed until another push buttom is operated, at which time the first operated push button will be automatically restored to its normal condition in which its contacts 6 and 8 are open. For example, as shown in the drawing, push button P^4 occupies its operated position in which its con-

tacts 6 and 8 are closed. This push button will continue to occupy this position until another push button, say push button P^1, is operated to close its contacts, at which time push button P^4 will be restored to its normal condition in which its contacts 6 and 8 are open.

Eastbound traffic over section B—C, that is, traffic moving from left to right, is controlled by a trackway signal S^B, and westbound traffic over this section is controlled by a similar signal S^C. As here shown, each signal is of the two-position semaphore type, arranged to indicate "proceed" or "stop" according as the signal is energized or deenergized.

The signals S^B and S^C may be controlled in any suitable manner. As here shown, they are controlled by a manually operable lever L which is capable of assuming three positions, indicated by the dash lines in the drawing, and designated by the reference characters N, O, and R, respectively. Lever L is provided with a normal contact $10—10^a$ which is closed when and only when the lever occupies its N position, and with a reverse contact $10—10^b$ which is closed when and only when the lever occupies its R position.

The semaphore signals S^B and S^C are also controlled by a stick relay E which, in turn, is controlled by the track relay T, by a normally open manually operable contact 11, and by the contact 8 of each of the push buttons P. Relay E is provided with four pick-up circuits each of which includes a suitable source of current, here shown as a battery 12, front contact 14 of relay T, normally open contact 11, the contact 8 of a different one of the push buttons P, and the winding of relay E. When one of these pick-up circuits is closed, relay E becomes energized and closes its front contacts 15 and 16. If relay T is energized, a stick circuit is then completed for relay E at front contact 15, this circuit including battery 12, front contact 14 of relay T, front contact 15 of relay E, and the winding of relay E. It follows that when relay E has once been energized, this relay will subsequently remain energized as long as section B—C is unoccupied.

Signal S^B is provided with a circuit which includes battery 12, front contact 16 of relay E, normal contact $10—10^a$ of lever L, and the operating mechanism of signal S^B; and signal S^C is provided with a similar circuit which includes battery 12, front contact 16 of relay E, reverse contact $10—10^b$ of lever L, and the operating mechanism of signal S^C. It will be apparent, therefore, that if lever L is thrown to its N position when relay E is energized, signal S^B will move to its proceed position, but that if lever L is thrown to its R position when relay E is energized, signal S^C will move into its proceed position.

As shown in the drawing, push button P^4 occupies the position in which its contacts 6 and 8 are closed. Counting device D^4 is therefore connected with the rails of the auxiliary section 4. The pick-up circuits for relay E are all open at contact 11, and the stick circuit for relay E is open at front contact 15 of relay E, so that this relay is deenergized. Lever L occupies its O position in which both its normal and reverse contacts are open, and signals S^B and S^C therefore indicate stop.

In explaining the operation of the apparatus as a whole, I will first assume that the operator wishes to permit an eastbound train, belonging to the railroad for which the counting device D^1 has been provided, to traverse the section B—C. To do this, he first operates the push button P^1. This connects the counting device D^1 with the rails of the auxiliary section, and, at the same time, releases push button P^4, so that the counting device D^4 which was previously connected with the rails of the auxiliary section over the contact 6 of this latter push button, is now disconnected from the rails of the auxiliary section. The operator then closes contact 11. Since track relay T is energized, this completes the pick-up circuit for relay E including contact 8 of push button P^1, and relay E therefore becomes energized. The closing of front contact 15 of relay E completes the stick circuit for this relay, and relay E therefore now remains energized even though the operator permits contact 11 to return to its normally open position. Finally, the operator moves lever L to its N position. This causes signal S^B to move to its proceed position as previously decribed, so that the train is now permitted to enter the section. As soon as the train does this, track relay T becomes deenergized and interrupts the stick circuit for relay E. Relay E therefore becomes deenergized and deenergizes signal S^B. Signal S^B therefore returns to its stop position, thus preventing a following train from entering section B—C. As the train proceeds through the section, current is supplied to counting device D^1 each time the auxiliary section 4 is shunted by a pair of car wheels on the same axle, and since device D^1 registers each time this device becomes energized, it follows that the device D^1 will record the total number of car wheels in the train. When the train passes out of section B—C, relay T again picks up, but since the pick-up and stick circuits for relay E are then both open, relay E will now remain deenergized and signal S^B will continue to indicate stop.

If, after the train has passed out of section B—C, the operator wishes to permit a following eastbound train belonging to the same railroad to enter the section, he may do so by merely closing contact 11. This

will again energize relay E which, in turn, will complete the circuit for signal S^B so that the signal will again move to its proceed position. The following train may then proceed through the section and the apparatus will function in the manner previously described.

If the operator, instead of wishing to permit an eastbound train belonging to the railroad for which the counting device D^1 has been provided to traverse section B—C, wishes to permit a westbound train belonging to this railroad to traverse the section, he will proceed in the manner previously described, except that instead of moving lever L to its N position to clear signal S^B, he will move it to its R position to clear signal S^C. The operation of the apparatus will then be similar to that previously described, and will be apparent from an inspection of the drawing without describing it in detail.

If the operator wishes to permit a train, belonging to the railroad for which any of the other counting devices D^2, D^3 or D^4 have been provided, to enter section B—C, he will proceed substantially in the manner previously described except that, instead of operating the push button P^1, he will operate the push button P associated with the counting device for the railroad whose train is to be permitted to enter the section. The operation of the apparatus under these conditions will be substantially the same as that previously described, and will be readily understood from an inspection of the drawing without describing it in detail.

It should be pointed out that since the circuits for the signals S^B and S^C each include a front contact 16 of relay E, it is impossible for an operator to clear these signals unless relay E is energized. Relay E cannot be energized unless section B—C is unoccupied and the contact 8 of one of the push buttons P is closed, and it follows therefore that it is impossible for an operator to permit a train to enter section B—C unless the section is unoccupied and one of the counting devices D is connected with the rails of the auxiliary section.

Although I have herein shown and described only one form of wheel counting apparatus embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. In combination, a stretch of railway track one of the rails of which has been divided to form a track section of such length that said section cannot be occupied by more than the car wheels on a single axle at a time, a counting device, and means controlled by said track section for operating said counting device each time a pair of wheels connected by an axle traverses said section.

2. In combination, a stretch of railway track one of the rails of which is divided to form a track section, a counting device, and means for operating said counting device one time each time a pair of car wheels connected by an axle traverses said section.

3. In combination, a stretch of railway track one of the rails of which has been divided to form a track section of such length that said section cannot be occupied by more than the car wheels on a single axle at a time, a source of current, and a counting device connected across the rails of said section in series with said source and operated each time a pair of wheels connected by an axle traverses said section.

4. In combination, a stretch of railway track one of the rails of which has been divided to form a track section of such length that said section cannot be occupied by more than the car wheels on a single axle at a time, a source of current, a push button, and a counting device connected across the rails of said section in series with said source and a contact of said push button.

5. In combination, a stretch of railway track one of the rails of which has been divided to form a track section of such length that only the car wheels on a single axle can occupy said section at a time, a source of current, a plurality of counting devices, a plurality of push buttons, and means for connecting each of said counting devices with the rails of said section in series with said source and a contact of a different one of said push buttons.

6. In combination, a main section of railway track one of the rails of which is divided to form an auxiliary track section, a counting device, a push button, a source of current, means controlled by said push button and including said source for connecting said counting device with the rails of said auxiliary track section, a signal for governing traffic over said main section, and means controlled in part by said push button for controlling said signal.

7. In combination, a main section of railway track one of the rails of which is divided to form an auxiliary track section, a counting device, a push button, a source of current, means controlled by said push button and including said source for connecting said counting device with the rails of said auxiliary track section, a signal for governing traffic over said main section, and means controlled in part by said push button and effective for clearing said signal if and only if said main section is unoccupied.

8. In combination, a main section of railway track one of the rails of which is divided to form an auxiliary track section, a counting device, a push button, a source of current,

means controlled by said push button and including said source for connecting said counting device with the rails of said auxiliary track section, a stick relay, means controlled by said push button for at times energizing said stick relay, means for subsequently maintaining said stick relay in its energized condition if and only if said main section is unoccupied, and a signal for governing traffic over said main section controlled by said stick relay.

9. In combination, a main section of railway track one of the rails of which is divided to form an auxiliary track section, a counting device, a push button, a source of current, means controlled by said push button and including said source for connecting said counting device with the rails of said auxiliary track section, a stick relay, a manually operable switch, means controlled by said push button and said manually operable switch for energizing said stick relay, means for subsequently maintaining said stick relay in its energized condition if and only if said main section is unoccupied, and a signal controlled by said stick relay.

10. In combination, a main section of railway track one of the rails of which is divided to form a short auxiliary section, a track circuit for said main section including a track relay, a counting device, a push button provided with two contacts, means for connecting said counting device with the rails of said auxiliary section in series with one contact of said push button and a source of current, a stick relay, a normally open manually operable switch; a pick-up circuit for said stick relay including the remaining contact of said push button and said normally open manually operable contact as well as a contact of said track relay, a stick circuit for said stick relay including its own front contact and a contact of said track relay, and a signal for governing traffic over said main section controlled in part by said stick relay.

11. In combination, a main section of railway track one of the rails of which has been divided to form an auxiliary track section of such length that only a single pair of car wheels can occupy said auxiliary section at a time, a track circuit for said main section including a track relay, a plurality of counting devices, a first source of current, a plurality of push buttons each provided with two contacts, said push buttons being so arranged that when one of said push buttons is operated its contacts will become closed and will subsequently remain closed until another push button is subsequently operated, means for connecting each of said counting devices with the rails of said auxiliary section in series with said source and one contact of a different one of said push buttons, a normally open manually operable switch, a stick relay, a plurality of pick-up circuits for said stick relay each including said normally open contact and a front contact of said track relay as well as the remaining contact of a different one of said push buttons, a stick circuit for said stick relay including its own front contact and said front contact of said track relay, and signals for governing traffic over said main section controlled in part by a front contact of said stick relay.

12. In combination, a section of railway track, a plurality of counting devices, selecting means for rendering any one of said devices effective to count the wheels of a train proceeding through said section, and a signal for said section controlled by said selecting means.

13. In combination, a section of railway track, a plurality of counting devices, selecting means for rendering any one of said devices effective to count the wheels of a train proceeding through said section, a relay controlled by said selecting means, and a signal for said section controlled by said relay.

14. In combination, a section of railway track, a plurality of counting devices, selecting means for rendering any one of said devices effective to count the wheels of a train proceeding through said section, a relay, means for at times energizing said relay only if one of said counting devices is effective, means for subsequently holding said relay energized until a train enters said track section, and a signal for said section controlled by said relay.

15. In combination, a section of railway track, a counting circuit for said section, a plurality of counting devices, means for connecting a selected one of said devices in said circuit to count the wheels of a train proceeding through said section, a manually controlled contact, a relay, means for energizing said relay when said contact is operated provided one of said devices is connected in said counting circuit, means for subsequently holding said relay energized until a train enters said section, a signal for governing traffic through said section, and means controlled by said relay for controlling said signal.

In testimony whereof I affix my signature.

ARTHUR H. McKEEN.