

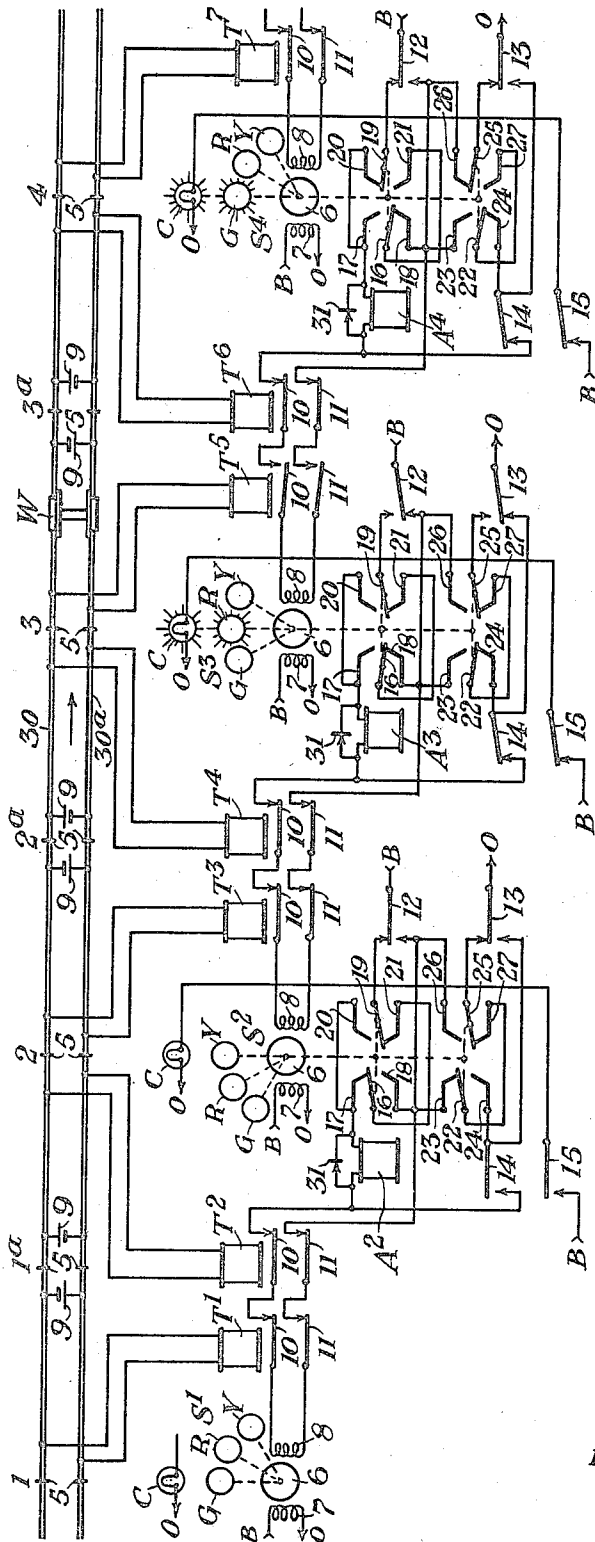
Oct. 15, 1935.

H. S. YOUNG

2,017,452

RAILWAY SIGNALING SYSTEM

Original Filed Aug. 10, 1933



INVENTOR
Henry S. Young
BY *A. R. Vercell*
HIS ATTORNEY

UNITED STATES PATENT OFFICE

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RAILWAY SIGNALING SYSTEM

Henry S. Young, Wilkinsburg, Pa., assignor to
The Union Switch & Signal Company, Swiss-
vale, Pa., a corporation of Pennsylvania

Application August 10, 1933, Serial No. 684,517
Renewed February 25, 1935

5 Claims. (Cl. 246—39)

My invention relates to railway signaling systems, and particularly to systems involving light signals of the searchlight type.

One feature of my invention is the provision, in systems of this character, of novel and improved means for preventing a signal from momentarily giving the stop indication when the signal next in advance changes from proceed to caution or from caution to proceed.

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

The accompanying drawing is a diagrammatic view showing one form of signaling system embodying my invention.

Referring to the drawing, the reference characters 30 and 30^a designate the track rails of a stretch of railway track along which traffic normally moves in the direction indicated by the arrow. These rails are divided by insulated joints 5 into blocks 1—2, 2—3, 3—4, etc., and, as here shown, each block is further divided by insulated joints 5 to form two track sections, such as the sections 1—1^a and 1^a—2 in block 1—2.

Each track section is provided with a track circuit comprising a battery 9 connected with the rails adjacent one end of the section, and a track relay connected with the rails adjacent the other end of the section and designated by the reference character T with a distinguishing exponent.

Located adjacent the entrance end of each block is a signal designated by the reference character S with an exponent corresponding to the location. Each of these signals is of the searchlight type, comprising a member 6 mounted to oscillate and controlled by two windings 7 and 8. The member 6 carries three roundels G, R and Y, arranged to cooperate with an electric lamp C in such manner that when the member 6 is in its middle position, to which it is biased, roundel R is in front of the lamp C, whereas when the member 6 is swung to the right or to the left, roundel G or roundel Y will be in front of the lamp C. As shown in the drawing, the lamp C is above the roundels, but the lamp is placed in this location solely for purposes of illustration, and it is understood that in actual practice the lamp is located directly behind the roundels. The signal is in its proceed, caution or stop position according as the roundel G, Y or R is located in front of lamp C. When lamp C is lighted, the signal indicates "proceed", "caution" or "stop", according as it is in its proceed, caution or stop position.

Operatively connected with the member 6 of

each signal are four contact members 16, 19, 22 and 25. The operation of these members is such that when the signal is in the stop position each contact member is moved downwardly into engagement with its lower associated contact finger; when the signal is in its caution position contact members 19 and 25 remain in contact with the lower of their associated contact fingers, whereas contact members 16 and 22 are moved upwardly into engagement with the upper of their associated contact fingers; when the signal is in its proceed position contact members 16 and 22 are in their downward positions wherein they engage with the lower of their associated contact fingers, whereas contact members 19 and 25 are moved upwardly into engagement with the upper of their associated contact fingers.

A signal of the type thus described is disclosed and claimed in reissue Letters Patent of the United States No. 14,940, granted to Eli J. Blake on August 31, 1920.

Associated with each signal S is a relay designated by the reference character A with an exponent corresponding to its location. Each of these relays is slow releasing in character, and, as here shown, the slow releasing characteristic is obtained by connecting a rectifier 31 across the terminals of the relay winding.

Winding 7 of each signal S is constantly supplied with current from a suitable source, such, for example, as a battery, which is not shown in the drawing, but the terminals of which are designated B and O. The other winding 8 of each signal is controlled by the track relays in the corresponding block and the track relay for the first section of the block next in advance, and at times by the slow releasing relay A for such block next in advance.

As shown in the drawing, track section 3—3^a is occupied by a car or train which is represented by an axle and pair of wheels W. Track relay T⁵ is therefore deenergized, so that the circuit for winding 8 of signal S³ is open at contacts 10 and 11 of that relay, with the result that this signal is in the stop position. Winding 8 of the signal S² is supplied with current of what I will term "reverse" relative polarity by virtue of a circuit which passes from terminal B, through back point of contact 12 of track relay T⁵, front contacts 11 of track relays T⁴ and T³, winding 8, front contacts 10 of track relays T³ and T⁴, back contact 14 of relay A³, and the back point of contact 13 of track relay T⁵ to terminal O. The supply of current of reverse polarity to winding 8 of signal S² causes this signal to be in its cau-

tion position, that is, with the roundel Y in front of lamp C. It will be observed that the circuit just traced for winding 8 does not include relay A³, so that the back contacts 14 and 15 of this relay are closed. The circuit for lamp C of signal S³ includes back contact 15 so that this lamp is lighted.

The circuit for winding 8 of signal S¹ is from terminal B, through the front point of contact 12 of track relay T³, contact 13—21 of signal S², contact 16—17 of the same signal, winding of relay A², contacts 10 of track relays T² and T¹, winding 8 of signal S¹, contacts 11 of track relays T¹ and T², contact 23—22 of signal S², contact 27—25 of the same signal, and the front point of contact 13 to terminal O. The current thus supplied to signal S¹ is of normal polarity, so that this signal is in its proceed position.

Assuming that signal S² were in its proceed position instead of its caution position, (see signal S⁴), current of normal polarity would still be supplied to winding 8 of signal S¹, and the circuit would then be from terminal B, through the front point of contact 12 of track relay T³, contact 19—20 of signal S², winding of relay A², contacts 10 of track relays T² and T¹, winding 8 of signal S¹, contacts 11 of track relays T¹ and T², contact 26—25 of signal S², and the front point of contact 13 of track relay T³ to terminal O.

It will be seen from the foregoing that each relay A is used as an approach lighting relay, in that this relay will be energized to extinguish the lamp C of the associated signal except when a train or car occupies the block immediately in the rear. When a signal is in the stop position, however, the associated relay A is also deenergized regardless of the presence or absence of cars or trains, so that the associated lamp C is always lighted.

Assuming now that the car or train W passes out of section 3—3^a and into section 3^a—4, track relay T⁵ will become energized and track relay T⁶ will become deenergized. Signal S³ will therefore remain in the stop position, because the circuit for its winding 8 will be open at contacts 10 and 11 of relay T⁶, but the circuit for winding 8 of signal S² will then be as follows: From terminal B, through the front point of contact 12 of track relay T⁵, contact 19—21 of signal S³, contact 16—18 of the same signal, contacts 11 of track relays T⁴ and T³, winding 8 of signal S², contacts 10 of track relays T³ and T⁴, back contact 14 of relay A³, contact 24—22 of signal S³, contact 27—25 of the same signal, and the front point of contact 13 of track relay T⁵ to terminal O. This current will be of reverse polarity, so that signal S² will remain in the caution position. When the car or train W passes out of section 3^a—4 and into the next section in advance, track relay T⁶ will become energized and track relay T⁷ will become deenergized. Signal S⁴ will then change to the stop position, and winding 8 of signal S³ will be supplied with current of reverse polarity so that the latter signal will move to the caution position. This will cause current of normal polarity to be supplied to winding 8 of signal S², so that the latter signal will move to its proceed position. The winding of relay A³ will then be included in the circuit for winding 8 of signal S², so that relay A³ will become energized.

When the car or train passes out of the block in advance of point 4, signal S⁴ will move to its caution position and signal S³ will move to its proceed position. During this movement of sig-

nal S³, all four lower contacts of that signal will be closed momentarily, and this would ordinarily supply current of reverse polarity for a moment to winding 8 of signal S², thereby causing signal S² to move to the stop position for a short interval of time. This operation of signal S² is prevented, however, because of the fact that relay A³, being slow releasing, holds its contact 14 open during the transition of the contacts associated with signal S³, so that signal S² will remain in its proceed position during this transition.

Assuming now with two successive signals in the proceed positions, the forward signal changes to caution, the rear signal will not move to its stop position momentarily for the same reason, that is, for the reason that the slow releasing relay A² for the forward signal will hold its back contact 14 open during the transition of such signal from the proceed position to the caution position, and so will prevent current of reverse polarity being momentarily supplied to the rear signal.

Although I have herein shown and described only one form of signaling system 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 divided into blocks, a signal of the searchlight type for each block arranged to indicate proceed or caution according as current of normal or reverse polarity is supplied to its controlling winding, a slow-releasing relay associated with each signal, means operating when a signal indicates proceed or caution to supply current of normal relative polarity to the controlling winding of the signal next in the rear through the winding of the slow-releasing relay associated with the forward signal, means operating when a signal indicates stop to supply current of reverse relative polarity to the controlling winding of the signal next in the rear through a back contact of the slow-releasing relay associated with the forward signal, and track circuits for said blocks for controlling said signals.

2. In combination, a stretch of railway track divided into blocks, a signal of the searchlight type for each block arranged to indicate proceed or caution according as current of normal or reverse polarity is supplied to its controlling winding, a slow-releasing relay associated with each signal, means operating when a signal indicates proceed or caution to supply current of normal relative polarity to the controlling winding of the signal next in the rear through the winding of the slow-releasing relay associated with the forward signal, means operating when a signal indicates stop to supply current of reverse relative polarity to the controlling winding of the signal next in the rear through a back contact of the slow-releasing relay associated with the forward signal, a lighting circuit for each signal controlled by a back contact of the associated slow-releasing relay, and track circuits for said blocks for controlling said signals and said slow-releasing relays.

3. In combination, a stretch of railway track divided into blocks, a signal for each block arranged to indicate proceed or caution as well as stop, a slow-releasing relay associated with each signal, proceed and caution control circuits for

each signal effective when energized to cause the associated signal to indicate proceed or caution respectively, means effective when said proceed and caution control circuits are deenergized to cause the associated signal to indicate stop, means operating when a signal is controlled to indicate proceed or caution to energize the proceed control circuit for the signal next in the rear through the winding of the slow-releasing relay associated with the forward signal, means operating when a signal is controlled to indicate stop to energize the caution control circuit for the signal next in the rear through a back contact of the slow-releasing relay associated with the forward signal, and track circuits for said blocks for controlling said signals.

4. In combination, a stretch of railway track divided into blocks, a signal for each block arranged to indicate proceed or caution as well as stop, a slow-releasing relay associated with each signal, proceed and caution control circuits for each signal effective when energized to cause the associated signal to indicate proceed or caution respectively, means effective when said proceed and caution control circuits are deenergized to cause the associated signal to indicate stop, means operating when a signal is controlled to indicate proceed or caution to energize the proceed control circuit for the signal next in the rear through the winding of the slow-releasing

relay associated with the forward signal, means operating when a signal is controlled to indicate stop to energize the caution control circuit for the signal next in the rear through a back contact of the slow-releasing relay associated with the forward signal, a lighting circuit for each signal controlled by a back contact of the associated slow-releasing relay, and track circuits for said blocks for controlling said signals and said slow-releasing relays.

5. In combination, a stretch of railway track divided into a forward block and a rear block, a signal for each of said blocks arranged to indicate proceed or caution as well as stop, a slow-releasing relay associated with said forward signal, control means for at times causing said forward signal to indicate proceed or caution or stop, proceed and caution control circuits for said rear signal effective when energized to cause said rear signal to indicate proceed or caution respectively, means operating when said forward signal is controlled to indicate proceed or caution to energize the proceed control circuit for the rear signal through the winding of said slow-releasing relay, and means operating when the forward signal is controlled to indicate stop to energize the caution control circuit for the rear signal through a back contact of said slow-releasing relay.

HENRY S. YOUNG. 30