W. H. GEIGER.

THREE-POSITION ANNUNCIATOR.

APPLICATION FILED APR. 23, 1914. RENEWED OCT. 28, 1918.

1,311,118. Patented July 22, 1919.

FIG. 1

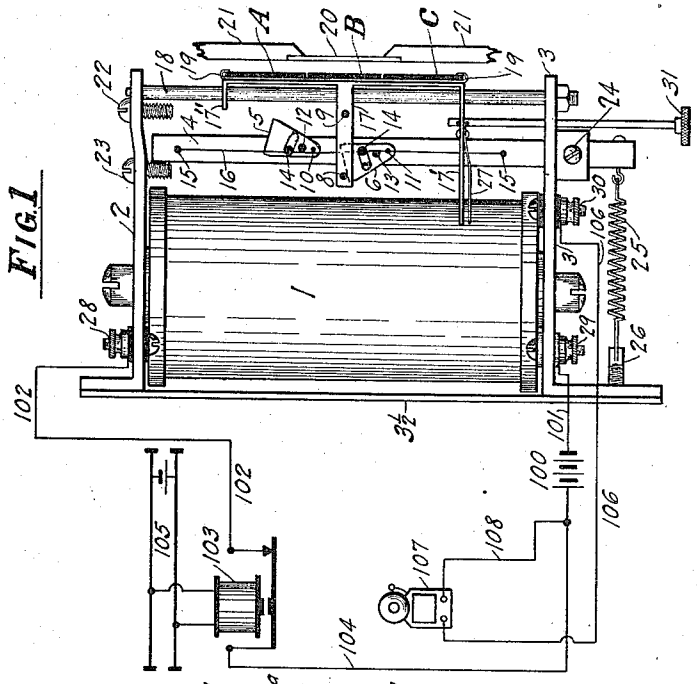
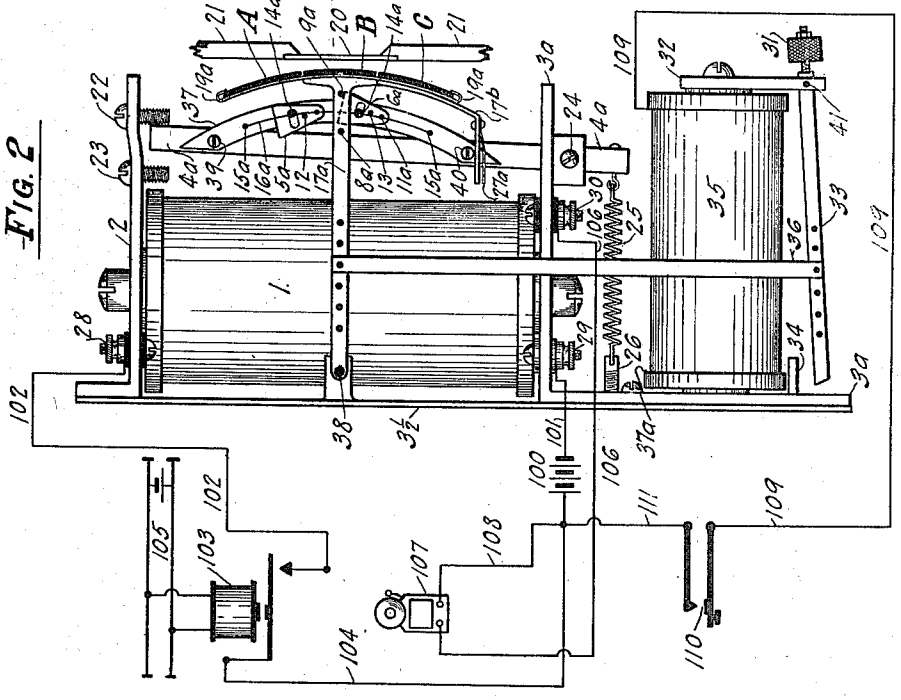


FIG. 2



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THREE-POSITION ANNUNCIATOR.

1,311,118. Specification of Letters Patent. Patented July 22, 1919.

Application filed April 23, 1914, Serial No. 833,900. Renewed October 28, 1918. Serial No. 260,069.

To all whom it may concern:

Be it known that I, WESLEY H. GEIGER, a citizen of the United States, residing at Wormleysburg, in the county of Cumberland and State of Pennsylvania, have invented new and useful Improvements in Three-Position Annunciators, of which the following is a specification.

The object of my invention is to announce the approach of a train to an attendant in a signal tower, or to a crossing watchman, by giving a visual signal and to operate contacts to control an audible signal at the same time the visual signal is given, and a method for silencing the audible signal and substituting another or third visual signal for the first announcing signal, while the cause for giving the signal is still active, and to be automatically set from its third visible signaling condition to its first, or clear position as will be described later.

Another object is to construct an annunicator that may be used on an open or closed circuit, without adding any extra parts, it being only necessary to change the position of the reversible pawls.

In the drawings, Figure 1 is a side view without the cover, for operation on a closed circuit, and having a slidably mounted shutter.

Fig. 2 is a similar view for an open circuit operation, with a pivotably mounted shutter, and electrical means for resetting the shutter to its upper or to the central position.

Construction, Fig. 1: The electromagnet 1, is held between the polepieces 2 and 3 which are in turn held by the non-magnetic plate 3½ which forms the back of the device; an armature 4, is pivoted on the polepiece 3, at 24, and is free to move between the stops 22 and 23, under the tension of the spring 25, which is attached to one end of the armature 4, which will hold the armature against the stop 22, when not under the influence of the magnet 1, and will be held against the stop 23, when under the influence of the magnet 1.

Upon the armature 4, which carries two reversible pawls or stops 5 and 6 pivoted at 10 and 11 on the armature 4, the pins 14 are fixed on the armature to limit the movement of the stops 5 and 6, which are held in position by the spring 16 acting upon the pins 12 and 13 which are a part of the stops 5 and 6. The pins 8 and 9 are stops carried by the shutter arm 1 and engage the stops 5 and 6 carried by the armature 4 sucessively. This spacing on the armature of the pawls, corresponds to the spacing visible on the sections C. and B. of the signal arm 17 which operates in three positions, and the space between the contact strip 27 and the contact post 30, is equal to the spacing of A. and B. and which position when section A is exposed is independent of the position of the armature 4, or in other words section A. will be displayed at the opening 20, with the armature 4 in either the attracted or unattracted position after the signal arm has moved from the position exposing section B.

The signal arm 17 is slidably mounted on the rod 18, and has two arms 17 and 17′ the latter arm carrying the contact strip 27 to contact with the contact post terminal 30, when the signal arm is in its lowest position. The signal arm 17 carries two pins 8 and 9, for engagement with either of the reversible pawls 5 or 6, to hold the signal arm in either of its upper positions displaying section B. or C. at the opening 20 of the case 21.

Attached to the signal arm 17, is a plate 19, which is divided into three equal sections, A, B, and C, successively visible through the opening 20 of the case 21, the center section B, showing clear when there is no train on the track section 105; the upper section A, showing when there is a train on the track section 105. An audible signal is given simultaneously with the display of visible signal A, by the bell 107 controlled by the contacts 27, and 30. Section C is a substitution for the section A, when the signal arm is reset to its uppermost position, and the bell contacts 27 and 30 are open and the audible signal given by the bell silenced.

The three sections of the signal member may be displayed by the signaling colors, white, red and green, section B, showing white, section A, showing red, section C, showing green, or the word clear used on the section B, the word train used on the section A and also on section C. Or a combination of the above may also be used to avoid confusion when more than one annunciator is used.

The resetting push 31 is slidably arranged in the polepeice 3, and has its one end connected to the signal arm 17′, for the purpose

of raising the shutter to its center or uppermost position.

The binding post 28 is for one end of the magnet coil 1, and is insulated from the pole piece 2. The binding post 29 is uninsulated from the pole piece 3, and is connected to the other end of the magnet coil 1.

If it is desired to have all parts insulated it may be done by adding another contact post 29^a Fig. 3, on the pole piece 3^a similar to the contact post 30; the contact strip 27^b is held under the head of the contact post 29^a and is arranged so that when the signal arm 17^a is in its lowest position it will rest on the insulation 28^c which is secured on the contact strip 27^b, and press the contact strip 27^b against the contact post 30; this would close a circuit which might be connected to the two contact posts 29^a and 30, for instance the wires 101 and 106.

In Fig. 2, of the drawing, the magnet 1, and the armature 4, are arranged as in Fig. 1. The signal arm 17^a is pivotally mounted to the plate $3\frac{1}{2}$ at 38 and the free end carrying the plate 19^a which has three signaling sections A. B. and C. successively visible through the opening 20 of the case 21. Upon the arm 17^b near the signaling end are the pins 8^a and 9^a for engagement with the reversible pawls 5^a and 6^a upon the segment 37, attached to the armature 4^a by the screws 39 and 40, and forms an arc with the pivot 38. The lower end 17^b of this arm carries the contact strip 27^a to make contact with contact post and terminal 30, when the arm is in its lowest position and section A is displayed at opening 20. In this arrangement the pawls 5^a and 6^a have been reversed so that the upper pawl 5^a will arrest the signal arm 17^b when the armature 4^a is in the attracted position, and the pawl 5^a is engaged with the pin 8^a. The lower pawl 6^a will engage the pin 9^a and arrest the signal arm 17^a when the armature 4^a is in the unattracted position, and the pawl 6^a is engaged with the pin 9^a.

It will be seen by this application of the pawls that it is only necessary to reverse these pawls to change to an open or a closed circuit operation, the lower pawl being used for arresting the signal arm in the B position, whether the open or closed circuit operation is used, and the upper pawl for the arresting of the arm to display section C.

The magnet 35 has an armature 33 which is pivoted at 41 on the pole piece 32 and at its opposite end this magnet is held against the pole piece 3^a by a screw not shown in the drawing. To the armature 33 is connected a rod 36, which at its opposite end is connected to the signal arm 17^a for the purpose of resetting the signal arm 17^a. When the magnet 35 is energized it will attract the armature 33, and rod 36 will push the arm 17^a to its uppermost position, and the armature 33 against the stop 34. The armature 33 carries a counter weight 31 to partially counteract the weight of the arm 17^a.

The track relay 103 is connected to one end of the railroad track 105, and to the other end of the track is connected a battery to operate the relay 103, the two rails completing the circuit between the battery and the relay.

Operation of Fig. 1, on a closed circuit with current flowing from the battery 100, through wire 101, terminal 29, magnet coil 1, terminal 28, wire 102, contact of relay 103, wire 104, to the battery 100. This will energize the magnet 1, and hold the armature attracted against the stop 23, the pin 8 will be arrested on the reversible pawl 6, and the section B, showing clear at 20. A train coming on the track section 105 will shunt the relay 103 and will open the circuit flowing through these contacts, which in turn will deënergize the magnet 1 and permit the armature 4 to be drawn away from the stop 23 by the action of the spring 25 which will hold the armature 4 against the stop 22. This movement of the armature 4 will cause the reversible pawl 6 to be drawn away from the pin 8, which will allow the signal arm to drop and show A, or train, at 20, and at the same time contact strip 27 will contact with contact post 30, this will close a circuit through the bell 107, and give an audible signal with current flowing from battery 100, wire 101, binding post 29, pole piece 3 through the rod 18, contact strip 27, contact post 30, wire 106 through the bell 107, wire 108 to the battery 100.

To silence the alarm before the train has passed off of the section of track 105, rod 31 is pushed upward until the pin 9, is engaged with the reversible pawl 5, thereby substituting the section C for the section A, both of which indicate that the track section 105 is occupied by a train. The audible signal is silenced by the opening of contacts 27 and 30, at the beginning of the upward movement of the rod 31. Section C will be displayed at 20 until track section 105 is clear of a train. Should this section 105 be of considerable length and a second train come on it before the first one has cleared, the signaling section C would remain displayed at 20 so long as there was a train on the section of track 105. When the train clears the section 105, the contacts of relay 103 will close, and current will flow as before, from the battery 100, wire 101, terminal 29, magnet coil 1, terminal 28, wire 102, contacts of relay 103, wire 104, to the battery 100. This will energize the magnet 1, and armature 4 will be attracted, the reversible pawl 5, will be

disengaged from the pin 9, the shutter 17, will then drop and show B at 20, and be arrested from further movement by the pin 8, engaging the reversible pawl 6, in which position it has been set automatically for the next train.

Operation of Fig. 2. on an open circuit: A train coming on the track section 105 will shunt the track relay 103, and cause the armature to drop and close the back contacts of the relay 103. With this contact closed current will flow from the battery 100, wire 101, binding post 29, magnetic coil 1, binding post 28, wire 102, contact of relay 103, wire 104, to the battery 100. This will energize the magnet 1, and attract the armature 4^a. This will disengage the pin 9^a from the reversible pawl 6^a, and the signal member will drop from the clear position B expose the section A at opening 20, showing train and at the same time contact 27^a will make contact with contact post and terminal 30. This produces an audible signal by current flowing from the battery 100, wire 101, pole piece 3^a, plate $3\frac{1}{2}$, arm 17^a, contact strip 27^a, contact post and terminal 30, wire 106, bell 107, wire 108, to the battery 100 ringing the bell 107 to give an audible signal and at the same time the section A is shown at the opening 20. To silence the audible signal and continue the visual by substituting a third signaling section C for the announcing section A, close the circuit closer 110, when current will flow from the battery 100, wire 101, terminal 29, polepiece 3^a, coil of magnet 35, wire 109, circuit closer 110, wire 111, to the battery 100, to energize the magnet 35, and attract armature 33, against the stop 34, when the rod 36, will raise the arm 17^a to its uppermost position and the pin 8^a will engage the reversible pawl 5^a, and section C will be substituted for the section A at the visible opening 20. The audible signal will be silenced by the opening of contacts 30 and 27^a when the arm 17^a is raised from its lower position to one of the upper positions.

As soon as the train leaves the track section 105, relay 103 will be energized and attract its armature and open the relay contacts, which will open the circuit flowing through the magnet 1, and the armature 4^a will be drawn away from the stop 23, by the spring 25, and held against the stop 22, the pin 8^a will disengage from the reversible pawl 5^a, and the arm 17^a will drop and pin 9^a will engage the reversible pawl 6^a, and be automatically reset to its first or clear signaling position, with the passing off of the train on track section 105, and be set ready for the next train.

I claim:—

1. In an annunciator of the type described in combination with, an electromagnet and coacting armature having two stops thereon, a three position signal member having two train and one clear visual sections operatively associated with said electro-magnet and coacting armature in two of its positions.

2. In an annunciator of the type described in combination with, contacts to control an audible signal, an electro-magnet and coacting armature having two stops thereon, a three position signal member having two train and one clear visual sections operatively associated with said electro-magnet and coacting armature in two of its positions, said signal member when in its other position adapted to operate said contacts to control an audible signal.

3. In an annunciator of the type described in combination with, a resetting electro-magnet and armature therefor, contacts to control an audible signal, an electro-magnet and coacting armature, having two stops thereon, a three position signal member having two train and one clear visual sections operatively associated with said electro-magnet and coacting armature in two of its positions, said signal member when in its other position adapted to operate said contacts to control said audible signal, means to energize said resetting magnet and reset said signaling member from the last named position to either of the first named positions thereby silencing the audible signal.

4. In an annunciator of the type described in combination with, a resetting electro-magnet and armature therefor, contacts to control an audible signal, an electro-magnet and a coacting armature having two stops thereon, a three position signal member having two train and one clear visual sections operatively associated with said electro-magnet and coacting armature in two of its positions, said signal member when in its other position adapted to operate said contacts to control said audible signal, means to energize said resetting magnet and reset said signaling member from the last named position to the upper of said first named positions thereby silencing the audible signal, said signaling member being automatically set to the lower of the first named positions.

5. In a three position annunciator, three visual signals and an audible signal, an electrical circuit and a circuit closer, means to hold and expose one of said visual signals, means to change one of said visual signals and sound the audible signal, and means to silence said audible signal and substitute another visual signal for the one shown when the audible signal was sounded, said circuit closer being in the same condition as when the audible signal was sounded.

6. In a three position annunciator, the combination with an electromagnet, a coacting armature, a three position display device having a clear signaling position and

two train signaling positions, a main circuit and a circuit closer, an auxiliary circuit and auxiliary circuit closer operatively associated with an audible alarm when said display device is in one of its train signaling positions.

7. In an annunciator, in combination with an electrical circuit and circuit closer, an electromagnet and coacting armature, a resetting magnet and armature therefor, a three position display device, and an audible signal, means to hold said display device in its first signaling position with said circuit closer open and said magnet deënergized, and adapted to release said display device from its first signaling position to assume its second signaling position of said display device with said circuit closer closed and said magnet energized, a resetting magnet and armature therefor to reset said display device from its second signaling position to its third signaling position, means to hold said display device in its third signaling position with said circuit closer closed and said magnet energized, said last movement of said display device silencing the audible signal controlled by said display device when in its second signaling position, said third signaling position being substituted for the second signaling position while the means for giving the second signaling position of said display device is still active and said circuit closer closed, and adapted to release said display device from its third signaling position and be held in its first signaling position with said circuit closer open.

8. In a signaling device, the combination of an electromagnet, an armature therefor, a circuit closer directly connected with and controlled by said armature, and a movable arm constucted to latch with the armature and arrest it when the armature is attracted and the movable arm is in one position, and constructed to also latch with said armature when the armature is released from the influence ef the magnet and when the movable arm is in a second position, and said arm having a third position which is automatically assumed by the movable arm when released from the armature; said movable arm carrying three signals which are visible in its respective positions.

9. In a signaling device, an audible signal, an electromagnet and its armature, a make-and-break device controlled by the armature and adapted to operate said audible signal, a movable arm adapted to assume any one of three positions, namely, an intermediate position and two extreme positions, latching means carried by said movable arm adapted to engage with the armature and arrest it when the movable arm is in its intermediate position and in one of its extreme positions, respectively, but adapted to be both released from the armature to permit the movable arm to assume its third position, three visual signals carried by the movable arm and adapted to be presented to view by the three different positions of the arm, means whereby the movable arm controls the make-and-break device to arrest the operation of the audible signal when in one of its three positions, and the visual signal presented to view at this time being adapted to indicate the same condition as the audible signal before arrested.

10. In an annunciator, the combination of an electromagnet, an armature therefor, a three-position signal arm constructed for latching engagement with the armature at its extreme position and at its intermediate position, and adapted to assume its other extreme position when wholly released from the armature; said signal arm carrying an intermediate visual signal indicating absence of the condition to be announced, and two extreme visual signals, each indicating the condition to be announced and located to be presented to view when the signal arm is wholly released by the armature and when the signal arm is reset in its extreme engaging position.

11. In an annunciator, the combination of an electromagnet, an armature therefor, a three-position signal arm constructed to be engaged and arrested by the armature at one of its extreme positions and at its intermediate position, and adapted to assume its other extreme position when wholly released from the armature; said signal arm carrying an intermediate visual signal indicating absence of the condition to be announced, and two extreme visual signals, each indicating the condition to be announced and located to be presented to view when the signal arm is wholly released by the armature and when the signal arm is reset in its extreme engaging position; said annunciator also embodying an audible signal and a make-and-break device for said electromagnet operable in conjunction with said armature and adapted to control said audible signal which is effective when the signal arm is dropped to its free extreme position; and said signal arm being adapted to co-act with said make-and-break device to arrest the audible signal when the signal arm is reset in an engaging position.

12. In an annunciator, the combination of an electromagnet, an armature assuming one position when the magnet is in energized condition and another position when the magnet is in deënergized condition, and a movable arm adapted to assume three distinct positions; said arm being adapted to be held by the armature in its first position, when the magnet is in one condition, and being adapted to be held by the armature in its second position when the magnet is in its

other condition the armature being simultaneously arrested by said arm in said two positions, and said arm being adapted to assume its third position when free from the armature; there being three visual signals connected with said movable arm and presented to view as the arm assumes its respective positions.

13. In an annunciator, the combination with an electromagnet, an armature for said magnet, a member carrying two spaced stops attached to said armature, a movable three position signal member having two stops constructed to engage said two spaced armature stops, and means to move said signal member into interengagement with said armature stops said signal member automatically returning to its first signaling position when disengaged from said armature stops.

14. In an annunciator, the combination with an electromagnet, an armature for said magnet, of two stops carried by said armature, a movable member adapted to engage said stops and having three visual signals attached thereto, an electric contact arranged to be closed when said member is released from engagement with either of said stops, and means to disengage said contacts and move said signal member to its second engaged position with said armature thereby positioning the third visual signal carried by said movable member and automatically resetting said member to its first signaling position.

15. In an annunciator, in combination with an electromagnet, an armature for said magnet, of two spaced stops carried by said armature, and a three position signaling member namely one free and two engaged positions, said member having two corresponding projections for engagement with said stops, one projection for engagement when the armature is in one position and the other projection for engagement when the armature is in its other position and means to move the said signaling member from its free position to one of its engaged positions, said signaling member being automatically released from first the one and then the other of its engaged positions upon the energizing and subsequent deënergizing of said magnet and thus returned to its free position.

16. In a three position annunciator, three visual signals and an audible signal, an electrical circuit and a circuit closer, means to hold and expose one of said visual signals, means to change one of said visual signals and actuate the audible signal, means to silence said audible signal and substitute another visual signal for the one shown when the audible signal was sounded said circuit closer being in the same condition as when the audible signal was sounded.

17. In an annunciator, in combination with an electrical circuit and circuit closer, an electromagnet and coacting armature, a display device having a first or clear position and a second and a third position for danger, and an audible signal, means to hold said display device in its first signaling position with said circuit closer open and said magnet deënergized, said display device being released from its first signaling position and assuming its second signaling position with said circuit closer closed and said magnet energized, means to set said display device from its second signaling position to its third signaling position, means to hold said display device in its third signaling position while said circuit closer remains closed and said magnet energized, said last movement of said display device silencing the audible signal controlled by said display device when in its second signaling position, said third signaling position being substituted for the second signaling position while the means for giving the second signaling position of said display device is still operated with said circuit closer closed, said display device being released from its third signaling position and secured in its first signaling position when said circuit closer is opened.

18. In an annunciator, in combination with an electromagnet, a coacting armature, an electrical circuit, a three position display device, said display device having a first or clear visual section and second and third visual sections, and a normally silent audible signal, means controlled by the breaking of said electrical circuit to expose said clear visual section, means controlled by the closing of said electrical circuit to release said display device and display the second one of the visual sections and sound the audible signal, means to silence the audible signal and substitute the third visual section for the second one displayed when the audible signal was given, said first means holding said third section displayed, when said first means is controlled by said electrical circuit in the same condition as when the audible signal was given.

19. In a three position annunciator, in combination with an electromagnet and coacting armature, a visual display device having a first or clear position, and a second and a third position for danger, a main circuit and a circuit closer for said magnet, means to hold said display device in the first signaling position with said circuit closer open and said magnet deënergized, said display device being shifted into its second position exposing its upper signaling section with said circuit closer closed and said magnet energized, means to set said display device in its third position exposing its lower signaling section while said circuit closer remains closed and said mag-

net energized, said display device being released from its third position showing the lowermost signaling section secured by said holding means in its central position when said circuit closer is opened and said magnet deënergized, means to give an audible signal when said display device stands in its second position displaying its uppermost signaling section, means to silence the audible signal by moving said display device into its third position thus exposing its lowermost signaling section, said armature being in the attracted position.

20. In an annunciator, a circuit which is closed and opened by the presence or absence of a condition to be signaled, an electromagnet in said circuit, a co-acting armature for said magnet, a display device having three positions, to wit, a first or clear position and a second and a third position, each indicating the condition to be signaled, means controlled by said armature for holding the display device in its clear position with the magnet deënergized, said means releasing said display device from said clear position by the energizing of said magnet, and thereby permitting it to assume its second position, an audible signal, the check for said audible signal, means through which to move said display device from its second position to its third position and means through which said display device is held in said third position by the magnet said check being constructed to sound said audible signal while the display device is in its second position.

21. In an annunciator, a circuit which is closed and opened by the presence or absence of a condition to be signaled, an electromagnet in said circuit, a coacting armature for said magnet, a display device having three positions, to wit, a first or clear position and a second and a third position, each indicating the condition to be signaled, means controlled by said armature for holding the display device in its clear position with the magnet deënergized, said means releasing said display device from said clear position by the energizing of said magnet, and thereby permitting it to assume its second position, an audible signal, a check for said audible signal, means through which to move said display device from its second position to its third position, and means through which said display device is held in said third position by the magnet said check being constructed to sound said audible signal while the display device is in its second position; said display device being movable from its second to its third signaling position during continuance of the energized condition of the magnet.

22. In an annunciator, a circuit which is closed and opened by the presence or absence of a condition to be signaled, an electromagnet in said circuit a coacting armature for said magnet, a display device having three positions, to wit, a first or clear position and a second and a third position, each indicating the condition to be signaled, means controlled by said armature for holding the display device in its clear position with the magnet deënergized, said means releasing said display device from said clear position by the energizing of said magnet, and thereby permitting it to assume its second position, an audible signal, a check for said audible signal, means through which to move said display device from its second position to its third position, and means through which said display device is held in said third position by the magnet, said check being constructed to sound said audible signal while the display device is in its second position; the clear position of the display device being an intermediate position, and its second and third positions being on either side of said intermediate position; said display device being movable from its second position, past its clear position and to its third position while the electromagnet is energized.

23. In an annunciator, a circuit which is closed and opened by the presence or absence of the condition to be signaled, an electromagnet in said circuit, two coacting members including an armature for said electromagnet, and a display device having three signaling positions, namely, a first or clear position indicating the absence of the condition, and a second or annunciating position indicating the arrival of the condition, and a third position indicating the continuance of the condition; reciprocally acting engaging means through which the armature engages the display device in its first and third positions, respectively.

24. In an annunciator, a circuit which is closed and opened by the presence or absence of a condition to be signaled, an electromagnet, two coacting members including an armature for said electromagnet, and a display device having three signaling positions, namely, a first or clear position indicating the absence of the condition, and a second or annunciating position indicating the arrival of the condition, and a third position indicating the continuance of the condition; means through which said armature restrains the display device in its first and third positions, comprising a pair of projections on one of said members and projections on the other of said members engaging the projections of said pair successively.

25. In an annunciator, a circuit which is closed or opened by the presence or absence of a condition to be signaled, an electro magnet, two coacting members including an armature for said electromagnet, and a display device having three signaling positions,

namely, a first or clear position indicating the absence of the condition, and a second or annunciating position indicating the arrival of the condition, and a third position indicating the continuance of the condition; means for said armature and said display device for holding the display device in both its first and third positions; said display device entering either the first or the second position automatically and the third position by manipulation.

26. In a train annunciator, the combination with a visual signaling element adapted to assume a "clear," a "first train" and a "second train" signaling position, of means for normally holding said element in the "clear" position comprising a pivoted member formed with a catch and a stop carried by said signaling element which engages said catch, means for releasing the signaling element from said catch to permit it to assume the "first train" position, an audible signaling device, contact elements engaged by said signaling element during its movement from "clear" to "first train" position for putting into operation said audible signaling device, electromagnetic means operated at will to silence said audible signaling device and move said visual signaling element from the "first train" position to the "second train" position, and means for retaining said signaling element in the last named position.

WESLEY H. GEIGER.

Witnesses:
R. B. FROWNFELTER,
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