F. W. AYRES & R. A. BARNETT.

SIGNAL SIGN FOR VEHICLES.

APPLICATION FILED APR. 15, 1913.

1,102,564.

Patented July 7, 1914

2 SHEETS—SHEET 1.

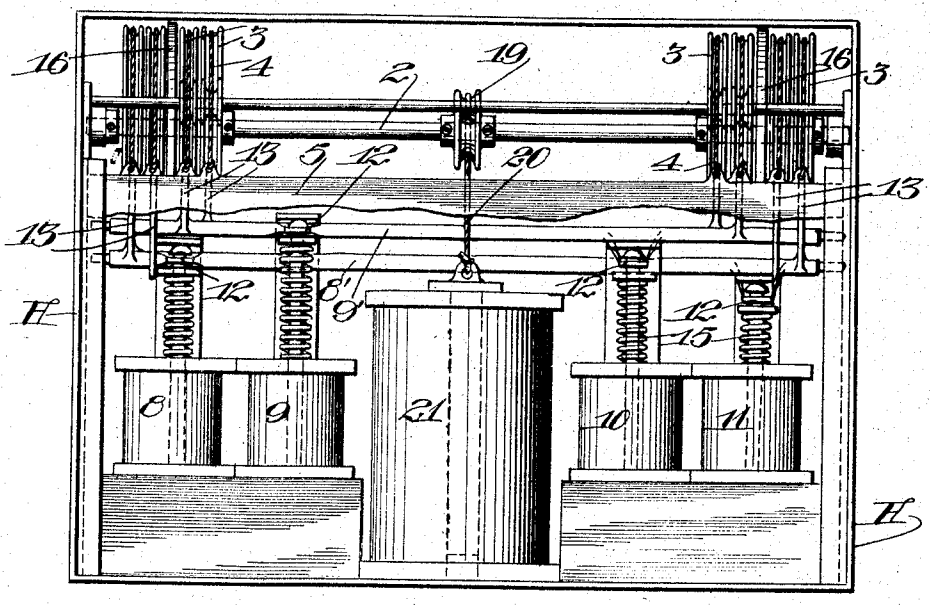


Fig. 1.

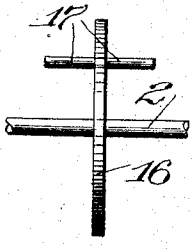


Fig. 3.

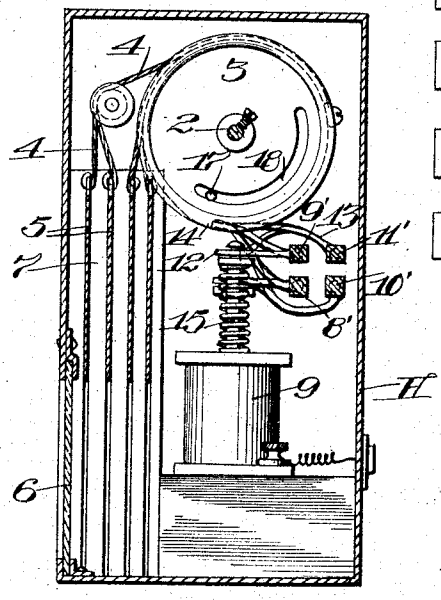


Fig. 2.

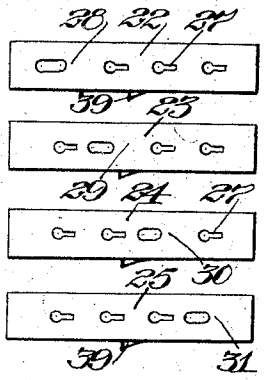


Fig. 9.

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2 SHEETS—SHEET 2.

Fig. 4.

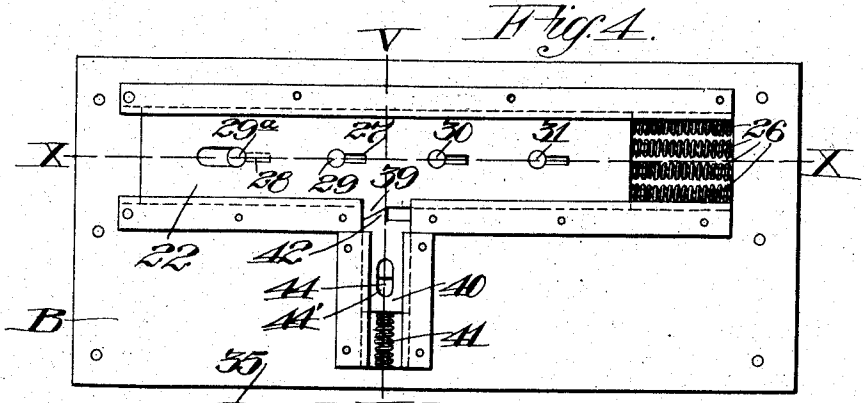


Fig. 5.

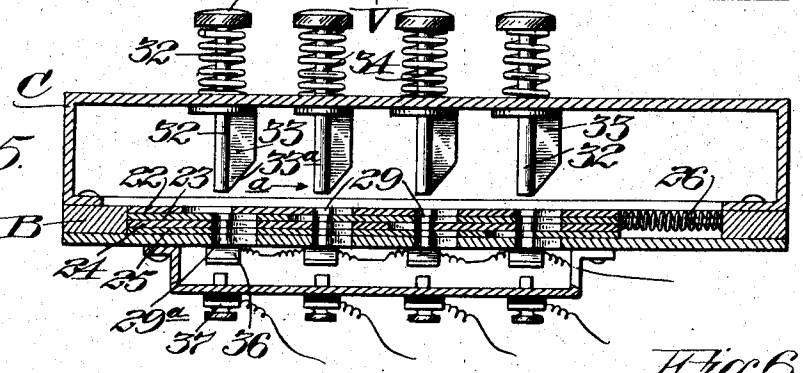


Fig. 6.

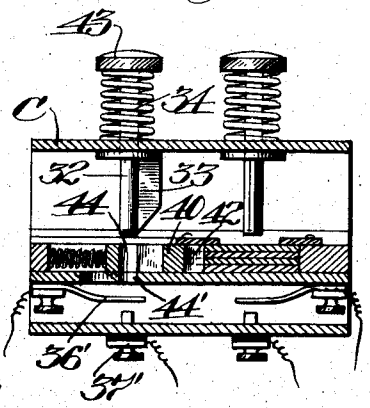


Fig. 7.

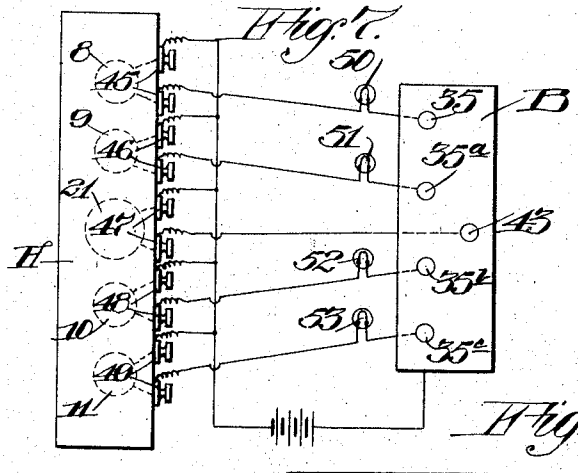
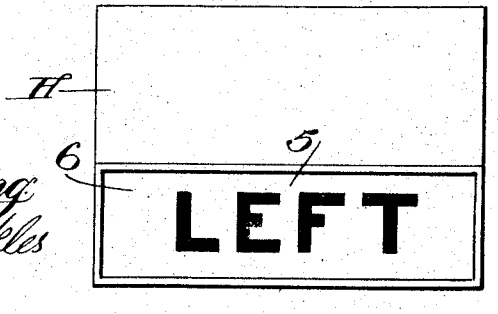


Fig. 8.



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SIGNAL-SIGN FOR VEHICLES.

1,102,564. Specification of Letters Patent. Patented July 7, 1914.

Application filed April 15, 1913. Serial No. 761,160.

To all whom it may concern:

Be it known that we, FRANK W. AYRES and ROBERT A. BARNETT, citizens of the United States, residing at Fruitvale, in the county of Alameda and State of California, have invented new and useful Improvements in Signal-Signs for Vehicles, of which the following is a specification.

This invention relates to a signaling device for vehicles.

The object of this invention is to provide a simple, practical and compact indicating mechanism which is particularly adapted for application to automobiles and like vehicles, and by which the operator of the car may indicate to pedestrians and drivers of other vehicles the intended direction or movement of the car.

A further object of the invention is generally to improve this class of apparatus so as to reduce the number of accidents and generally decrease the difficulties of the traffic problem in crowded districts.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a view of the display casing partly broken away to show the mechanism. Fig. 2 is a cross section of the display casing. Fig. 3 is a detail view showing a sign retracting disk. Fig. 4 is a plan view of the controlling switch, showing the push-buttons removed. Fig. 5 is a longitudinal section of same on line x—x, Fig. 4. Fig. 6 is a cross section on line v—v, Fig. 4. Fig. 7 is a diagrammatic view showing the wiring diagram. Fig. 8 is a front view of the display casing showing one of the signs in display position. Fig. 9 is a plan view showing the different sliding plates on the switch.

Referring to the drawings, A indicates a rectangularly shaped casing adapted to be attached to the rear portion of a vehicle. Loosely mounted upon a shaft 2, extending lengthwise of the casing, are four pairs of pulleys 3, from which are suspended by chains 4 secured to the peripheries of the pulleys 3 independently operable display plates or signs 5. The signs 5 are adapted to be lowered into position with relation to a display opening 6 formed on the casing, or elevated into the retracted position, indicated at 7 in Fig. 2. The several signs here shown are provided for the purpose of displaying such words as "Right", "Left", "Stop", "Back up", or the like, which, when lowered into display position, will immediately indicate to a car approaching from the rear the intended direction or movement of the car displaying the sign.

As before described, the display plates or signs 5 are supported by chains 4 at their opposite ends, as indicated in Figs. 1 and 2, which in turn are secured to the peripheries of the pulleys 3, one pair being provided for each sign. The positions of the four pairs of loosely mounted pulleys 3 on the shaft 2 are controlled by four separate and independently operable solenoid magnets 8, 9, 10 and 11, the cores of which are connected to four rocker-shafts 8′, 9′, 10′ and 11′ through arms 12. Suitably secured on the separate rocker-shafts are latch arms 13 which are so positioned as to engage with lugs 14, formed on the pheripheries of the pulleys 3, thus providing means for temporarily holding the pulleys and connected sign plates 5 in the elevated position shown in Fig. 2. When it is desired to lower one of the plates into display position, with relation to the opening 6, it is accomplished by energizing one or another of the solenoid magnets which will cause the core to be retracted. The retracting movement of the core is transmitted through the rocker-arm 12 to its connected shaft, which in turn is transmitted to lower the latch arms 13 out of engagement with the lugs 14, formed on the peripheries of the pulleys, and consequently allow the weight of the display sign to revolve the loosely mounted pulleys about the shaft 2 and lower the plate into the display position. The cores of the several solenoid magnets are surrounded with coil springs 15 which will immediately project the core into the elevated position where the latch arms will be in position to engage with the lugs 14, formed on the peripheries of the pulleys, when these are thrown into position with relation to the latch arms.

The display plates 5 are returned to the elevated, retracted position, indicated at 7, Fig. 2, by the following mechanism: Interposed between the loosely mounted pulleys 3 and secured to the shaft 2 is a retracting mechanism consisting of a pair of plates 16,

suitably secured to the shaft 2, and projecting from the opposite faces of the plates 16 are pins 17 which project through slots 18 formed in the several pulleys 3. Secured to the shaft 2 is another pulley 19 connected through a chain or similar device 20 with the core of a solenoid magnet 21, which, when energized, will retract the core and transmit revolving motion to the shaft 2, which in turn is transmitted through the disks 16 and projecting pins 17 to revolve the pair of pulleys 3 attached to the lower display plate. The revolving motion of the shaft 2 will cause the projecting pins 17 to engage with the ends of the slots 18 in this pair of pulleys and cause these to be revolved a sufficient distance to raise the display plate into the elevated, retracted position, indicated at 7, Fig. 2. The moment the plate has assumed its normally retracted position, the lugs 14 will be in position to be engaged with the latch arms 13, thus preventing the weight of the plate from again revolving the pulleys 3 about the shaft and lower the plate into display position. The slots 18, formed in the several pairs of pulleys 3, will thus allow any independent pair of pulleys to revolve about the shaft without affecting the position of the remaining pairs of pulleys, and the revolving movement of the released pair of pulleys 3 is produced by the weight of the display plate 5, the revolving movement is also transmitted through the disks 16 and pins 17 to the shaft 2 to the pulley 19 to elevate the core of the solenoid 21, so that this will be in elevated position to be retracted when it is energized to elevate the plate 5 into its retracted position as previously described.

For the purpose of preventing the operation of more than one display plate at one time, and also for the purpose of returning the sign into the elevated, retracted position before lowering a different plate, a switch is provided which prevents the energizing of more than one solenoid at one time, thus preventing the release of more than one pair of pulleys at one time. The switch provided for this purpose consists of a main supporting base-plate B, in which are slidably mounted four separate plates 22, 23, 24 and 25. These plates are normally held in the position shown in Figs. 4 and 5 by coil springs 26 interposed between the ends of the sliding plates and the stationary supporting frame B. Each independent plate is provided with a key-shaped perforation, as indicated at 27. The only difference in the perforations of the several plates is in eliminating the elongated portion 27, as shown at 28, in Figs. 4 and 9. For instance, the elongated perforation 27 is eliminated, as at 28, in the top plate 22, while the elongated perforation 27 is eliminated in the second plate 23, as at 29, and similarly eliminations are made in the plates 24 and 25, as at 30 and 31 respectively. The supporting plate B is also provided with a secondary frame C in which are slidably mounted push-rods 32, the lower ends of which are provided with key-shaped projections 33 corresponding in cross section to the perforations formed in the sliding plates. The push-rods 32 are normally projected out of engagement with the sliding plates by springs 34 and are only projected into engagement with the sliding plates when pressure is brought to bear upon the heads of the push-rods. The sliding plate arrangement constructed as here shown prevents the operation of more than one push-rod at one time, this being accomplished by the following operation: For instance, supposing that the push-rod, indicated at 35, is depressed, the downward movement of the rod would cause it to enter the perforation 29^a, while the key-shaped projection 33 will be forced to enter the elongated formation 27 formed in the plates. The elongated formation being eliminated in the top plate 22 will thus cause the lower cam face 33^a of the push-rod to force the sliding plate 22 in the direction of arrow a in order to permit the key-shaped end of the rod 32 to enter the perforations formed in the several plates. The sliding movement of the plate 22 will thus move the plate into such a position as to close the perforations 29 formed in the remaining lower plates and will thus prevent the depression of any of the corresponding keys. The key 35 in being depressed through the several perforations 29, formed in the several plates, will allow the end of the key to engage with a spring contact member 36 and depress this into engagement with an adjustable stop 37 carried by a lower supplementary frame 38. The spring contact member 36 and the adjustable stop 37, forming opposite terminals of a circuit, connect one of the solenoid latch-operating magnets. From this it can be seen that the depressing of one of the push-rods 32 will permit the closing of a circuit through one or another of the solenoid magnets 8, 9, 10 or 11 and will thus energize these and rock the corresponding latch-carrying shaft. This will throw the corresponding latches into a position out of engagement with the lugs 14 and permit the corresponding pair of pulleys to be revolved by the weight of the corresponding display sign, which is thus lowered into display position. Means are also provided for he purpose of preventing the release of a second sign before the sign already lowered has been elevated into retracted position. This means consists in providing each individual

sliding plate 22, 23, 24 and 25 in the switch with a projecting lug 39. Slidably mounted with relation to the projecting lugs 39, formed on the several plates at right angles to the main sliding plates, is a secondary sliding plate 40, which is also spring actuated, as at 41, for the purpose of throwing the sliding plate 40 into engagement with the projecting lugs 39 formed on the several sliding plates; the plate 40 being provided with a corresponding projecting lug 42. The lugs 39 and 42 are provided for the purpose of retaining the sliding plate in the projected position until a circuit has been closed through the solenoid magnet 21 which will cause this to be energized and elevate the lowered sign into retracted position. The retention of the sliding plate in the projected position will thus prevent any of the remaining push-rods from being depressed until the projected sliding plate has been returned into normal position, thus preventing the closing of any circuits connected with the remaining solenoid magnets.

The operation of the sliding plate retaining and releasing mechanism will be as follows: The forward movement of a slide plate will cause a lug 39 to depress the sliding plate 40 sufficiently to allow the lug 39 to pass the projection 42. The moment the lug 39 has passed beyond the path of the projecting lugs 42 this will be allowed to project into position behind the lug 39 and prevent the plate and lug from being returned to normal position. It can thus be seen that it will first be necessary to retract the plate 40 and its corresponding lug 42 before the sliding plate may be returned, or before any other push-rod 32 can be depressed, as the perforations 29 in the several plates are thrown out of alinement by the forward projected position of one of the sliding plates, as 22.

As before described, it is one of the objects of this invention to raise the lowered display plate into retracted position before lowering or displaying another sign. It, therefore, becomes necessary to energize the solenoid magnet 21 and raise the lowered display plate. This is accomplished by depressing a separate push-rod, indicated at 43, which, when depressed, will pass through a perforation 44 formed in the sliding plate 40 and a corresponding perforation 44′ formed in the supporting plate B. The lower cam edge 33^a of the push-rod 43 will engage the inner edge of the perforation 44′, when the rod is depressed, and cause the plate 40 to be retracted, thus forcing the lug 42 out of engagement with the lug 39 on the plate 22 which is thus free to return to normal position, being moved into normal position by the pressure of the spring 26. The insertion of the push-rod 43 into the perforations 44 and 44′ will correspondingly close a circuit between the flexible spring contact 36′ and an adjustable stop 37′ and cause the circuit to be closed through the solenoid magnet 21. This energizes the solenoid magnet 21 and causes the core to be retracted, which movement, as before described, is transmitted through the chain 20, pulley 19, shaft 2, disks 16 and pins 17, which in turn engages with the ends of the slots 18 of the pulleys 3, causing the pulleys to be partly revolved and the lowered sign to be elevated into the retracted position, as shown at 7, Fig. 2. The sign is retained in this position by the engagement of the corresponding latch arms 13 with the projecting lugs 14 on the pulleys. From this it can be seen that the depression of the push-rod 43 to close the circuit, connecting with the solenoid 21 for the purpose of elevating the lowered sign 5, will also cause the plate 40 and its projecting lug 42 to be retracted out of engagement with the corresponding lug 39 on the main switch sliding plate 22 and allow this to return to normal position, thus insuring a positive return of the display plate before it is possible to depress another rod to close a second circuit or lower a second display sign, as the previously advanced sliding plate must be returned into normal position before a rod may be inserted through the several plates to close a circuit.

While we have here only described the operation of the top sliding plate 42, it will be understood that the operation of the second, third and fourth sliding plates will be exactly the same, and that the advanced position of any one of the plates will prevent the insertion of any other rod to close a circuit. It is necessary to operate the solenoid 21, which is controlled by push-rod 43, to permit the return of any one plate that has previously been advanced by the action of the insertion of one or another of the push-rods 32.

Fig. 7 is a diagrammatic view showing the wire connections between the switch B and the several terminals of the various solenoid magnets contained within the display casing A. The terminals 45, 46, 47, 48 and 49 control the solenoids 8, 9, 21, 10 and 11 respectively. Correspondingly the push rods 35, 35^a, 35^b and 35^c control the solenoids 8, 9, 10 and 11 respectively, while the push-rod 43 controls the solenoid 21. It can thus be seen that the depression of any one of the push-rods here shown will close a circuit through the connected magnet and cause this to be energized. The operations of same have been previously described while the push-rod 43 is provided for the purpose of energizing the solenoid 21 and

also for releasing any advanced sliding plate in the switch. We have also shown the circuits connecting the solenoids 8, 9, 10 and 11 as provided with signal lights of various colors, such as red, green, blue and white, as 50, 51, 52 and 53 which will immediately indicate to the operator which sign is being display ', as indicated in Fig. 8. The operator can thus at all times determine by the color of the signal light which sign is being displayed. This will obviate any confusion or mistakes.

We wish it understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims, and that we do not wish to limit ourselves to the specific design and construction here shown. We also wish it understood that the display casing may be provided with suitable lights for illuminating the display sign during the dark hours, and that the controlling switch B may be placed in any convenient position near the operator where he may quickly operate the switch to indicate the direction of travel of the car.

The apparatus is neat in appearance, simple in construction and reliable in action. It may be placed in any convenient position on the rear of the vehicle and is not too large to prove cumbersome or liable to interfere with the action of any part of the vehicle.

The materials and finish of the several parts of the device are such as experience and judgment of the manufacturer may dictate.

Having thus described our invention, what we claim and desire to secure by Letters Patent is—

1. The combination in a signal device, of a casing, a plurality of display signs in said casing, a shaft in the casing, a pair of pulleys for each sign loosely mounted on said shaft, chains attached to the pulleys from which the signs are hung, means for locking the pulleys when the signs are retracted from display position, means for releasing the pulleys from the locked position to permit the lowering of a sign into display position, and means for preventing the release of more than one pair of pulleys at one time.

2. The combination in a signal device, of a casing, a plurality of display signs in said casing, a shaft in the casing, a pair of pulleys for each sign loosely mounted on said shaft, chains attached to the pulleys from which the signs are hung, stop lugs formed on the outer peripheries of the pulleys, latch arms adapted to engage with said lugs to retain the display signs in their retracted positions, means for throwing the latch arms out of engagement with the stop lugs to permit revolution of the pulleys to lower a sign into display position, and means for preventing the release of more than one pair of pulleys at one time.

3. The combination in a signal device, of a casing, a plurality of display signs in said casing, a shaft in the casing, a pair of pulleys for each sign loosely mounted on said shaft, chains attached to the pulleys from which the signs are hung, stop lugs formed on the outer peripheries of the pulleys, latch arms adapted to engage with said lugs to retain the display signs in their retracted positions, rocker-shafts to which said latch arms are secured, rocker arms secured to said shafts, magnets connected with said rocker arms adapted to be energized for the purpose of rocking said arms, shafts and connected latch arms to throw the latch arms out of engagement with the stop lugs to permit revolution of the pulleys to lower a sign into display position, and means for preventing the energization of more than one magnet to prevent the release of more than one pair of pulleys at one time.

4. The combination in a signal device, of a casing, a plurality of display signs in said casing, a shaft in the casing, a pair of pulleys for each sign loosely mounted on said shaft, chains attached to the pulleys from which the signs are hung, stop lugs formed on the outer peripheries of the pulleys, latch arms adapted to engage with said lugs to retain the display signs in their retracted positions, rocker-shafts to which said latch arms are secured, rocker arms secured to said shafts, magnets connected with said rocker arms adapted to be energized for the purpose of rocking said arms, shafts and connected latch arms to throw the latch arms out of engagement with the stop lugs to permit revolution of the pulleys to lower a sign into display position, means for raising the signs into elevated retracted position, and means for preventing the energization of more than one magnet to prevent the release of more than one pair of pulleys at one time.

5. The combination in a signal device, of a casing, a plurality of display signs in said casing, a shaft in the casing, a pair of pulleys for each sign loosely mounted on said shaft, chains attached to the pulleys from which the signs are hung, stop lugs formed on the outer peripheries of the pulleys, latch arms adapted to engage with said lugs to retain the display signs in their retracted positions, rocker-shafts to which said latch arms are secured, rocker arms secured to said shafts, magnets connected with said rocker arms adapted to be energized for the purpose of rocking said arms, shafts and connected latch arms to throw the latch arms out of engagement with the stop lugs to permit revolution of the pulleys to lower

a sign into display position, means for raising the signs into elevated retracted position, and means controlled by the sign elevating means for preventing the energization of more than one magnet to prevent the release of more than one pair of pulleys at one time.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

FRANK W. AYRES.
ROBERT A. BARNETT.

Witnesses:
KARL SCHNORR,
JAMES J. BURNS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."