

Aug. 8, 1944.

K. J. J. MCGOWAN

2,355,544

ATTACHING MEANS

Filed April 8, 1942

4 Sheets-Sheet 1

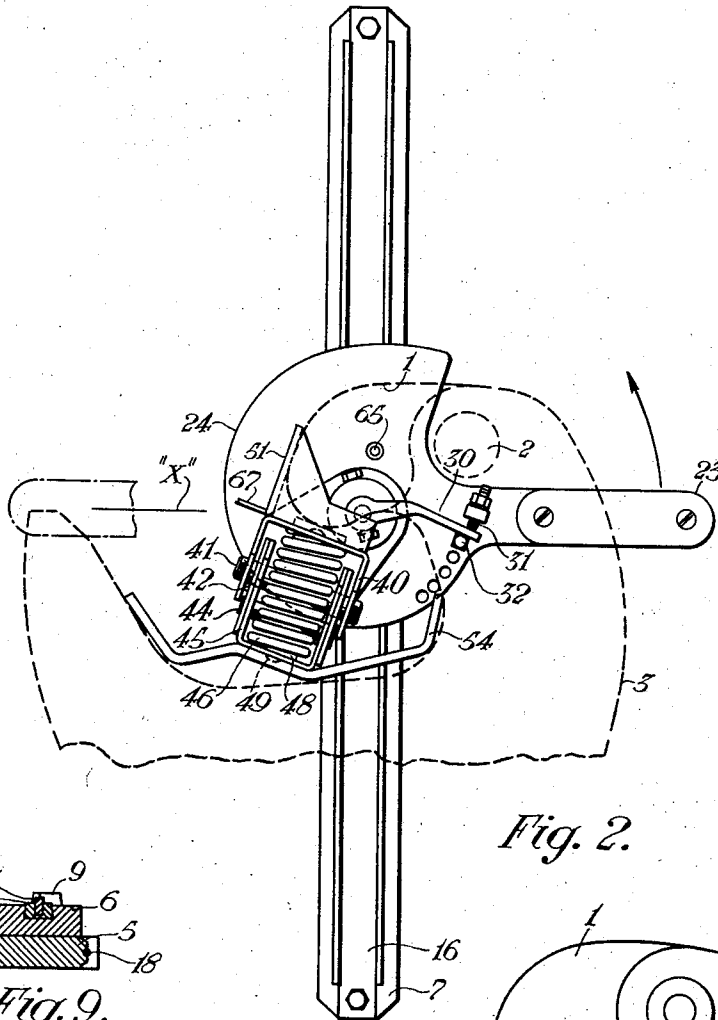


Fig. 2.

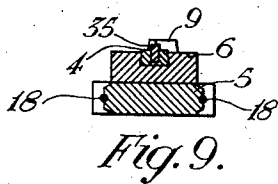


Fig. 9.

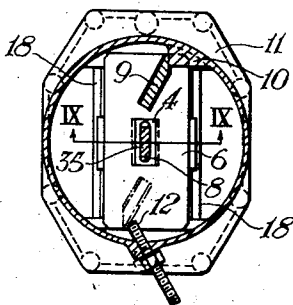


Fig. 8.

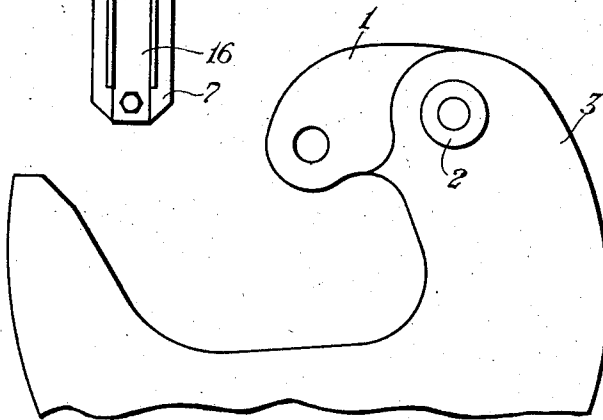


Fig. 1.

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4 Sheets-Sheet 2

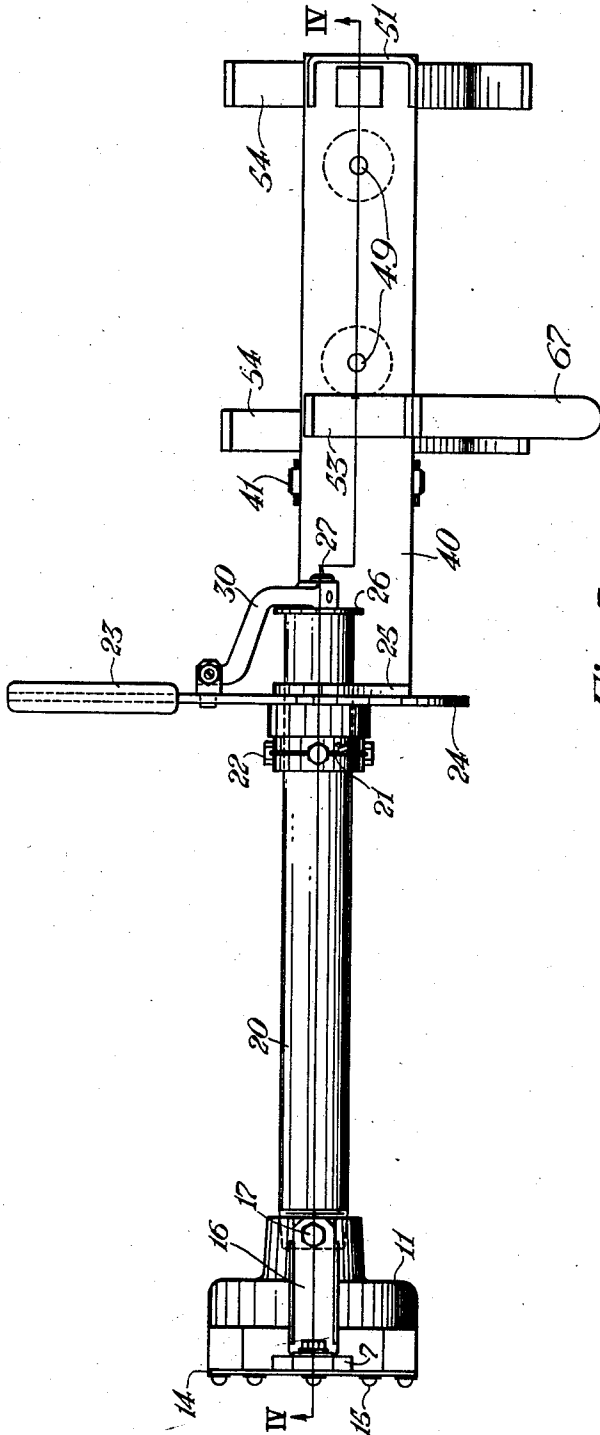


Fig. 3.

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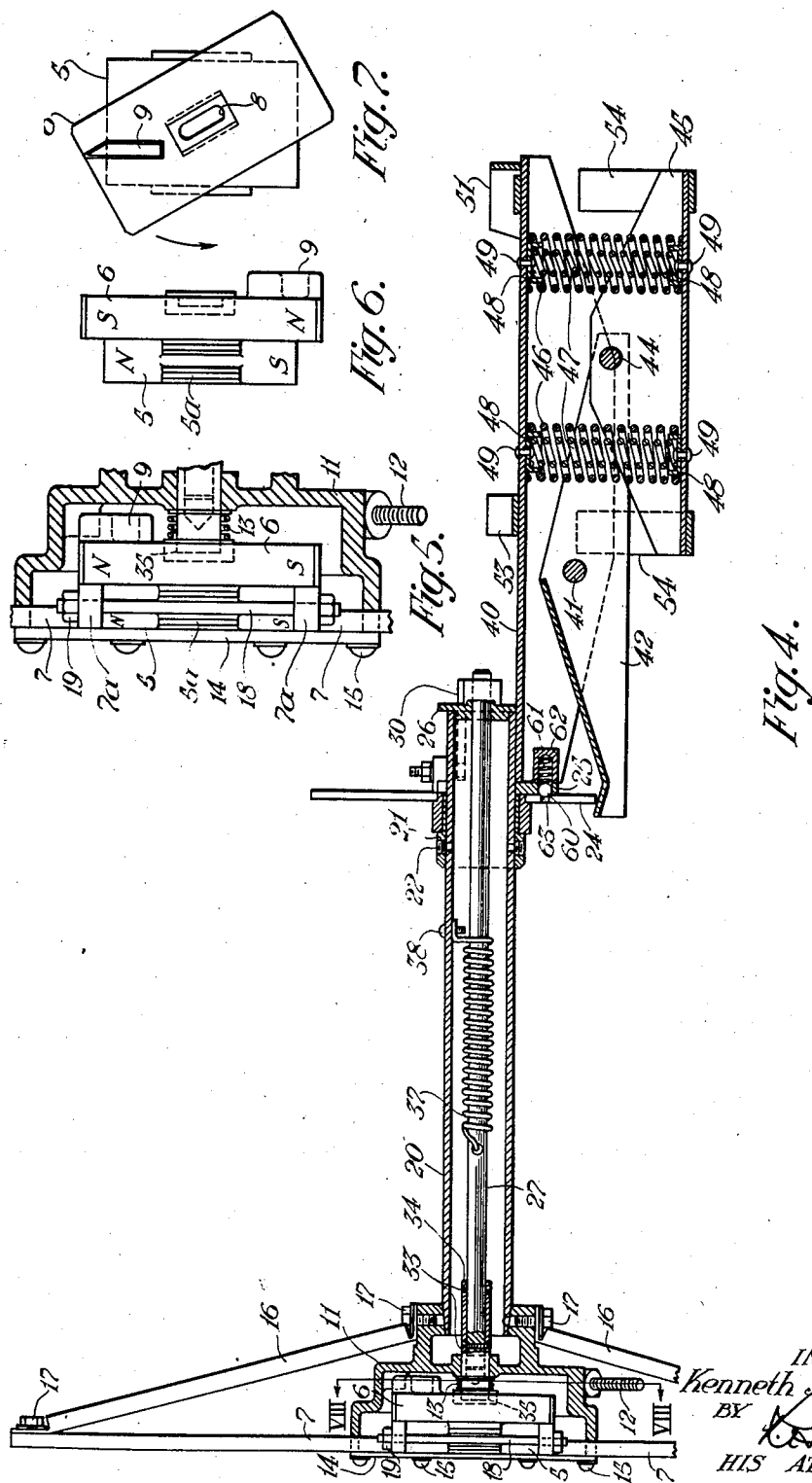
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ATTACHING MEANS

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4 Sheets-Sheet 3



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ATTACHING MEANS

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4 Sheets-Sheet 4

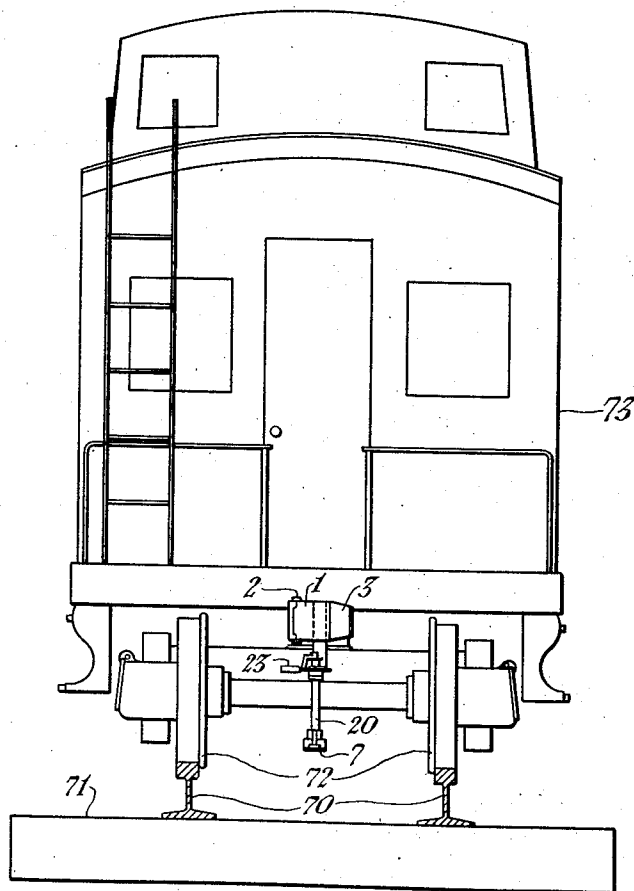


Fig. 10.

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UNITED STATES PATENT OFFICE

2,355,544

ATTACHING MEANS

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Application April 8, 1942, Serial No. 438,088

13 Claims. (Cl. 246—1)

My invention relates to attaching means, and it has particular reference to the provision of novel and improved means for attaching a signaling device to the rear of a train. More particularly, my invention relates to means for removably securing a signaling device to the rear car coupler of a train.

It has been proposed heretofore to provide a train detecting and reporting system by attaching to the rear of a train, as one of the rear end marker signals required by the rules, a portable device that functions as a source of control influences. Located at spaced points along the roadway are receiving means each cooperable with the train-carried device when it passes over a receiver, to cause a control to be established to denote the passage of such a device, thereby to provide means for positively indicating that the rear of a train has passed or cleared a given point on the track. In one such system of this class, disclosed in a copending application, Serial No. 396,745, filed on June 5, 1941, by George W. Baughman for Train detecting and reporting apparatus, and assigned to the assignee of the present application, the source of control influences comprises a magnetic device, preferably in the form of a permanent magnet removably secured to the rear car of a train and disposed in inductive relation to the roadbed. An object of my invention is the provision of novel and improved means for attaching such a magnetic device to the rear car of a train.

In order to insure that the magnetic device will be attached only to the rear car of a train, the attaching device is designed to be attached to a car coupler and is so arranged that when attached, the attaching means renders such car coupler incapable of mating with another car coupler, thereby limiting the use of such a device to the rear car coupler of a train. Another object of my invention is, therefore, the provision of attaching means cooperable with a car coupler and effective when attached to a car coupler, to prevent such coupler from mating with another coupler.

Additionally, since the portable device must be handled by a member of the train crew and moved from one car coupler to another, there is a possibility that while the crew member is handling the device, the watch of such crew member might be affected by the magnetic device and thus caused to become inaccurate. To avoid this possibility, the magnetic device comprises two magnets arranged in additive relation when attached to a train and operative to a neutralizing relation

when the device is to be handled. A further object of my invention is, therefore, the provision of novel and improved means for attaching a pair of magnets to a car coupler in such manner that the magnets must be in additive relation when attached to a coupler, and must be in a neutralizing relation before the device may be detached from a coupler for handling.

An additional object of my invention is the provision of novel and improved attaching means cooperable with a railway car coupler.

The above-mentioned and other important objects and characteristic features which will become apparent from the following description, are attained in accordance with my invention by providing means for attaching a pair of magnets to a car coupler and including an operating lever or member having a first or handling position in which the two magnets are positioned in a predetermined relation such that they do not create a strong magnetic field external to the magnetic structure, and which lever is operable to another or attached position wherein the attaching means is adapted to attach the magnets to a car coupler and the magnets are then positioned in another predetermined relation wherein they create a strong magnetic field external to the actual structure of the magnets.

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

In the accompanying drawings, Fig. 1 is a top plan view representing a railway car coupler to which an attaching device embodying my invention may be attached. Fig. 2 is a top plan view showing an attaching device embodying my invention and the relation of such a device to a car coupler. Fig. 3 is a side view of the attaching device shown in Fig. 2. Fig. 4 is a sectional view taken on the lines IV—IV of Fig. 3. Fig. 5 is another sectional view showing on an enlarged scale a portion of the device represented in Fig. 4. Figs. 6 and 7 are side and top views, respectively, of the two magnets represented in Figs. 4 and 5. Fig. 8 is a sectional view taken on the line VIII—VIII of Fig. 4. Fig. 9 is another sectional view taken on the line IX—IX of Fig. 8. Fig. 10 is an elevational view illustrating the attaching device attached to the rear car coupler of a train. In each of the several views, similar reference characters have been employed to designate corresponding parts.

In accordance with the invention, an attaching device is provided for suspending a signaling device vertically from a railway car coupler shown

in Fig. 1 and comprising a knuckle member 1 rotatably mounted on a pin 2 journaled in a coupler shank member 3 attached to be secured in the usual manner to a railway car. The signaling device supported vertically from the car coupler preferably comprises a source of control influences for a rear end train reporting system of the type disclosed in the aforesaid Baughman application, Serial No. 396,745, and such a source preferably comprises a pair of magnets disposed in inductive relation to the roadway with the poles of the magnets aligned longitudinally with the track rails.

The attaching device, represented in Figs. 2, 3 and 4, comprises attaching means cooperating with the car coupler, supporting means attached to the attaching means, a magnet assembly secured to the supporting means and including a pair of magnets, and operating means for conditioning the attaching means for cooperation with the car coupler and for establishing different relative relations of the two magnets of the magnet assembly.

The attaching means which cooperates with the car coupler comprises a first channel member 40 provided in its sidewalls with aligned openings journaling a pin 41 on which a lever 42 is pivoted intermediate its ends. One end of lever 42 is connected as by means of a pin 44 to a second channel member 45 arranged to operate within the sidewalls of the first channel member. The two channel members have their open faces confronting, and disposed between the closed faces of the channels are compression springs 46 and 47, disposed in pairs on either side of pin 44. The springs 46 are held in position by means of spring blocks 48 secured as by rivets 49 to channel members 40 and 45, respectively.

The upper or right-hand end, as viewed in Figs. 3 and 4, of member 40 has secured thereto, as by welding, a knuckle engaging member 51 having side members shaped to engage knuckle 1 and provided with a lip for engaging the top face of the knuckle. Another knuckle engaging member 53 welded to channel 40 has side members shaped to engage the knuckle, while channel member 45 has secured thereto shank engaging members 54 shaped or bent to engage shank 3 at a plurality of spaced points.

Attached as by welding to the lower or left-hand end of member 40, as viewed in Figs. 3 and 4, is a tubular supporting member 20 provided intermediate its ends with a bearing member 22 secured as by screws 21 to member 20 and provided with a collar. Journaled on member 22 intermediate its collar and a plate member 25 welded to tubular member 20 and channel member 40, is a handle member 23 provided with a cam 24 which engages the other or free end of lever 42. Cam 24, as can best be seen in Fig. 2, has a cammed surface which varies from a low to a high portion and which is effective to operate the channel members from an open to a closed position, respectively, as will be made clear presently. Cam 24 also is preferably provided with detent openings 63 and 65 (see Figs. 4 and 2, respectively) which cooperate in a manner to be made clear presently, with spring detent means shown in Fig. 4 and comprising a ball 60 biased into engagement with the side surface of cam 24 by means of a spring 61 enclosed in a housing 62 secured to member 40.

The lower or left-hand end, as viewed in Figs. 3 and 4, of tubular member 20 is threaded into a non-magnetizable housing 11 while the other or upper end of member 20 is enclosed by an end

plate 26 welded to member 20 and provided with an opening in which an operating shaft 27 is journaled. Secured to the upper end of shaft 27 that projects through plate 26 is a crank arm 30 operatively connected with cam 24 by means of stops or lugs 31 and 32 (see Fig. 2) secured to cam 24 and disposed on either side of the crank arm for engagement therewith. One or the other of the two stops 31 and 32 engages crank arm 30 to rotate shaft 27 when cam 24 is rotated in a manner explained hereinafter.

A sleeve member 34 journaled in housing 11 (see Fig. 4) is secured by screws 33 to the other or lower end of shaft 27, and the shaft is provided with suitable biasing means comprising a torsion spring 37 disposed around shaft 27 and secured at one end to the shaft and at the other end by a screw 38 to tubular member 20. These biasing means function to bias shaft 27 in a given direction, wherein crank arm 30 is held in engagement with stop 32, for a purpose to be made clear presently. The sleeve member 34 terminates in a tongue 35 adapted to cooperate with the magnet assembly for establishing different relative relations of the magnets of the assembly, which assembly is shown in detail in Figs. 5-9, inclusive, and comprises a pair of bar magnets 5 and 6 supported in housing 11. As can best be seen in Fig. 5, the magnets are disposed in the housing with a spring 13 interposed between the inner face of the housing and the upper face of the upper or right-hand magnet 6 (as viewed in Fig. 5), which magnet rests upon and is supported by the lower magnet 5 which in turn is supported by a cover-plate 14 attached by bolts 15 to and enclosing the lower or left-hand end, as viewed in Fig. 5, of housing 11. Lower magnet 5 is provided with two elongated pole pieces 7, one for each end or pole of the magnet. These pole pieces are provided adjacent to magnet 5 with upturned legs 7a having openings which receive bolts 18 disposed in semi-circular shaped grooves formed in lugs 5a molded on magnet 5 (see Fig. 9). Nuts 19 are provided on the ends of bolts 18 and when drawn up, secure the pole pieces to magnet 5. The outer ends of the pole pieces are supported by braces 16 secured by bolts 17 to housing 11 and to the outer ends of pole pieces 7, respectively.

For cooperation with tongue 35 secured to shaft 27, the upper magnet 6 is provided on its upper face with an insert 4 provided with a slot 8 into which tongue 35 fits. Magnet 6 also is provided on its upper face with a projection 9 which cooperates with a fixed stop 10 formed in housing 11, and with an adjustable stop comprising a bolt 12 threaded through an opening in the housing.

In accordance with an object of the invention, the attaching device is arranged to establish different relative relations of the two magnets 5 and 6, whereby when the magnets are attached to a car coupler a relatively strong magnetic field is obtained but when the device is detached from the coupler for the purpose of handling or moving the magnets, a relatively weak magnetic field is provided. The magnets 5 and 6 produce a relatively strong magnetic field when the magnets are in the condition represented in Figs. 4 and 5. In this condition of the magnets, the north poles (designated by the reference characters N) of the two magnets are adjacent to each other while the south poles (designated by the reference characters S) are likewise adjacent. The fluxes of the magnets are, therefore, in agreement and the magnets cooperate in creating a relatively strong magnetic field. Should, however, the upper magnet 6 be rotated as indicated in Fig. 7 through an

angle of approximately 180°, then the unlike poles of the two magnets will be adjacent to each other, as represented in Fig. 6, and the magnets will then be in a neutralizing relation wherein a relatively weak resultant magnetic field is produced.

To handle the device and prepare it for attachment to the car coupler, a convenient grip member 67 welded to channel member 40 may be grasped and used to assist in rotating handle 23 in the direction indicated by an arrow in Fig. 2, from its full-line position represented in the drawings to the dotted line position "X." This operation of lever 23 brings the high portion of cam 24 into engagement with lever 42 to rotate that lever about its pivot 41, whereupon channel members 40 and 45 are operated against the action of springs 46 and 47, to a closed position wherein the channel members are in their closest proximity. In this position of cam 24, detent opening 65 is disposed beneath and occupied by ball 60 of the spring detent means, thereby locking the cam and handle 23 against accidental movement. If desired, however, the detent locking means may be replaced by a fixed stop secured to channel member 40 and engaging a projection on cam 24 to limit the stroke of lever 23. The rotation of handle 23 to its "X" position also results in the rotation of shaft 27, and the upper magnet 6 operatively connected therewith, through an angle of approximately 180° to the position wherein projection 9 of magnet 8 engages adjustable stop 12. Under the assumed conditions, the magnets 5 and 6 are positioned as indicated in Fig. 6 and create a relatively weak resultant magnetic field so that the device and magnets may be handled by a train crew member without danger of magnetizing the watch of such crew member. I shall, therefore, refer to the device as being in the handling condition when lever 23 is rotated to its dotted line "X" position indicated in Fig. 2.

When the device is in its handling position, it may be attached to a locked car coupler by inserting the channel members 40 and 45 between knuckle portion 1 and shank portion 3 of the coupler, with the lip of knuckle engaging member 51 arranged to engage the upper face of the knuckle member, and with the side portions of member 51 disposed as shown in Fig. 2 to engage the relatively flat sides of knuckle 1. Handle 23 may then be operated from its dotted position "X" to its full-line or attached position represented in Fig. 2, in which position the low portion of cam 24 engages lever 42 and the springs 46 and 47 are enabled to separate the channel members 40 and 45. The parts are preferably proportioned so that when lever 23 is rotated to its attached position, represented in full lines in Fig. 2 and wherein detent opening 63 is engaged by ball 60 to lock the handle against accidental movement, the channel members do not reach their full open position, that is, the position wherein lever 42 bears against the low portion of cam 24. The channel members are, therefore, under spring compression and their associated knuckle and shank engaging members are forced by spring action firmly into engagement with the component parts of the car coupler to position the device firmly in the coupler. The device, as pointed out hereinbefore, is suspended vertically from the coupler with the magnets 5 and 6 projecting downwardly toward the trackway, as shown in Fig. 10 of the drawings. In this figure, the rails 70 supported on a tie 71 in turn support the wheels 72 of a railway car 73 shown as comprising a caboose. Inserted in the free or disengaged coupler of the caboose between

the knuckle 1 and shank 3 portions of the coupler are the coupler engaging elements of applicant's device, and with the device attached to the coupler as shown, the magnets are positioned in a predetermined relationship with the trackway so that the magnets, pole pieces 7 and associated housing will clear with a predetermined clearance a line drawn tangent to the tops of rails 70. The parts are adjusted so that the elongated pole pieces 7 are in alignment with the axis of the car to which they are attached, or in other words the pole pieces are in parallel relation to the two track rails of the roadway. The suspended weight of the device is supported from the lip of member 51 (see Figs. 3 and 4), which lip bears against the top of knuckle 1.

In the attached position of the device, represented in Fig. 2, the magnets 5 and 6 are in the additive relation due to the rotation of magnet 6 to the position represented in Fig. 5. The biasing spring 37 of shaft 27 is effective to operate shaft 27 and its associated handle 23 and magnet 6, to the positions wherein projection 9 engages stop 10 of housing 11, and detent opening 63 of cam 24 is engaged by ball 60, even though channel members 40 and 45 might be prevented from reaching their full open position due to the engagement of the knuckle and shank members 51 and 54 with the tongue and shank portions 1 and 3 of the coupler, respectively. The biasing of shaft 27 therefore insures that magnets 5 and 6 will be in their additive relation when the magnets are attached to a car coupler.

It is to be noted that the shaft 27 which operatively connects the upper magnet 6 to operating lever 23 is permitted a slight amount of lost motion by virtue of the connection of the shaft to the lever 23 effected through crank arm 30 secured to the shaft and adjustable lugs or stops 31 and 32 secured to cam 24. This lost motion connection affords a means which enables the angular displacement of magnet 6 to be varied while permitting the operating lever 23 to be swung always through its full stroke. It is, of course, obvious that an alternative arrangement may be provided, if desired, by securing crank arm 30 to cam 24 and by connecting shaft 27 to magnet 6 by means, such as by an arm on the shaft and adjustable stops on the magnet, that permits lost motion in such parts.

It is, of course, obvious that when an attaching device embodying my invention is attached to a car coupler, the coupler is then rendered incapable of mating with another coupler. Thus, once the magnets are attached to a coupler, the device functions to insure that the coupler will be the last car coupler of a train.

From the foregoing, it is readily apparent that I have provided novel and improved means for removably securing a device to a car coupler in such manner that a predetermined relation of elements is established when the device is attached to a coupler, and another predetermined relationship must be established in order to remove the device for handling. More particularly, it is to be noted that I have provided means for attaching a pair of magnets to a car coupler in such manner that when the magnets are attached they must be in additive relation, and such magnets must be in a neutralizing relation in order to be detached from the car coupler.

Although I have herein shown and described only one form of an attaching means 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 with a railway car coupler in its locked condition, a pair of magnets, and means for removably securing both of said magnets to said railway car coupler, said means preventing said car coupler from mating with any other car coupler and including means operative for establishing a predetermined magnetic relationship of the magnets when attached to a car coupler and for establishing another predetermined magnetic relationship prior to disconnecting said magnets from said car coupler.

2. In combination with a railway car coupler in its locked condition, a pair of magnets, and means for removably securing said magnets to said railway car coupler, said means preventing said coupler from mating with any other car coupler and including means operative to establish an additive magnetic relationship of said magnets when attached to a car coupler and effective to establish a neutralizing magnetic relationship of said magnets in disconnecting said magnets from said coupler.

3. Attaching means for removably securing a pair of magnets to a railway car coupler in its locked condition, comprising in combination, means for supporting a pair of magnets, and means for attaching said supporting means to a car coupler, said attaching means including means for operating said magnets to an additive relation when attached to said coupler and for operating said magnets to a neutralizing relation prior to detaching said magnets from said coupler.

4. Means for attaching a signaling device to a railway car coupler in its locked condition and for preventing said coupler from coupling with another car coupler, comprising in combination, a supporting member for supporting a signaling device, and means operatively connected with said member for removably securing said member to said coupler including a pair of members spring biased apart and operable against such spring bias to a closed position wherein said members are insertable in a car coupler and to an open position wherein said spring bias is effective to maintain said members firmly attached to said coupler.

5. A portable device for attaching impulsing means to a railway car, said device cooperating with a locked coupler of said car and comprising a supporting member to which said impulsing means is attachable, and means for attaching said member to a coupler of said car, said means comprising two members one secured to said supporting member, a lever pivotally secured intermediate its ends to said one member and having a pin connection at one end to the other of said two members, springs disposed between said two members on either side of said pin connection, and means operatively connected with the other end of said lever for moving said two members toward each other to enable said attaching means to be inserted into said coupler and for at times permitting said springs to urge said two members apart and into engagement with the parts of said coupler.

6. In combination with a railway car coupler in its locked condition, two magnets, a nonmagnetizable housing enclosing said magnets, a supporting member secured to said housing, attaching means secured to said supporting member

and comprising a pair of coupler engaging elements compressible to a closed position for insertion into a coupler and biased to an expanded position in engagement with said coupler, operating means for compressing said coupler engaging elements, and means operatively connected with said operating means for varying the relative positions of said two magnets for at times establishing an additive and at other times a neutralizing flux relation.

7. In combination, a pair of coupler engaging elements, means for biasing said elements to an expanded position into engagement with the parts of a railway car coupler in its locked condition, operating means for compressing said coupler engaging elements to a closed position for insertion into a car coupler, a pair of magnets supported from said coupler engaging elements, and means operatively connecting said operating means to said magnets for normally establishing an additive flux relation and operative to establish a neutralizing flux relation when said coupler engaging elements are in their closed positions.

8. In combination, a nonmagnetizable housing, two bar type permanent magnets disposed in said housing, a supporting member secured to said housing and provided with attaching means having one position wherein said means may be inserted into or removed from a railway car coupler in its locked condition and operable to another position wherein said supporting means is suspended from said coupler, and means operatively connecting the attaching means to said permanent magnets for arranging said magnets in additive magnetic relation when said means is in its said other position and in a neutralizing magnetic relation when said means is in its said one position.

9. In combination, a nonmagnetizable housing, two bar type permanent magnets disposed in said housing and biased to occupy relative positions wherein the fluxes are in additive relation, and means for attaching said housing to a railway car coupler in its locked condition, comprising a pair of coupler engaging elements secured to said housing and biased to an expanded position into engagement with the parts of said car coupler, operating means for operating said coupler engaging elements to a closed position wherein said elements may be inserted into a car coupler, and means operatively connecting said operating means to said magnets for operating said magnets to an operated position wherein the fluxes are in a neutralizing relation when said coupler engaging elements occupy their closed positions.

10. In combination, two channel members arranged with confronting open faces, a lever pivoted intermediate its ends to one of said members and having one of its ends pin-connected to the other of said members, compression springs disposed between the closed faces of said channel members on either side of said pin-connection, a signaling device to be supported, and means connecting said signaling device to one of said channel members, said means including a cam engaged by the other end of said lever and effective to rotate said lever about its pivot, whereby said members at times may be compressed to a closed position and at other times may be released from said closed position to an open position.

11. The combination with a railway car having a disengaged railway car coupler in its locked position, of magnetic means, and means for attaching said magnetic means to said car

coupler with said magnetic means disposed to be in a predetermined relation to the trackway, said attaching means comprising a pair of coupler engaging elements biased to an expanded position wherein the elements engage the shank and knuckle portions of said coupler, operating means acting on said coupler engaging elements for operating said elements to a closed position wherein said elements may be inserted into said coupler between its shank and knuckle portions, and means connecting said magnetic means to said coupler engaging elements in such a manner that when said coupler engaging elements engage said coupler portions with said connecting means projecting downwardly toward the trackway, said magnetic means are positioned in said predetermined relation so that said magnetic means will clear with a predetermined clearance a line drawn tangent to the tops of the two rails of said trackway.

12. The combination with a railway car having a disengaged railway car coupler in its locked condition, of two coupler engaging elements, means for biasing said two coupler engaging elements to an expanded position wherein the elements engage the shank and knuckle portions of said coupler, operating means for operating said coupler engaging elements to a closed position wherein said elements may be inserted into said coupler between its shank and knuckle portions, a non-magnetizable housing member, a first permanent magnet, separate pole pieces for each pole of said first magnet, means for attaching each pole piece to its associated pole of said first magnet and for mounting said first magnet in said housing member, a second permanent magnet mounted in said housing in magnetic relation to said first magnet, means for moving one of said magnets relative to the other between relative positions wherein the two magnetic fields aid and oppose each other respectively, a connecting member connecting said housing member to said coupler engaging elements in such a manner that when said coupler engaging elements engage said coupler portions with said connecting member projecting downwardly, said housing member is positioned in a predetermined relation to the trackway with said pole pieces paralleling the two track rails and said magnets and housing clearing with a predetermined clearance a line drawn tangent to the two track rails, and means operatively connected with said operating means for causing motion of said one magnet relative to the other in such a manner that said magnets are in one of said relative positions when said coupler engaging elements are in their expanded position and said magnets are in the other relative position when said coupler engaging elements are in their closed positions.

13. In combination, two channel members ar-

ranged with confronting open faces, knuckle engaging elements fastened to the outside closed face of one of said channel members and shank engaging elements fastened to the outside closed face of the other of said channel members, a lever pivoted intermediate its ends to one of said members and having one of its ends pin-connected to the other of said members, compression springs disposed between the closed faces of said channel members on either side of said pin-connection, a connecting member attached to said one member, a cam mounted on said connecting member for cooperation with the other end of said lever and having a shape effective to rotate said lever about said pivot between either of two extreme positions in one of which said channel members are compressed to a closed position wherein the channel members may be inserted into a disengaged railway car coupler in its locked condition and in the other extreme position of which said channel members are expanded by said compression springs to cause said knuckle engaging and shank engaging elements to be in a position for engaging the knuckle and shank portions respectively of the car coupler, a non-magnetizable housing, a first permanent magnet, separate pole pieces for each pole of said first magnet, means for attaching each pole piece to its associated pole of said first magnet and for mounting said first magnet in said housing member, a second permanent magnet mounted in said housing in magnetic relation to said first magnet, means for moving one of said magnets relative to the other between relative positions wherein the two magnetic fields aid and oppose each other respectively, said non-magnetizable housing member attached to said connecting member with said connecting member having a length such that when said knuckle and shank engaging members engage said knuckle and shank respectively of a car coupler with said connecting member extending downwardly from said coupler toward the trackway, said housing member is positioned in a predetermined relation to the trackway with said pole pieces paralleling the two tracks of the trackway and said magnets and housing clearing with a predetermined clearance a line drawn tangent to the two track rails, and means operatively connecting said magnet moving means with said cam for causing movement of said one magnet relative to the other in such a manner that when said channel members are compressed to a closed position said two magnetic fields oppose and when said two channel members are expanded to a position wherein said knuckle and shank engaging elements are in positions to engage with the knuckle and shank of a car coupler said two magnetic fields are additive.

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