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CAR RETARDING RAIL

Filed May 12, 1927 2 Sheets-Sheet 1

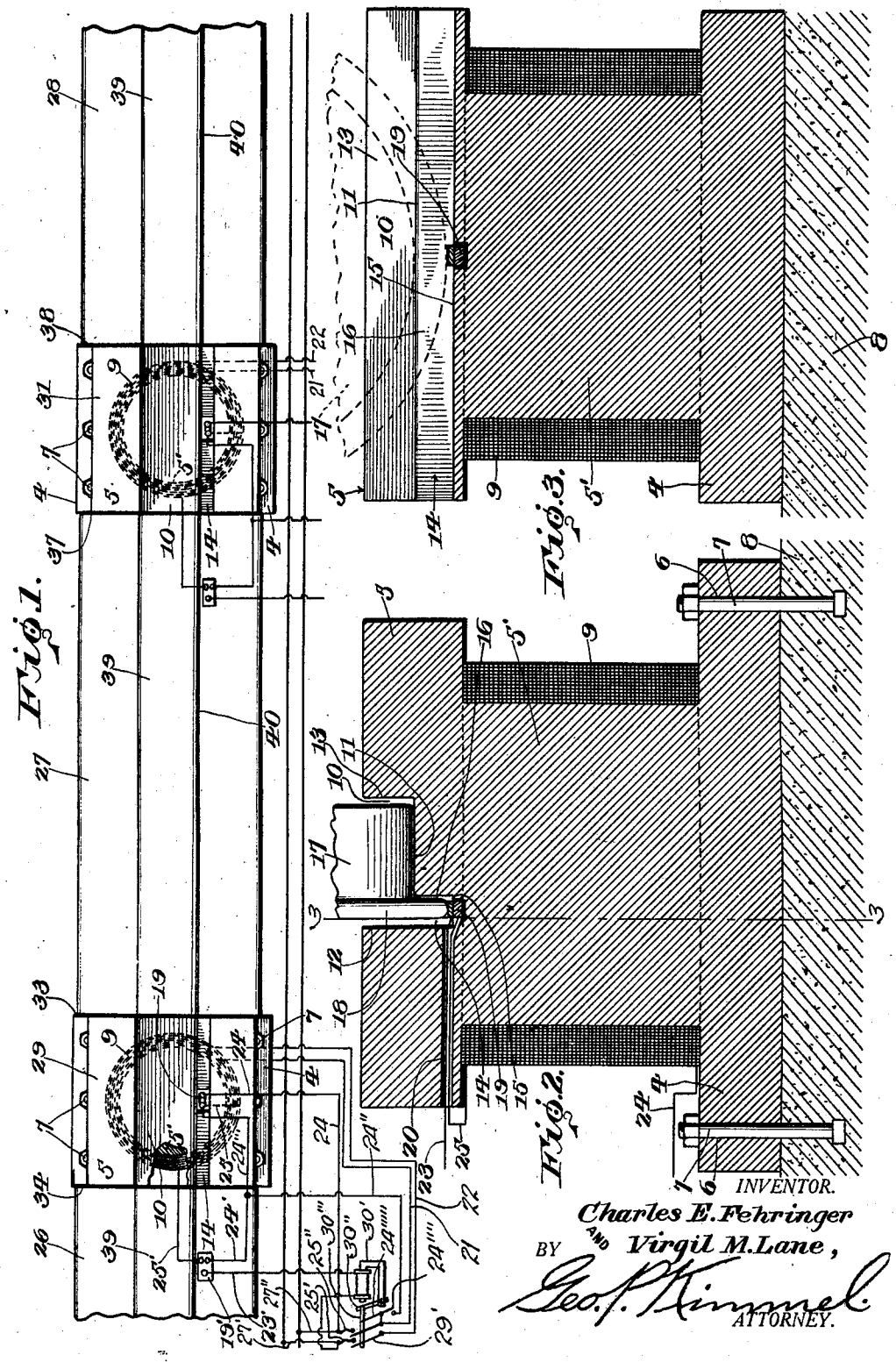


Fig. 1.

Fig. 3.

Fig. 2.

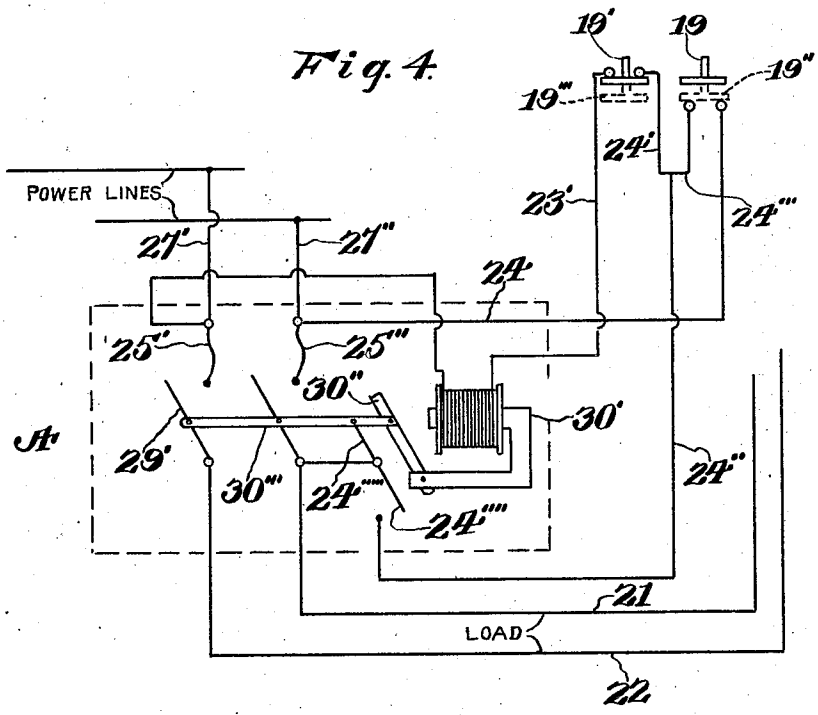
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Fig. 4.



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UNITED STATES PATENT OFFICE

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CAR-RETARDING RAIL

Application filed May 12, 1927. Serial No. 190,825.

This invention relates to a retarder of the electromagnet type, more particularly to an electric magnet retarding rail section, and has for its object to provide, in a manner as hereinafter set forth for the controlling of the speed of rolling stock down an incline, but more particularly for the controlling of the speed of freight cars travelling down an inclined portion of a railway track and into a classification track when it is desired that switching of cars be handled by use of the hump system.

Further objects of the invention are to provide, in a manner as hereinafter set forth, an electromagnet retarder for the purpose referred to which is simple in its construction and arrangement, strong, durable, compact, thoroughly efficient in its use, automatic in its action, readily installed with respect to a track rail to form a continuation thereof, and comparatively inexpensive to manufacture.

With the foregoing and other objects in view the invention consists of the novel construction, combination and arrangement of parts as hereinafter more specifically described, and illustrated in the accompanying drawings wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which fall within the scope of the claims hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:

Figure 1 is a fragmentary view in plan of a track rail showing the adaptation therewith of a plurality of retarders in accordance with this invention.

Figure 2 is a vertical sectional view of a retarder, in accordance with this invention, clamped to a supporting base or tie, and further illustrating in side elevation, a fragmentary portion of a wheel of a car in position with respect to the top of the retarder.

Figure 3 is a section of the retarder taken at right angles to Figure 2 and further illustrating in dotted lines the lower portion of the wheel of a car in respect to the top of the retarder.

Figure 4 is a diagrammatic view illustrating the current control with respect to a retarder.

The retarder is constructed to have its top form a continuation of a section of a track rail and is in itself a normally de-energized electromagnet and which when energized, by the wheel flange of a wheel travelling thereover will retard the revolving of such wheel due to the attraction between the magnet and the wheel body, under such conditions checking or slowing the travel of the car travelling over the track which the retarder forms an element thereof.

The retarder comprises a base 4, a core 5′ and a head 5 which are cast in one solid piece of any suitable conducting material. The base 4 is of rectangular contour, as well as the head 5, but the base 4 extends in a direction at right angles to the head 5. The width of the base 4 corresponds to the length of the head 5. The base 4 is formed with vertically disposed openings 6 for the passage of anchoring means 7 which are embedded in a suitable foundation 8. The core 5′ is cylindrical and is provided with the windings 9. The windings of the coil are to be in percentage taps of five horsepower, ranging to the maximum of retarding power desired.

The head 5 is the armature of the magnet and the upper face of the head 5, at the longitudinal median thereof is formed with a groove 10 which extends from one end of the other end of the head and the bottom of said groove is indicated at 11 and its side walls at 12, 13. The head 5 is furthermore formed with a channel 14 which extends from one end to the other end thereof and which is provided by cutting away one side of the bottom 11 of the groove 10. The side wall 12 of the groove 10 is extended to form one side wall of the channel 14. The bottom of the channel 14 is indicated at 15 and its other side wall at 16. The bottom 11, of the groove 10 forms a tread surface for the wheel 17 and the channel 14 forms a space for the flange 18 of the wheel 17 to travel through. The width of the groove 10 is materially greater than the width of the wheel and the channel

14 is of a width materially greater than the thickness of the wheel flange 18.

Associated with each retarder is a current control therefor and which is illustrated diagrammatically in Figure 4, and by reference to the latter A is a magnetic contactor switch and includes the magnetic coil 30′, the contactor switch 29′ actuated by the arms 30″, 30‴, the fuses 25′, 25″, and the interlock switch 24⁗ actuated by the arm 24⁗′.

The control switch for operation of the magnetic contactor switch 29′ is a two button push type switch with an "On" and "Off" button. The "On" button 19 has normally open contacts. The "Off" button 19′ has normally closed contacts. Pushing the "On" button closes the circuit necessary to close the magnetic contactor switch 29′. Pushing the "Off" button opens the circuit necessary to open the magnetic contactor switch 29′. The contactor buttons 19, 19′ are spring actuated and will return from their depressed position to their normal position when pressure is removed from them. The spring mechanism for returning the contactor buttons 19, 19′ is not shown in Figure 4.

The operation of the current control device, shown in Figure 4, is as follows:

When the contactor button 19 is pushed downward to the position 19″ contact is made and a circuit is maintained through conductor wires 23′, 24′ 24‴ and 24, and the magnetic coil 30′ is energized and draws in the arm 30″ adapted to carry the arm 30‴ and closes the contactor switch 29′ and the interlock switch 24⁗, which is also actuated by the arm 30‴ through the arm 24⁗′. When the contactor switch 29′ is closed a circuit is maintained through the conductor wires 21, 22, which are connected to the winding of the electro-magnet retarder, and the electro-magnet retarder is energized. The electro-magnet retarder is not shown in Figure 4. When the contact button 19 is released it will return to its normal position, being so actuated by a spring, not shown, and no current passes through conductor wires 24, 24‴, but conductor wire 24″, known as a maintaining circuit, is in circuit and maintains the interlock switch 24⁗ in a closed position which prevents the magnetic contactor switch 29′ from opening. When the contactor button 19′ is pushed downward to the position 19‴ contact is broken and so is the circuit through conductor wires 23′, 24′, 24″ and the magnetic coil 30′ de-energized and the magnetic contactor switch 29′ opens, and the circuit through the conductor wires 21, 22 is broken and the electro-magnet retarder de-energized.

On closing of the circuit it will provide for the energizing of the magnet and the latter will act to retard the travel of the wheel 17 due to the attraction between the magnet and the wheel. The circuit closing and opening device may be of any suitable construction capable of performing the function required therefor, and preferably it is of the magnetic start and stop type, and is so arranged that after the flange 18 leaves the retarder, for a distance say about two inches the device will be operated to open the magnet circuit. The switch element 19 closes the circuit and the switch element 19′ opens it. The positioning of the switch element 19, centrally in the manner shown is to overcome pull of the wheel towards the center of the retarder forwardly. If the electric power was turned on before the car wheel reached the center of the retarder, the wheel would receive a pull toward the center and give it an increase in speed, naturally offsetting the full retarding power desired. If the object being pulled is before it, it will pull it to the center and if past the center it will pull it back. So the switch is placed in the center of the retarder that no energy is placed in the magnet until the car wheel has reached the center when the only pull will be back, and the greatest pull will be when it goes to leave the retarder, when, depending upon the windings of the coil if desired it can be made terrific.

The head 5 is formed with a bore 20 which leads to and opens into the channel 14. As shown the bore 20 extends from one side edge of the head 5 to the wall 12 of the groove 10. The inner end of the bore 20 is directed downwardly towards the switch element 19. The bore 20 is provided for the passage of circuit connections to the terminals of the switch element 19.

Figure 1 illustrates a track rail formed of a series of spaced rail sections 26, 27 and 28, having interposed therebetween the retarders 29, 31. The retarder 29 is interposed between the rail sections 26, and 27 and forms a continuation thereof. The retarder 31 is interposed between the rail sections 27 and 28 and forms a continuation thereof. The retarder 29 is insulated from rail section 26, as at 34, and from rail section 27, as at 33. The retarder 31 is insulated from rail sections 27, 28, as at 37, 38 respectively. The tread surface of each of the track rail sections is indicated at 39 and the bottom 11 of the groove 10 formed in each head 5 of a retarder forms a continuation of the tread surface 39. The channels 14 are positioned with respect to the inner side 40 of the tread surface 39 of each of the track rail sections.

Preferably the length of each head of a retarder is twenty-four inches and the width of each base is the same. The length of the base is thirty inches. The core 5′ of the retarder is of a diameter materially less than the width and length of the head and base. Preferably the length of a track rail section which is interposed between the retarders is forty-two inches. The track rail sections are dead rails. The number of retarders inter-

posed on a down grade will be such as is suitable for proper control of a car. It will be understood however that the length of a retarder can be as desired and this statement also applies to the rail section which is interposed between a pair of retarders.

When the retarders are employed they act as a means to control the speed of cars when travelling down a grade or rather an inclined portion of a railway track in a thoroughly efficient manner and therefore it is thought that the many advantages of a retarder, in accordance with this invention, can be readily understood, and although the preferred embodiment of the invention is as illustrated and described, yet it is to be understood that changes in the details of construction can be had which will fall within the scope of the invention as claimed.

What we claim is:—

1. A retarder device for rolling stock comprising an electromagnet normally in an open circuit for interposition between, insulated from and forming a continuation of the tread surfaces of a pair of track rail sections, and means operated by the flange of a wheel travelling over said magnet for closing the magnet circuit when the wheel flange reaches the center of the magnet and for openng the magnet circuit when the wheel flange passes clear of the magnet.

2. A retarder device for rolling stock comprising an electromagnet normally in an open circuit for interposition between, insulated from and forming a continuation of the tread surfaces of a pair of track rail sections, and means operated by the flange of a wheel travelling over said magnet for closing the magnet circuit when the wheel flange reaches the center of the magnet and for opening the magnet circuit when the wheel flange passes clear of the magnet, said means being arranged within and below the top of the magnet and forwardly of the magnet.

3. A retarder device for rolling stock comprising a track rail section in the form of an electromagnet normally in an open circuit, and means within the head of the magnet and engaged by the flange of a wheel travelling over said head for closing the magnet circuit when the flange reaches the center of the head.

4. A retarder for interposition between the sections of a track rail to form a continuation thereof comprising a body portion consisting of an electromagnet having arranged in the upper part thereof a normally inactive circuit closing means therefor, adapted to be engaged by the flange of a wheel travelling over the magnet to close the circuit for the latter thereby providing for the energizing of the magnet to cause the latter to attract the wheel to retard travel of the latter as it passes over the magnet.

5. A retarder for interposition between the sections of a track rail to form a continuation thereof comprising a body portion consisting of an electromagnet having arranged in the upper part thereof a normally inactive circuit closing means therefor, adapted to be engaged by the flange of a wheel travelling over the magnet to close the circuit for the latter thereby providing for the energizing of the magnet to cause the latter to attract the wheel to retard travel of the latter as it passes over the magnet, said body formed below its upper face with a tread surface for the wheel and further formed with a channel depending below the tread surface for the passage of the wheel flange, said passage having said means arranged at the bottom thereof.

6. A retarder for interposition between the sections of a track rail to form a continuation thereof comprising a body portion consisting of an electromagnet having arranged in the upper part thereof a normally inactive circuit closing means therefor, adapted to be engaged by the flange of a wheel travelling over the magnet to close the circuit for the latter thereby providing for the energizing of the magnet to cause the latter to attract the wheel to retard travel of the latter as it passes over the magnet, said body formed below its upper face with a tread surface for the wheel and further formed with a channel depending below the tread surface for the passage of the wheel flange, said passage having said means arranged at the bottom thereof, said means disposed at the transverse median of the bottom of the channel.

7. A retarder comprising a body of conducting material formed of a head, a base and a cylindrical part connecting the base and head together, a coil surrounding said cylindrical part and forming in connection with said body an electromagnet, a normally open circuit closing means for said magnet mounted in said head below the upper face thereof and adapted to be engaged by the flange of a wheel travelling over said head to close the magnet circuit to provide for the energizing of the magnet whereby the latter will act to retard the travel of the wheel as it passes over said head.

8. A retarder comprising a body of conducting material formed of a head, a base and a cylindrical part connecting the base and head together, a coil surrounding said cylindrical part and forming in connection with said body an electromagnet, a normally open circuit closing means for said magnet mounted in said head below the upper face thereof and adapted to be engaged by the flange of a wheel travelling over said head to close the magnet circuit to provide for the energizing of the magnet whereby the latter will act to retard the travel of the wheel as it passes over said head, said head formed with a tread surface for the wheel, said sur-

face arranged below the upper face of the head, said head further formed with a channel for the passage of the wheel flange, said channel arranged below said tread surface.

9. A retarder comprising a body of conducting material formed of a head, a base and a cylindrical part connecting the base and head together, a coil surrounding said cylindrical part and forming in connection with said body an electro-magnet, a normally open circuit closing means for said magnet mounted in said head below the upper face thereof and adapted to be engaged by the flange of a wheel travelling over said head to close the magnet circuit to provide for the energizing of the magnet whereby the latter will act to retard the travel of the wheel as it passes over said head, said head formed with a tread surface for the wheel, said surface arranged below the upper face of the head, said head further formed with a channel for the passage of the wheel flange, said channel arranged below said tread surface, said circuit closing means positioned in the bottom of said channel substantially at the transverse median thereof.

10. A retarder for the purpose set fourth comprising a body of conducting material formed of a head, a base and a cylindrical part connecting the head and base together, a coil surrounding said cylindrical part and forming in connection with said body an electromagnet normally in an open circuit, a normally open circuit closing means for said magnet positioned within said head and adapted to be engaged by the flange of a wheel travelling over the head to close the magnet circuit thereby energizing the magnet to provide for the retarding of the wheel during the travel thereof over said head, said head provided in its upper face with a groove having the bottom thereof forming a continuation of the tread surface of a track rail section, and said head further formed with a channel depending below said bottom and providing means for the passage of the wheel flange.

11. A retarder for the purpose set forth comprising a body of conducting material formed of a head, a base and a cylindrical part connecting the head and base together, a coil surrounding said cylindrical part and forming in connection with said body an electromagnet normally in an open circuit, a normally open circuit closing means for said magnet positioned within said head and adapted to be engaged by the flange of a wheel travelling over the head to close the magnet circuit thereby energizing the magnet to provide for the retarding of the wheel during the travel thereof over said head, said head provided in its upper face with a groove having the bottom thereof forming a continuation of the tread surface of a track rail section, said head further formed with a channel depending below said bottom and providing means for the passage of the wheel flange, said circuit closing means positioned in the bottom of said channel.

12. A retarder for the purpose set forth comprising a body of conducting material formed of a head, a base and a cylindrical part connecting the head and base together, a coil surrounding said cylindrical part and forming in connection with said body an electromagnet normally in an open circuit, a normally open circuit closing means for said magnet positioned within said head and adapted to be engaged by the flange of a wheel travelling over the head to close the magnet circuit thereby energizing the magnet to provide for the retarding of the wheel during the travel thereof over said head, said head provided in its upper face with a groove having the bottom thereof forming a continuation of the tread surface of a track rail section, said head further formed with a channel depending below said bottom and providing means for the passage of the wheel flange, said circuit closing means positioned in the bottom of said channel, and arranged substantially in the transverse median of the bottom of the channel.

13. Retarding means for rolling stock comprising the combination with spaced track rail sections, of magnetic retarder elements interposed between and insulated from said sections and each in a normally open circuit, said elements having their tops formed with tread surfaces for the wheels of the rolling stock and providing continuations of the tread surfaces of the track rail sections, said elements further formed with channels at one side of and depending below the tread surfaces for the passage of the flanges of the wheels, and a normally inactive circuit closing device arranged in each of said channels and engaged by the flanges of the wheels of the rolling stock for closing the magnetic circuit to provide for the retarding of the wheels when travelling over the tread surfaces formed on said elements.

14. Retarding means for rolling stock comprising the combination with spaced track rail sections, of magnetic retarder elements interposed between and insulated from the ends of said sections and each in a normally open circuit, said elements having their tops formed with tread surfaces for the wheels of the rolling stock and providing continuations of the tread surfaces of the track rail sections, said elements further formed with channels at one side of and depending below the tread surfaces for the passage of the flanges of the wheels, a normally inactive circuit closing device arranged in each of said channels and engaged by the flanges of the wheels of the rolling stock for closing the magnetic circuit to provide for the retarding of the wheels when travelling over the tread

surfaces formed on said elements, said tread surfaces arranged below the upper face of each of said elements.

15. Retarding means for rolling stock comprising the combination with spaced track rail sections, of magnetic retarder elements interposed between and insulated from said sections and each in a normally open circuit, said elements having their tops formed with tread surfaces for the wheels of the rolling stock and providing continuations of the tread surfaces of the track rail sections, said elements further formed with channels at one side of and depending below the tread surfaces for the passage of the flanges of the wheels, a normally inactive circuit closing device arranged in each of said channels and engaged by the flanges of the wheels of the rolling stock for closing the magnetic circuit to provide for the retarding of the wheels when travelling over the tread surfaces formed on said elements, said tread surfaces arranged below the upper face of each of said elements, and each of said circuit closing devices arranged in its associated channel at the bottom thereof at its transverse median.

16. A retarder for rolling stock comprising a track rail formed of a plurality of sections insulated from each other, certain of said sections being in the form of normally deenergized electromagnets and including means engaged by the rolling stock when travelling upon the track rail to provide for successively energizing said magnets to retard the travel of the rolling stock thereover, each of said sections including a tread surface for a flanged wheel, and each magnetic section formed with a channel for the passage of the flange of the wheel and having said means arranged therein.

In testimony whereof, we affix our signatures hereto.

VIRGIL M. LANE.
CHARLES E. FEHRINGER.