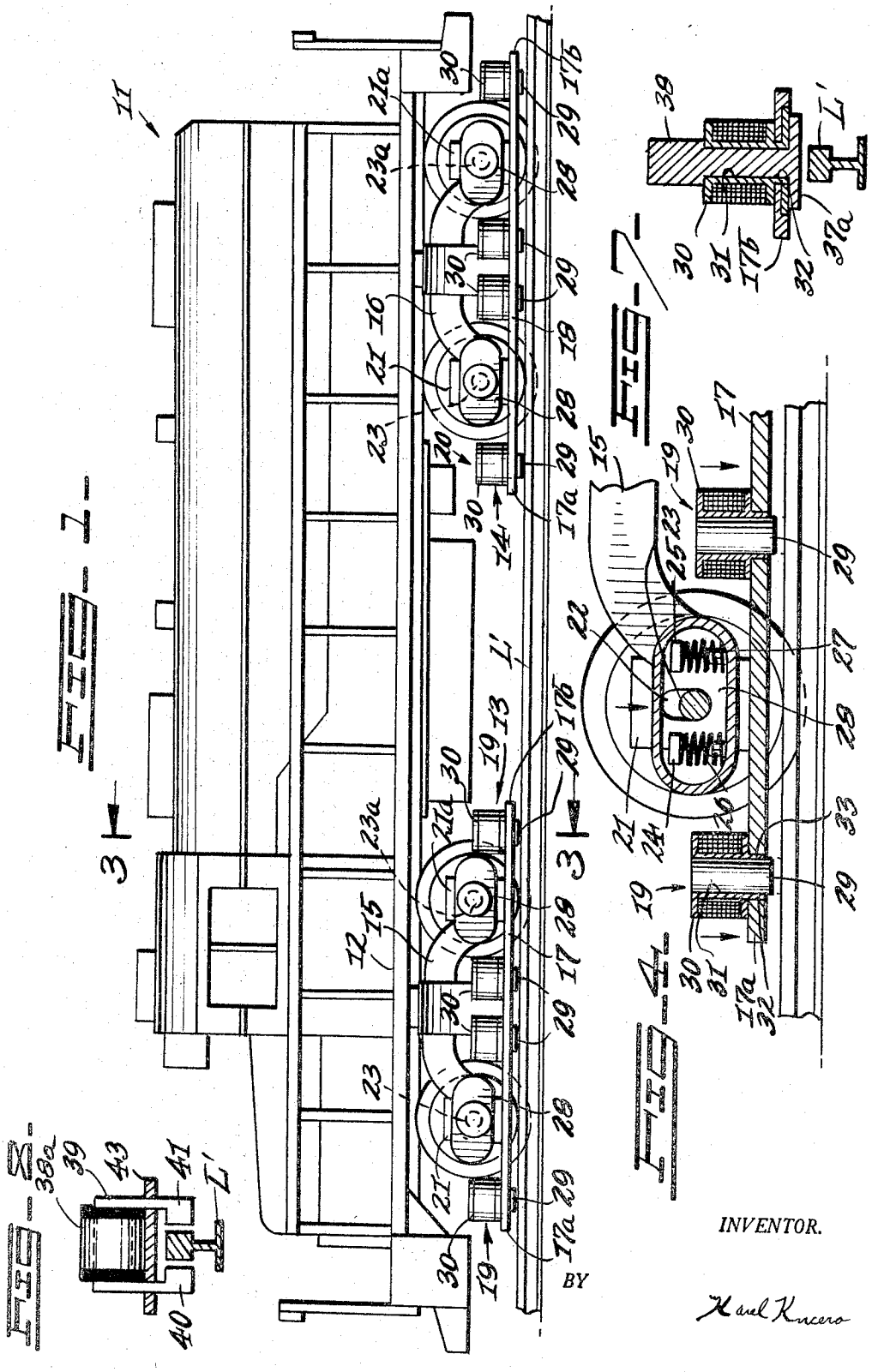
Feb. 28, 1967 K. KUCERA 3,307,058

ELECTROMAGNETIC ADHESION MEANS FOR RAILROAD LOCOMOTIVES

Filed Jan. 20, 1964 3 Sheets-Sheet 1



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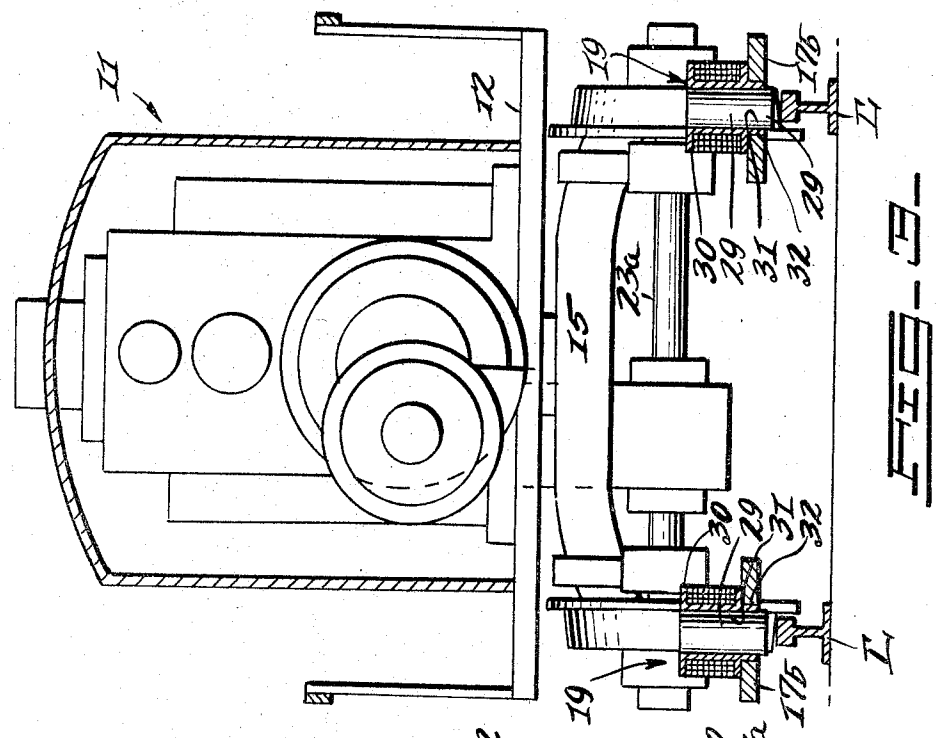


FIG. 3

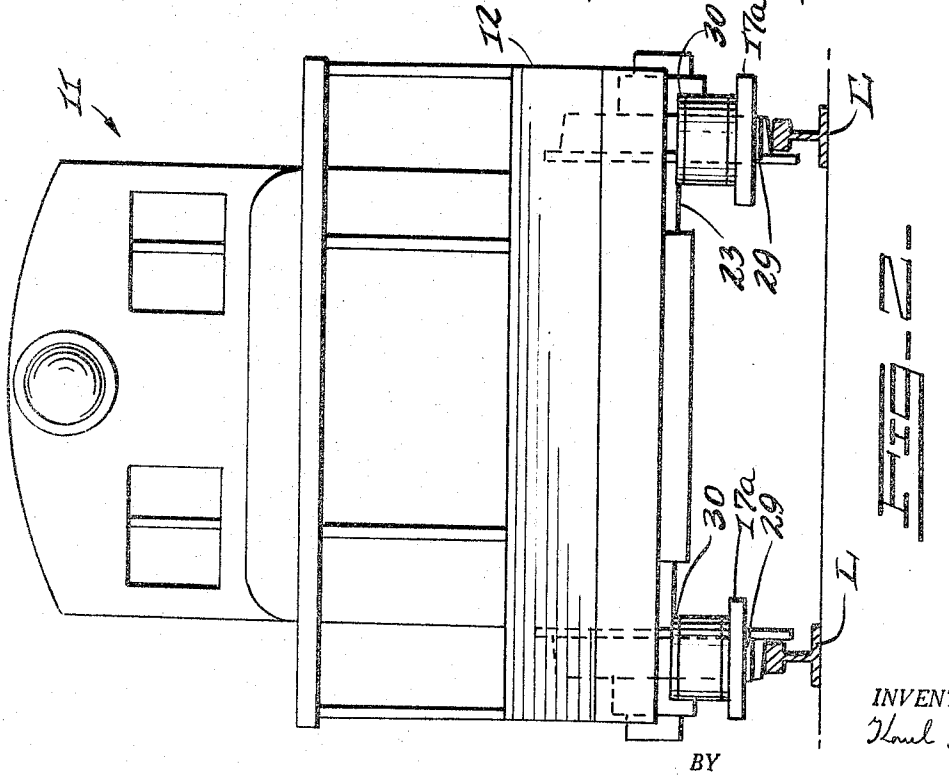


FIG. 2

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ELECTROMAGNETIC ADHESION MEANS FOR RAILROAD LOCOMOTIVES

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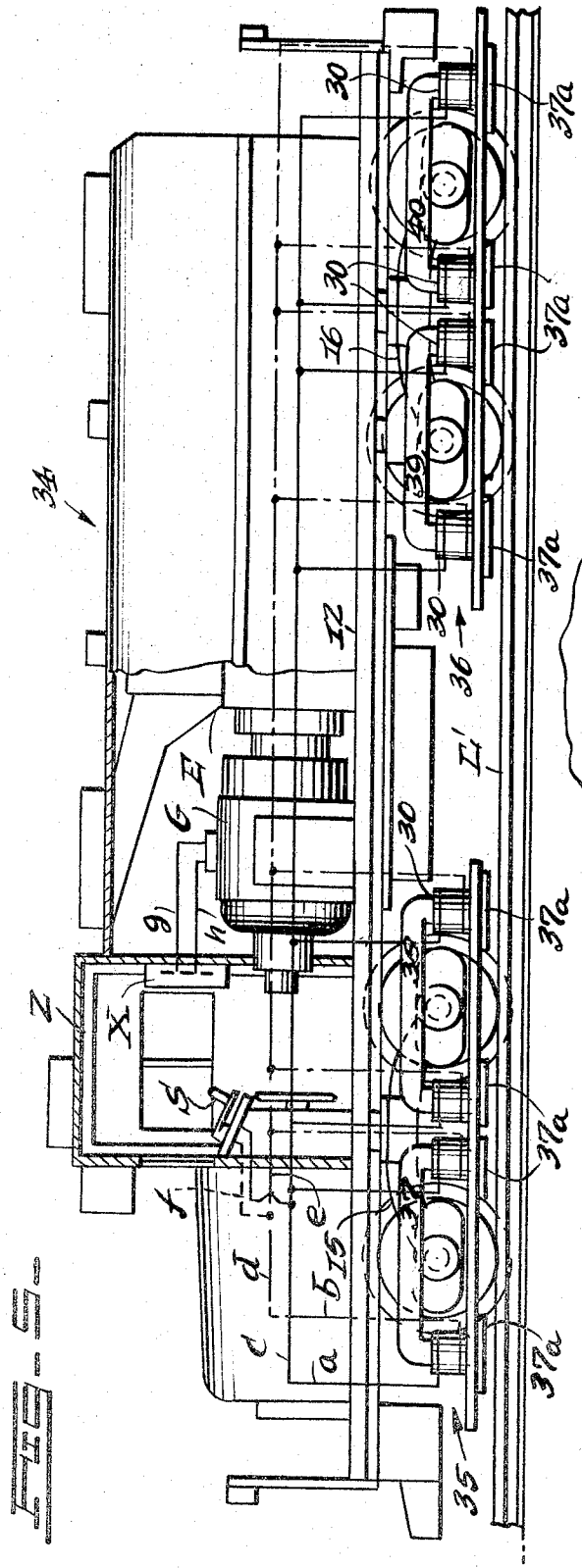


Fig. 5.

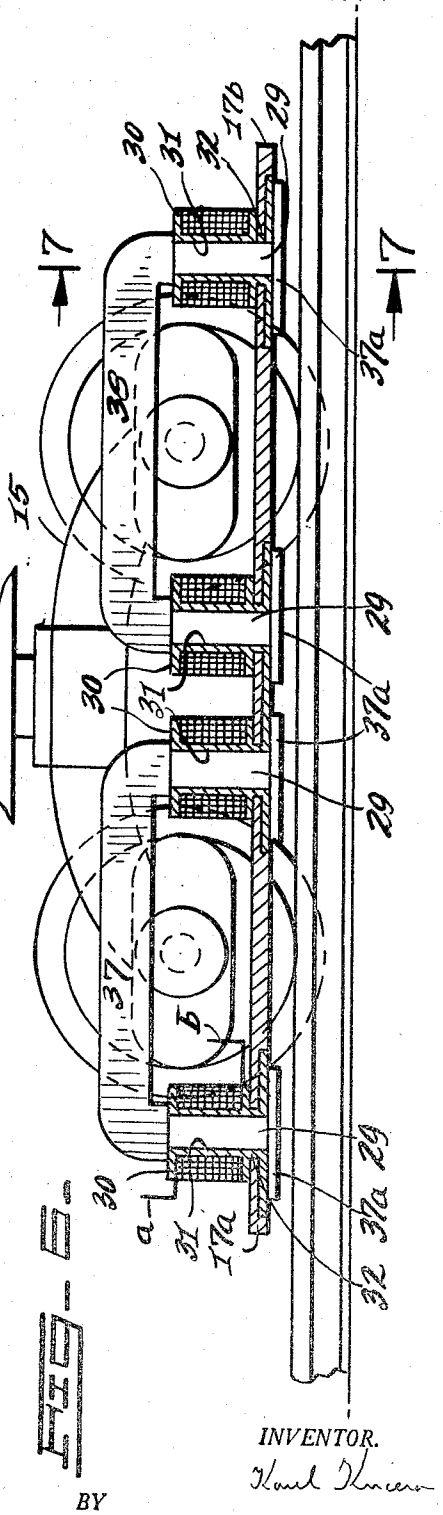


Fig. 6.

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ELECTROMAGNETIC ADHESION MEANS FOR RAILROAD LOCOMOTIVES

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1 Claim. (Cl. 310—93)

The present invention relates to braking means for railroad vehicles, and more particularly it relates to electromagnetic adhesion means for railroad locomotives in which a group of electromagnets are being utilized to bring a railroad vehicle to a stop. It is understood that the present invention may find utilization in steam-driven locomotives, as well as, in electric locomotives, diesel-electric locomotives, diesel-hydraulic locomotives, in railway cars and other such vehicles operating on conventional type rails. Also, the present invention may be applied to toy electric trains and other such vehicles which may be operated upon double, triple or single railroad tracks.

It is fully realized that there are a number of devices and brake systems in use in which magnets are being utilized to brake the wheels of railroad vehicles. In the latter, the magnets may be mounted upon the vehicle chassis, facing the rim of the car wheel. When the magnets in such a brake system are energized an electromagnetic field is produced which reacts upon the rotating car wheels to increase the vehicle's traction. While in the latter brake system the magnets face the rim of the car wheel, in the present invention the electromagnets may be carried under the locomotive, upon conveniently mounted frames, facing the railroad track. The poles of the electromagnets are held upon the mounting frames very close to the rail, always facing the rail, but never touching the rail. Also, the electromagnets may be held to the mounting frames vertically over the rail, or they may be mounted facing the long side of the rail, or horse-shoe type electromagnets having a pair of poles may be mounted over the rail in such a manner as one pole in said pair facing one side of the rail, while the other pole in said pair facing the opposite side of the rail.

The primary object of this invention is to provide an efficient electromatnetic brake system by means of which a railroad vehicle may be slowed down to a stop in the shortest time possible.

Another object of this invention is to provide an electromagnetic brake means for railroad vehicles which may be inexpensive to manufacture, easy to install in a locomotive, simple to operate and efficient.

An additional object of this invention is to provide a means for mounting each individual electromagnet to the mounting brackets and means for servicing the electromagnets.

A further object of this invention is to provide electrical conduit means for supplying each electromagnet under the railroad vehicle with electric current from a current source.

Another object of this invention is to provide an electric switch and control panel means from which the operation of said electromagnets may be controlled from the locomotive.

This invention also consists in certain other features of construction, and the combination and arrangement of parts, to be hereinafter fully described, illustrated in the accompanying drawings, and specifically pointed out in the appended claim.

In describing the invention in detail, references will be made to the accompanying drawings, where like character numerals denote like or corresponding parts throughout the several views, in which:

FIG. 1 is a side elevational view of the electric locomotive showing the application of the present invention.

FIG. 2 is a front elevational view of FIG. 1;

FIG. 3 is a section taken on the line 3—3 of FIG. 1;

FIG. 4 is a section through the electromagnets showing the manner of mounting;

FIG. 5 is a modification showing the application of a horse-shoe type electromagnet to the present invention;

FIG. 6 is an enlarged view of a group of electromagnets shown in FIG. 5;

FIG. 7 is a sectional view taken on the line 7—7 of FIG. 6; and

FIG. 8 is a sectional view through another modification showing the application of a horse-shoe type electromagnet.

It is to be understood that the present form of disclosure is merely for the purpose of illustration and that there might be various modifications thereof, without departing from the spirit of the invention as herein set forth.

Referring now more particularly to the electromagnetic brake system, made in accordance with the present invention, best seen in FIG. 1, it comprises, in combination, the locomotive engine **11**; the vehicle's chassis **12**; the front group of wheels **13**; the rear group of wheels **14**; the front wheel supporting cage **15**; the rear wheel supporting cage **16**; the electromagnets supporting frames or supporting brackets **17** and **18**, respectively; and the group of electromagnets **19** and **20**, respectively. It is, of course, understood that FIG. 1, being only a side elevational view of the locomotive engine **11**, shows one row of electromagnets. In FIGS. 2 and 3, it can be seen that a similar row of electromagnets are being utilized and are shown mounted on the other side of the locomotive engine, substantially as shown.

Reference now being made to the enlarged sectional view shown in FIG. 4, it can be seen that one end **17***a* of the supporting frame or the supporting bracket **17** in the front wheel cage **15**, may be held to the latter by means of the vertical mounting plate **21**, which through the medium of the elongated slot **22** may be mounted over the wheel shaft, or the axle **23**. The plate **21** may be provided with a pair of shoe extensions **24** and **25**, respectively. A pair of compression coil springs **26** and **27** may be readily housed under the shoe extensions **24** and **25**. The shoe extensions **24** and **25** and their respective springs **26** and **27** may be contained within the bearing mounting **28** in the front wheel cage **15**. A mounting similar to the one herein described may be provided in the opposite end **17***b* of the frame **17**. Through the medium of a secondary vertical plate **21***a* (similar to the plate **21**) the opposite end **17***b* of the frame **17** is supported over the axle **23***a*. The rear wheel cage **16** is similar in construction, in all essential details, with the front wheel cage **15**, as already above described. Also, the electromagnets are similarly mounted. Accordingly, all the character numerals already utilized in the description of the construction of the front wheel cage **15** may be reproduced in the description of the construction of the rear wheel cage **16** and its electromagnet mounting means.

In regard to the manner of mounting the electromagnets, each magnet in the group **19** (or **20**) may be provided with a soft iron core **29** (preferably round or square in section) having a hard rubber or plastic mounting sleave **30**. An opening **31** in the sleave **30** receives the soft iron core **29**; the latter being long enough to extend beyond the supporting frame **19**, yet short enough not to contact the top of the rail L. A group of holes **32** may be machined in the frame **17** into which, by means of the extensions **33**, the plastic mounting sleaves **30** are being held in a substantially vertical position. A length of fine, insulated, wire may be wound around the vertical sleave **30** to complete the construction of the electromagnets, substantially as shown. If it is necessary, the outside of

the electromagnets may be covered with a plastic bag (not shown) to protect the latter from the elements.

Referring more particularly to the modification shown in FIGS. 5 and 6, inclusive, it can be discerned that the locomotive engine **34** is similar in all details of construction with the locomotive shown in FIGS. 1 to 4, inclusive, except that the electromagnets in the groups **19** and **20** (now in the groups **35** and **36**) may be provided with a horse-shoe type armature (or core) **37**, **38**, **39** and **40**, substantially as shown. Otherwise, the mounting of the electromagnets is substantially similar to the form of mounting already described in FIGS. 1 to 4, except that the cores are additionally provided with the magnetic plates or shoes **37***a*. Because the electromagnet mounting means, and the wheel mounting cages in both instances is similar, the same character numerals are being used throughout. Also, FIG. 5 shows the wiring diagram. It can be discerned that each electromagnet may be provided with a pair of conduit wires *a* and *b*, which connect to a secondary conduit *c* and *d* (all the *a* wires connect to the conduit *c*, and all the *b* wires connect to the conduit *d*). By means of the additional conduits *f* and *e*, it is possible to connect the secondary conduits *c* and *d* to the on-and-off switch S in the locomotive. Electric current to energize the electromagnets may be generated through the electric generator G, which is driven by the diesel engine E. Current piped through the conduit wires *g* and *h*, from the generator G, leads to the distributor box X, and by means of the U-shaped conduit box Z may be delivered to the on-and-off switch S, substantially as shown.

FIG. 8 shows another modification. In this case the electromagnet **38** may be provided with a horse-shoe type armature **39** having a pair of poles **40***a* and **41**, respectively, each pole facing the side of the rail L'. The electromagnet **38***a* may be held to the mounting frame or bracket **43** by means of clamps (not shown). A number of similar electromagnets may be provided in the front and rear wheel cage to produce a braking effect substantially as above already described.

From the description of the construction of my invention, it is rather obvious, that the operation of my electromagnetic adhesion system for locomotives is extremely simple. For the purpose of energizing the magnets which are mounted under the locomotive engine (on either side thereto) all that is necessary is to turn upon the switch handle in the on-and-off switch S. Of course, it is understood, that the switch S may be provided with a rheostat to allow the regulation of the current supply to the electromagnets, to vary the magnetic field produced, and thus control the braking effect.

A careful examination of the foregoing description in connection with the invention as illustrated in the drawings, will enable the reader to obtain a clear understanding and impression of the alleged features of merit and novelty, sufficient to clarify the construction of the invention as hereinafter claimed.

Minor changes in shape, size materials, and rearrangement of parts, may be resorted to in actual practice, as long as no departure is made from the invention claimed.

Having described my invention, what I claim is the following:

An electromagnetic braking system of the class described for locomotive engines, comprising in combination, a standard type locomotive, an electric power source, a locomotive engine chassis, a front group of wheels and a rear group of wheels under said locomotive chassis, wheel cages supporting said wheels, a plurality of mounting frames under said locomotive held to said wheel cages, and a group of electromagnets mounted in said mounting frames, said electromagnets having armatures vertically mounted thereto, the bottom of said armatures facing the railroad tracks, conduit wires connecting said electric source to said electromagnets and a switch to regulate the supply of current to said magnets the operation upon said switch energizing said magnets to produce a magnetic field to increase the traction of said locomotive for discontinuing the motion of said locomotive upon said railroad track, each of said electromagnets having armatures which are of horseshoe type and having a pair of poles, each of said poles facing an opposite vertical side of each of the rails of said track.

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