July 11, 1939. E. L. SCHEUFLER 2,165,580

AIR CIRCULATING SYSTEM FOR ROLLING STOCK

Filed July 11, 1936 3 Sheets-Sheet 1

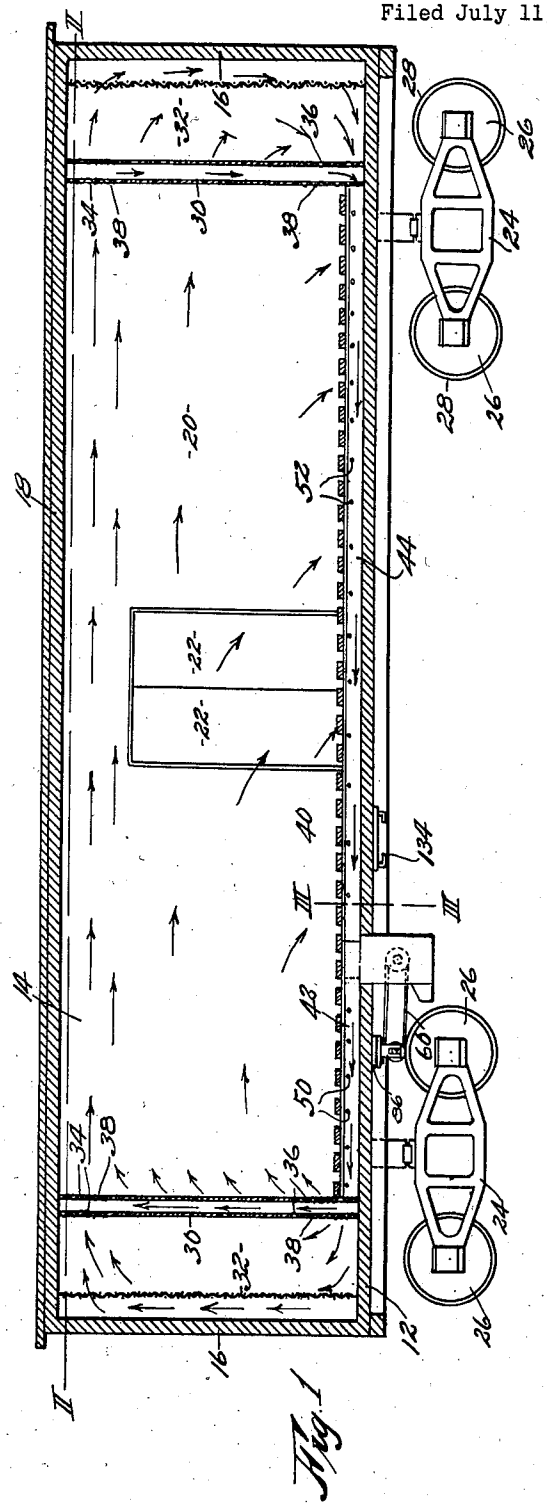


Fig. 1

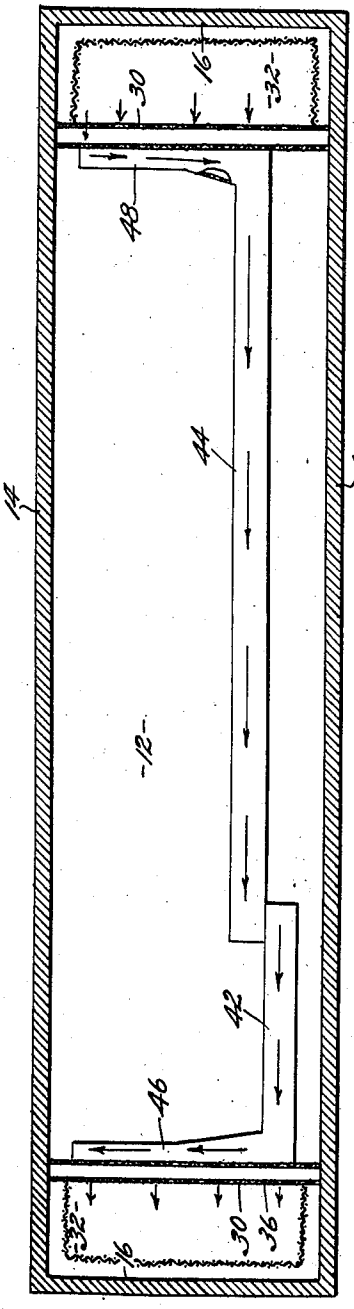


Fig. 2

INVENTOR,
Edward L. Scheufler.
BY
Hovey & Hamilton,
ATTORNEYS.

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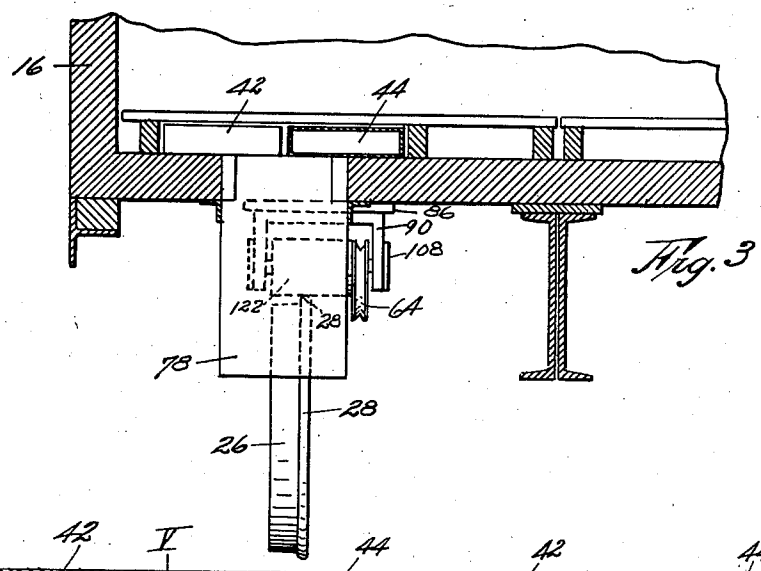


Fig. 3

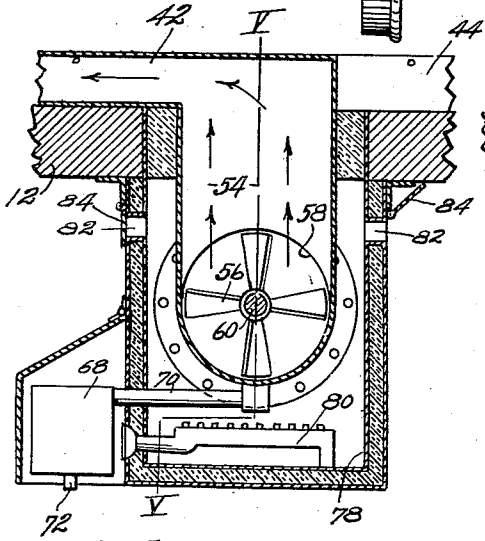


Fig. 4

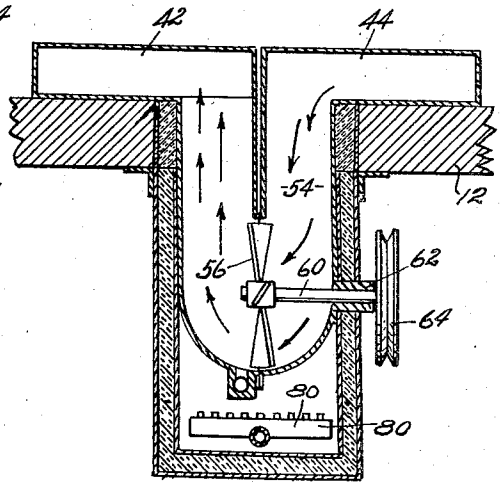


Fig. 5

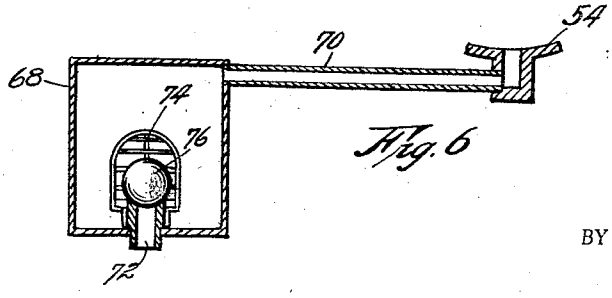


Fig. 6

INVENTOR,
Edward L. Scheufler.

BY Harvey & Hamilton,
ATTORNEYS

July 11, 1939. E. L. SCHEUFLER 2,165,580

AIR CIRCULATING SYSTEM FOR ROLLING STOCK

Filed July 11, 1936 3 Sheets-Sheet 3

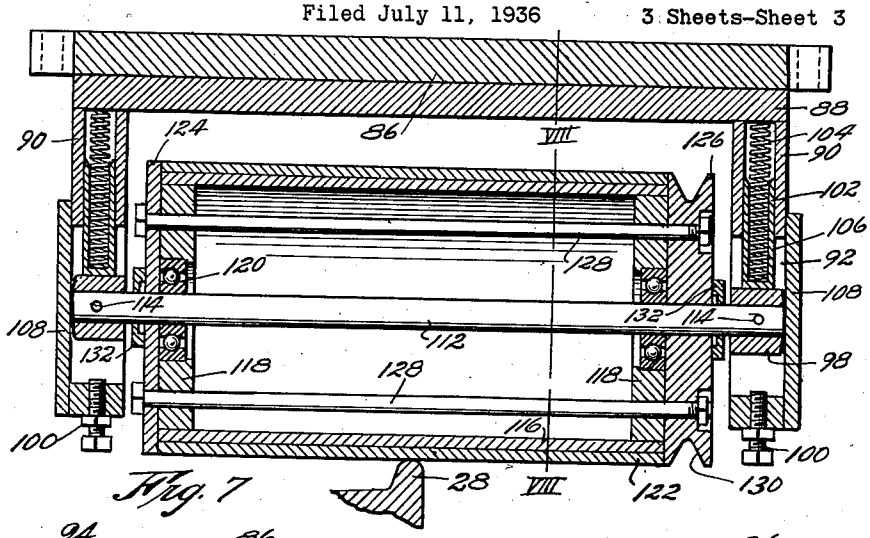


Fig. 7

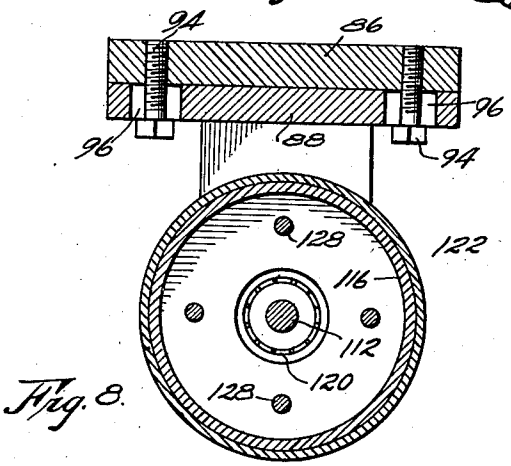


Fig. 8.

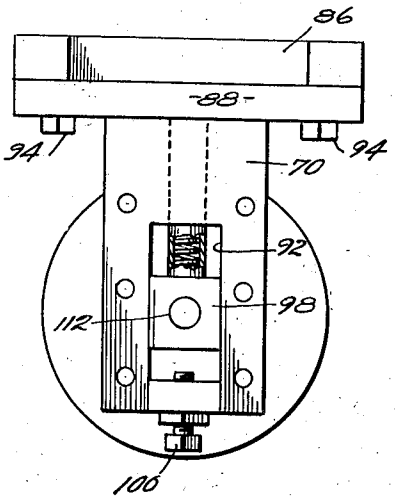


Fig. 9

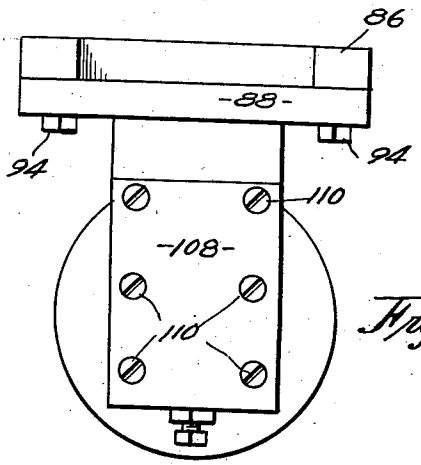


Fig. 10.

INVENTOR,
Edward L. Scheufler.

BY Harvey & Hamilton,
ATTORNEYS.

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UNITED STATES PATENT OFFICE

2,165,580

AIR CIRCULATING SYSTEM FOR ROLLING STOCK

Edward L. Scheufler, Kansas City, Mo.

Application July 11, 1936, Serial No. 90,199

3 Claims. (Cl. 74—13)

This invention relates to air circulating systems of the type applicable to rolling stock, such as railway cars or other similar conveyances, having a storage compartment provided therein for the transportation of perishables, and the primary object of the invention is the provision of such a system as will be operable by at least one of the wheels of the car, to the end that mechanical circulation is established, rather than that usually employed.

One of the important aims of this invention is to provide in a car having a storage compartment therein and wheels to support the car, means for positively directing currents of air in cyclic paths through the storage compartment, so that no static condition will prevail, and so that a relatively even temperature is maintained throughout the entire compartment as the car is being transported.

A yet further object of the present invention is to provide in an air circulating system for rolling stock, a system of ducts, means for circulating air through said ducts, and the compartment formed with the car, and structure operable by a wheel of the car for actuating the circulating means, all to the end that outside sources of energy are not required so long as the car is traveling.

A still further object of the invention is the provision, in a circulating system, of means for heating the air passing through the ducts and compartment of the car without interrupting its cyclic path, and in such fashion as to definitely preclude the entrance into the ducts or compartment of objectionable products of combustion.

Another and very important aim of this invention is the provision in refrigerator cars of the conventional type, of means for positively circulating the air within the storage compartment of the car and through the ice bunkers therein, currents of air in complete cyclic paths so that even though the bunkers are not filled to capacity, a predetermined temperature might be maintained within the car compartment and unevenness of temperature overcome.

A yet further object of the invention is to provide a novel and unique power take-off mechanism for rolling stock circulating systems, which take-off mechanism might be assoicated with one of the wheels of the car in such fashion as to combine the structures of both wheels and take-off mechanism as to compensate for variation in specific location of the wheel as the truck carrying the same passes around curves of varying degrees and over rail joints and frogs that normally displace the wheels.

Other objects of the invention, including specific structural details and advantages arising from the combination, will appear during the course of the following specification, referring to the accompanying drawings, wherein is illustrated one embodiment of the circulating system.

Figure 1 is a vertical, longitudinal, sectional view through a railroad car, having associated therewith a circulating system embodying this invention.

Fig. 2 is a horizontal, longitudinal section through the same, taken on line II—II of Fig. 1, but with the false floor removed to reveal the position of the ducts.

Fig. 3 is a fragmentary, detailed, sectional view, taken on line III—III of Fig. 1.

Fig. 4 is a vertical, fragmentary, sectional view, taken through the combined circulator and heater unit.

Fig. 5 is another sectional view through said unit, taken on line V—V of Fig. 4.

Fig. 6 is a fragmentary, detailed, sectional view, taken through the liquid trap forming a part of the circulator and heater unit.

Fig. 7 is an enlarged, longitudinal, central, sectional view, taken through the power take-off unit.

Fig. 8 is a vertical, central, sectional view of the power take-off unit, taken on line VIII—VIII of Fig. 7.

Fig. 9 is an end elevation of the power take-off unit, with the end plate removed, and,

Fig. 10 is a similar view, but with the end plate in position.

Before definitely mentioning the specific nature of the parts forming the air circulating system and describing the manner in which they combine with the conventional elements of a refrigerator car, short comings and objectionable features that this system eliminates will be recorded.

One skilled in the art fully understands that refrigerator cars now in common use must be cooled during certain seasons of the year and as they are passed through certain parts of the country, and heated during the colder seasons of the year and while the car is transported across certain territory. Temperature differential within the storage compartment annd bunkers of the car has heretofore been relied upon to provide circulation. Static conditions existed and spoilage of perishable occurred. When means for heating the storage compartment of the car was

employed, products of combustion, including dangerous gases, were released within the storage compartment of the car, to the end that injury and sometimes loss of life occurred because inspections at terminal points required the attendant to enter the car before a change of air occurred therein.

In many instances chipped ice was piled directly upon the perishables being shipped and the storage compartment was actually flooded with water and the floor and lower walls of the car damaged to a considerable extent. It has also been found that the ice bunkers in the car must be maintained substantially filled to capacity or the perishable goods in the center of the car at the point farthest removed from the bunkers will spoil.

From the foregoing, it will be apparent, and one skilled in the art fully recognizes, that the lack of complete circulation is the predominating factor contributing to practically all the shortcomings now being encountered through the use of the well known commercial type of refrigerator car.

Broadly, this invention aims to provide a complete circulating system for such refrigerator cars or, in fact, any piece of rolling stock, wherein it is desirable to create cyclic paths of air without the employment of mechanical means or sources of power other than that which can be easily carried by the car as a permanent part thereof, and driven by one of the wheels of the car as the same is traveling.

Parts embodying the invention are illustrated in association with a refrigerator car having a floor, sides, ends and top **12**, **14**, **16** and **18** respectively, which combine to provide a storage compartment **20**, wherein is placed perishable goods for shipment. The usual doors **22** permit access to compartment **20** and trucks **24**, having wheels **26**, support the car for movement along the rails. Each wheel **26** has a flange **28**, and the later described power take-off is in engagement with the outer periphery of this flange. Bulk heads **30** are built within compartment **20** across the ends of the car to set off bunkers **32**, within which is placed a quantity of ice when compartment **20** is to be maintained at a temperature lower than the atmosphere. Bulk heads **30**, having openings **34** and **36** near the top and bottom respectively thereof, are covered by screen or foraminous material **38**, so that currents of air may freely pass from compartment to bulk head and vice versa.

A false floor **40** supports the articles stored within compartment **20**, and it is within the space provided between false floor **40** and floor **12** that ducts, forming a part of this system, are disposed. First duct **42** extends from a point adjacent one wheel **26** toward one end of compartment **20**, and second duct **44** extends longitudinally along compartment **20** toward the other end thereof. These ducts are in overlapping relation at the point adjacent and above the wheel, and laterals **46** and **48** are extended from ducts **42** and **44** respectively. Ducts **42** and **44** are in communication with bunkers **32** through the medium of laterals **46** and **48**, that may have an open side directly against lower openings **36**, or which may be provided with a number of perforations, such as are employed in ducts **42** and **44**, as shown at **50** and **52** respectively.

The use of ducts as illustrated and described will accomplish the end of establishing complete cyclic circulation when the hereinafter circulator and heater unit is employed. The direction of the flow of air currents within the car is indicated by the arrows of Figs. 1 and 2, and it is obvious that no static condition will prevail in any part of the entire car so long as the ducts and the openings through bulk heads **30** are maintained unrestricted.

The combination circulator and heater unit, shown in detail in Figs. 4 and 5, is in direct communication with ducts **42** and **44**, and as a matter of fact, scroll housing **54** is merely a continuation of the two ducts, which extends laterally and downwardly through floor **12** of the car so that the circulating fan **56** may be conveniently positioned at the point of juncture between ducts **42** and **44**, to the end that air will be circulated through these ducts, regardless of the direction of travel of the car and, therefore, the direction of rotation of fan **56**.

Scroll housing **54** houses fan **56** at a point within an opening **58** formed in the walls of the depending portions of the two ducts. This fan **56** is mounted upon a shaft **60** that extends outwardly through a bearing **62**, and a pulley wheel **64** is secured to the outer end of shaft **60** so that belt **66** may operate the fan. A water drain **68** is in connection, through the medium of pipe **70**, with the lowermost part of scroll housing **54**, so as to remove any collected water which would always migrate to the said lowermost point. A ball valve of the nature shown in Fig. 6, automatically seals pipe **70** so that air will not pass into the ducts through the drain, and this ball valve comprises an outlet pipe **72**, covered by a cage **74**, within which is confined ball **76**, that normally seats itself upon the inner end of outlet pipe **72** to obtain the desired end. This liquid trap may be housed as shown in Fig. 4 to protect the same from the elements, and pipe **70** projects into housing **78**, which encases scroll housing **54** below floor **12**.

Housing **78** has walls of insulating material so that no heat transfer will occur where ducts **42** and **44** leave the interior of the car. This housing is attached directly to floor **12** and besides encasing scroll housing **54**, carries therein burner **80**, that serves as a means for heating air passing through ducts **42** and **44** when it becomes necessary to maintain a temperature within the car higher than that of the outside atmosphere.

Connection to burner **80** may be made in any suitable manner and the source of fuel supply, not here shown, may be oil or gas in drums or containers, carried by the car at any place thereon. Further amplification of this feature of the invention need not be made because one skilled in the art could readily recognize the possibility of heating the air as it passes through scroll housing **54** from one duct to another.

Products of combustion that may be generated within housing **78** will escape through vents **82**, and these vents are closed or left open, as desired, by the use of doors **84**. Manifestly, no fumes or gases arising from burner **80** can possibly enter compartment **20** of the car and, therefore, entrance thereto for purpose of inspection might be made at any time without danger.

The power take-off unit, best illustrated in Figs. 7 to 10 inclusive, is of novel construction and designed to transfer power from one of wheels **26** to fan **56** through the medium of belt **66**. This unit comprises a base **86**, that is secured directly to floor **12** of the car, and plate **88**, having depending posts **90**, with slots **92**

formed therein, is secured to base 86 through the medium of bolts 94. Slots 96, provided through plate 88, permit lateral movement of the entire assembly so that belt 66 might be tightened.

Blocks 98 are disposed in slots 92 for vertical movement toward and from the adjustable stop bolts 100 that project into slots 92 at the bottom. These stops 100 limit the downward movement of blocks 98, and springs 102 yieldably urge blocks 98 and the later described structure associated therewith toward stops 100. Springs 102 project into sockets 104 formed in end posts 90, and sleeves 106 receive the ends of springs 102 which engage against blocks 98. End plates 108 preclude outward movement of blocks 98, and these plates are secured in position by screws or analogous means 110. A shaft 112 is carried by blocks 98, and pins 114 hold this shaft against rotation.

An unique roller for contacting wheel flange 28 is mounted upon shaft 112 for rotation, and comprises an inner cylinder 116, closed by rings 118 that carry bearings 120. A cylinder facing 122, composed of material best suited to engage the outer periphery of flange 28, is mounted directly upon inner cylinder 116, and end plates 124 and 126 maintain inner cylinder and the facing thereon against displacement. Tie bolts 128 extend through end plates 124, 126 and rings 118 to complete the assembly. End plate 126 is grooved as at 130 to provide a pulley which may be engaged by belt 66. Packing rings 132 preclude any leakage where shaft 112 passes out through the end plates, and it is preferred to completely fill the hollow interior of this contact roller with a suitable lubricant.

The normal working position of this power take-off unit, and especially the said roller, is directly above wheel 26, from which power is taken, and when the car is on a stretch of straight track, the roller is in engagement with the outer periphery of flange 28 at a point intersected by a vertical line extending from the axis of rotation of wheel 26. The length of the roller, and especially the facing 122 thereof, is sufficient to maintain good working contact between the flange of the wheel and the power take-off unit at all times as the car is traveling over normal roadways.

In the event the car is idle and it is desired to circulate air through compartment 20 thereof, bracket 134 is used to support any suitable motor or engine that may be belted to pulley 64 for the purpose of maintaining circulation to cool or heat the interior of the car, as conditions require.

The vast number of short comings which a system embodying this invention overcomes is apparent to one skilled in this art, and it is obvious that numberless advantages may be gained through its use. While the preferred embodiment has been illustrated and described, it is desired to be limited only by the spirit of the invention and scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a railway car provided with trucks having wheels to carry the car, said trucks being pivotally connected to the car at its longitudinal center for movement relative to the car structure, a power take-off unit comprising a bracket carried by the car floor; bearings slidably mounted on the bracket for movement toward and from one of said trucks; a roller journalled in the bearings, over one of the wheels of the truck and to one side of the longitudinal center of the car; and springs engaging the bearings to yieldably maintain the roller in driving connection with the said one wheel, said roller being appreciably longer than the width of the underlying wheel and in contact with the periphery of the wheel at the uppermost portion thereof whereby a point contact is established between the roller and wheel which is maintained as the truck turns about the pivotal connection with the car.

2. In a railway car provided with trucks having flanged wheels to carry the car, said trucks being pivotally connected to the car at its longitudinal center for movement relative to the car structure, a power take-off unit comprising a bracket carried by the car floor; bearings slidably mounted on the bracket for movement toward and from one of said trucks; a roller journalled in the bearings, over one of the wheels of said one truck and to one side of the longitudinal center of the car; and springs engaging the bearings to yieldably maintain the roller in driving connection with the said one wheel, said roller being appreciably smaller in diameter than the contacted wheel, appreciably longer than the width of said wheel and in contact with the outer annular periphery of the wheel at the uppermost portion thereof whereby a point contact is established between the roller and wheel which is maintained as the truck turns about the pivotal connection with the car, the length of said roller being great enough to insure contact with the wheel as the car is drawn around curves along the railway said roller having one of said bearings and one of said springs at each end thereof, normally on each side of the wheel contacted by the roller.

3. In a railway car provided with trucks having flanged wheels for carrying the car, said trucks being pivotally connected to the car at its longitudinal center for movement relative to the car structure, a power take-off unit comprising a U-shaped bracket carried by the car floor over one of the wheels of one of said trucks, the legs of said bracket having opposed cavities opening on the inner faces thereof; bearing blocks slidably mounted in the cavities of the bracket legs; springs yieldably urging the blocks toward the free ends of said legs; a shaft mounted in the bearing blocks; a roller rotatably carried by the shaft; and a pulley wheel secured to one end of the roller for rotation therewith, the periphery of said roller being held in frictional driving connection with the periphery of the flange of the underlying wheel, said roller normally extending to each side of the said wheel and being long enough to remain in contact with the periphery of the flange as the truck pivots with respect to the said car structure.

EDWARD L. SCHEUFLER.