J. H. DAVIS.

MEANS FOR APPLYING VEHICLE BRAKES.

APPLICATION FILED JULY 24, 1909.

1,008,792.

Patented Nov. 14, 1911.

3 SHEETS—SHEET 1.

Fig. 1.

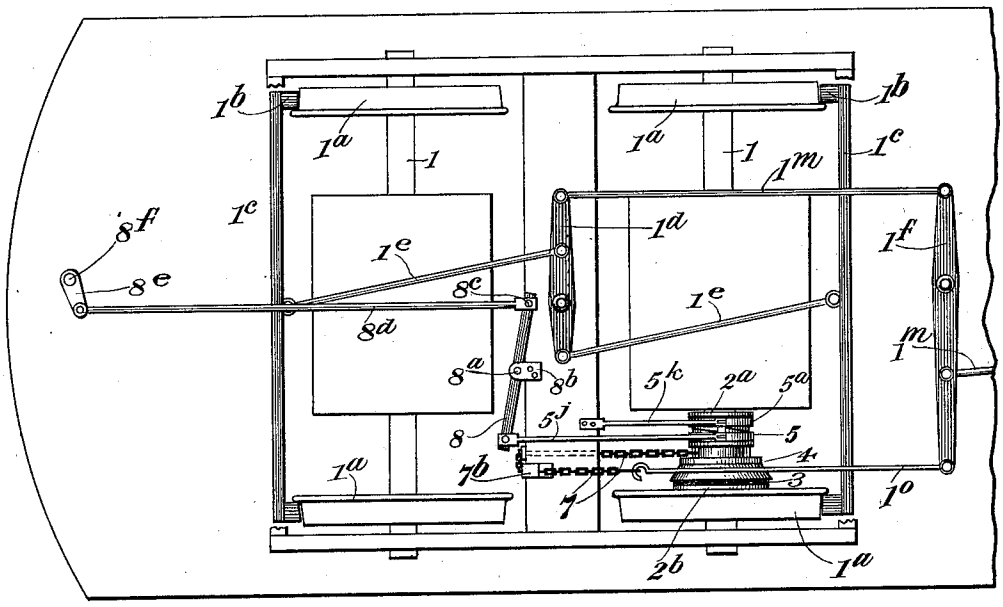


Fig. 3.

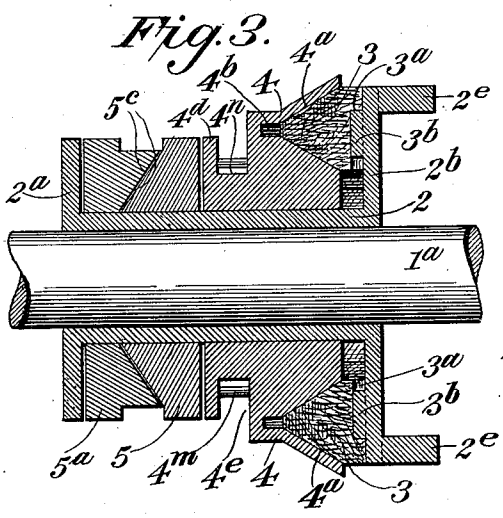
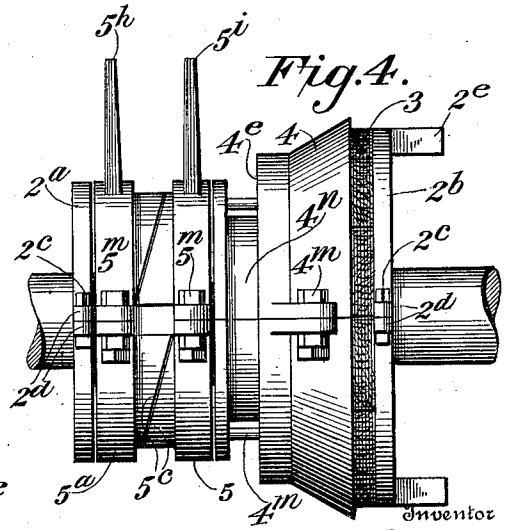


Fig. 4.



Witnesses

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3 SHEETS—SHEET 2.

Fig. 2.

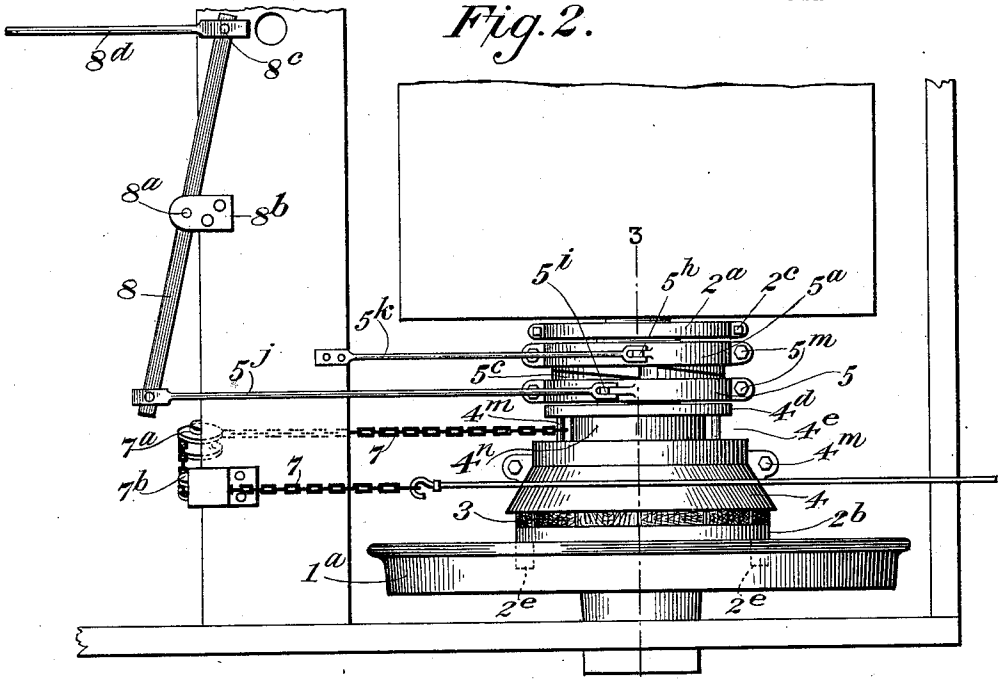


Fig. 5.

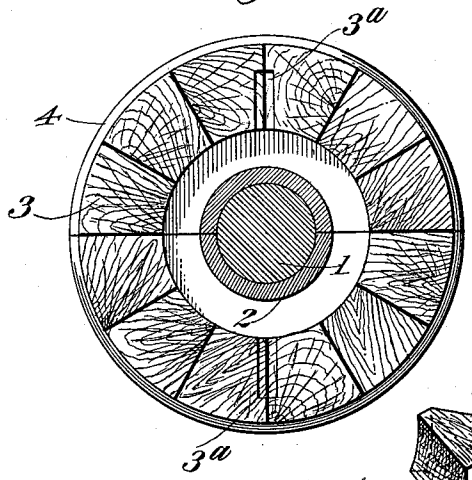
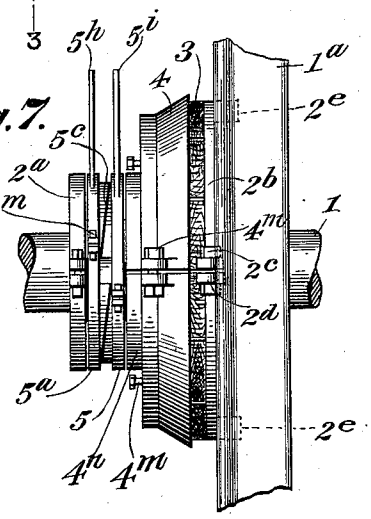


Fig. 7.



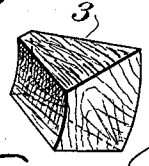


Fig. 6.

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3 SHEETS—SHEET 3.

Fig. 8.

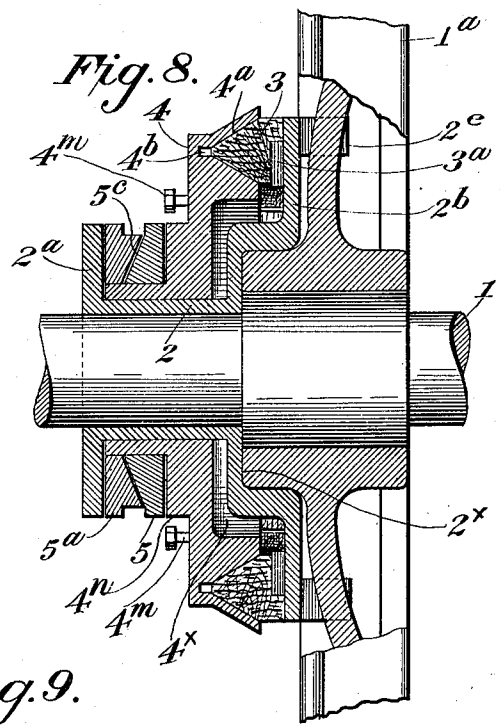


Fig. 9.

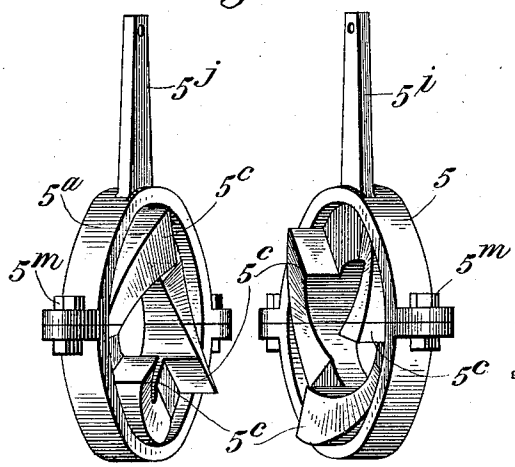
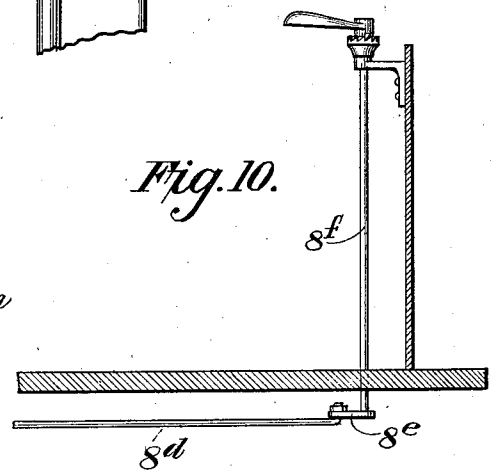


Fig. 10.



Witnesses

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UNITED STATES PATENT OFFICE.

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MEANS FOR APPLYING VEHICLE-BRAKES.

1,008,792. Specification of Letters Patent. **Patented Nov. 14, 1911.**

Application filed July 24, 1909. Serial No. 509,375.

To all whom it may concern:

Be it known that I, JOHN H. DAVIS, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in the Means for Applying Vehicle-Brakes; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improvement in the method of applying vehicle brakes, and is especially designed for street railway cars or trucks, and in particular is an improvement upon the class of brakes shown in Firth's Patent No. 882,105, dated March 17, 1908.

The objects of the present invention are (1) to improve the construction of the wood friction surfaces and the manner of attaching the same to one of the friction members; (2) to simplify the construction of the friction devices so that they can be readily attached to a car axle without any special work being required for this purpose; (3) to simplify the construction of the brake shown in the Firth patent by dispensing with the inner sleeve and the ball-bearings; (4) to render the friction devices more compact so that it can be applied to electrically driven cars operated by standard size motors; and (5) to do away with the necessity of cutting key-ways in the axle or boring the same in any way in order to attach the friction devices thereto.

The several novel features of the invention and parts and combinations of parts for which protection is desired will be summarized in the claims following the detailed description of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a diagrammatical bottom plan view of a car truck equipped with my friction brake operating devices, an ordinary form of brake rigging being conventionally shown in connection with the truck, and part of a car body being outlined around the truck, none of the parts being drawn to a working scale. Fig. 2 is an enlarged plan view of the friction devices applied to a wheel and axle. Fig. 3 is a longitudinal section on line 3—3, Fig. 2. Fig. 4 is a side view of the friction devices detached. Fig. 5 is a face view of the movable friction member. Fig. 6 is a detail view of one of the friction segments detached. Fig. 7 is a side elevation of a form of friction device for use in very contracted space. Fig. 8 is an enlarged vertical central sectional view of Fig. 7. Fig. 9 is a detail view of the cam rings and levers. Fig. 10 is a detail view of the brake controlling devices.

The present invention resides principally in the friction devices for applying the brakes, and can be used in connection with any ordinary brake rigging. These devices are shown as applied to a four-wheel car truck having axles 1 provided with wheels 1^a which are adapted to be engaged by the usual brake shoes 1^b on beams 1^c suspended from the truck frame in any suitable manner and connected to a lever 1^d in the usual manner by rods 1^e. The lever 1^d is pivotally connected at one end by a rod 1^m with the master lever 1^f so that when the lever 1^f is properly operated all the brake-shoes will be simultaneously applied. The brake rigging is merely conventionally shown and may be of any desired or preferred construction. The outer end of master lever 1^f is connected by a rod 1^o to the friction brake devices which embody the present invention as hereinafter explained.

The frictional brake applying devices are mounted upon one of the axles 1, and comprise a spool 2 provided with circumferential flanges 2^a, 2^b, at its opposite ends, said spool being preferably made in similar opposite halves which can be arranged on opposite sides of the axle, and then firmly united by bolts 2^c engaging perforated ears 2^d on said halves, as shown.

Projecting from the outer face of the flanges 2^b are lugs 2^e which are constructed and arranged to engage between the spokes or in the webs of the adjacent wheel 1^a, (as indicated in Figs. 2, 7 and 8,) when the sleeve is in position, and act as keys to lock the spool to the axle and wheel and cause it to positively rotate therewith. These lugs 2^e are preferably located at or near the periphery of the flange 2^b and form a much more powerful driving connection between the spool and axle than would be afforded by a key or bolt transfixing the axle; but the principal advantage of the lugs is that they enable the spool to be easily and rigidly attached to the axle so as to rotate there-

with, without the necessity of cutting any key-ways in the sleeve or the axle, or doing any mechanical work thereon in order to attach the spool rigidly thereto.

The flange 2^b serves as one friction clutch member of the device and has on its inner face an annular friction surface 3 which is preferably formed of wood and then cut radially into a series of sections, see Figs. 5 and 6. These sections 3 are preferably not rigidly fastened to each other nor to the member 2^b, but are kept in proper relative position by being loosely seated in an annular groove 4^a in the opposed friction member 4. The sections 3 are kept from slidably rotating on the member 2^b by means of lugs or keys 3^b on the inner face of member 2^b engaging radial key-ways 3^a in the ring 3. The sections 3 are preferably triangular in cross section, see Figs. 3, 6 and 8, and the groove 4^a in the opposed friction clutch member 4 is also triangular or V-shaped. The sections 3 are positively rotated by and with the spool 2, but each section is practically self-adjusting to the opposed clutch member 4.

The clutch member 4 is rotatably and slidably fitted upon the spool 2 intermediate the flanges 2^a, 2^b. It has an annular V-shaped groove 4^a in its end adjacent member 2^b, the sides of said groove being inclined on angles corresponding to the inclinations of the opposed friction sections 3. At the apex of groove 4^a is an annular channel 4^b to permit wear on the friction sections 3 and prevent the latter seating in the apex of the groove.

The periphery of the friction member 4 is preferably annularly grooved as shown at 4^e, and the groove is spanned by a bolt 4^m to which is attached a chain 7, that is passed over suitable guide pulleys 7^a, 7^b, on the truck frame and is connected to the outer end of the rod 1^e connected to the motor brake lever 1^f, so that by throwing the clutch into engagement the brakes can be applied with the car going in either direction.

A very slight lateral movement of the clutch member 4 is sufficient to engage or disengage the clutch faces (4^a, 3). In actual practice this movement is less than the thickness of the keys 3^b, consequently it is unnecessary and undesirable to fasten the sections 3 to the member 2^b, as the sections do not have sufficient lateral play to disengage them from the keys 3^b;—and when the clutch members are not in engagement the sections 3 simply move idly around in the groove 4^a without any appreciable wear. A resultant great practical advantage of this construction is that the friction sections 3 wear uniformly and the friction pressure is applied uniformly entirely around the spool, and the full advantage of the increased friction surface afforded by the V-shaped or double-face friction clutch is realized; whereas if the friction sections were rigidly connected both friction faces thereof could not be fully utilized as pressure on the face of a solid friction ring at one point would relieve pressure thereon at the opposite point; but by using loose sections the full frictional effect of both faces of each section is realized.

The sections 3 may be of any suitable material but are preferably formed of wood, and cut so that the grain of the wood runs perpendicularly to the surface of the flange 2^b. By this construction the friction wear is upon and across the end of the grain, and when these sections are clamped, during the application of the brake, the fibers of the sections are compressed laterally by their wedging in the groove 4^a, and the tendency to disruption is largely overcome.

The friction member 4 is preferably provided with a short annular flange 4^d on its rear end (formed in groove 4^e) and on the spool 2 intermediate the flanges 2^a and 4^d are supported two cam rings 5 and 5^a, the outer faces of which respectively bear against the rear side of the friction member 4 and against the flange 2^a; these cam rings may be made of brass, and preferably the cam ring fitted against the inner side of the flange 2^b is made of brass. For the purposes of convenience in applying the friction devices to car axles the friction member 4 is preferably made in opposite sections united by bolts 4^m, and the cam rings 5, 5^a, are also made in sections united by bolts 5^m, (see Figs. 2, 4 and 7).

The cam rings 5, 5^a, are provided on their meeting faces with interlocking wedges or cam surfaces 5^c, so that if either ring be turned in the proper direction the cam surfaces being in contact will cause the rings to separate and thereby shift the friction member 4 toward friction member 2^b and bring the surface of the groove 4^a in member 4 into powerful contact with the friction sections 3 on member 2^b and cause the member 4 to rotate with the spool 2 and wind up chain 7 thereby operating motor lever 1^f and applying the brakes with greater or less force according to the extent of movement of the cam rings 5, 5^a.

The cam rings can be operated by the motorman through any suitable devices. As shown the cam ring 5 is provided with a radially extending arm 5^i which is connected by a rod 5^j to one end of a lever 8 pivoted at 8^a on a bracket 8^b attached to the truck bolster (Figs. 1 and 2) and the other end of lever 8 is pivotally connected at 8^c to a rod 8^d, which is in turn pivotally connected to a crank 8^e on the lower end of a brake controlling shaft 8^f (Figs. 1 and 10) which extends up into easy reach of the motorman, and can be readily operated by him to apply

or release the brakes at will. The arm 5^h may be connected by a rod 5^k to the adjacent truck bolster—or may be connected to a similar hand controlling device at the other end of the car. It is only necessary to shift one cam ring to apply or release the brake.

It will be observed that the point of connection, 8^c, of the rod 8^d to the lever 8, is substantially at the center of the truck-bolster; and in practice the pivot 8^e is located as near as practical to the king-bolt of the truck-bolster; and this enables the brakes to be applied or released when the car is rounding curves as readily as when on a straight track, because the point of connection 8^c remains practically constant in relation both to the king-bolt of the bolster and to the shaft 8^f. It would be impossible to control the brakes when rounding curves if the rod 5^j were connected to shaft 8^f in such manner that the oscillation of the truck in rounding curves would cause shifting of the cam-rings and thereby set or release the brakes; but by the aforesaid simple and novel arrangement of the levers the brakes are not affected in rounding curves and are always under control of the operator both on straight track and on curves.

In the drawings I have not attempted to show the parts in proper proportions. In practice however the entire friction device, as shown in Figs. 2 to 4, can be easily placed upon the axle in the 5 or 6 inches space usually left between the motor casing and the wheel; but in some constructions the friction devices have to be applied where there is only about 3 inches space between the motor casing and the wheel hub; in such cases the slight modifications shown in Figs. 7, and 8, may be used, the outer end of the sleeve 2 in this case being stepped or cupped as at 2^x so that the flange 2^b is brought up and over the inner end of the wheel hub, instead of being flush with the end of the hub, as in Figs. 3—4. And the friction member 4 is recessed as at 4^x to accommodate the stepped portion of the sleeve, as shown in Fig. 8. This brings the clutch faces practically over or in alinement with the end of the wheel hub instead of entirely at one end of the wheel hub as in Figs. 3—4. In this manner the friction devices can be readily applied to trucks in places where it would be impossible to apply the particular form shown in Figs. 3—4; but there is no difference in the practical construction of the two devices.

It will be observed that the friction surfaces are of considerably larger diameter than the drum surface 4^n upon which the chain 7 is wound; and the power of the clutch will be increased in proportion to the extent which the diameter of the friction surfaces exceeds the diameter of the drum surface.

Having described my invention what I claim as new and desire to secure by Letters Patent thereon is:

1. In means for applying car brakes, the combination of a friction member mounted on the car axle and rotating therewith, an opposed friction member having an annular groove, and a loose annular frictional surface formed of independent sections interposed between said members, and loosely retained therebetween when the brakes are released.

2. In a friction device for applying car brakes, the combination of an axle, a friction member mounted thereon and rotating therewith, an opposed friction member having an annular groove, and a frictional surface composed of an annular series of radial independent sections interposed between said members, and loosely confined therebetween when the brakes are released.

3. In a brake applying device the combination of a disk-like member upon and rotating with the axle, an annular friction surface on the face of said disk-like member composed of a series of radially disposed independent sections, an opposed friction member also mounted on the axle and having an annular groove engaging the friction sections and holding the latter loosely in position when the brakes are released, and means for bringing the friction members into forcible engagement.

4. In a brake applying device for cars, the combination of a friction member mounted upon the car axle and provided with lugs interlocking with the wheel to cause it to rotate therewith, an opposed friction member slidably mounted on the axle, a loose friction surface interposed between said members, means for preventing rotation of the friction surface relative to the first member, and means for causing the members to forcibly clamp the friction surface between them to apply the brakes.

5. In a friction device for applying car brakes, the combination of a friction member mounted on the car axle and rotating therewith, an opposed friction member having an annular groove V-shaped in cross section, and a frictional surface interposed between said members, and composed of a series of independent sections loosely confined in said groove when the brakes are released.

6. In a friction device for applying car brakes, the combination of an axle, a friction member mounted thereon and rotating therewith, an opposed friction member having an annular groove, V-shaped in cross section, and a frictional surface composed of an annular series of independently adjustable radial sections interposed between said members, and loosely confined therebetween when the brakes are released, and

means for preventing rotation of said friction member when the brakes are released.

7. In a brake applying device the combination of a disk-like member upon and rotating with the axle, an annular friction surface on the face of said disk-like member composed of a series of radially disposed independent sections, an opposed friction member also mounted on the axle and having an annular groove, V-shaped in cross section, engaging the friction sections and holding the latter loosely in position when the brakes are released, and means for bringing the friction members into forcible engagement.

8. In a brake applying device for railway cars, the combination of a friction member mounted upon the car axle and provided with lugs interlocking with the wheel to cause it rotate with the axle, an opposed friction member slidably mounted on the axle and having an annular groove, a loose friction surface interposed between said members and composed of a series of radial sections and loosely supported in the groove of the movable member, and means for preventing rotation of the friction surface relative to the first member, and means for causing the members to forcibly clamp the friction surface therebetween.

9. In a brake applying mechanism for railway cars the combination of a sleeve mounted upon the car axle and having an enlarged flange at its outer end, a loose annular friction surface on the inner face of said flange consisting of a series of independently movable sections, an opposed friction member rotatably mounted on said sleeve and having an annular groove engaging said friction surface, a brake applying chain connected to said friction member, and means for shifting the friction member.

10. In a brake applying mechanism for cars, the combination of a car truck, a brake rigging, a sleeve mounted on one of the truck axles having a flange on one end provided with lugs engaging the wheel to cause the sleeve to rotate with the axle, a friction member slidably and rotatably mounted on said sleeve and having an annular series of radial sections interposed between said friction member and said flange, manually controlled means for throwing the friction member into or out of engagement, and a brake chain connecting said friction member to the brake rigging.

11. In a brake applying mechanism for cars, the combination of a car, a brake rigging, a sleeve mounted on one of the car axles and having a flange at one end provided with lugs engaging the adjacent wheel to cause the sleeve to rotate therewith, a friction member slidably and rotatably mounted on said sleeve and having an annular V-shaped groove on its outer face opposite the said flange, an annular friction surface interposed between the said friction member and said flange and loosely supported in said groove, means for preventing rotation of said friction surface when the brakes are released, and manually controlled means for throwing the friction member into or out of operation, and a brake chain connected with said clutch member and to the brake rigging.

12. In a brake applying mechanism for cars, the combination of a car, a brake rigging, a sleeve mounted on one of the car axles and having a flange at one end provided with lugs engaging the wheel to cause the sleeve to rotate with the axle, a friction member slidably and rotatably mounted on said sleeve and having an annular V-shaped groove on its outer face opposite the said flange, a friction surface composed of an annular series of radial independent sections interposed between the said friction member and said flange and loosely supported in said groove when the brakes are released, means for preventing rotation of said sections when the brakes are released, cam rings on said sleeve for throwing the friction member into or out of operation, and a brake chain connecting said clutch member to the brake rigging.

13. In combination, a car truck, a brake rigging therefor, a brake applying device on the car axle, a controlling lever pivotally mounted on the truck, and operatively connected with said devices, and manually operable devices connected with said controlling lever at a point adjacent the center of the truck-bolster, substantially as described.

14. In combination, a car truck, a brake rigging therefor, a friction brake applying device on one truck axle, means for throwing the device into or out of operation, a lever pivotally mounted on the truck, and operatively connected with said means, and manually operable devices connected with said lever at a point adjacent the king-bolt of the truck-bolster, substantially as described.

15. In combination, a car truck, a brake rigging, and brake applying devices on the car axle; with a controlling lever connected with the applying devices and having its free end adjacent the center of the truck-bolster, a brake shaft on the car within reach of the motorman, and a connection between said shaft and the free end of said controlling lever.

16. In combination, a car truck, a brake rigging, a brake applying drum on the car axle, and friction devices for locking said drum to the axle; with a controlling lever connected with the friction devices at one end and having its free end extending to a

point adjacent the king-bolt of the truck-bolster, a manually operable brake controller, and a connection between said controller and the free end of said lever.

17. In a device of the character described, a car body, a truck pivoted thereto, a brake on said truck, means upon said truck for operating the brake by the momentum of the car, and mechanism on said car body for controlling said means and connected thereto on the axis of the truck.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

JOHN H. DAVIS.

Witnesses:
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