(No Model.) 2 Sheets—Sheet 1.

W. G. PRICE.

STREET CAR BRAKE.

No. 572,823. Patented Dec. 8, 1896.

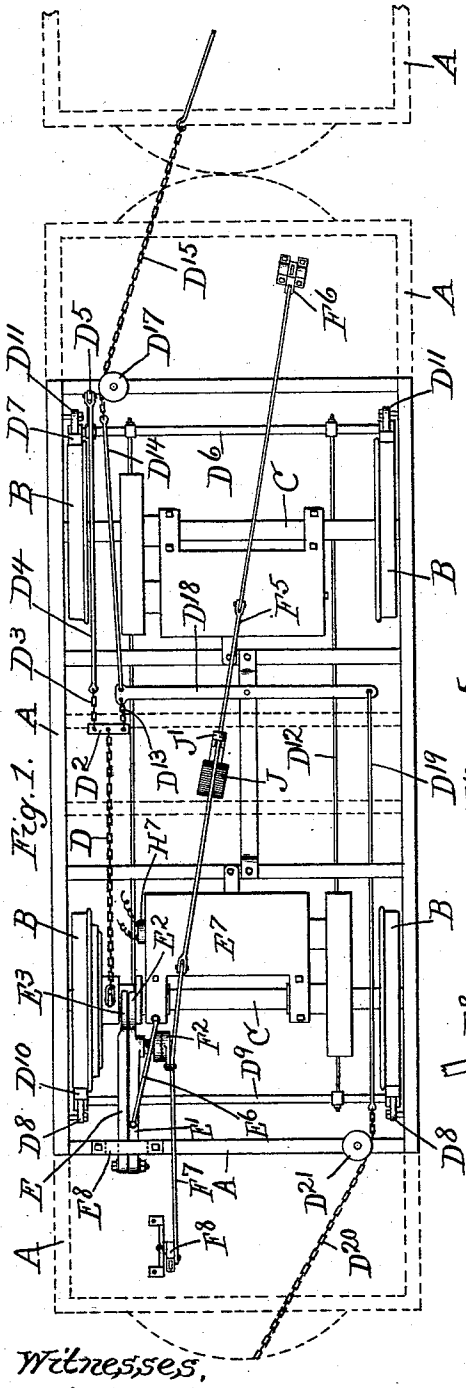


Fig. 1.

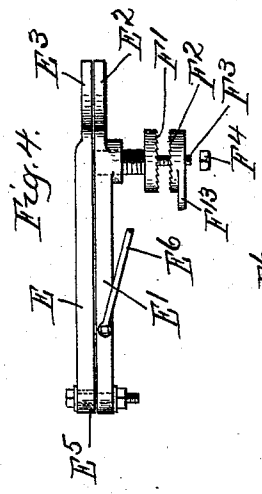


Fig. 4.

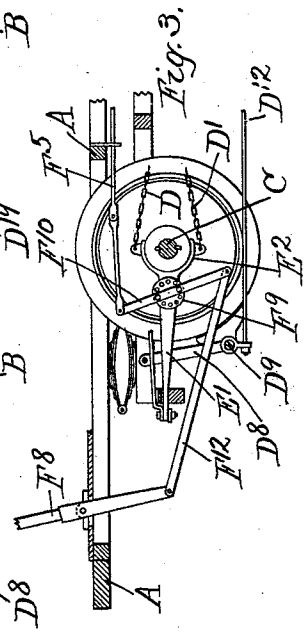


Fig. 3.

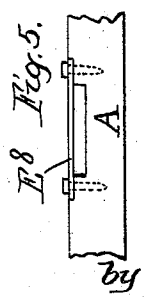


Fig. 5.

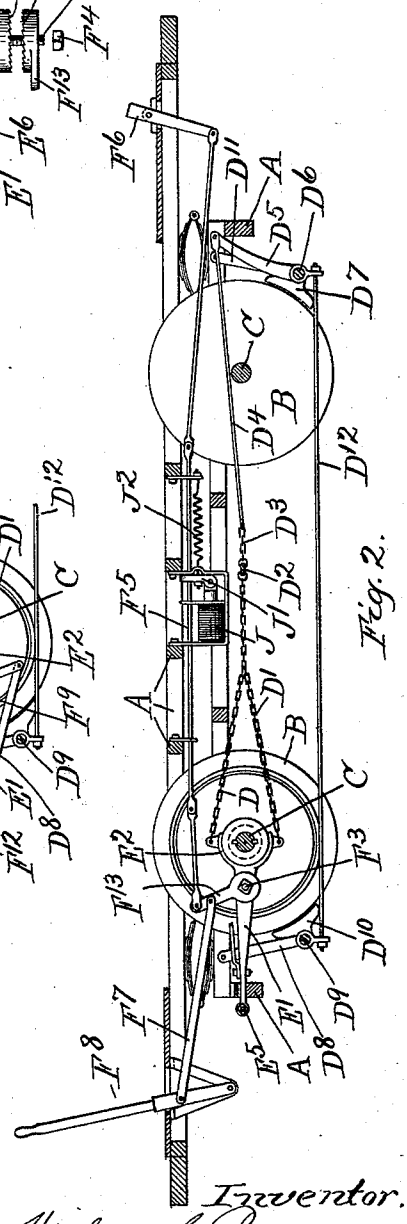


Fig. 2.

Witnesses,
E. T. Wray.
Bertha C. Sims

Inventor.
William G. Price
by Frances W. Parker,
his Atty.

(No Model.) 2 Sheets—Sheet 2.

W. G. PRICE.

STREET CAR BRAKE.

No. 572,823. Patented Dec. 8, 1896.

Fig. 9.

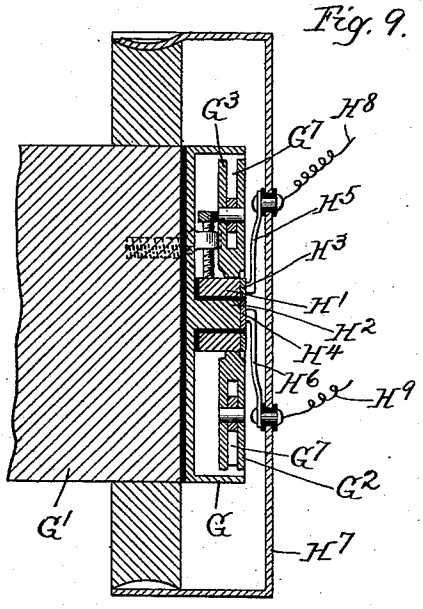
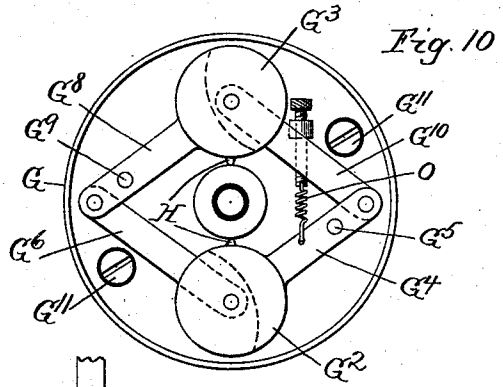


Fig. 10



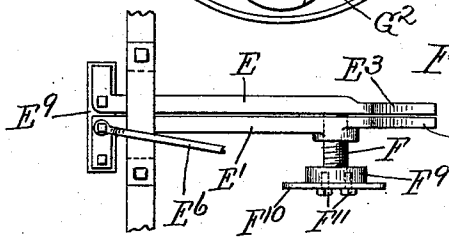


Fig. 12.

Fig. 6.

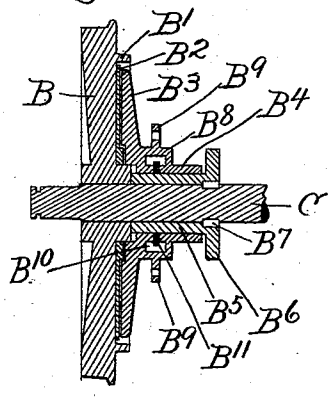
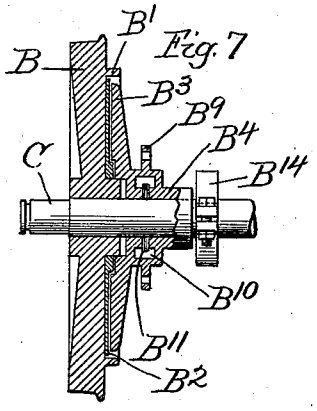


Fig. 7



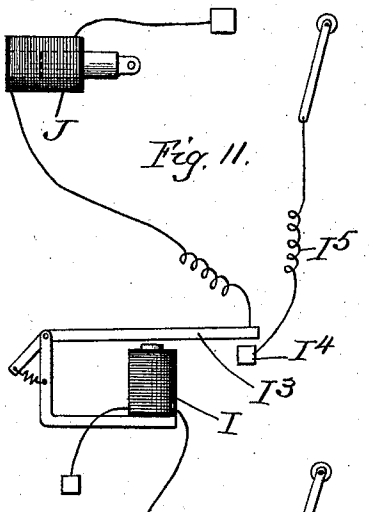
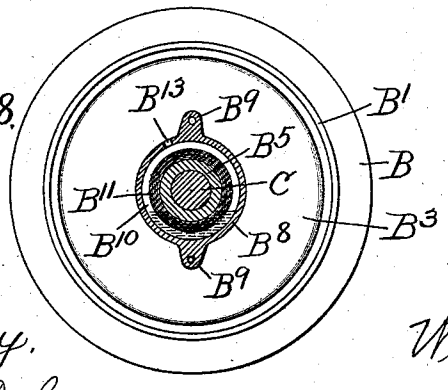
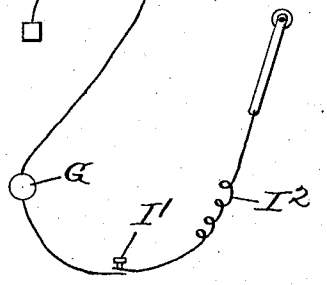


Fig. 11.

Fig. 8.





Witnesses
E. T. Wray.
Bertha C. Sims

Inventor.
William G. Price
by Baxter & Baker,
his Attys.

UNITED STATES PATENT OFFICE.

WILLIAM G. PRICE, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO MENARD K. BOWEN, OF SAME PLACE.

STREET-CAR BRAKE.

SPECIFICATION forming part of Letters Patent No. 572,823, dated December 8, 1896.

Application filed June 8, 1896. Serial No. 594,739. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. PRICE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain Improvements in Street-Car Brakes, of which the following is a specification.

My invention relates to brakes for street-cars and the like, and has for its object to provide certain new and useful improvements in the construction and for the operation of such brakes.

I do not propose to attempt to show every modification of my invention or every means by which it could be utilized; but I have illustrated one or two practical forms in which my invention may be used.

Figure 1 is a plan view of the running-gear of a car with my device attached. Fig. 2 is a longitudinal section. Fig. 3 is a longitudinal section of a modification; Fig. 4, a detail of the adjusting mechanism; Fig. 5, a detail of a portion of the frame; Fig. 6, a section through the friction-clutch; Fig. 7, a similar section through a modification; Fig. 8, a sectional view through Fig. 6; Fig. 9, a section through the brake-controller; Fig. 10, a plan view of a portion of the same; Fig. 11, a diagrammatic view of the circuits of the controller; Fig. 12, a modification of the adjusting and brake-setting device.

Like parts are indicated by the same letter in all the figures.

A is the frame of the car; B B, the wheels on which it is supported; C C, the car-axles.

The clutch mechanism embraces the following elements: On the wheel B is raised the annulus B′, within which lies the friction-plate B^2, opposed to the disk B^3 on the hub B^4 of the sleeve B^5. This sleeve is on the axle C, and its outer flange B^6 is held in position by the keys B^7. The hub B^4 has the projecting annular part B^8, with the links B^9 B^9 for the brake-chains, the internal annular passage B^{10}, and the wick B^{11} to take the oil from such annular passage to the bearing-surface between the sleeve. B^{13} is a hole for the admission of oil. In the modification shown in Fig. 7 the sleeve is dispensed with, and a collar B^{14} is securely fastened on the axle near the end of the hub. To avoid confusion, these several parts are not fully lettered on the drawings of Figs. 1 and 2. The chains D D′ are attached to the lugs and run to the center of the evener D^2, whence leads the chain D^3 to the rod D^4, which is connected to an arm D^5, attached rigidly to the brake-beam D^6, opposite the brake-shoe D^7. The brake-beam D^9 is suspended from the frame by the arms D^8, and the brake-beam D^6 is in like manner suspended from the frame by the arms D^{11}. The two brake-beams have downwardly-projecting lugs associated therewith, whereby they are connected by means of the rod D^{12}. From the other end of the evener D^2 leads the chain D^{13}, connecting with the rod D^{14}, whence leads the chain D^{15} about the pulley D^{17} to the following car. The chain D^{13} and rod D^{14} are connected together at the end of the evener D^{18}, which is pivoted on the frame, and from the opposite end of this evener leads the rod D^{19} to the chain D^{20}, which runs over the sheave D^{21} and leads to the forward car.

The means for operating the clutch are illustrated in the several drawings, but particularly in Figs. 2, 3, 4, and 12. E E′ are levers bifurcated at E^2 and E^3, the bifurcated ends surrounding the hub B^4. These two levers are connected together by the bolt E^5, which permits the lever E to have a rocking motion with reference to the other lever. E^6 is a rod leading from the lever E′ to the frame of the motor E^7. The two levers are loosely supported on the frame beneath the strap E^8.

F is a screw which passes through the lever E′ and abuts against the side of the lever E. At its outer end it carries the ratchet-faced disk F′, to which is opposed the ratchet-faced disk F^2, loose on the projecting screw F^3. The two are held in fixed rigid relation by the nut F^4, which works on the screw F^3 and forces the two disks together. From the disk F^2 projects the arm F^{13}, from which leads the system of rods F^5 to the brake-handle F^6 and the rod F^7 to the brake-handle F^8.

One of the great objections to brakes which are applied by other power than hand-power is that the brake-shoes are forced against the wheels with such force as to make them slide along the rails, thus producing what is termed

"flat wheels." I provide a governing mechanism which is associated with the brake mechanism and which is adapted to control the application of the brakes, so as to prevent the sliding of the wheels. This governor, Fig. 10, I prefer to connect to the end of one of the armature-shafts. This governing device is so constructed that it operates to release the brakes the moment the wheels begin to slide. As shown in the drawings, the governor consists of a circular box or case G, connected with the end of the armature-shaft G′, but insulated therefrom. Two weights G^2 G^3 are connected together by a series of arms in any convenient manner. As shown in the drawings, the weight G^2 is connected with an arm G^4, which is pivoted to the case G at G^5. A link G^6 is pivotally connected to the weight G^2, preferably at its center, as shown, the weight being slotted at G^7 for this purpose. An arm G^8 is pivotally connected to the link G^6, and is also pivotally connected to the case G at the point G^9, said arm being connected with the weight G^3. A link G^{10} is pivotally connected to the weight G^3 at its center and also to the arm G^4. The weights G^2 G^3 are provided with the contact-points H H, which are preferably of platinum. Said contact-points are opposed to a conducting-sleeve H′, surrounding a projection H^2, connected with the case G, said sleeve being insulated from the case. A thin plate H^3, preferably of tempered steel, is electrically connected with the ring H′, and a thin plate H^4 is connected with the projection H^2, the two plates being insulated from each other. The case G is connected to the armature-shaft in any convenient manner, as by the screws G^{11}. Two contact-brushes H^5 and H^6 are connected with a cover H^7, which protects the governor, said brushes being insulated from said cover and being in contact, respectively, with the plates H′ and H^4. Said brushes are connected by the wires H^8 and H^9 with the trolley-wire and with the electromagnet I. (See Fig. 11.) A key or push-button I′ is inserted in this circuit and is located within reach of the motorman. A resistance I^2 is also inserted in the circuit, as I desire only a very weak current to pass through the governor. Such current need only be sufficient to operate the electromagnet I and cause it to attract its armature I^3 and complete an electric circuit. A solenoid J is connected with the frame of the car and is provided with a core having a projecting end J′, said projecting end being provided with a hole through which the rod F^5 passes. (See Fig. 2.) A spring J^2 is connected with the projection J′ below the hole therein, said spring being connected with a stationary part of the car. If the solenoid J is energized, the core is moved inwardly against the pull of the spring J^2 and the projection J′ is cramped so as to engage the rod F^5 and move it so as to release the brake. The solenoid J is electrically connected to the armature I^3 of electromagnet I, and contact I^4 is connected with the trolley-wire through resistance I^5. The solenoid J is also connected to the ground, so that the circuit may be completed therethrough. I have described these electromagnets as connected with the trolley-wire, but of course it is evident that they may be connected with any source of electrical supply, if desired.

I have described in detail the several parts of my invention, but it is of course evident that these parts may be greatly varied and that some may be omitted and others used in connection with parts not herein shown without in any manner departing from the spirit of my invention, and I therefore do not wish to be limited to the construction herein shown and described.

A spring O is connected to the case G of the centrifugal circuit-breaking device, the other end of said spring being connected to one of the arms which connects the centrifugal balls together, the spring tending to prevent the outward movement of the weights. I have shown in Fig. 7 a view of this case, being somewhat different from the construction shown in Fig. 6. In this construction the sleeve B^5 is omitted and the hub B^4 is mounted directly upon the axle. A collar B^{14} is connected with the axle in any desirable manner and acts as a bearing for the lever E′. This construction will be used when there is sufficient room between the motor and the wheel to allow the collar B^{14} to be connected with the axle.

In the modification of the clutch-controlling mechanism illustrated in Figs. 3 and 12 I have shown the two levers E and E′ as attached to the plate E^9, the lever E being pivoted, the lever E′ being rigid. In this case the screw F is provided with the plate F^9, having a series of perforations whereby the bar F^{10} is adjustably secured thereto by the bolts F^{11}. The system of bars F^5 is secured to one end of the bar F^{10}, and to the other end is secured the bar F^{12}, which connects with the lower end of the brake-handle F^8.

The use and operation of my invention are as follows:

Referring to the brake mechanism proper, it may be considered under three heads.

The clutch mechanism or mechanism for connecting the brake-chain winding-drum with the wheel is illustrated particularly in Figs. 6 and 7, where I show it consisting of a bearing rigid on the axle or in fixed relation to the wheel, a friction-surface movable between such bearing and wheel, and means interposed between the movable part and the fixed bearing, so as to force them apart and thus tend to move the movable clutching portion against the wheel. In Fig. 6 I have shown a sleeve surrounding the axle. In Fig. 7 this is dispensed with. Obviously when the friction-surface of the clutch is set against the wheel it begins to turn and pressure is applied to one or the other of the brake-chains,

and this leads to the second portion of the device.

The brake-beams and connections may be very greatly altered and varied at will. I have simply shown, as it were, diagrammatically a construction whereby, when the brake-chain is wound on the drum, the brakes of one or more cars may be set. I do not in my illustration wish to limit myself to the use of any particular brake, the brake-beams, or brake connections. Any brake could be employed—as, as for example, a rail-brake rather than a wheel-brake—and the connections to the other cars could be used or dispensed with or varied at will.

The devices for operating the clutch and setting the brakes are illustrated in modified form in two different forms. They consist, however, primarily of two portions having a motion relative to each other and interposed between the movable part of the clutch and the fixed bearing with which it is associated. In this particular instance these two parts consist of two levers, which are, broadly speaking, pivotally connected together, and a screw controlled from the brake-handles and adapted to force the two levers apart. The levers themselves, though they are of course supported and carried by the frame of the car, are loosely connected therewith, that is to say, not to interfere with their normal relation to the clutch devices. The lateral swing of the car and the play of the parts might interfere with their successful operation if they bore anything like a rigid relation to the car. It is practically necessary, of course, that they should be adjustable, and hence the two forms which I have shown of adjustment whereby the position of the screw and the bar which controls it are varied to take up the lost motion and wear.

When the brakes are applied by this mechanism, it is found that the application is apt to be made so forcible as to cause the wheels to slide and thereby flatten portions of their periphery. This evil I obviate by applying a governing device which automatically operates and releases the brake, thus preventing the wheel from sliding. When the armature-shaft is rotating, the weights G^2 G^3, connected therewith, are moved outwardly, so that the contacts H H are out of contact with the sleeve H', and hence the circuit through governor is broken. If now the brake is applied so forcibly as to cause the wheels to slide, the armature-shaft ceases to rotate the moment the wheels begin to slide, and the weights G^2 G^3 move inwardly, so as to connect the contacts H with the sleeve H'. If now the push-button I' be pressed, the circuit will be completed through the magnet I, and said magnet will attract its armature I^3 and bring it into contact with the opposed contact I^4. The circuit is now completed through the solenoid J, and said solenoid attracts its core. The end J' of said core clamps the rod B^{10} and moves it so as to release the brakes. The circuit through the solenoid J will not be completed unless the key I' is pressed. Said key is placed within reach of the motorman, so that whenever he thinks the wheels are going to slide he may press it and thereby prevent such sliding. It will be seen that I have here a brake especially adapted for electric cars and which is operated by the car-wheel, and that I also provide such brake mechanism with a governor device which automatically releases the brakes in time to prevent the wheels from being flattened. The centrifugal weights G^2 and G^3 are so connected together as to form a balanced governing device, and thus obviate the effects of gravity. It will be seen that the action of gravity upon the weight G^3, tending to pull it downwardly, will be communicated to the weight G^2, and that the force of gravity upon said weight will also be communicated to the weight G^3, the whole system being thereby balanced.

The brake-shoe applied to the wheel is the best known form of brake, but of course the brake-shoe as previously suggested could be applied to the rail or to the axle or drum on the same.

I do not wish to be limited to any particular sort of brake proper.

While the particular form of the device which I have shown and which I have in same case specifically claimed presents two parts capable of a positive movement of separation, the essential point of course is that their outer surfaces are to be separated, or, in other words, moved so as to increase the distance between such outer surfaces.

I claim—

1. A brake for street-cars or the like comprising a brake-shoe opposed to the car-wheel, a disk in proximity to one of the car-wheels, a projecting hub rigid with said disk and surrounding a sleeve keyed to the axle so that it cannot be moved away from said disk, two levers with bifurcated ends which engage said hub, said levers supported by the car so that they have a relative movement, a screw working in threads in one of said levers and bearing against the other lever, a connection between said screw and an operating-handle, and an operative connection between said disk and the brake-shoe whereby the brakes are applied by the movement of the wheel.

2. A brake mechanism for street-cars comprising a brake-shoe, a frictional device opposed to one of the car-wheels and operatively connected with said brake-shoe, a connection between said frictional device and an operating-handle whereby the frictional device may be brought into contact with the wheel, and a brake-releasing device associated with said mechanism and adapted to disconnect the frictional device from the wheel when said wheel ceases to rotate.

3. A brake mechanism for street-cars com-

prising a brake-shoe opposed to the car-wheel, a movable disk in proximity to one of the car-wheels and provided with a projecting hub, a sleeve connected with the axle of the car and surrounded by said projecting hub, a key contained within a slot partly in the sleeve and partly in the axle, whereby the movement of the sleeve along the axle in one direction is prevented, the sleeve being at the same time connected with the axle, an operating-handle connected with said disk so as to control its position, and an operative connection between said disk and the brake-shoe whereby the movement of the operating-handle applies the brake.

4. A brake mechanism for street-cars comprising a brake-shoe opposed to the car-wheel, a disk in proximity to one of said car-wheels, and provided with a projecting hub, said projecting hub and disk mounted upon a sleeve connected with the car-axle, an annular projection on said hub provided with an opening for oil, a circular wick in said opening adapted to make contact with said sleeve, a connection between said disk and an operating-handle whereby the position of the disk may be controlled, and an operative connection between said disk and said brake-shoe, substantially as described.

5. A brake mechanism for street-cars comprising a brake-shoe opposed to the car-wheel, a frictional surface connected with one of the car-wheels, a disk provided with a projecting hub, opposed to said frictional surface and mounted upon a sleeve on the car-axle, two levers having bifurcated ends which engage said projecting hub, said levers being movable with relation to each other and adapted when so moved to come in contact with said sleeve and a projection on said hub, a screw working in threads in one of said levers and bearing against the other, the outer end of said levers being supported upon the car in such a manner that they may be moved laterally with relation to said car, a connection between said screw and an operating-handle whereby the screw may be turned by a movement of the handle, and an operative connection between said disk and the brake-shoe whereby a movement of the disk in either direction applies the brake.

6. A brake mechanism for street-cars comprising one or more brake-shoes, a frictional device opposed to one of the car-wheels, and operatively connected with said brake-shoes, a connection between said frictional device and an operating-handle whereby the frictional device may be brought into contact with the wheel, a brake-releasing device associated with said mechanism and adapted to disconnect the frictional device from the wheel when said wheel ceases to rotate, said brake-releasing device comprising a centrifugally-operated circuit making and breaking device associated with a moving part of the car, a magnet or solenoid in circuit therewith, and associated with the brake mechanism so that when energized it acts to release the brake.

7. A brake mechanism for street-cars comprising a brake-shoe, a frictional device opposed to one of the car-wheels and operatively connected with said brake-shoe, a connection between said frictional device and an operating-handle whereby the frictional device may be brought into contact with the wheel, and a brake-releasing device associated with said mechanism and adapted to disconnect the frictional device from the wheel when said wheel ceases to rotate, said brake-releasing device comprising centrifugal weights connected with a rotating part of the car and provided with contacts normally in contact with an opposed contact so as to complete an electric circuit when the weights are stationary but out of contact therewith when the weights are revolving so as to break said circuit, an electromagnet or solenoid connected in circuit with said centrifugal weights, said solenoid provided with a movable part which engages a part of the brake mechanism when said solenoid is energized and moves it so as to release the brakes.

8. A brake-releasing device for street-cars comprising a centrifugally-operated circuit-breaking device connected with a rotating part of the car and adapted to complete an electric circuit when the rotating part is stationary and adapted to break such circuit when the rotating part is in motion, an electric magnet or solenoid in circuit with said circuit-breaking device and provided with a movable part adapted to be connected with the brake mechanism when said solenoid is energized and move such mechanism so as to release the brakes.

9. A brake-releasing device for street-cars comprising a centrifugally-operated circuit-breaking device connected with a rotating part of the car and adapted to complete an electric circuit when the rotating part is stationary and to break such circuit when the rotating part is in motion, said circuit-breaking device comprising weights connected together so as to eliminate the action of the force of gravity, an electromagnet or solenoid in circuit with said circuit-breaking device, provided with a movable part adapted to be connected with the brake mechanism when said magnet or solenoid is energized and move such mechanism so as to release the brakes.

10. A brake for street-cars or the like comprising a brake-shoe opposed to the car-wheel, a disk mounted upon the car-axle in proximity to one of the car-wheels, two levers in proximity to said disk and adapted to be moved with relation to each other, one of said levers adapted to bear against some part of the disk, the other lever provided, with an opposed bearing-surface, means associated with said levers by which the ends associated with the disk may be separated, thereby

pressing the disk against the wheel, the outer end of said levers supported upon some part of the truck or car frame so that they are free to move laterally with relation to the car and an operative connection between said disk and said brake-shoe.

11. A brake mechanism for street-cars comprising a brake-shoe, a frictional device opposed to one of the car-wheels and operatively connected with said brake-shoe, a connection between said frictional device and an operating-handle whereby the frictional device may be brought into contact with the wheel, and a brake-releasing device associated with said mechanism and adapted to disconnect the frictional device from the wheel when said wheel ceases to rotate, said brake-releasing device consisting of centrifugal weights linked together, and connected with a rotating part of the car, said weights provided with contacts adapted to make contact with an opposed conductor when the weights are stationary, said contacts being moved so as to be out of contact therewith when the weights are rotating, said weights and said opposed conductor being connected respectively with a source of electrical supply, and an electromagnet or solenoid, a moving part associated with said solenoid and provided, with an opening through which passes a rod connected with the operating-handle of the brake, a spring connected with said movable part, the whole so arranged that when said solenoid or magnet is energized, said movable part clamps said rod and moves it so as to release the brakes.

12. In a brake for cars the combination of a brake proper with means for setting same, comprising a movable friction device opposed to a moving part on the axle, a fixed bearing in rigid relation to said moving part, two parts interposed between said moving part and the fixed bearing, a screw device associated with said two parts and adapted when operated to separate them so as to apply the movable friction device to the moving part, said screw device interposed between the axle and the ends of said two parts.

13. A brake mechanism for cars comprising a brake proper, a movable disk in proximity to one of the car-wheels and provided with a projecting hub, a collar fixed to the car-axle, two levers with bifurcated ends which partly surround the axle between the hub and the collar, the bifurcated ends of said levers loosely engaging said axle, the axle engaging ends of said levers being open, so that the levers may be removed from or connected with said axle by a longitudinal movement of said levers, an operating device for separating said levers so that one bears against the collar, the other against the hub.

14. A brake mechanism for cars comprising a brake proper, a movable disk in proximity to one of the car-wheels and provided with a projecting hub, a collar fixed to the car-axle, two levers with bifurcated ends which partly surround the axle between the hub and the collar, an operating device for separating said levers so that one bears against the collar, the other against the hub, and a hand-lever adjustably connected with the device for separating the levers.

15. A brake mechanism for cars comprising a brake proper, a movable disk in proximity to one of the car-wheels and provided with a projecting hub, a collar fixed to the car-axle, two levers with bifurcated ends which loosely engage and partly surround the axle between the hub and the collar, an operating device for separating said levers so that one bears against the collar, the other against the hub, a hand-lever adjustably connected with the device for separating the levers, and a disk on one of said levers, comprising part of such adjusting device.

16. In a brake mechanism the combination of a car-wheel with an opposed movable friction-plate, a fixed stop or collar on the car-axle, two associated relatively-movable parts interposed between the disk and the collar and loosely supported on the car-frame, a device for forcing them apart located between the axle and the free ends of said relatively-movable parts, and controlling connections from such device to the brake-handle.

17. In a brake device the combination of a wheel with an opposed movable and rotatable friction-plate, a fixed collar or the like, two parts loosely connected with the axle and interposed between the friction-plate and the collar, and movable with reference to each other, said parts supported loosely on the frame of the car, a device for separating the two movable parts, interposed between the axle and the ends of said parts and connections from the disk to the brake proper.

18. In a brake device for cars a brake proper, a collar fixed to the axle, a movable disk in proximity to a wheel and provided with a projecting hub which actuates the chain or rope to apply the brakes, a portion of said hub being reduced in size so as to support or carry a mechanism, which is interposed between the collar and large portion of the hub, which is used to force the disk against the wheel.

19. In a brake device for cars a disk on an axle opposed to a wheel, the hub of the disk surrounding a sleeve, which rests against a car-wheel and which is keyed to the axle so as to prevent movement along the axle in the direction away from the said car-wheel, a flange on said sleeve and means interposed between the flange and hub to force the disk against the wheel.

20. In a brake device for cars a brake proper, a collar fixed to the axle, a movable disk in proximity to a wheel and provided with a projecting hub which winds up the chain or ropes to apply the brakes, a portion of said hub being reduced in size and cylindrical in shape so as to support a mechanism which is inter-

posed between the collar and large portion of the hub which is used to force the disk against the wheel.

21. In a car-brake device the combination of a movable rotatable friction device opposed to the car-wheel, with a fixed opposed surface and two intermediate parts loosely supported on the frame, their outer surfaces movable with reference to each other and adapted when such outer surfaces are moved from each other to engage one the fixed part, the other the movable part and thus force the movable friction part against the wheel.

WILLIAM G. PRICE.

Witnesses:
BERTHA C. SIMS,
LILLEY JOHNSTONE.