

No. 609,143.

P. S. DUREL.
CAR BRAKE.

(Application filed Sept. 15, 1897.)

Patented Aug. 16, 1898.

(No Model.)

2 Sheets—Sheet 1.

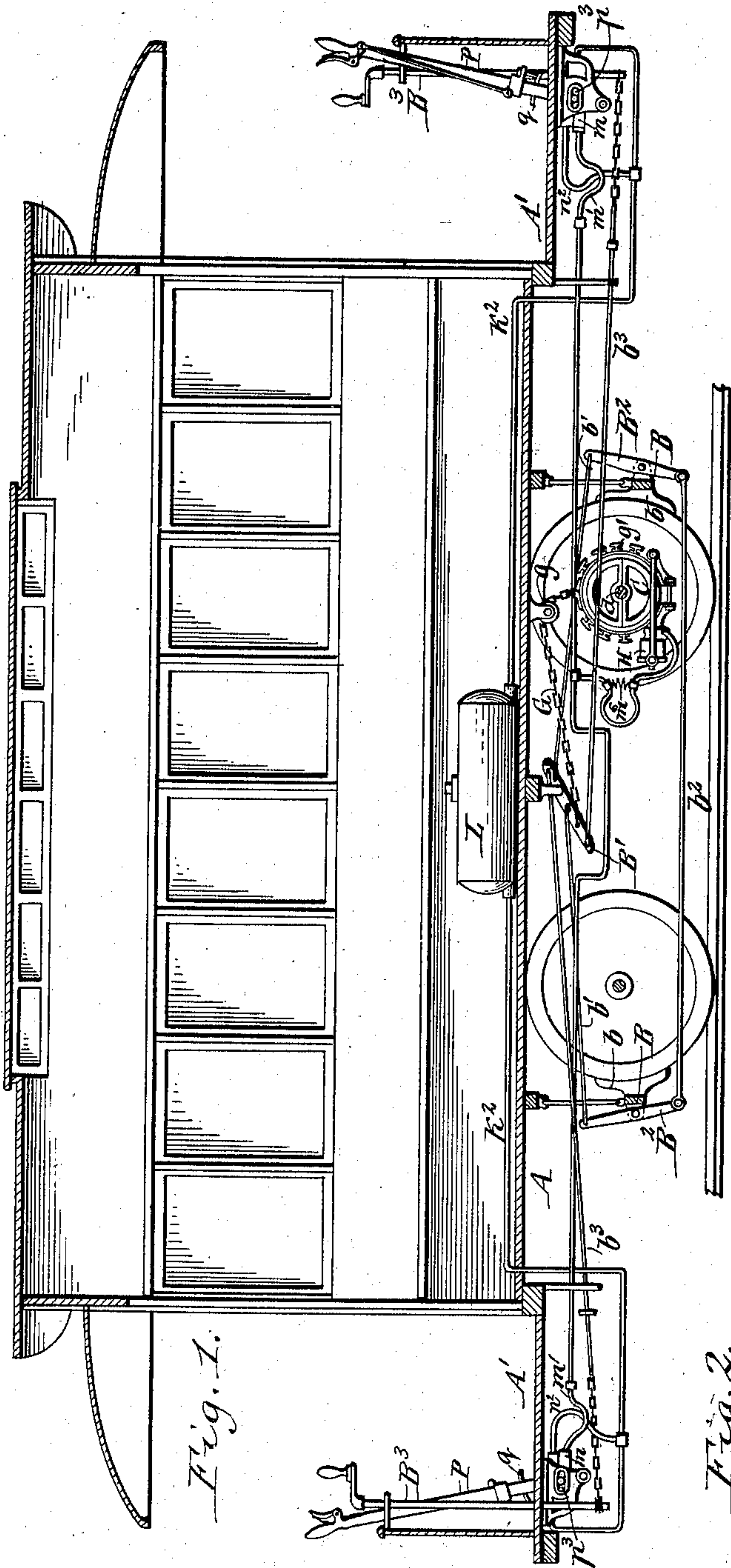


Fig. 1.

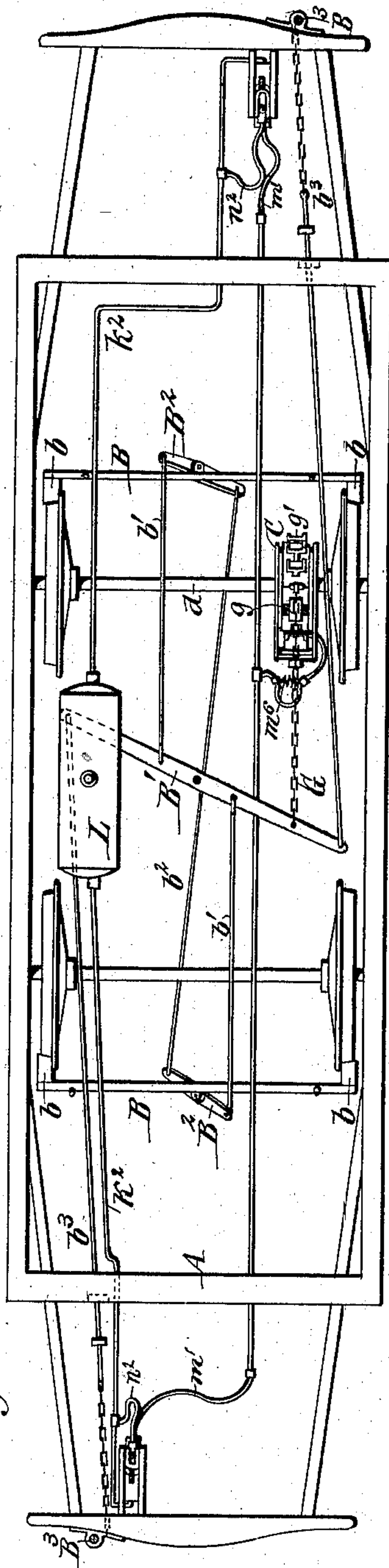


Fig. 2.

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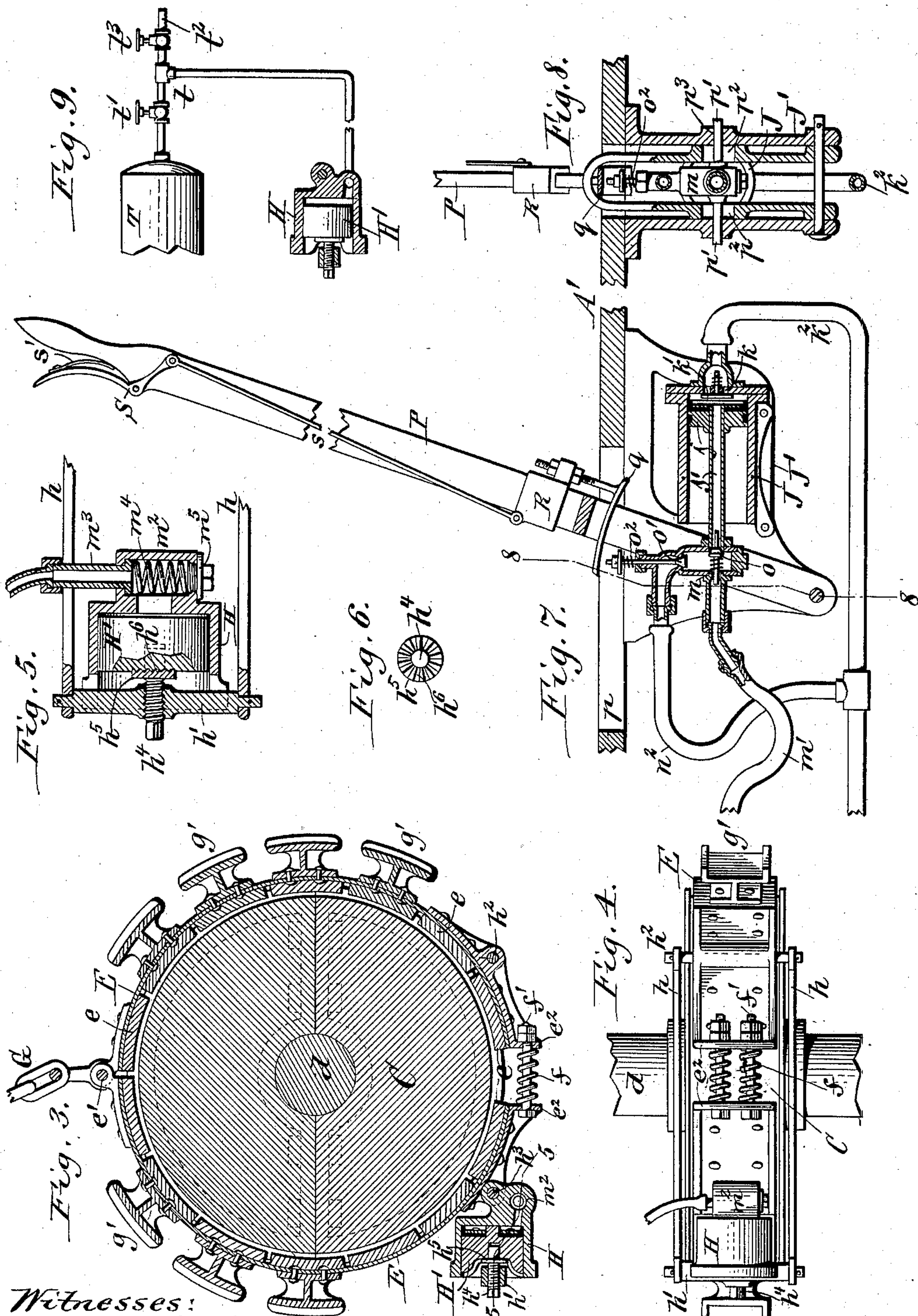
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UNITED STATES PATENT OFFICE.

PAUL S. DUREL, OF NEW ORLEANS, LOUISIANA.

CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 609,143, dated August 16, 1898.

Application filed September 15, 1897. Serial No. 651,706. (No model.)

To all whom it may concern:

Be it known that I, PAUL S. DUREL, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented a new and useful Improvement in Car-Brakes, of which the following is a specification.

This invention has more particular reference to car-brakes in which the momentum of the car is utilized for applying the brakes.

The object of my invention is the provision of an effective brake which can be conveniently applied to existing cars and which may be combined with the ordinary brake-gear in such manner that the latter can be used in the ordinary way in case the momentum brake becomes unserviceable.

In the accompanying drawings, consisting of two sheets, Figure 1 is a vertical longitudinal section of a street-car equipped with my improved brake. Fig. 2 is a sectional top plan view of the running and brake gear of the car. Fig. 3 is an enlarged cross-section of the clutch or brake-drum and adjacent parts. Fig. 4 is a bottom plan view of the same. Fig. 5 is a horizontal section, on an enlarged scale, in line 5 5, Fig. 3. Fig. 6 is an end view of the adjusting-screw connecting the piston of the clutch-operating cylinder with the cross-head. Fig. 7 is an enlarged longitudinal section of the pump. Fig. 8 is a transverse section in line 8 8, Fig. 7. Fig. 9 is a fragmentary elevation of a modification of the invention.

Like letters of reference refer to like parts in the several figures.

A is the car-frame, and A' the platforms.

B B are the usual brake-beams, carrying the brake-shoes *b*.

B' is the main lever of the ordinary brake, pivoted centrally to the under side of the car-frame, and B² the auxiliary levers, carried by the brake-beams and having their upper arms connected with opposite arms of the main lever B' by rods *b'*, while their lower arms are connected by the rod *b*².

B³ are the customary brake-staffs, journaled on the platforms and connected by the usual rods and chains *b*³ with the ends of the main brake-lever B'. This constitutes the ordinary hand brake mechanism, which can be

operated from either end of the car in a well-known manner.

C is a brake or clutch-drum rigidly secured to one of the car-axles *d* or a shaft geared therewith.

E is a brake or clutch band encircling the drum C and adapted to be firmly clamped thereto, so as to rotate with the same. As most clearly shown in Fig. 3, this band is provided on its inner face with segmental wooden shoes *e* to increase its grip, and it is preferably constructed of two semicircular sections, which are hinged together on the upper side of the band, as shown at *e'*, to permit the sections to approach and recede from the surface of the drum. If desired, the band may be formed of a single strip of elastic material, such as spring-steel. The ends of the clutch-band are provided with ears *e*², between which are interposed springs *f*, which tend to expand the sections, so as to release the band from the drum. These springs surround bolts *f'*, passing through the ears *e*² and serving to limit the spreading movement of the sections.

G is a chain or other flexible connection which connects the clutch-band with one arm of the main brake-lever B', so that when the clutch-band is tightened upon the drum C the chain is wound thereon and caused to swing the main brake-lever in the proper direction to apply the brake-shoes *b* to the wheels of the car. The chain G passes over a guide-roller *g*, journaled on the under side of the car-frame, as shown in Figs. 1 and 2. The clutch-band is provided on its outer face with a series of chairs or seats *g'*, upon which the chain is wound and supported when the brake is applied.

H H' represent a cylinder and piston whereby the clutch-band is contracted for gripping the drum C. The cylinder H is attached to one of the free ends of the clutch-band while the piston H' is connected with the opposite free end of the band by rods *h* and a cross-head *h'*, as shown in Figs. 3 and 4, so that when the piston is moved toward the outer end of the cylinder the ends of the band are drawn toward each other, causing the band to clutch the drum C and turn therewith.

The rods *h* are pivoted to the clutch-band

by a transverse pin or bolt h^2 , while the cylinder H is pivoted to the band by a similar bolt h^3 , by which construction the cylinder adapts itself to the varying positions of the connecting-rods and remains at all times in alinement therewith, preventing binding of the piston. As shown, the clutch-band carries its actuating-cylinder and piston and the connecting-rods, so that these parts rotate with the band and the drum when the brakes are applied.

To permit the wear of the band to be taken up, a longitudinal adjusting screw or bolt h^4 is interposed between the cross-head h' and the piston H'. This bolt engages in a screw-threaded opening formed in the cross-head, and its smooth inner end turns in a socket or bearing formed in the adjacent side of the piston. The adjusting-bolt is provided with a retaining-collar h^5 , provided on its inner face with radial teeth h^6 , which interlock with similar teeth on the piston, as shown in Figs. 3, 5, and 6. In order to adjust the parts to compensate for wear, the connecting-rods h are detached to release the adjusting-bolt h^4 , and the latter is then turned sufficiently to take up the play of the parts, after which the rods are then again attached.

The piston H' is operated by any suitable fluid under pressure delivered to the cylinder H; but I prefer to actuate the same by water, preferably brine, which is forced into the cylinder by hand-pumps arranged at opposite ends of the car under the platforms and operated by hand-levers extending upward through the platforms and terminating in convenient reach of the motorman or other attendant stationed on the platform. These pumps and their connections with the clutch-operating cylinder H are identical in construction, and a description of one will therefore suffice for both.

Referring to Figs. 7 and 8, J is the pump-cylinder, suspended by brackets or hangers J' from the under side of the platform, and j is the piston, having a hollow rod j' , which communicates at its inner end with the space on the front side of the piston. k is an inlet-port arranged in the front head of the pump-cylinder and provided with an inwardly-opening check-valve k' . This inlet-port has a nozzle which is connected by a pipe k^2 with a water supply or storage tank L, supported underneath the car. m is a valve-casing applied to the outer end of the hollow piston-rod j' and communicating with the latter; and m' is a flexible pipe connecting the inner end of the clutch-operating cylinder H with said valve-casing for delivering the water under pressure from the pump to said cylinder. This cylinder is preferably provided with a contracted inlet-chamber m^2 , Fig. 5, with which is connected an inlet-nipple m^3 , passing through an opening in the side of said chamber and having a flange at its inner end for retaining it in the chamber. m^4 is a spring arranged in the inlet-chamber and bearing

against the flange of the nipple for holding the same against inward movement. This spring and the nipple are introduced and removed through an opening in the opposite wall of the inlet-chamber, which opening is closed by a screw-plug m^5 .

In the operation of the pump during the forward stroke of the piston the check-valve of the inlet-port k is closed and the water is forced through the hollow piston-rod j' , the valve-casing m , and the pipe m' into the clutch-operating cylinder H in rear of its piston, thereby forcing the latter forwardly and contracting the clutch-band, as hereinbefore described. The valve-casing m is mounted on the piston-rod of the pump and reciprocates with the same.

n is a discharge or return pipe which connects the valve-casing m with the water-supply pipe k^2 of the pump, and through which the water is returned from the clutch-operating cylinder H to the supply-tank L upon releasing the brakes, thus using the water over and over again. To prevent the returning water from entering the hollow piston-rod j' , the latter is provided in its rear end with an outwardly-opening check-valve o , and to prevent the water from passing from the pump-cylinder directly into the return-pipe the valve-case is provided in its return-passage with a downwardly-opening check-valve o' , the stem of which extends upwardly through the top of the casing, and is provided with a spring o^2 , which tends to keep the valve closed.

P is the hand-lever, whereby the pump-piston is reciprocated and which is pivoted at its lower end to the hangers or brackets J' and extends through a longitudinal slot p , formed in the platform. The lower portion of this hand-lever is bifurcated and connected with the piston-rod of the pump through the medium of the valve-casing m , which is provided on opposite sides with horizontal pins p' , passing through vertical slots p^2 , formed in the jaws of the lever, and through horizontal slots p^3 , formed in the brackets.

q is a releasing-shoe preferably carried by the hand-lever P and adapted to depress the check-valve o' , governing the return-pipe n^2 , so as to allow the liquid in the clutch-operating cylinder H to escape from the same and return to the storage-tank L when it is desired to throw off the brakes. This releasing-shoe is arranged above the stem of the check-valve o' and is carried by a slide R, embracing the hand-lever P. This slide is moved downward by a releasing-lever S, pivoted adjacent to the handle of the hand-lever, so that it can be operated by the same hand which grasps the lever, and this lever is connected with the slide by a rod s . The slide is normally retracted by a spring s' , interposed between the handle of the lever and the upper arm of the releasing-lever. Upon pressing the releasing-lever toward the hand-lever the shoe q is lowered, causing it to depress

the valve and open the same, the shoe being made of sufficient length to operate the valve in any position of the hand-lever.

The operation of my car-brake is as follows: In the normal position of the parts the clutch-band E is expanded by the springs *f*, so as not to clutch the drum C, and the chain G is unwound from the drum, while the piston of the clutch-operating cylinder H is at the inner end of the cylinder, as shown in Fig. 3. To apply the brake, the motorman or other attendant on the car-platform vibrates the hand-lever P, so as to pump a quantity of liquid from the storage-tank L into the clutch-operating cylinder H. The pressure of the water entering this cylinder forces its piston toward the opposite end thereof, whereby the ends of the clutch-band are drawn together against the pressure of the expanding-springs *f* and the band is caused to clutch the drum. The band now rotates with the drum, and the chain G, connected therewith, is partially wound upon the band, thereby swinging the main brake-lever B' on its pivot and setting the brakes in an obvious manner. In setting the brakes the clutch-band and chain rotate with the drum for about a third or a quarter turn thereof, by which time the brake-shoes will have been applied to the wheels, and as soon as the shoes bear against the wheels the band and the chain remain at rest and the drum slips or turns in the band until the car comes to a standstill. It will thus be understood that the clutch-band and the drum act as a clutch, which couples the chain with the car-axle during the initial operation of setting the brakes, and that after the chain has been wound upon the drum sufficiently to draw the brake-shoes against the wheels the band and drum act as an auxiliary brake, which supplements the action of the ordinary or main brake. The force with which the band is caused to impinge against the drum may be varied by operating the hand-lever P a greater or less number of times, so as to increase or diminish the water-pressure exerted upon the piston of the clutch-operating cylinder H.

To throw off the brakes, the motorman depresses the releasing-shoe *q* by means of the releasing-lever S, thereby opening the valve *o'* of the return-pipe *n* and allowing the piston of the cylinder H to expel the water therefrom under the reactionary force of the expanding-springs *f*, which have been compressed by the contraction of the clutch-band, the expelled water being returned through the inlet-pipe *m'*, valve-casing *m*, and return-pipe *n'* to the storage-tank L. The clutch-band being now expanded and released from the drum C, the brake-shoes *b* and beams B swing away from the wheels and carry the chain G with them, thus unwinding the chain from the clutch-band and returning the latter to its normal position.

The flexible supply-pipe *m* has sufficient slack to allow the cylinder H to rotate with

the band E, and in order to take up this slack when the brakes are off and prevent the pipe from becoming entangled with the surrounding parts the same is provided with a spring *m'*, which normally doubles a portion of the pipe, as shown in Figs. 1 and 2.

The clutch-band is provided on each side of its chain attachment with a series of chairs *g'*, so as to form supports for the chain in either direction of rotation of the drum, according to the direction in which the car is moving.

My improved device, although combined with the old and well-known brake in general use, constitutes a separate mechanism, which is connected with a part of the ordinary brake, so that in case the improved momentum brake gets out of order the ordinary brake may be operated in the usual way by means of the brake-staffs. This separate and independent feature of my improvement renders the same applicable to the ordinary brakes of existing cars without interfering with or requiring a change in the construction or arrangement of the old brake or any other parts underneath the car, thus enabling the improvement to be applied to such cars at much less expense than a brake which necessitates changes in existing parts.

As hereinbefore described, the drum C and clutch-band E serve as a brake as well as a clutch. In some cases this drum and band, in connection with the cylinder and piston H, may be used alone as the car-brake without the employment of the ordinary brake-shoes operating against the car-wheels, in which case the chain G, instead of being connected with the main brake-lever B', is affixed to some stationary part of the car or frame.

As a modification of my improvement a tank T, containing fluid under pressure, such as compressed air, may be substituted for the hand-pumps J, as shown in Fig. 9. In this case the clutch-operating cylinder is supplied from the pressure-tank T by a pipe *t*, having a valve *t'*, and with the supply-pipe *t* is connected a discharge branch or pipe *t''*, having a valve *t''*. In applying the brakes with this apparatus the valve *t'* of the supply-pipe is opened, while the valve *t''* of the discharge-pipe is closed, permitting the compressed air to enter the clutch-operating cylinder and applying the brakes. To release the brakes, the valve of the supply-pipe *t* is closed and the valve of the discharge-pipe *t''* is opened, whereby the air is allowed to escape from the cylinder into the atmosphere through the discharge-pipe.

I claim as my invention—

1. The combination with a car-axle or similar rotary part and a drum mounted thereon, of a split brake or clutch band applied to said drum and adapted to turn therewith when tightened, a cylinder connected with one end of said band, a piston operating in said cylinder and connected with the opposite end of the band, said cylinder and piston being car-

ried by the band so as to turn therewith, a conduit for supplying fluid under pressure to said cylinder, and a flexible connection extending from said brake-band to a relatively stationary part of the car and adapted to be wound upon said drum when the band is tightened, substantially as set forth.

2. The combination with a car-axle or similar rotary part, a brake-gear and brake-shoes operated by said gear, of a drum mounted on said axle or rotary part, a split brake-band applied to said drum and adapted to turn therewith when tightened, a cylinder connected with one end of said brake-band, a piston arranged in said cylinder and connected with the opposite end of the band, a conduit for supplying fluid under pressure to said cylinder, and a chain or cable connecting said band with the brake-gear and adapted to be wound upon said drum when the band is tightened, substantially as set forth.

3. The combination with a car-axle or similar rotary part and a drum mounted thereon, of a brake or clutch band applied to said drum, a cylinder connected with one end of said band, a piston arranged in said cylinder, a rod connecting the piston with the opposite end of said band, and an adjusting-bolt interposed between the piston and said rod for taking up wear, substantially as set forth.

4. The combination with a car-axle or similar rotary part and a drum mounted thereon, of a brake or clutch band applied to said drum, a cylinder connected with one end of said band, a piston arranged in said cylinder, rods connected at one end with the opposite end of said band and united at their front ends by a cross-head, and an adjusting-screw carried by said cross-head and provided with a serrated collar which interlocks with a serrated surface of the piston, substantially as set forth.

5. The combination with a car-axle or similar rotary part and a drum mounted thereon, of a brake or clutch device coöperating with said drum, a cylinder and piston for applying said brake or clutch device, a pump for delivering fluid under pressure to said cylinder, a discharge-pipe connected with said cylinder and provided with a valve, a hand-lever for operating said pump extending above the car-platform, a releasing-shoe arranged to slide on said hand-lever and adapted to operate upon the stem of said valve for opening the latter, and a releasing-lever pivoted adjacent to the handle of said pump-lever and connected with said releasing-shoe, substantially as set forth.

6. The combination with a car-axle or other rotary part, and a drum mounted thereon, of a clutch or brake device coöperating with said drum, a cylinder and piston for applying said clutch or brake device, a pump having a piston provided with a hollow piston-rod, a supply-tank connected with the pump-cylinder, a valve-casing connected with the hollow piston-rod, a supply-pipe leading from said valve-casing to the operating-cylinder of the clutch or brake device, and a return-pipe leading from said valve-casing to said supply-tank, said hollow piston-rod being provided with a check-valve which prevents the returning fluid from entering the pump-cylinder and the return-passage of the valve-casing being provided with a check-valve which prevents the pumped fluid from passing directly into the return-pipe, substantially as set forth.

Witness my hand this 4th day of September, 1897.

PAUL S. DUREL.

Witnesses:

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