(No Model.)

2 Sheets—Sheet 1.

J. B. GATHRIGHT.

AIR BRAKE FOR CARS.

No. 353,673. Patented Dec. 7, 1886.

Fig 1.

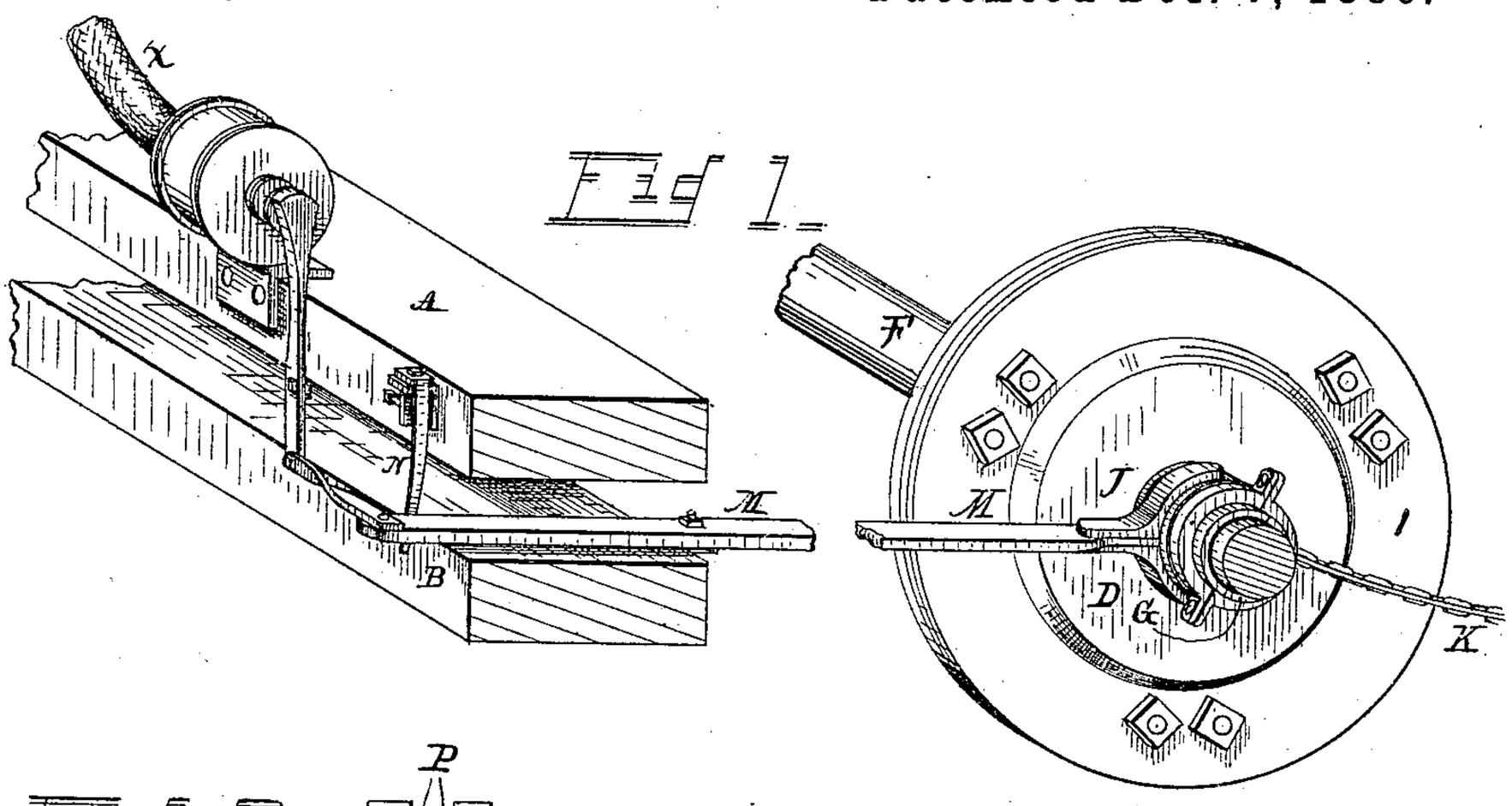


Fig 2.

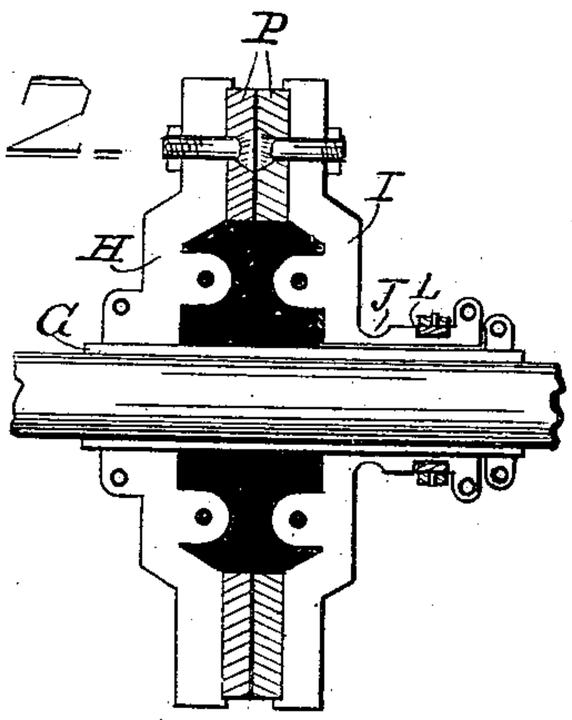
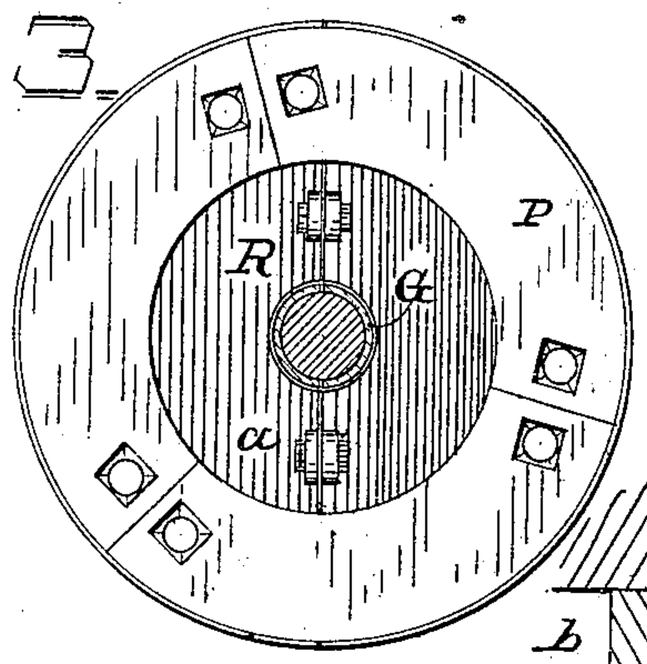


Fig 3.



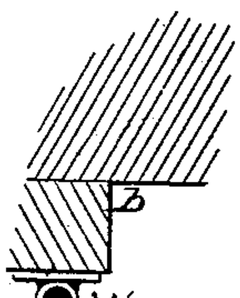


Fig 4.

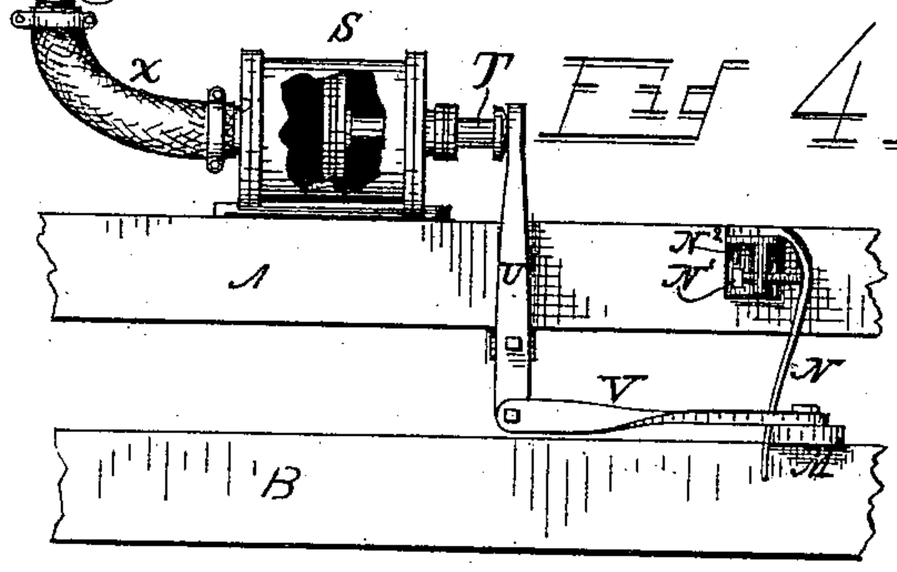
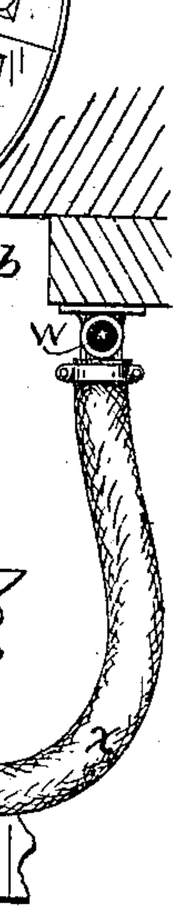


Fig 5.



Witnesses

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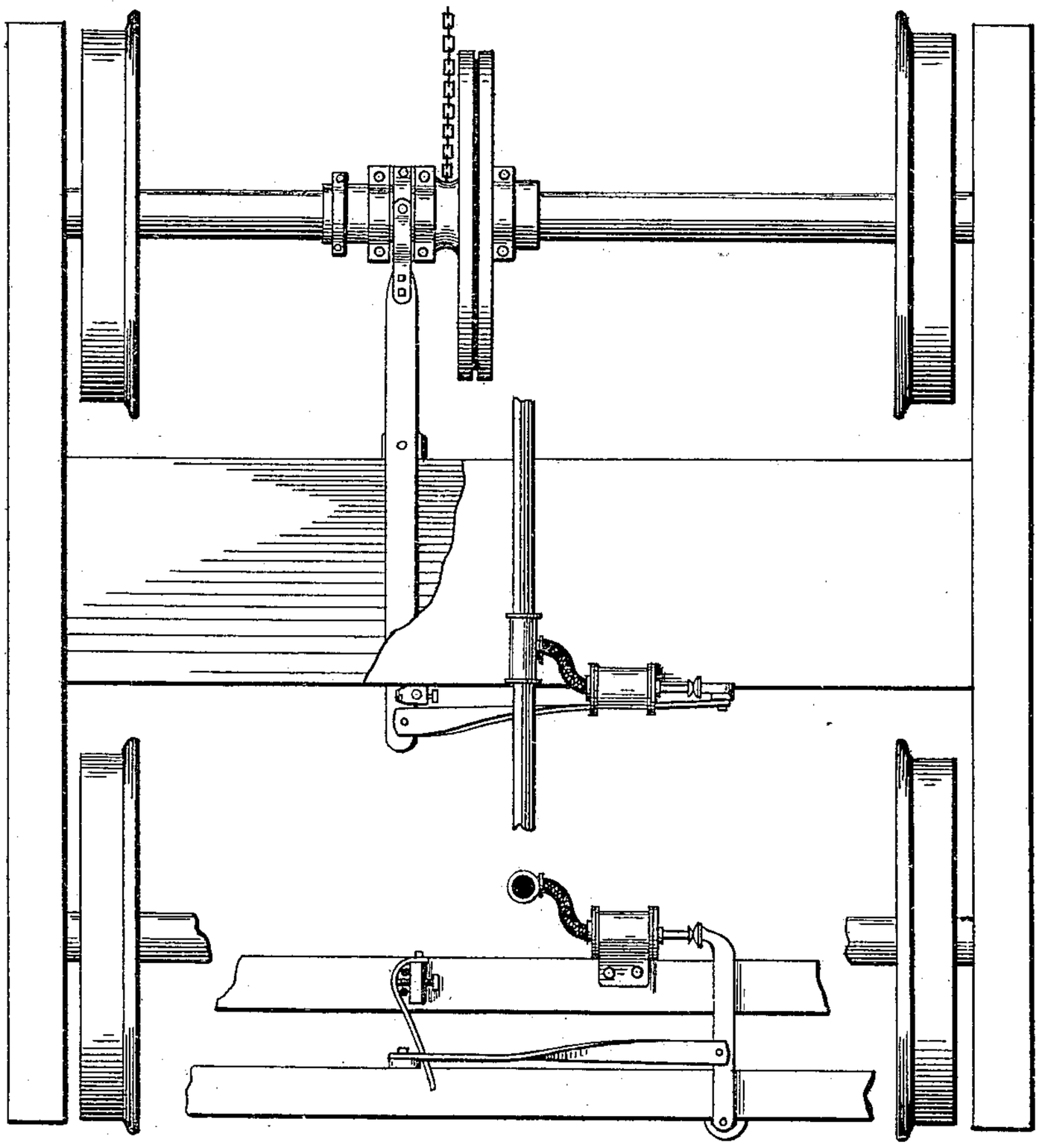
(No Model.) 2 Sheets—Sheet 2.

J. B. GATHRIGHT.

AIR BRAKE FOR CARS.

No. 353,673. Patented Dec. 7, 1886.

Fig 6.



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UNITED STATES PATENT OFFICE.

JOSIAH B. GATHRIGHT, OF LOUISVILLE, KENTUCKY.

AIR-BRAKE FOR CARS.

SPECIFICATION forming part of Letters Patent No. 353,673, dated December 7, 1886.

Application filed May 6, 1886. Serial No. 201,311. (No model.)

To all whom it may concern:

Be it known that I, JOSIAH B. GATHRIGHT, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Air-Brakes for Cars; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of devices whereby the engineer may apply or release the brakes on all the cars in his train at will through the medium of compressed air.

Heretofore, I believe, all brake devices operated wholly or partly by compressed air, adapted to work automatically, have required an air-pressure nearly equal to the sum of the brake-power required for the whole train.

The object of my invention is to provide means whereby the momentum of the cars may supply the greater part of the force required to apply the brakes, and whereby compressed air may serve as a medium by which the engineer may control this brake-force at will.

To this end my invention consists in the construction and combination of parts forming an automatic combined air and friction brake, hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view, part in longitudinal vertical section, of portion of a car showing my invention. Fig. 2 is a longitudinal section of the friction-clutch at its parting plane. Fig. 3 is a face view of the free disk of the said clutch. Fig. 4 is an elevation of certain details, part in vertical section transverse to the car. Fig. 5 shows a modification of the parts represented in Fig. 4; and Fig. 6 is a plan view of a car-truck partly broken away, and certain details being shown also in elevation, looking toward the side of the bolsters, to represent my invention freely in one view.

A represents the upper bolster, B the lower bolster, and F an axle, of a car-truck.

K is the brake-applying chain, one end of which is attached to the hub of the loose disk I of the friction-clutch, and the other to the evener-lever of the hand-brakes, or may connect with the hand-brake mechanism in any desired way to pull upon the brakes in the same direction in which the hand-winder pulls in applying the brakes.

The means here shown to utilize the motion of the axle to wind up the chain K to apply the brakes is part of the subject-matter of my former application for a patent filled April 10, 1886, Serial No. 198,445, and will be only briefly described herein.

G represents the parted sleeve fitted upon the axle to even it up, and also to prevent wear thereof.

H is the fixed disk of a clutch clamped firmly upon the sleeve, thereby clamping the sleeve tightly upon the axle. I is the free disk, also clamped upon the sleeve G, but so loosely fitted that it may be supported nearly free of the axle.

J is a groove in the hub of the free disk, adapted to wind the brake-chain K, one end of which is fixed thereto; and L is another groove in the same hub to receive the collar end of a shifter-lever, M, whereby the disk I may be forced into frictional engagement with disk H, to be revolved thereby to wind up brake-chain K, or whereby the said disk I may be held out of engagement with disk H.

N is a spring acting continually against the lever M to force the clutch into engagement. This spring is attached to the upper bolster by a bracket, N^2, and its initial force or pressure against the lever M is regulated by a set-screw, N′. This force is automatically increased or diminished as the car is loaded or unloaded, as shown in my former application referred to.

The frictional contact of the disks is confined to small annular wearing-plates, P, Fig. 2, secured to the faces of the disks near their outer edge. This affords as much friction-power as when the whole faces of the disks are allowed to engage, and possesses the very great advantage of having this force applied to the loose disk at the greatest possible distance from the axle, and thus by leverage greatly increasing its efficiency or power in winding the brake-chain upon its hub. If the disks or wearing-plates P should bear against each other all the way from their circumference to their axle, as heretofore, the parts farthest from the axle will revolve fastest and be first

worn away, which would soon result in the greatest pressure between the disks being near the axle, where it would be least effective. Having thus provided for the greatest efficiency of the friction-clutch, the force of spring N, used to press the disks together, may be correspondingly less to obtain the requisite tension upon the brake-chain K. Upon the recessed portions of the inner faces of the disks are cast lugs or ears *a*, Fig. 2, by which the two halves of each disk may be bolted together, thus making the clutch lighter, yet more durable.

To enable the engineer to control this brake mechanism—*i. e.*, to hold the disks apart against the force of spring N, or to permit them to be forced into engagement and apply the brakes—I utilize compressed air by means of any suitable mechanism—such, for instance, as an air pump and reservoir on the engine, an air-pipe, W, under each car, with flexible connections between the cars, a cylinder, S, under each car having a piston, T, bearing against a vertical lever, U, which is connected with the lever M by a rod, V. The pipes W connect, of course, with the reservoir of compressed air, and a cock is provided convenient to the engineer, by which the compressed air is admitted to or discharged from the pipes at will. The brakes are now under his control as follows: Opening connection between reservoir of compressed air and the pipes, the air passes back into the cylinders, forces out the piston, and by the mechanism heretofore described separates the disks, thus relieving the brakes and preventing them from coming into action so long as this air-pressure is maintained. When he wishes the brakes applied, he turns the cock so as to permit the air to escape from the pipe and cylinder, and the spring promptly forces the disks into engagement and the brakes are wound on. Cocks for allowing the air to escape from the pipe may be placed on each car, as in other systems of automatic air-brakes, and as the escape of air applies the brakes, of course they will be automatically applied at once on both sections should the train break in two and sever the pipe-connections. As the two disks of the clutch need be separated but very little when not engaged, very little motion of lever M is required to engage them, and consequently but very little motion of piston I is required to disengage them. That this small motion may be always effective, it is necessary to maintain a fixed relation between the piston and the lever U, against which it acts. To secure this object I locate the truck-bolster as shown in Fig. 4, (modified in Fig. 5,) and provide a flexible connection, X, between it and the pipes W, which is attached to the car-body.

By this construction and arrangement of my devices the constant swaying, swiveling, and changing of relative position between the car-body and the trucks in no manner interfere with these devices to endanger their certain and efficient action. The friction-clutch multiplies greatly the power of the spring N, and the connections which bring the action of the piston into resistance to the force of the spring may give the piston greatly the advantage in leverage; hence the air-pressure in the pipe and cylinder with my device need not exceed one-fifth part that required by the systems of automatic air-brakes heretofore in use. This fact will also admit of the use of much smaller and cheaper cylinders, and altogether afford an automatic air-brake very much cheaper than those in use in first cost, and consuming much less steam-power from the engine in keeping up a supply of compressed air.

Another advantage my system possesses is that when the brakes are applied they remain applied until relieved by the engineer. This is important in stops on downgrades and in many other ways. The engineer can promptly and certainly release them by letting the compressed air into the pipe and cylinder. This acts positively to release, and neither in releasing nor applying is there any dependence upon delicate or complicated valves, as in some automatic air-brakes.

The lever U may be hung in a position to connect directly with lever M, or it may directly engage a groove in the loose disk I. The cylinder S may be secured upon the side of bolster B in a position for its piston-rod to impinge directly against the edge of lever M, opposed to spring N, as shown in Fig. 5. The lever M is so balanced upon its pivot that it will largely support the loose disk I with its hub, and thus reduce the friction between this disk and its axle when the disk is out of engagement or at rest.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a car-axle, a clutch adapted to be revolved thereby, a chain connecting the clutch with the brakes, a shifter-lever for the clutch, and a spring adapted to force the clutch continually into action, of an air-cylinder, a piston therefor connected with the said lever in opposition to the action of the said spring, and means for supplying compressed air to the said cylinder, substantially as shown and described.

2. In an air-brake, the combination, with a clutch adapted to receive rotary motion from the wheels, a chain connecting it with the brakes, and a spring adapted to force the clutch continually into engagement, of an air-cylinder provided with a piston, and means for connecting the said piston with the clutch in opposition to the said spring, substantially as shown and described, whereby compressed air in the cylinder will hold the piston extended and keep the clutch disengaged against the action of the said spring, and whereby permitting the air to escape from the cylinder will permit the spring to engage the clutch and apply the brakes to the wheels by power received from the wheels, as set forth.

3. The combination of the axle F, the disk

H, fixed thereon, the disk I, very loosely fitted upon the axle, and the shifter-lever M, provided with a bearing for the disk I, adapted to support the same partially free from the axle, as set forth.

4. The combination of clutch-disks H I and the annular wearing-plates P, having an open space, R, between them and the axle-holes in the disks, substantially as shown and described.

5. In a clutch-disk, the combination of two half-disks provided with bolting-ears on their inner ends and having jointly an annular wearing-face surrounding the said ears and extending beyond them, as shown and described.

6. The combination of the axle F, the clutch H I thereon, the brake-chain K, attached to one member of the clutch, the lever M, engaging the clutch and pivoted to one of the truck-bolsters, the spring N, bearing against the said lever to engage the clutch, the air-cylinder S, provided with a piston, T, engaging the lever M in opposition to the spring N, an air-pipe, W, fixed to the car-body, and a flexible pipe-connection, *x*, between the cylinder S and pipe W, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

JOSIAH B. GATHRIGHT.

Witnesses:

WALTER WALKER,

J. E. MCGRATH.