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APPARATUS FOR ADJUSTING RAILWAY VEHICLE AND LIKE BRAKES.

APPLICATION FILED SEPT. 22, 1908.

920,540.

Patented May 4, 1909.

2 SHEETS—SHEET 1.

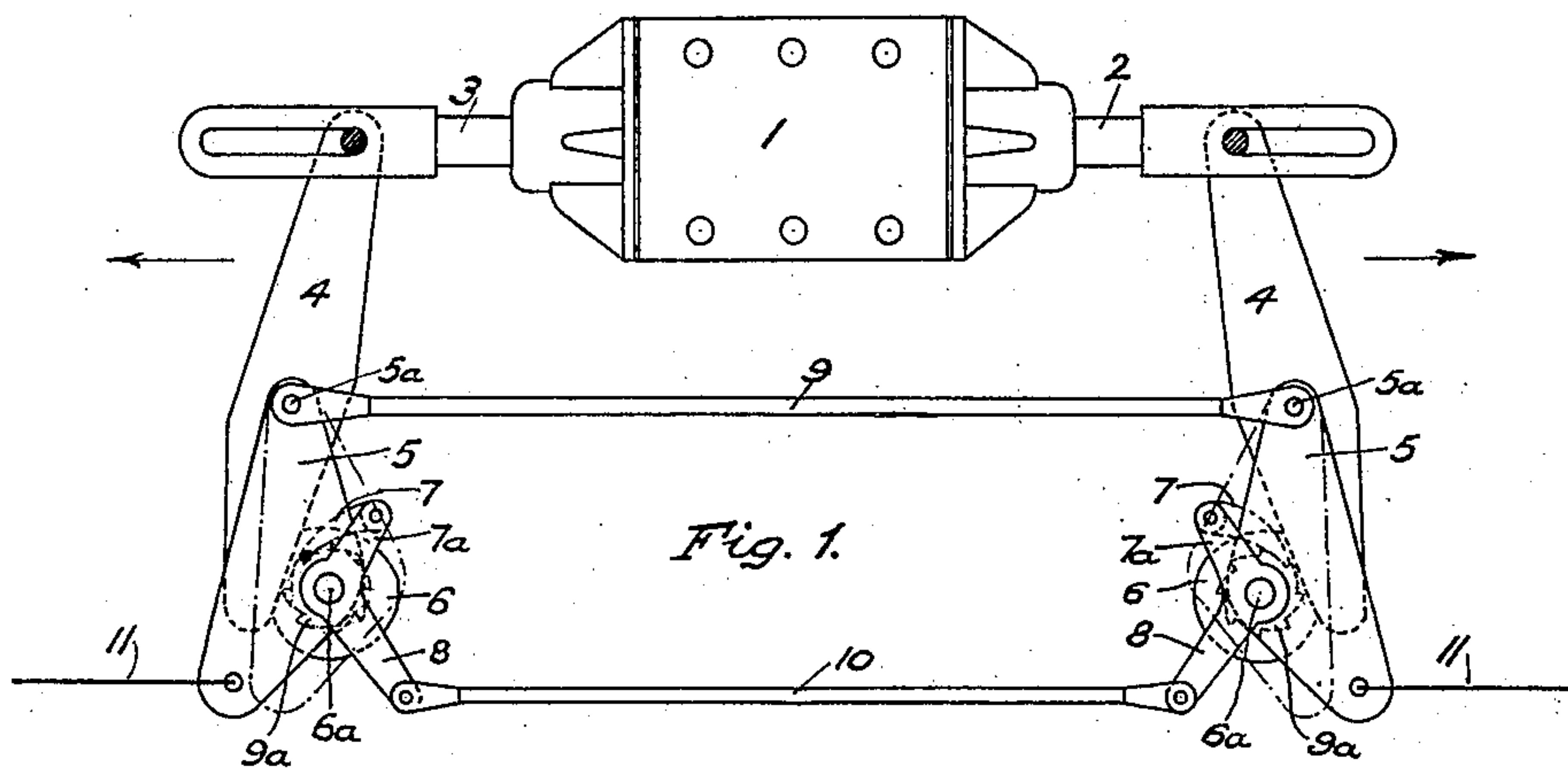


Fig. 1.

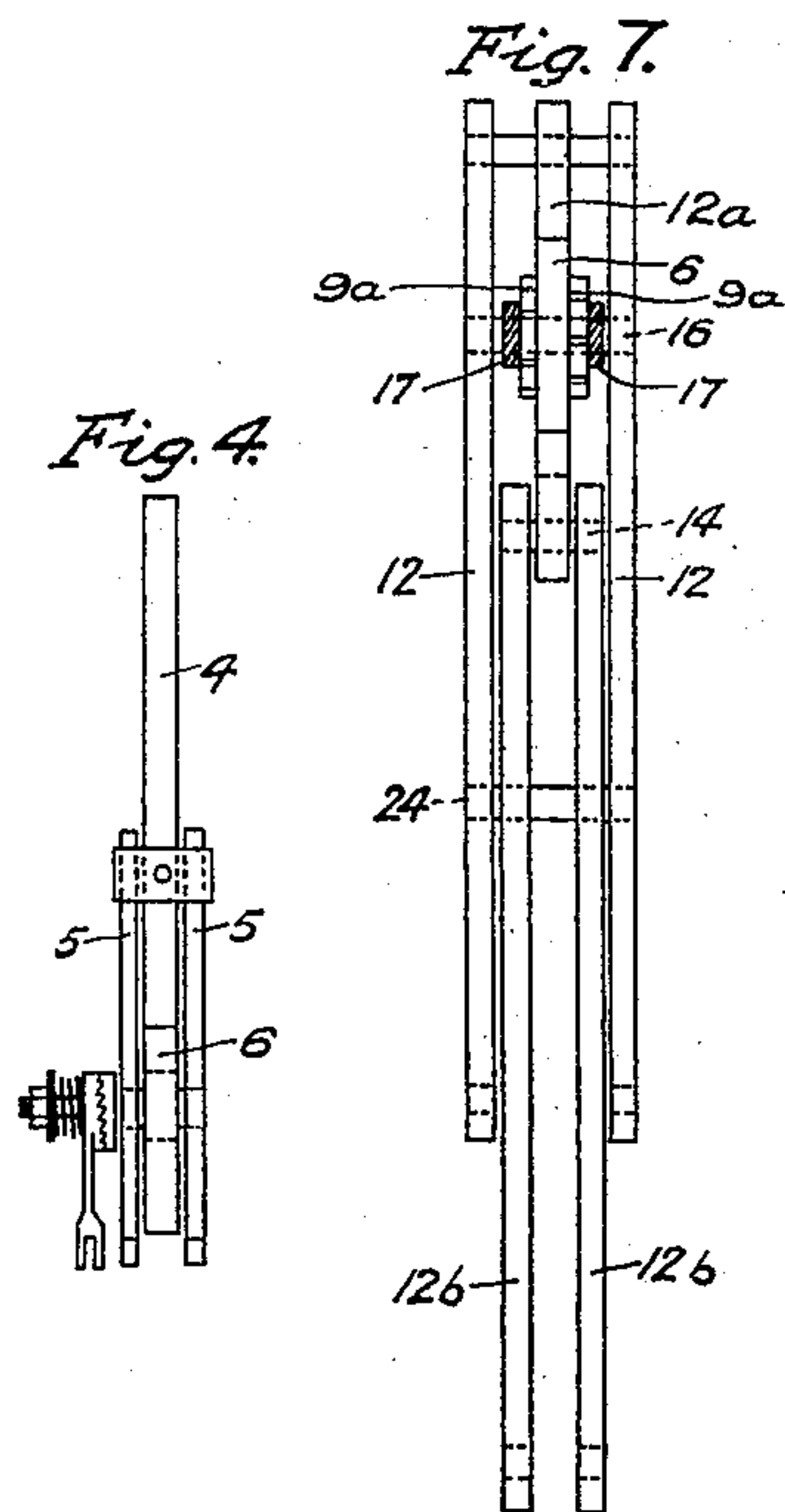


Fig. 4.

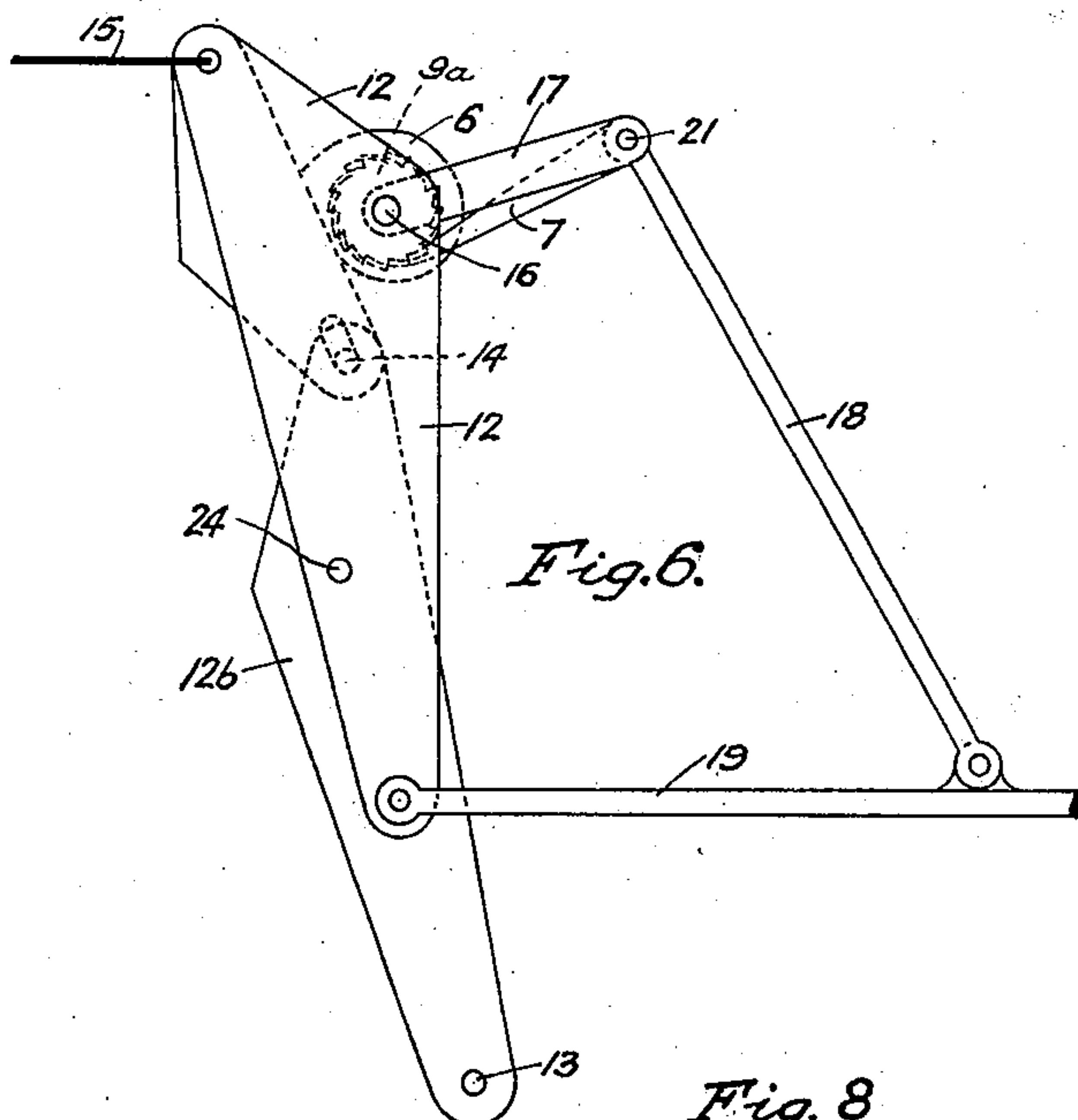


Fig. 6.

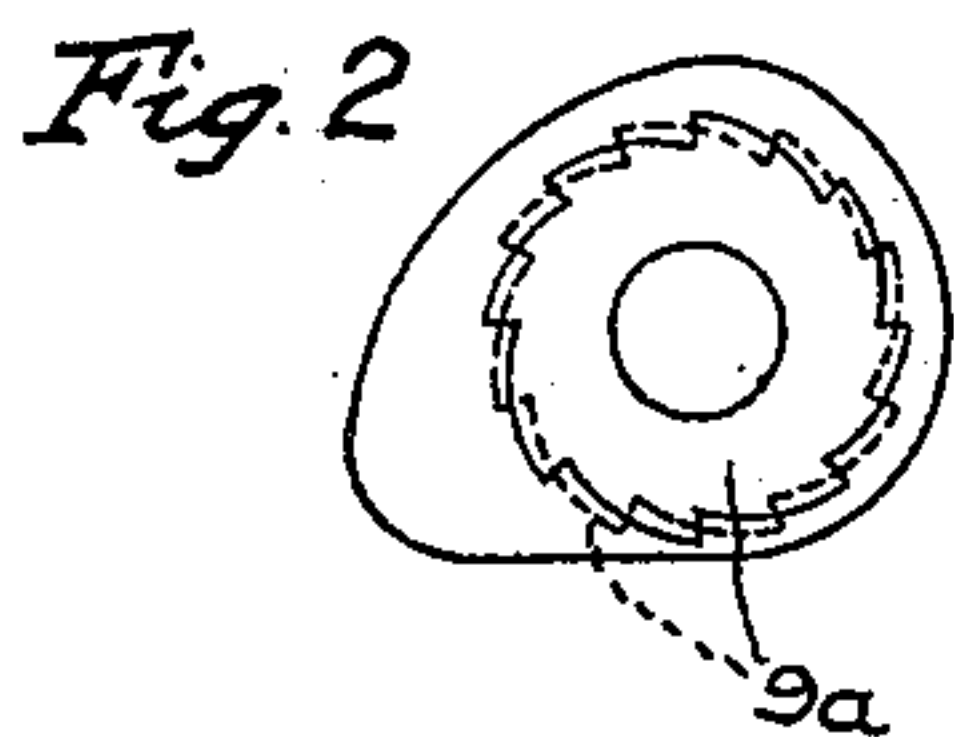


Fig. 2.

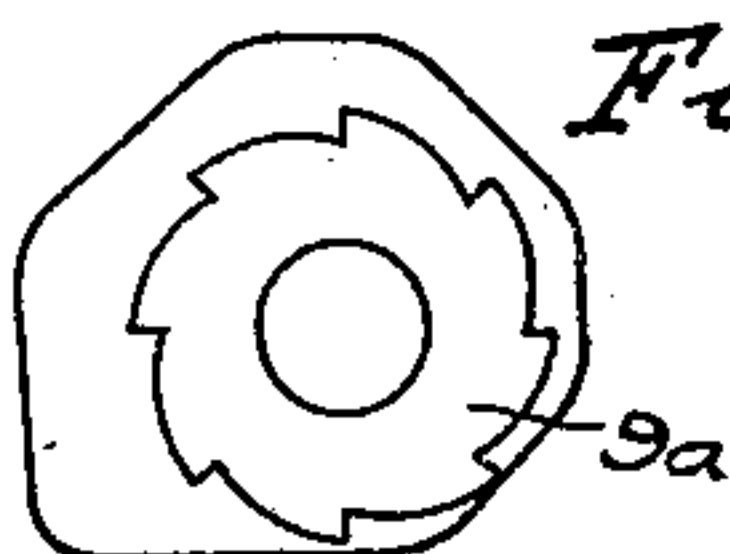


Fig. 3.

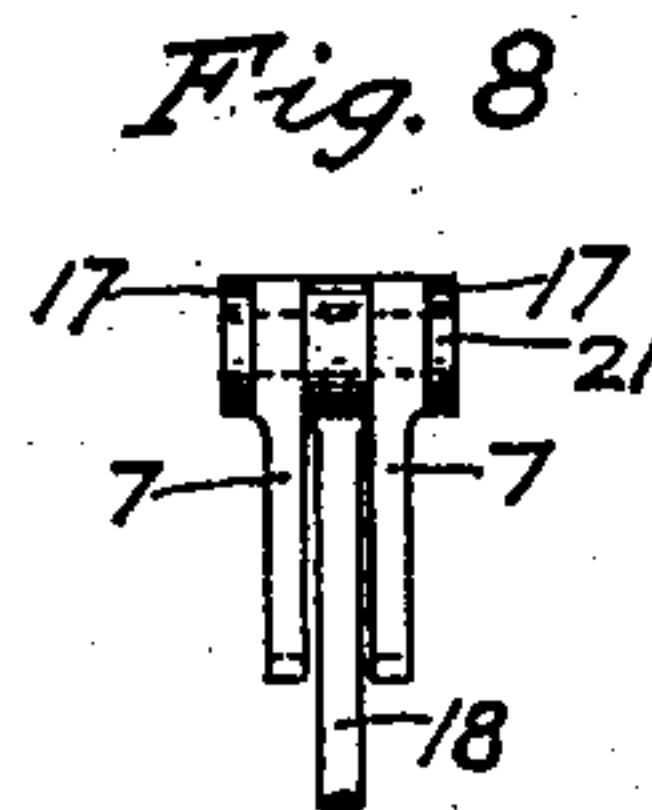


Fig. 8.

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR ADJUSTING RAILWAY-VEHICLE AND LIKE BRAKES.

No. 920,540.

Specification of Letters Patent.

Patented May 4, 1909.

Application filed September 22, 1908. Serial No. 454,261.

To all whom it may concern:

Be it known that I, VICTOR CHAVÉRIAT, a citizen of the Republic of France, residing at St. Denis, Seine, in the Republic of France, whose post-office address is 14 Rue Catulienne, have invented certain new and useful Improvements in Apparatus for Adjusting Railway-Vehicle and Like Brakes; 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 consists in improvements in apparatus for automatically adjusting the brake mechanism of railway vehicles and the like in order to take up or compensate for slackness in the brake rigging and wear of the brake shoes or blocks.

The present invention consists more particularly of improvements in the automatic brake adjusting apparatus described and shown in my U.S. Letters Patent No. 897,817, granted September 1, 1908, comprising a pair of articulated or pivoted arms or parts (constituting a lever) with a rotatable cam or its equivalent interposed between the said arms or levers, and a driving device for rotating the said cam on a predetermined amount of wear of the brake shoes or slackness of the brake mechanism having taken place, the rotation of the said cam varying the angle of the said arms or parts, or varying the position of one of the said arms in relation to the other, and thus taking up the slack.

The present invention has for its object to provide simple apparatus of the character above referred to which is adapted to be employed in conjunction with the well known Westinghouse brake apparatus or other similar brake mechanism.

A further and important object of the present invention is to so construct and arrange apparatus of this character that a single apparatus, or a single set of levers or arms with interposed cam and driving mechanism therefor, will automatically adjust the entire brake mechanism or all the brake blocks on a bogie vehicle.

Further features of the invention will appear from the following description with reference to the accompanying drawings and from the claims.

In the accompanying drawings—Figure 1

illustrates an application of the invention to the well known Westinghouse brake apparatus. Figs. 2 and 3 are detail views of alternative forms of the hereinbefore mentioned rotatable cam. Fig. 4 is an end view of the automatic adjusting apparatus shown in Fig. 1 but illustrates an alternative form of ratchet and pawl mechanism for rotating the cam. Fig. 5 shows diagrammatically the application of a single set of articulated arms or levers with rotatable cam and driving mechanism therefor—constituting a single adjusting apparatus—for automatically adjusting the entire brake rigging and all the brake blocks of a bogie vehicle as hereinbefore mentioned. Fig. 6 shows the adjusting apparatus of Fig. 5 on a larger scale. Fig. 7 is an elevational view looking from the left in Fig. 6, and Fig. 8 is a detail view showing the actuating pawls and adjacent supporting parts.

Like reference numbers indicate corresponding parts in the several figures of the drawings.

Referring to Fig. 1, 1 indicates the brake cylinder and 2 the piston rod, 3 being the usual rod or part at or adjacent to one end of the cylinder 1 and to which one of the usual cylinder levers of the Westinghouse brake rigging is pivotally connected. The automatic adjusting apparatus illustrated in this figure consists of two articulated or pivoted levers, arms or parts 4 and 5, the part 5, in the example shown, being double and the part 4 lying between the parts 5 as shown in Fig. 4. The part 5 is articulated or pivoted to the part 4 by means of a pin or bolt 5^a. 6 is a cam or equivalent device carried by the part 5 the said cam being pivotally mounted on the said part or arm 5 at 6^a, 7 being a pawl pivoted to the arm or arms 7^a of a bell crank lever which latter is also pivoted at 6^a; the arm or arms 8 of this bell crank lever are pivotally connected to one end of a rod or connection 10 whose other end is also pivoted to the corresponding arm or arms 8 of the bell crank lever in connection with the similar automatic adjusting apparatus shown at the right hand end of Fig. 1. 9^a is a ratchet wheel or equivalent device formed on or operatively connected to the cam 6. The parts or arms 5 of the automatic adjusting apparatus on each end of the brake cylinder 1 are connected by a rod 9 which is equivalent to the

rod connection between the usual two cylinder-levers of the Westinghouse brake mechanism. 11, 11 indicate pull rods or operating connections to the usual floating levers and rod and link mechanism (or other suitable rigging) through which movement is transmitted to the brake blocks.

The articulated arms or parts 4 and 5 of the apparatus above described constitute and take the place of the usual cylinder levers of the Westinghouse brake apparatus. In the case where a brake cylinder is employed for operating the brake blocks of the wheels at one end only of the vehicle the above mentioned rod 10 (for operating the ratchet mechanism so as to turn the cam 6 as described) may be operatively connected to a suitable part of the vehicle structure or of the brake mechanism.

The working according to the construction shown in Fig. 1 is as follows:—Assuming there is no slackness in the brake connections or wear of the shoes, on power being applied to the piston in the brake cylinder the cylinder lever, consisting of the articulated parts or arms 4, 5, will be moved in the direction of the arrow and the brake blocks will be applied in the well known way; on pressure being released from the cylinder 1 the brake shoes will come off and the brake mechanism or connections will return to the normal position. During these movements the bell crank lever carrying the pawl 7 will be turned an extent sufficient to merely cause the end of the said pawl to ride to and fro on the tooth of the ratchet 9^a with which it is in contact. On a predetermined amount of slackness or wear arising in the brake mechanism, necessitating abnormal travel of the brake piston and brake operating connections to apply the brake shoes to the wheels, the above mentioned bell crank lever with pawl 7 will be turned to a correspondingly greater extent, sufficient to permit the pawl 7 to drop into engagement with the next tooth of the ratchet 9^a so that on releasing the pressure from the brake cylinder and the brake mechanism returning toward the normal position the cam 6 will, through the pawl 7 and ratchet 9^a, be revolved and will, by acting on the part or arm 4 of the automatic adjusting apparatus (or as it may be called compound cylinder lever), cause a movement of the part 5 (for instance to the position shown in dotted lines),—or in other words the rotation of the cam will prevent the return of the part 5 and consequently of the brake operating connection thereto to the full normal position,—thus holding the brake blocks nearer to the wheels to an extent corresponding to the slackness or wear of the shoes so that on further applications of power to the mechanism for applying the brake the shoes will be moved so as to efficiently act on the wheels without any ab-

normal stroke of the piston in the cylinder 1. It will be seen that through the rod 10 connecting the bell crank levers carrying the pawls 7 of the apparatus at each end of the brake cylinder the action will be precisely the same at each end, both the parts or arms 5 being correspondingly adjusted.

Referring to Figs. 5 and 6 which illustrate the single automatic brake adjusting device, or single set of levers with cam and pawl and ratchet mechanism, by which wear of all the brake shoes and slackness throughout the brake rigging of a bogie vehicle may be taken up, in this figure the automatic brake adjusting device or lever comprises three arms or levers 12, 12^a and 12^b, the arms or levers 12 and 12^b being, in the example shown, double and the arm or lever 12^a being single; the arms or levers 12^a and 12^b work between the two sides or parts of the arm or lever 12 as shown in Fig. 7, and the arm or lever 12^b is pivoted at one end, at 13, to a fixed part which may be the rod or extension 3 (Fig. 1) or its equivalent, the other end of the said arm or lever 12^b being pivotally connected at 14 to one end of the arm or link 12^a whose other end is pivotally connected to the arm 12 and to the brake pull rod 15 and through the latter to the truck levers, rods, brake shoe hangers etc. The cam 6 is in this case rotatably mounted on the arm or lever 12 the pivot or spindle 16 on which the said cam rotates bearing and working in the sides or parts constituting the lever 12, and the pawl 7 is pivotally mounted on an arm or yoke 17 which latter is rotatably mounted on the spindle 16 on which the cam rotates. The yoke 17 is operatively connected to one end of a rod 18 whose other end is pivotally connected to a rod 19 one end of which latter rod is operatively connected to the arm or lever 12 the other end of the said rod 19 being operatively connected to the usual live cylinder-lever 20, the lever 12 being also operatively connected to the above mentioned pull rod 15. In the preferable form of the ratchet and pawl mechanism for rotating the cam 6 two ratchet wheels, or a double set of ratchet teeth, are provided one on each side of the cam the teeth of one of said ratchet wheels being slightly in advance of the teeth of the other,—i. e. the teeth of the two ratchet wheels are not in alinement,—and two pawls 7 are mounted on a bolt or shaft 21 fixed to the arms of the yoke 17, this construction of the ratchet and pawl mechanism being shown in Figs. 2 and 8. 22 indicates a spring which may be connected at one end to a suitable fixed part of the vehicle structure and at its other end connected to the levers 12 and 12^b at their point of pivotal connection 24, the said spring tending to maintain the several levers or arms of the apparatus in their proper relative positions; if desired other suitable means might

be employed for this purpose. The live cylinder-lever 20 is operatively connected, in the known manner, to the brake pull rod 23 and through the latter to the known or any suitable arrangement of truck levers, rods and brake shoe hangers at the right hand end of the vehicle.

The automatic adjusting device above described, comprising the levers or arms 12, 12^a and 12^b, together with the cam 6 and pawl and ratchet mechanism as above described, takes the place of one of the known cylinder-levers of the Westinghouse brake apparatus.

The working of the automatic adjusting apparatus above described with reference to Figs. 5, 6 and 7 of the drawings is substantially the same as hereinbefore described with reference to Fig. 1, the several levers or parts 12, 12^a and 12^b of the adjusting device moving as one lever under normal conditions when there is no wear of the brake blocks and no slackness of the rigging to be compensated for, under which condition the end of the pawl 7 will simply ride to and fro on the tooth of the ratchet wheel with which it is in contact; when however a predetermined amount of wear of the brake shoes or slackness in the brake rigging has taken place on power being applied to the piston in the brake cylinder an abnormal stroke of the piston and of the brake operating levers will, as is known, be necessary in order to apply the brake shoes to the wheels and under these conditions the pawl 7 will,—when movement is given to the cylinder lever 20 and through the rods 19, 18 to the levers or parts 12, 12^a and 12^b (comprising the other cylinder lever),—owing to the connection of its supporting yoke 17 to the rod 18, be moved through a greater distance sufficient to cause the end of the pawl to drop off the tooth with which it is in engagement and on to the next tooth so that when power is released from the brake cylinder and the brake shoes and brake rigging return to the normal position, in the known manner, the cam 6 will, through the pawl engaging the next or succeeding tooth of the ratchet wheel as above described, be rotated and acting on the arm or link 12 will cause the levers or parts 12, 12^a to move toward the position shown in dotted lines in Fig. 5 thus on this return movement of the brake apparatus (release of brakes) giving a pull to the rods 15 and 23 (to the latter through the rod 19) whereby the brake shoes are brought nearer to the wheel rims to an extent corresponding to the wear or slackness that has taken place, or, in other words, the rotation of the cam 6 as above described will prevent the return of the levers or parts 12, 12^a, to which the brake pull rods 15 and 23 are operatively connected, to the full normal extent, thus, under all conditions of the brake apparatus, maintaining the brake blocks at a constant or practically constant

distance from the wheels. Although the movement given to the cylinder live lever 20 by the admission of motive power to the cylinder 1 is transmitted to the lever 12, and consequently to the levers or parts 12^b, 12^a, primarily through the rod 19, the rod 18, in addition to its function of operating the pawl 7 as hereinbefore described, exerts a certain amount of pull on the lever or part 12 and consequently assists in the movement of the levers or parts 12, 12^a and 12^b and of the brake pull rod 15. The hereinbefore mentioned arm or part 12 Fig. 5 is pivotally connected at 24 to the arm, part or lever 12^b.

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

1. In a brake apparatus, the combination with a brake cylinder, brake levers and connecting rod for the brake levers, one of said levers comprising a plurality of pivotally connected parts, of adjusting mechanism mounted upon said latter lever, and means actuated by the brake apparatus for automatically operating said mechanism to relatively adjust the parts of said lever.

2. In a brake apparatus, the combination with a brake cylinder, brake levers and connecting rod for the brake levers, one of said levers comprising a plurality of pivotally connected parts, of a cam mounted upon said latter lever, and pawl and ratchet mechanism actuated by the brake apparatus for automatically operating said cam to relatively adjust the parts of said lever.

3. In a brake apparatus, the combination with a brake cylinder, of a live brake lever actuated by the cylinder piston, a dead brake lever, a rod connecting the live and dead brake levers, said dead brake lever comprising a plurality of pivotally connected parts and adjusting mechanism mounted thereon, and means actuated by the brake apparatus for automatically operating said mechanism to relatively adjust the parts of said dead brake lever.

4. Apparatus of the kind set forth consisting of a lever made up of a plurality of parts pivoted one to the other, a cam rotatably mounted on a bodily movable part of said lever so as to be capable of acting on another part, and driving mechanism for rotating the said cam, the said apparatus being operatively connected to the brake mechanism and to the prime mover thereof and operating substantially as and for the purposes set forth.

5. In apparatus of the kind set forth, the combination, with the brake mechanism and prime mover thereof, of a device for automatically adjusting the brake mechanism so as to take up slack and compensate for wear of the brake blocks, the said device consisting of a lever made up of three principal parts pivotally connected together, a cam rotatably mounted on one of the said

parts and so arranged as to act on another of the said parts, and driving mechanism for automatically rotating the said cam, the cam when rotated varying the position or
5 angle of two of the said parts in relation to the third part, substantially as and for the purposes set forth.

6. In apparatus of the kind set forth, the combination with the piston rod and cylinder live lever, of a device constituting a lever and consisting of three principal parts pivotally connected together, a fulcrum shaft in a fixed position and on which one of the said parts is pivotally mounted, an operating
15 connection from the cylinder live lever to another of the parts of the said device, a rod connecting the last mentioned part with the truck levers and brake shoes, a rotatable cam carried by the said last mentioned part and so arranged as to be capable of acting
20 on another or third part of the said lever, a ratchet device connected to the said cam, a device carrying a pawl adapted to coöperate with the said ratchet to rotate the said cam,
25 and a rod operatively connected to the afore-

said operating connection from the cylinder live lever and to the said pawl carrying device so as to be capable of giving movement to the pawl, substantially as described and for the purposes set forth. 30

7. A device constituting a lever and consisting of a part pivotally mounted on a shaft in fixed position, a part pivotally connected with the first mentioned part, a part pivotally connected with the first and second
35 mentioned parts, a rotatable cam carried by the second mentioned part and adapted to act on the third mentioned part, and driving devices for automatically rotating the said cam, the said lever being operatively connected to a movable part of the brake mechanism and operating substantially as described for the purposes set forth. 40

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

VICTOR CHAVÉRIAT.

Witnesses:

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GEORGES BONNEUIL.