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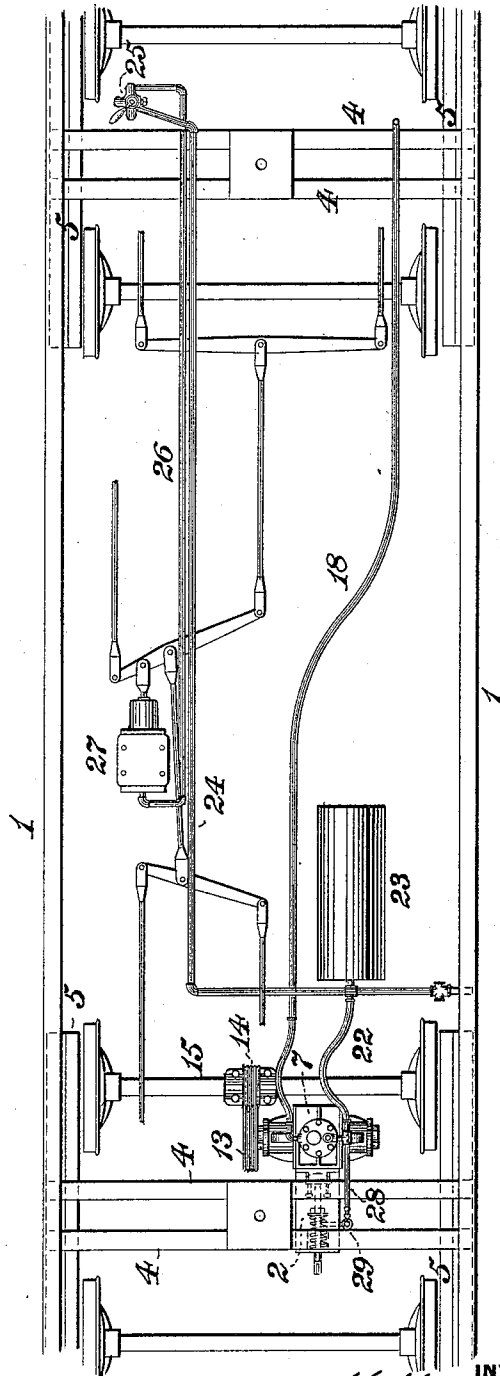
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H. H. WESTINGHOUSE & R. W. BAYLEY.
AIR BRAKE FOR CARS.

No. 461,779.

Patented Oct. 20, 1891.

FIG. 1.



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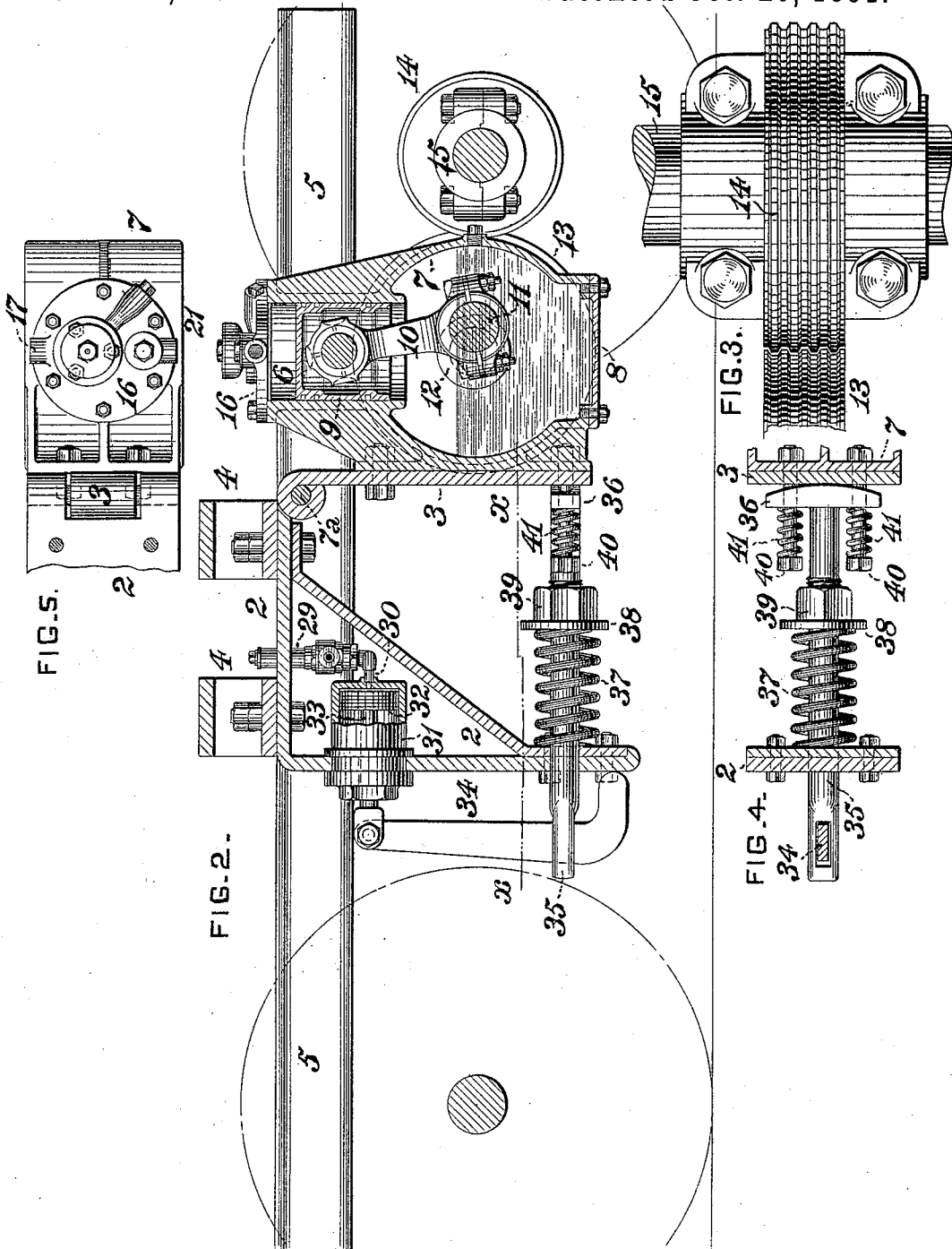
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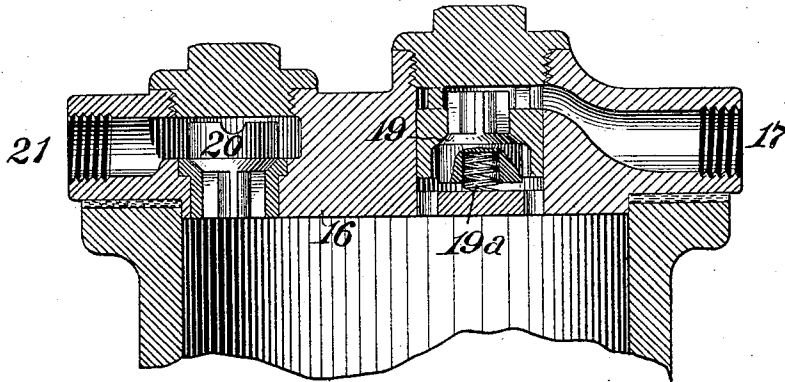
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FIG. 6.



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UNITED STATES PATENT OFFICE.

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AIR-BRAKE FOR CARS.

SPECIFICATION forming part of Letters Patent No. 461,779, dated October 20, 1891.

Application filed September 15, 1890. Serial No. 365,025. (No model.)

To all whom it may concern:

Be it known that we, HENRY HERMAN WESTINGHOUSE and RICHARD W. BAYLEY, citizens of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Air-Brakes for Cars, of which improvement the following is a specification.

Our invention is more particularly designed for use upon cable-railroad cars or others which are not drawn by locomotive-engines; and its object is to provide a simple and compact apparatus in which power derived from an axle of the car is utilized for the compression of air to the degree requisite for the application of braking-pressure, and the degree of compression is automatically regulated and limited to a normal and determined maximum.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a plan or top view of a portion of the frame and trucks of a railroad-car, illustrating an application of our invention; Fig. 2, a longitudinal section, on an enlarged scale, through one of the trucks in the central plane of the pump; Fig. 3, a plan view, on a further enlarged scale, of the driving-gearing; Fig. 4, a horizontal section at the line *x x* of Fig. 2; Fig. 5, a plan or top view of the central portion of the pump-casing and a portion of its supporting-bracket; and Fig. 6, a vertical section, on an enlarged scale, through the pump-cylinder head.

Our invention, while specially designed for application to street-railroad cars, in which the employment of steam as a motive power for the compression of air is not available, as in cable and electric systems, is likewise adaptable, without variation of structural or operative principle, to cars whose traction is effected by locomotive-engines. As herein exemplified, it is illustrated as applied to a car which is supported near each of its ends upon a four-wheeled swiveling truck, as in standard railroad practice. A corresponding construction is similarly employed in cars having a rigid wheel-base—that is to say,

where no swiveling movement of the axles relatively to the body is permitted, the members, which are in this instance connected to the truck-frame, being, in such case, connected to the car-body frame.

In the practice of our invention we provide an air-compressing pump, which is connected to and supported by the frame of one of the trucks upon which the car-body frame 1 is supported, and is actuated through interposed gearing by one of the axles of said truck. To this end a frame or bracket 2, having a downwardly-projecting member 3, is secured to the transoms 4, which connect the side bars 5 of the truck-frame. The pump-cylinder 6, which is vertical, is formed integral with a casing 7, which projects downwardly from the open lower end of the cylinder and is closed at bottom by a removable bonnet 8. The pump-cylinder 6 is fitted with a properly-packed piston 9, which is coupled by a connecting-rod 10 to the pin 11 of a crank formed upon a pump-shaft 12, which is journaled in bearings in the sides of the casing 7 and has fixed upon one of its ends a gear 13, which engages with and is rotated by a pinion 14, fixed upon one of the axles 15 of the truck. The casing 7, which serves both as the framing of the pump and as a reservoir of lubricating material for the pump-shaft journals and crank-pin, is secured to the downwardly-projecting member 3 of the supporting-bracket 2, and the upper end of the pump-cylinder is closed by a head 16, having suitable inlet and discharge valves, as presently to be described.

As shown in Figs. 1, 2, and 3, the driving-gearing of the pump is of the frictional type, and in order to maintain the proper relation of the driving and driven gears in longitudinal movements of the axle, as well as to admit of the driven gear being moved out of contact with the driving-gear to effect a stoppage of the operation of the pump when the normal maximum pressure has been attained, the downwardly-projecting member or arm 3 of the bracket 2, to which the pump-casing is rigidly secured, is hinged by a pin or bolt 7^a to the main body of said bracket, which, as before described, is secured to the truck-

transoms. The hinge-socket portion of the arm 3 is of less length than the distance between the corresponding lugs or sockets of the body 2, so that lateral movement of the arm 3 and pump-casing 7 is admitted in accordance with lateral movement of the axle 15, thereby maintaining the normal relation of the gears 13 and 14. Disengagement of the gears 13 and 14, and consequent cessation of operation of the pump, is effected by movement of the arm 3 away from the axle about the axis of the hinge-pin 7^a, automatic mechanism, as presently to be described, being provided for disengaging the gears upon the attainment of the maximum degree of compression desired and re-engaging them upon a reduction of pressure below such degree.

The pump-cylinder head 16 is provided with an inlet passage or nozzle 17, to which is connected an air-supply pipe 18, the opposite end of which is open and is preferably provided with a strainer to prevent the entrance of foreign matters and located near the forward end of the car. The passage 17 is controlled by an inlet-valve 19, which opens inwardly to the pump-cylinder 6, and an outwardly-opening discharge-valve 20 controls communication between the pump-cylinder and a discharge passage or nozzle 21, from which a pipe 22 leads to a compressed-air reservoir 23, secured to the car-body frame. The pipe 22 and reservoir 23 are connected by a pipe 24 with a three-way cock 25, located in position to be conveniently accessible to the driver or gripman of the car, and controlling communication between the pipe 24 and a pipe 26, leading to a brake-cylinder 27, or between the brake-cylinder pipe 26 and the atmosphere, according to the position into which it may be turned. The brake-cylinder 27 is provided with the usual piston and with a retracting spring bearing thereon, and the piston-rod is connected through intermediate levers and rods with the brake beams and shoes in the usual manner.

The discharge-pipe 22 of the pump is connected by a pipe 28 with a pump-governor 29 of any suitable and preferred construction embodying a regulating-valve and movable abutment. The governor which is here illustrated accords substantially with that which is set forth in Letters Patent of the United States No. 401,915, granted and issued to George Westinghouse, Jr., under date of April 23, 1889, and not forming in and of itself part of our present invention need not be herein at length described. The governor is connected by a pipe 30 with a cylinder 31, secured upon the bracket 2 and provided with a piston 32, secured upon a rod 33, air under pressure being admitted to the cylinder by the regulating-valve of the governor and forcing the piston 32 thereof outwardly when the pressure in the discharge-pipe 22 and reservoir 23 exceeds the determined maximum. The piston-rod 33 is coupled at its outer end to a lever-arm 34, which passes freely through a slot in a horizon-

tal stem 35, and bears at its lower end against the supporting-bracket 2. The stem 35 is provided at its opposite end with a head 36, which has a curved face abutting centrally against the lower portion of the arm 3, to which the pump-casing 7 is secured, and is surrounded by a helical spring 37, which bears at its ends against the bracket 2 and against a collar 38, the position of which is regulated by an adjusting-nut 39, engaging a screw-thread on the stem 35. Bolts 40, secured to the arm 3 and pump-casing 7, pass freely through holes in the head 36, said bolts being surrounded by helical springs 41, bearing against the head 36 and against the heads of the bolts. In the outward movement of the piston 32, under pressure admitted to the cylinder, the connected lever-arm 34 draws with it the stem 35, compressing the spring 37 and, through the bolts 40, moving the arm 3 and pump-casing 7 to the left, thereby disengaging the gears 13 and 14 and stopping the operation of the pump. Upon decrease of air-pressure in the reservoir the governor shuts off the air-admission to the cylinder 31, while the air contained therein leaks away to the atmosphere past the piston 32 and rod 33, and the parts are returned to normal position by the spring 37, upon which the gears 13 and 14 are re-engaged and the operation of the pump is resumed. The play allowed to the bolts 40 and stem 35 in the head 36 and bracket 2, respectively, together with that in the hinge connection of the bracket 2 and arm 3, admits of such degree of movement of the pump-casing as is occasioned by lateral movement of the axle 15.

The brakes are operated on what is known as the "straight-air" system—that is to say, their application is effected by the admission of air from the reservoir to the brake-cylinder and their release by cutting off the air-supply to the brake-cylinder and opening an exhaust from the latter to the atmosphere, both operations being performed by proper movements of the three-way cock controlling the brake-cylinder supply and exhaust passages.

We claim as our invention and desire to secure by Letters Patent—

1. The combination of a pump-casing which is closed to contain a lubricant and to protect the working parts and is connected to a portion of the supporting-frame of a car, a pump-cylinder fitted with a piston and fixed to said casing, a driving-shaft journaled in the casing and having a crank coupled to the piston, a gear fixed upon the driving-shaft and engaging a gear upon an axle of the car, and a hinge connection directly coupling the pump-casing to its supporting-frame, with the capacity of movement of the casing both relatively to the frame in accordance with endwise movement of the axle and relatively to the axle in a direction lateral thereto, substantially as set forth.

2. The combination of a pump-casing con-

5 nected to a portion of the supporting-frame
of a car, a pump-cylinder fitted with a piston
and fixed to said casing, a driving-shaft jour-
naled in the casing and having a crank
coupled to the piston, a gear fixed upon the
driving-shaft and engaging a gear upon an
axle of the car, and a hinge connection coup-
ling the pump-casing to its supporting-frame
with the capacity of movement of the casing
toward and from the axle, whereby the pump
may be engaged with or disengaged from the
axle, substantially as set forth.

15 3. The combination of a pump-casing con-
nected to a portion of the supporting-frame
of a car, a pump-cylinder fitted with a piston
and fixed to said casing, a driving-shaft jour-
naled in the casing and having a crank
coupled to the piston, a gear fixed upon the
driving-shaft and engaging a gear upon an
axle of the car, a hinge connection coupling
the pump-casing to its supporting-frame with
the capacity of movement of the casing to-
ward and from the axle, and a device for
moving the casing relatively to the axle and
thereby effecting the engagement and disen-
gagement of the gears, substantially as set
forth.

30 4. The combination of a pump-casing con-
nected to a portion of the supporting-frame
of a car, a pump-cylinder fitted with a piston
and fixed to said casing, a driving-shaft jour-
naled in the casing and having a crank
coupled to the piston, a gear fixed upon the
driving-shaft and engaging a gear upon an
axle of the car, a hinge connection coupling

the pump-casing to its supporting-frame, a
fluid-pressure device actuated by pressure
from a compressed-air reservoir for moving
the casing relatively to the axle and thereby
effecting the engagement and disengagement
of the gears, a reservoir for receiving air com-
pressed by the pump, and a governor actu-
ated by pressure from said reservoir and con-
trolling the engaging and disengaging device,
substantially as set forth.

45 5. The combination of a compressing-pump
casing flexibly connected to a portion of a
supporting-frame of a car and actuated
through gearing from an axle thereof, a res-
ervoir supplied with compressed air by said
pump, a governor connected with said reser-
voir, a fluid-pressure cylinder having a piston
to which air is supplied by the governor when
the pressure in the reservoir exceeds a deter-
mined limit, a lever actuated by said piston
to move the pump away from the axle and
thereby disengage the driving and driven
pump-gears, a stem coupled to said lever and
to the pump-casing, and a spring exerting
tension on said stem in direction opposite to
that in which the lever acts thereon in the
application of fluid-pressure to the piston,
substantially as set forth.

In testimony whereof we have hereunto set
our hands.

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RICHARD W. BAYLEY.

Witnesses:

J. SNOWDEN BELL,
R. H. WHITTLESEY.