No. 839,884. PATENTED JAN. 1, 1907.

A. PARKER-SMITH.

FLUID PRESSURE BRAKE.

APPLICATION FILED JULY 16, 1906.

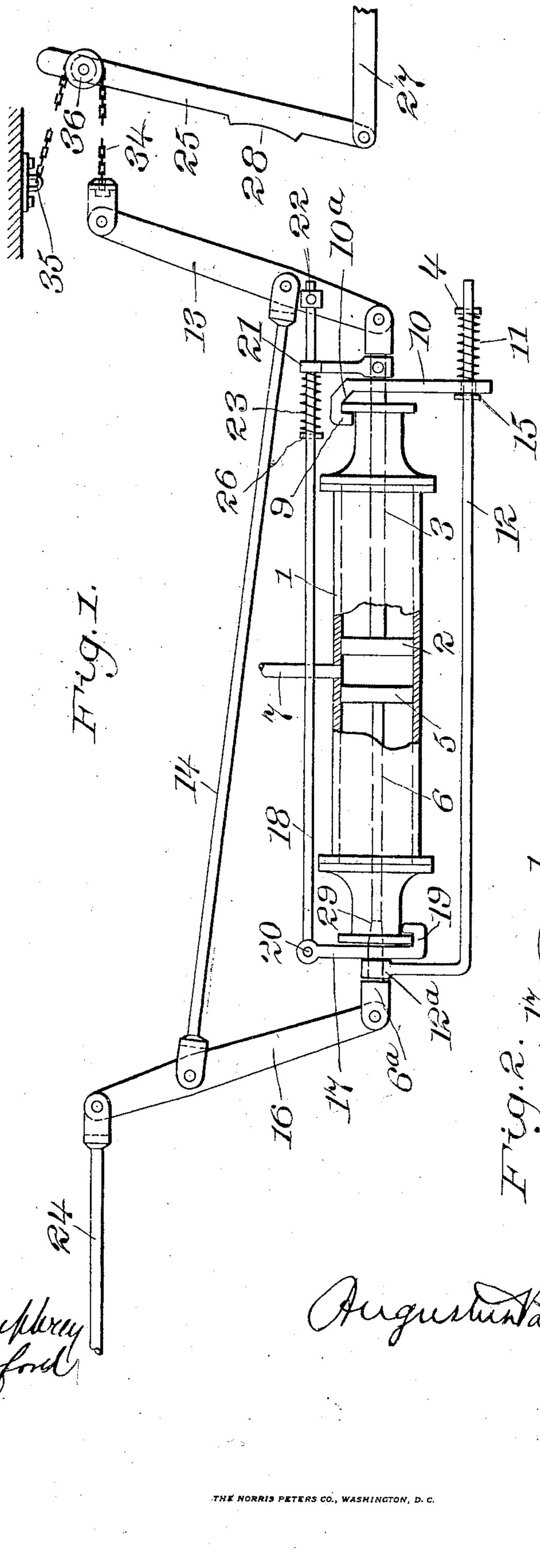

Fig. 1.

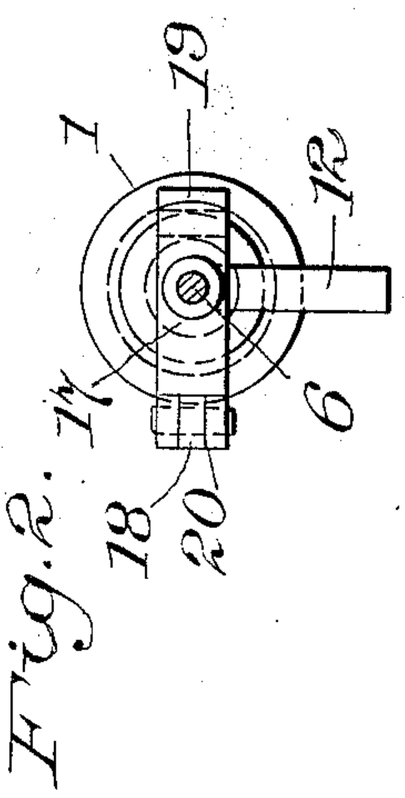

Fig. 2.

Witnesses
W. H. Pumphrey
M. G. Crawford

Inventor
Augustus Parker-Smith

UNITED STATES PATENT OFFICE.

AUGUSTUS PARKER-SMITH, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO SAUVAGE SAFETY BRAKE COMPANY, A CORPORATION OF NEW JERSEY.

FLUID-PRESSURE BRAKE.

No. 839,884. Specification of Letters Patent. Patented Jan. 1, 1907.

Application filed July 16, 1906. Serial No. 326,385.

To all whom it may concern:

Be it known that I, AUGUSTUS PARKER-SMITH, a citizen of the United States of America, and a resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Fluid-Pressure Brakes, of which the following is a specification.

My invention relates to fluid-pressure brakes in general; and more specifically it consists of an improvement on the type of apparatus illustrated in patent to William H. Sauvage, No. 825,077, dated July 3, 1906.

This invention is designed to simplify and reduce the cost of apparatus by substituting one long cylinder for two shorter ones and producing other improvements in detail.

The best form of apparatus embodying my invention at present known to me is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view, in partial section, of the portion of a brake apparatus to which my invention is applied; and Fig. 2 is a detail view taken on line 2 2 of Fig. 1, certain of the parts being illustrated in a plane of ninety degrees to the plane of Fig. 1.

Throughout the drawings like reference-figures indicate like parts.

1 is the cylinder containing the right-hand piston 2 and the left-hand piston 5, provided, respectively, with piston-rods 3 and 6.

7 is an inlet-pipe whose opening in the cylinder is located between the two pistons.

The two piston-rods are connected, respectively, to the ordinary brake-levers 13 and 16, which are connected together by the tie-rod 14 and have their outer ends connected to top rod 24 and chain 34. The chain 34 passes around the pulley 36, whose journals are mounted on or connected to the live lever 25, which is connected to brake-shoe 28 and bottom rod 27 in the usual manner. The other end of said chain is fastened to the car-body or other fixed point, as shown at 35.

The oblique arrangement of the tie-rod 14 coöperates with the above-described apparatus to produce a lever system adapted to multiply the force of the second piston more than that of the first piston and still produce uniform brake-shoe pressures on all the wheels of the car.

10 is a clutch-dog perforated to permit the passage through it of the piston-rod 3 and journaled upon the right-hand head of the cylinder 1 by any convenient means, as by the hooked end 9 and beveled portion 10^a.

11 is a spring on the end of the tappet-rod 12, confined between the pin 4 on the outer end and the clutch-dog and normally tending to force the clutch-dog's free end toward the left until it brings up against the stop-pin 15, set in said tappet-rod. The other end of the tappet-rod 12 has a yoke 12^a, which fits over the piston-rod 6 and is engaged by the piston-rod head 6^a when the piston 5 is in its inmost position. This clutch-dog and connections evidently form a gripping device engaging the first piston-rod and permitting it to move outwardly, but normally preventing it from moving inwardly until the clutch-dog is tripped by a thrust of the tappet-rod 12 toward the right.

17 is a second clutch-dog journaled on the left-hand cylinder-head by any convenient means, as by the hooked end 19, and perforated to permit the passage of the second piston-rod 6. The free end of this dog 17 is pivoted at 20 to a second tappet-rod 18, which extends to and through a perforated tappet-arm 21, carried by the first piston-rod 3. On the outer end of this second tappet-rod 18 is an adjustable tappet-block 22. 23 is a spring on the tappet-rod 18, confined between the tappet-arm 21 and the pin 26, mounted in the tappet-rod 18. This spring is normally under pressure and tends to force the tappet-rod 18 and dog 17 toward the left, thereby causing the dog to grip the piston-rod 5 when the same tends to move toward the left. Thus the apparatus last described constitutes a gripping device engaging the second piston-rod and permitting the same to move inwardly, but normally preventing it from moving outwardly.

Preferably the piston-rod 6 is cut away, as shown at 29, so that after the initial outward movement of the piston 5 the diminished portion of the piston-rod will be within the perforation of the dog 17, and no ordinary inclination will cause said dog to grasp this portion of the piston-rod.

The operation of my invention is as follows: Compressed air or other fluid under pressure being admitted through the inlet-pipes 7, both pistons will tend to move out-

wardly toward their respective ends of the cylinders. The left-hand piston 5 cannot move, however, because the clutch-dog 17 grasps its piston-rod and prevents any motion thereof. The right-hand piston 2 will move out freely, however, the piston-rod running through the clutch-dog 10, which is held in the correct position by the pin 4 and spring 11. After the piston 2 has moved far enough to cause the tappet-arm 21 to strike the tappet-block 22 on the second tappet-rod 18 it will obviously pull the second dog 17 up into a position at right angles to the piston-rod 6 and release the same. The left-hand piston 5 will then immediately start to move out, overpowering the first piston by means of the leverage system and tending to cause the first piston to be forced in again. The initial movement of the piston-rod head 6ª, however, releases the yoke 12ª of the tappet-rod 12 and allows the dog 10 to spring slightly to the left, gripping the piston-rod 3 and preventing any backward movement of the first piston 2. In case the slight backward movement of the piston 2 or any other cause during the outward movement of the second piston should tend to produce a movement to the left of the second tappet-rod 18, which would again cause the dog 17 to clutch the piston-rod 6, I cut away the said piston-rod at 29, as previously explained, so that after the initial movement of the second piston no such slight left-hand movement of the dog 17 as would be permitted by the tappet-arm 21 or by the yoked end 12ª of the tappet-rod 12 will be sufficient to cause it to again grip the piston-rod 6. When the air is exhausted from the cylinder, the left-hand piston 5 will first move inwardly until the piston-rod head 6ª strikes the yoked end 12ª of the tappet-rod 12, which will trip the dog 10 and permit the first piston also to move inwardly, thus entirely releasing the brakes. When the first piston 2 has reached its inmost position, the tappet-arm 21 will slightly compress the spring 23, forcing the dog 17 toward the left far enough to cause it to bind on the enlarged portion of the piston-rod 6 and grip the same, so as to prevent any outward movement of the second piston upon a reapplication of the brakes until the first piston has traveled its predetermined distance to the right, as above explained.

While I have shown the two dogs and their tappet-rods in the same plane in Fig. 1, it might conduce to their freer and more independent action to have them arranged at right angles, as shown in Fig. 2.

It is evident, of course, that various changes could be made in the details of construction illustrated and described without departing from the spirit and scope of my invention. Other forms of multiplying-lever systems designed to increase the effective thrust of the second piston might be substituted for the one illustrated. Other forms of gripping device and mechanism for tripping the same might be employed. These and similar modifications, however, would be changes in form and not in principle.

Having, therefore, described my invention, I claim—

1. In a fluid-pressure brake apparatus, the combination of a cylinder open at both ends, an inlet-opening in the side thereof, two pistons located one on each side of the inlet, two piston-rods, brake-levers pivoted thereto and adapted to multiply the force of the second piston more than that of the first piston, a gripping device engaging the first piston-rod and permitting it to move outwardly but normally preventing it from moving inwardly, connections by which said gripping device is tripped when the second piston is in its inmost position, a second gripping device engaging the second piston-rod permitting the same to move inwardly but normally preventing it from moving outwardly, and connections by which the second gripping device is tripped when the first piston reaches a predetermined limit of outward travel.

2. In a fluid-pressure brake apparatus, the combination of a cylinder open at both ends, an inlet-opening in the side thereof, two pistons located one on each side of the inlet, two piston-rods, brake-levers pivoted thereto and adapted to multiply the force of the second piston more than that of the first piston, a gripping device engaging the first piston-rod and permitting it to move outwardly but normally preventing it from moving inwardly, connections by which said gripping device is tripped when the second piston is in its inmost position, a second gripping device engaging the second piston-rod permitting the same to move inwardly but normally preventing it from moving outwardly, and connections by which the second gripping device is tripped when the first piston reaches a predetermined limit of outward travel, said gripping devices comprising clutch-dogs pivoted on the cylinder-heads, the dog engaging the first piston-rod having its free end connected to a tappet-rod whose other end is yoked over the second piston-rod, and the dog engaging the second piston-rod having its free end connected to a second tappet-rod whose other end has a lost-motion connection with the first piston-rod.

3. In a fluid-pressure brake apparatus, the combination of a cylinder open at both ends, an inlet-opening in the side thereof, two pistons located one at each side of the inlet, two piston-rods, brake-levers pivoted thereto and adapted to multiply the force of the second piston more than that of the first piston, a gripping device engaging the first piston-rod and permitting it to move outwardly but normally preventing it from moving inwardly, connections by which said gripping

device is tripped when the second piston is in its inmost position, a second gripping device engaging the second piston-rod permitting the same to move inwardly but normally preventing it from moving outwardly, and connections by which the second gripping device is tripped when the first piston reaches a predetermined limit of outward travel, the second piston-rod having that portion within the gripping device after the piston has started on its outward stroke of such form as to pass freely through said gripping device.

4. In a fluid-pressure brake apparatus, the combination of a cylinder open at both ends, an inlet-opening in the side thereof, two pistons located one on each side of the inlet, two piston-rods, brake-levers pivoted thereto and adapted to multiply the force of the second piston more than that of the first piston and means for permitting motion of the second piston only after the motion of the first piston is completed.

5. In a fluid-pressure brake apparatus, the combination of the cylinder, piston and piston-rod, a friction-clutch grasping said piston-rod when the piston is near its inmost position, means for tripping said clutch, and means preventing it from gripping the piston-rod after the piston has traveled a short distance on its outstroke.

6. In a fluid-pressure brake apparatus, the combination of the cylinder, piston and piston-rod, a friction-clutch grasping said piston-rod when the piston is near its inmost position, a means for tripping said clutch, the piston being partly cut away inside of the point at which the clutch grips it when the piston is at its inmost position.

Signed at New York, N. Y., this 13th day of July, 1906.

AUGUSTUS PARKER-SMITH.

Witnesses:

WILLIAM ENNIS,

M. G. CRAWFORD.