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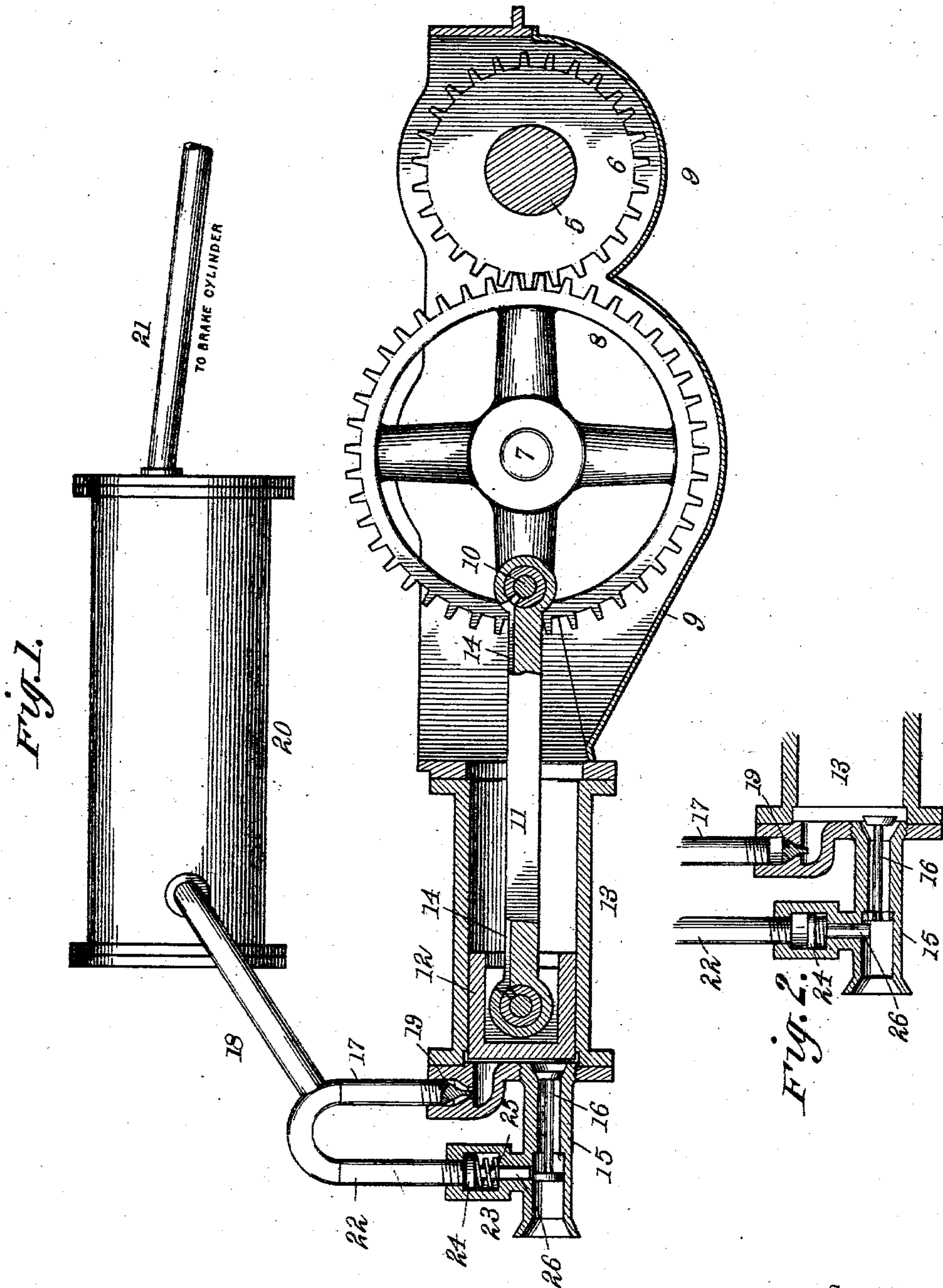
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W. F. KNELL.

PUMP FOR STREET CAR BRAKES.

(Application filed Mar. 11, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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PUMP FOR STREET-CAR BRAKES.

SPECIFICATION forming part of Letters Patent No. 629,194, dated July 18, 1899.

Application filed March 11, 1899. Serial No. 708,706. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. KNELL, a citizen of the United States, residing at Battle Creek, in the county of Calhoun and State of Michigan, have invented a new and useful Street-Car Brake, of which the following is a specification.

This invention relates to brakes for street-cars, and more especially to that class of car-brakes in which the brakes are actuated to stop the car by air-pressure stored up by a pump actuated from the car-axle. In such brakes it has been customary to provide a governor, or it might be called a "safety-valve," set to blow off at any desired pressure and to continuously work the pump against such pressure as long as that pressure existed in the reservoir. This resulted in a great loss of power; and it is the primary object of the present invention to provide brake-operating mechanism which will be effective in operation and in which the pressure is at once relieved in the pump when the required pressure exists in the reservoir.

A further object of the invention is to provide the pump with improved lubricating mechanism.

With this object in view my invention consists in the improved construction, arrangement, and combination of parts hereinafter fully described and afterward specifically pointed out in the appended claim.

In order that others skilled in the art to which my invention most nearly appertains may make and use the same, I will now proceed to describe its construction and operation, having reference to the accompanying drawings, forming part hereof, in which—

Figure 1 is a central longitudinal sectional view through the car-axle and connecting mechanism, the air-reservoir being shown in elevation, the parts being illustrated in positions which they assume while the air in the reservoir is under a pressure less than that at which the governor is set. Fig. 2 is a similar view showing the check-valves and governor in the positions they assume as soon as the required pressure exists in the reservoir.

Like numerals of reference mark the same parts in both figures of the drawings.

Referring to the drawings by numerals, 5 indicates the car-axle; 6, a pinion thereon; 7, a

crank-shaft parallel with the axle and driven therefrom by means of a gear-wheel 8, meshing with pinion 6. These parts are inclosed in a casing 9, which also acts as an oil-reservoir. A crank-pin 10 on gear-wheel 8 carries one end of a pitman 11, the opposite end being pivoted to the valveless piston 12, adapted to reciprocate in a pump-cylinder 13. The pitman 11 is grooved from end to end in its upper face at 14, so that when in its rotation the crank-pin and the inner end of the pitman are submerged in oil carried in casing 9 a portion of the oil will be carried up in groove 14 and caused to run down in said groove to the piston and lubricate it and the pivot of the pitman.

15 indicates the inlet for air to the pump, it being provided with inward-opening check-valve 16. The pipes 17 18 are the outlets through which the air from the pump passes and are provided with outward-opening check-valve 19.

20 indicates the reservoir into which the air is pumped, and 21 a pipe leading therefrom to the brake-cylinder.

Ordinarily at some point between the reservoir and the brake-cylinder a governor or safety-valve is placed, which when the required pressure is attained in the reservoir will blow off. With such a device the pump at its instroke will draw in air through inlet 15, and in its outstroke, having no other escape, will be forced into and through the reservoir and blow off through the safety-valve or governor. This of course amounts to a resistance to each outstroke of the piston equal to the pressure at which the safety-valve or governor is set and the waste of that much power at each revolution of the crank-shaft. As before stated, the primary object of my invention is to avoid this waste of power, and in carrying out my invention I dispense with the ordinary safety-valve or governor and substitute the following mechanism:

22 indicates a branch pipe leading from pipe 17 to a small upright governor-cylinder 23, erected upon and communicating with inlet 15. In the cylinder 23 is a piston-head 24, upheld by a spring 25, to which piston-head is attached a rod 26, which when spring 25 is compressed will project into inlet 15 in the

rear of check-valve 16. The spring 25 is of a strength just sufficient to resist all pressure below that required in the reservoir.

While the pressure in the reservoir is below the required point, the pump will act as before described and the piston-head 24 be held up by the spring 25, keeping the piston-rod 26 out of the way of check-valve 16. As soon, however, as the required pressure is attained in the reservoir the next outstroke of the pump piston-head will force air through pipes 17 and 22 and force the piston-head 24 down, compressing spring 25 and causing piston-rod 26 to project into inlet 15 behind check-valve 16, and to hold the check-valve open, as shown in Fig. 2. So long as the pressure is maintained in the reservoir this condition will be maintained, and the pump in its reciprocations will simply take in and discharge air around check-valve 15, having no resistance to overcome. As soon as the pressure in the reservoir becomes less than the force of spring 25 the pin 26 will be raised, leaving the check-valve 16 free and permitting the pump to resume its normal functions.

The operation of my invention and the advantages attending its use will be readily apparent from the foregoing, and while I have illustrated what I consider to be efficient means for carrying it out I do not restrict myself to the exact constructions shown, as

many slight changes might be made without departing from the limit and scope of my invention.

Having thus fully described my invention, what I claim to be new, and desire to secure by Letters Patent of the United States, is—

The combination with the valveless piston, of the cylinder having discharge and inlet openings in its head, an outward-opening check-valve in the discharge-opening, the inlet-pipe secured in the inlet-opening and formed as a valve-seat at its inner end, a valve adapted to said seat and to open inwardly, a stem for the valve extending into the inlet-pipe, a perforated piston-head at the outer end of the valve-stem, a governor-cylinder mounted upon and communicating with the inlet-pipe, a spring-supported piston head and rod in the governor, the rod being adapted to project transversely into the inlet-pipe outside of and in the path of the valve-stem when the pressure exceeds the strength of the spring, a curved pipe communicating between the discharge-opening and the governor-cylinder, and a pipe leading from the curved pipe to the air-reservoir, substantially as described.

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