

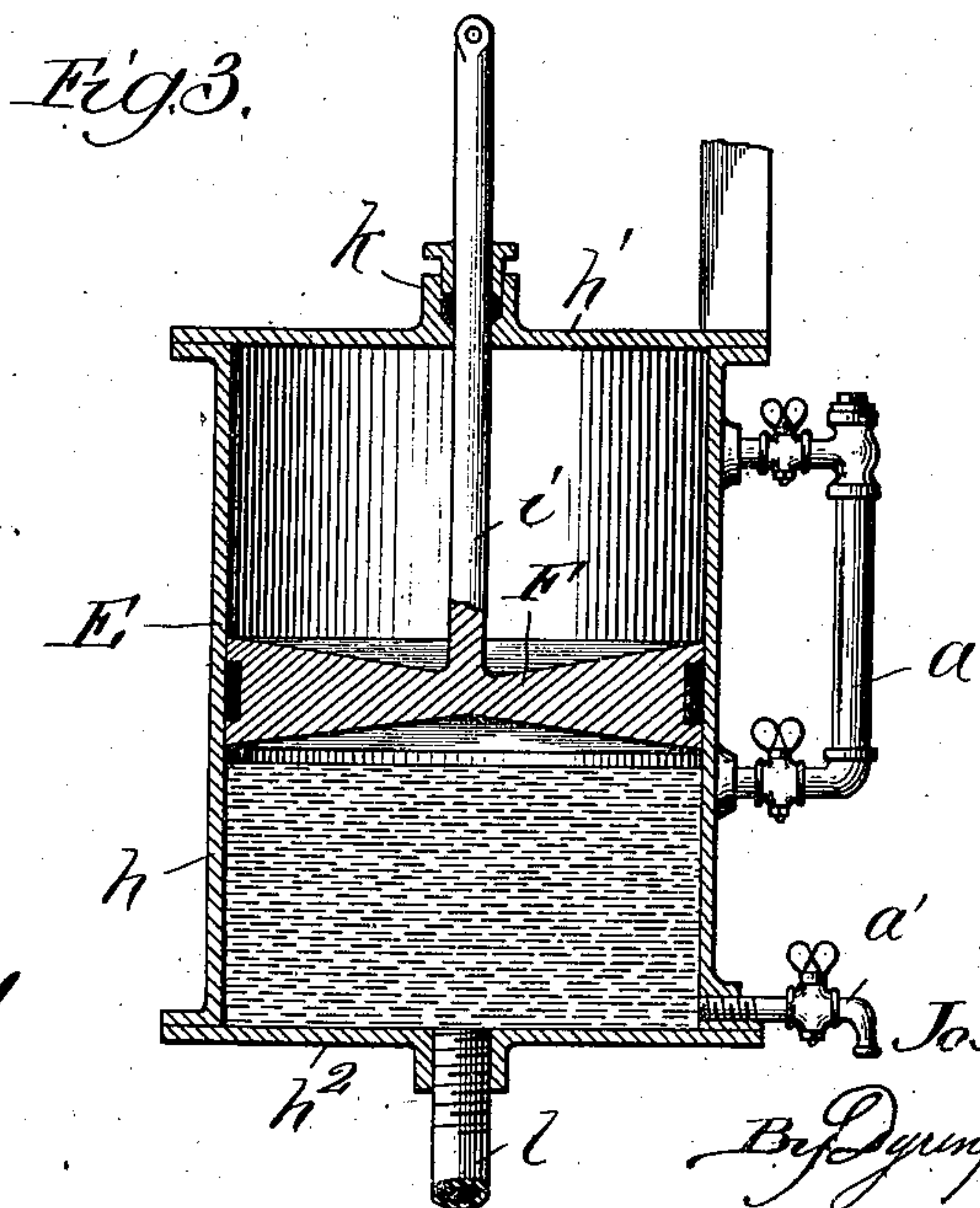
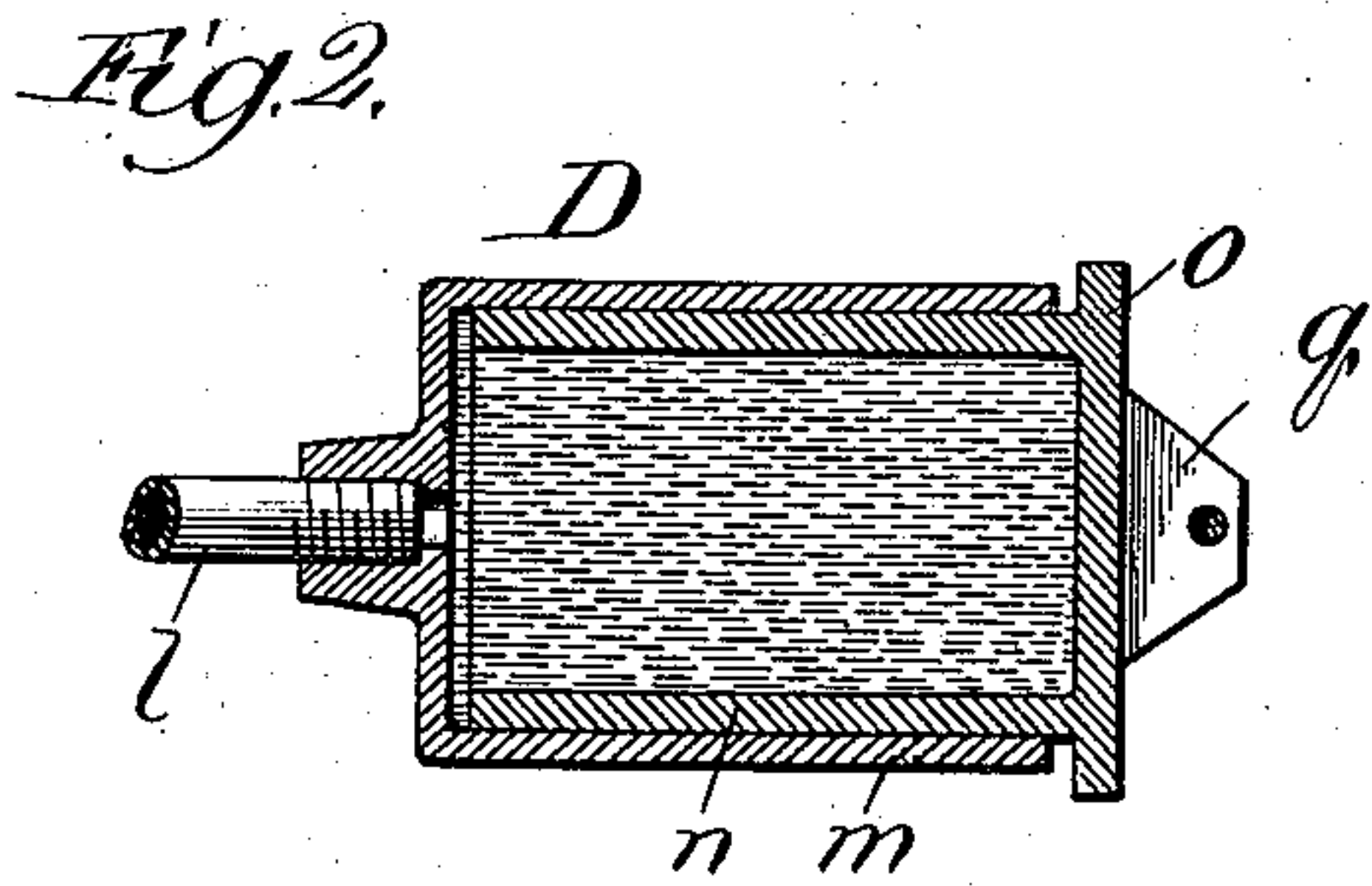
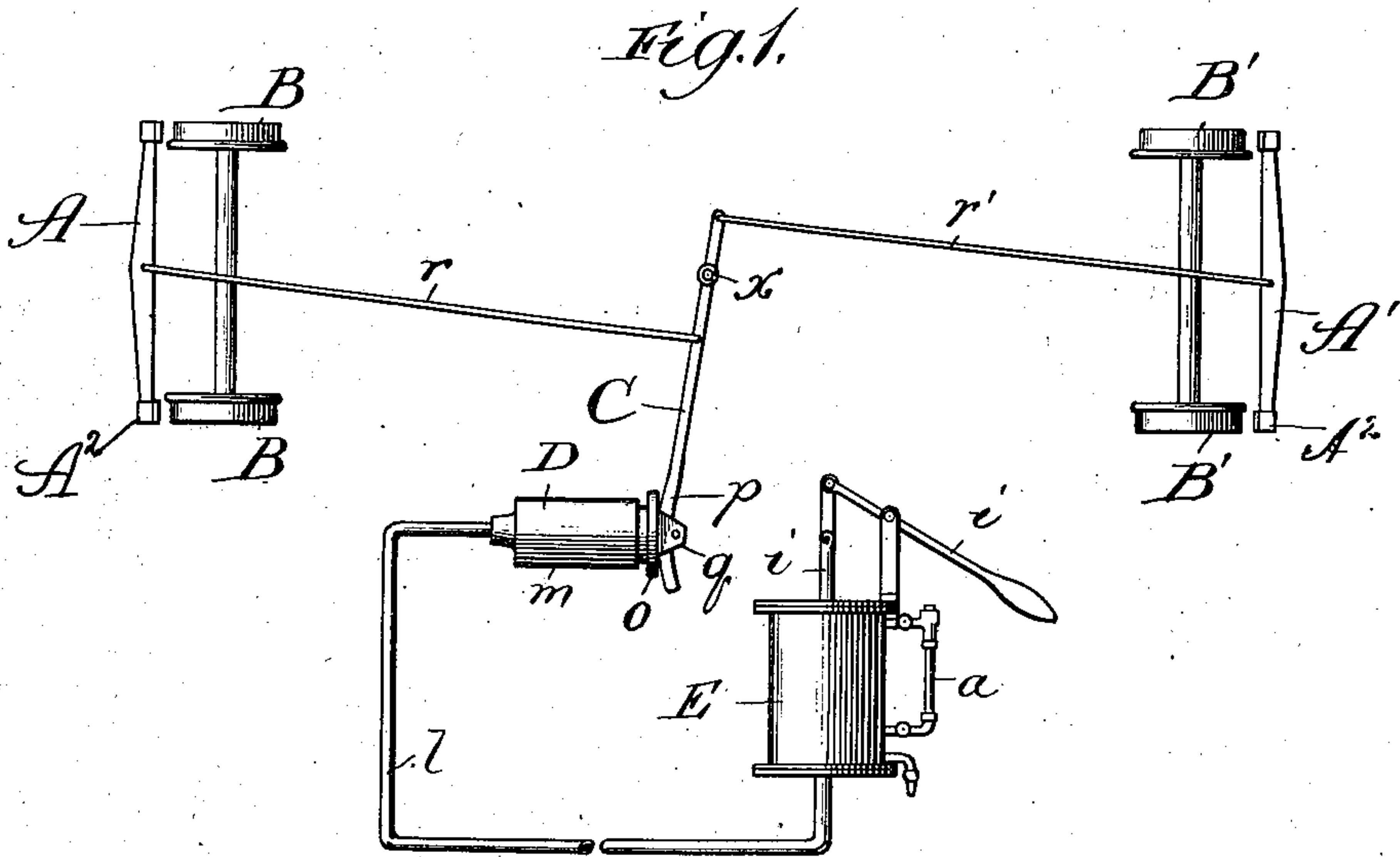
(No Model.)

2 Sheets—Sheet 1.

J. S. TROTT.  
CAR BRAKE APPARATUS.

No. 545,663.

Patented Sept. 3, 1895.



Witnesses:  
E. S. Gaylord,  
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Inventor:  
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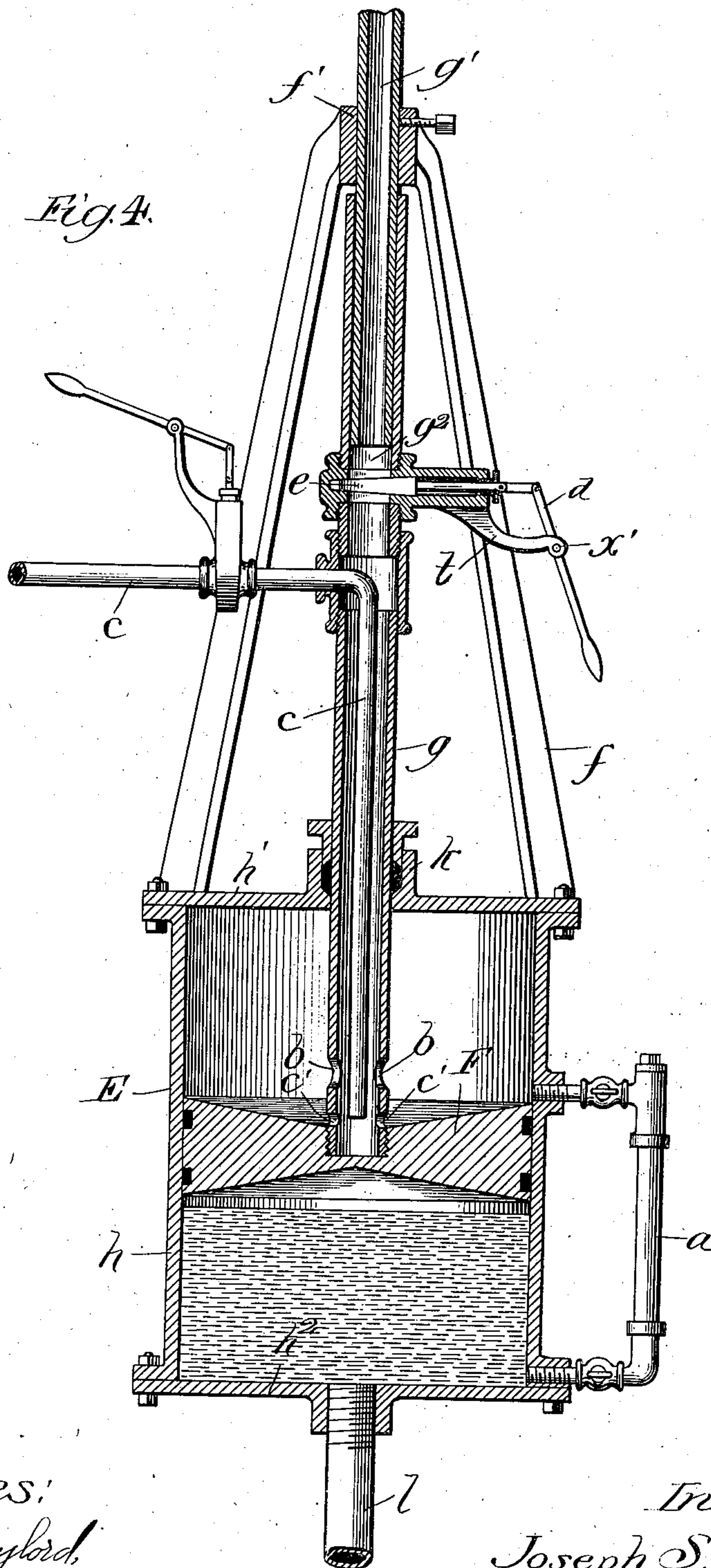
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CAR BRAKE APPARATUS.

No. 545,663.

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# UNITED STATES PATENT OFFICE.

JOSEPH S. TROTT, OF CHICAGO, ILLINOIS, ASSIGNOR OF TWO THIRDS TO  
WILLIAM K. CARLISLE AND WILLIAM J. STRONG, OF SAME PLACE.

## CAR-BRAKE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 545,663, dated September 3, 1895.

Application filed April 5, 1894. Serial No. 506,486. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH S. TROTT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Car-Brake Apparatus, of which the following is a specification.

My invention relates to an improvement in the class of fluid-operated mechanism for actuating the brakes on cars by liquid-pressure directed against the brake mechanism.

One object of my invention is to provide a construction of liquid-pump communicating through a conduit with the brake-lever mechanism and operatively connected therewith through the liquid confined in the conduit to form, as it were, the operating-rod of the piston, whereby the stroke of the latter in one direction forces the liquid against the brake-lever mechanism, and the contrary stroke releases the liquid-pressure from the brake-lever mechanism, and my further object is to adapt the pump referred to to be actuated by steam-pressure.

Referring to the accompanying drawings, Figure 1 is a view in the nature of a diagram, showing a hand-pump form of my improved mechanism applied to the brakes of a car, the same being the form of my improvement suitable for street-car purposes. Fig. 2 shows a longitudinal section of the telescoping-cylinder medium through which the fluid-pressure is applied to the brake-lever. Fig. 3 shows the fluid-pump in sectional elevation, and Fig. 4 is a view in vertical longitudinal section of the pump with its connections for forcing it by steam-power.

A A' denote the brake-beams carrying brake-shoes A<sup>2</sup> and supported to be swung in contrary directions to force the brake-shoes against the wheels B B' of a car, both sets of the wheels being indicated as belonging to separate trucks, (not shown,) though they may be respectively the forward and rear wheels of the same truck, as will be readily understood.

C is the brake-lever, fulcrumed at *x* to the bottom of a car (not shown) and connected by the brake-rods *r* and *r'* from opposite sides of its fulcrum, respectively, with the

beams A and A'. The lever C is fulcrumed to afford a handle portion *p* of comparatively great length or as long as it may be in its position, thereby to permit the exertion of the greater leverage with the lesser power, and the end of the handle portion of the brake-lever should be curved, as shown, where it is confined between a pair of guide-lugs *q* (only one of which is shown, owing to the nature of the views) extending from the head *o* of the inner telescoping section *n* of a brake-cylinder D into the rear end of the outer stationary section *m*, of which there leads the pipe *l* from the lower end of the pump E.

The pump, which would be supported on the platform of a street-car where my improvement is applied to street-car purposes or on a locomotive in connection with steam-cars, comprises a cylinder *h*, having heads *h'* and *h*<sup>2</sup>, and containing a piston-head F, suitably packed about its periphery and dish-shaped or concave on its under side, and also preferably on its upper side. The stem of the piston F passes through the handle *h'* at a suitable stuffing-box *k*, and for the hand-pump form of the device is a mere rod *i*, connected with the pump-handle *i'*. For the steam-operated pump the piston-stem is in the form of a pipe *g*, screwed at one end into the piston-head F, and containing toward its upper end a telescoping pipe-section *g'*, supported in a guide *f'* on a suitable frame *f* on the cylinder-head *h'* and having a head *g*<sup>2</sup> at its lower end. The steam-supply (not shown) is connected with the outer end of the pipe-section *g'*, which is stationary, and below the head *g*<sup>2</sup> the pipe *g* contains a sliding or gate valve *e*, having an operating-handle *d* connected with its stem and fulcrumed at *x'* to a bearing *t* on the valve-casing. Below the valve *e* a steam-exhaust pipe *c* enters the pipe *g* and extends downward therein, the steam-pipe being provided near its lower end with steam-inlet ports *b* and below the latter with exhaust-ports *c'* for the steam and condensation. In the pipe *c* is provided a vertically-operated gate-valve device like that in the pipe *g*.

The operation is as follows: As shown, the pump-piston F is at the end of its upper stroke. The cylinder *h* below the piston and the pipe



l are filled with liquid (as water) introduced through a valve-controlled filling-pipe *a*, the cylinder being also provided with a draw-off cock *a'*, through which to permit any excess of the liquid to discharge.

To set the brakes with the hand-pump device the handle *i'* is actuated to lower the piston F, which strikes the liquid about the edge of its concave base, thereby rendering the operation practically noiseless and cushioning against the liquid. the pressure also compressing the air that is confined between the liquid and piston and part of which at least may come from the water. This forces the liquid below the piston against the head *o* of the telescoping section *n* of the brake-cylinder D, driving it out against the brake-lever C and actuating it to set the brakes. To release the brakes the pump-handle *i'* is released or it may be forced down by the operator to assist, and the expansion of the compressed air under the piston F, supplemented by the weight of the brake mechanism, returns the piston to the upper end of its stroke and effects the release of the brakes.

When the pump E is forced by steam-pressure the valve *e* is opened (that in the pipe *c* being shut) to admit steam from the pipe-section *g'*, through the ports *b*, into the cylinder *h* above the piston, therein to expand and force the piston down with the same effect as that already described, and to effect the release of the brakes and rise of the piston F the valve *e* is closed to shut off the steam-supply and the valve in the exhaust-pipe *c* opened, when the steam and the condensation through the ports *c'* escape into the exhaust-pipe, followed by the rise of the piston.

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

1. In a car-brake apparatus, the combination of a brake-lever connected with the brake-beams, a fluid pump having its piston formed with a concave cushioning surface, and an outlet-pipe leading from the pump and provided with an extensible liquid-operated connection with the brake-lever and containing the supply of liquid permanently confined between said extensible connection and the

pump-piston to form a piston-rod, substantially as described.

2. In a car-brake apparatus, the combination of a brake-lever connected with the brake-beams, a steam-operated pump having an outlet-pipe provided with an extensible fluid-operated connection with the brake-lever, and a telescoping steam-supply pipe forming the stem of the pump-piston and provided with steam-inlet and exhaust ports, and valve-mechanism for controlling the steam-supply and exhaust of the pump, substantially as described.

3. In a car-brake apparatus, the combination of a brake-lever connected with the brake-beams, a steam-operated pump E having a piston F formed with a concave cushioning surface, and an outlet-pipe *l* terminating in a telescoping brake-cylinder connected with the brake-lever, a liquid confined in the outlet-pipe between the pump-piston and brake-cylinder to actuate the latter by forcing the piston against the liquid, a telescoping steam-supply pipe forming the stem of the pump-piston and provided with steam-inlet and exhaust ports, and valve-mechanism for controlling the steam supply and exhaust of the pump, substantially as described.

4. A car-brake apparatus comprising, in combination, the brake-lever C connected with the brake-beams and having the handle-extension *p*, a pump E having a piston F formed with a concave cushioning surface, a pipe *l* leading from the pump and terminating in a brake-cylinder D formed with telescoping sections *m* and *n*, the latter being connected with the handle-portion of the brake-lever, said pipe containing the operating liquid confined between the pump-piston and brake-cylinder, a steam-pipe forming the stem of the pump-piston and comprising the telescoping pipe-sections *g* and *g'*, ports *l* and *c'* and a valve in the pipe-section *g* and a valve-controlled exhaust-pipe *c* therein, the whole being constructed and arranged to operate substantially as described.

JOSEPH S. TROTT.

In presence of—

JOHN BROWN,  
D. J. ZINNER.