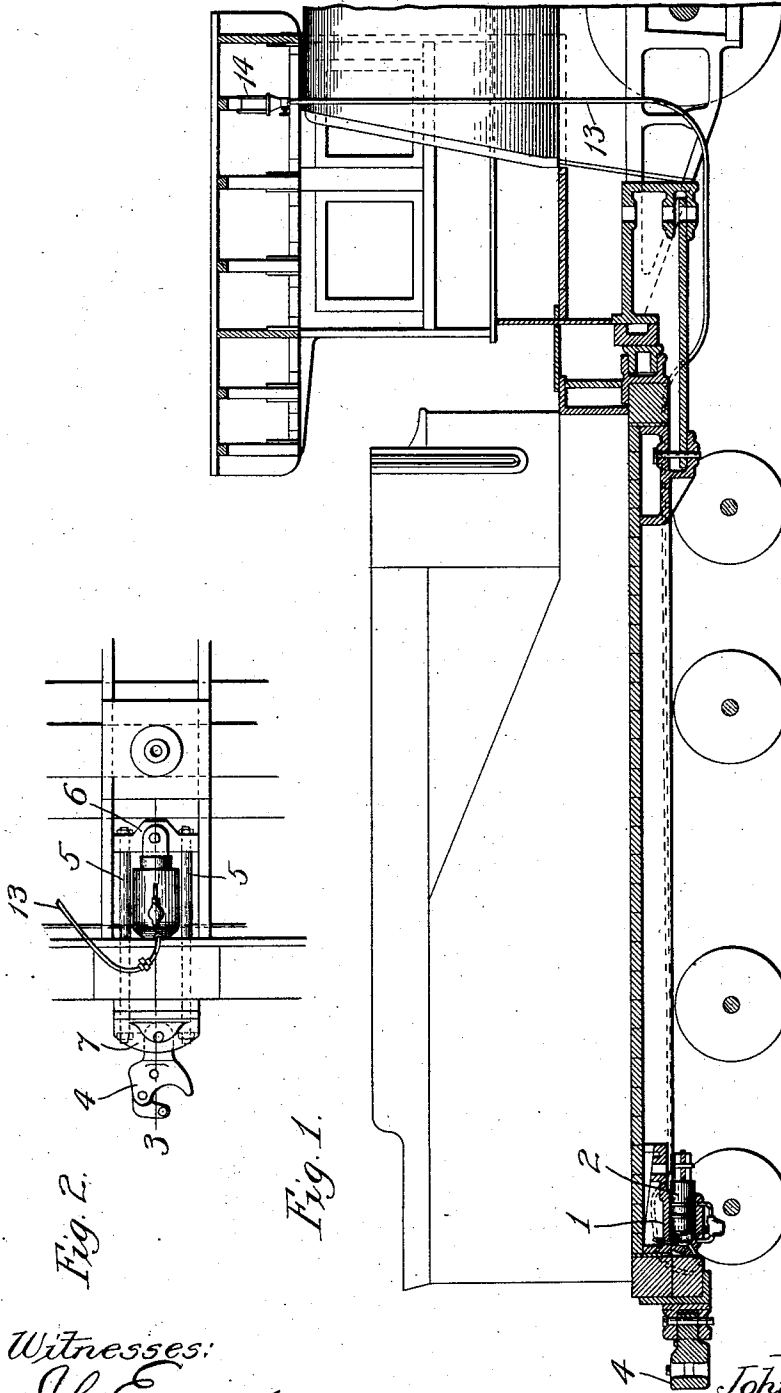


J. E. PHILLIPS & S. T. PARK.
LOCOMOTIVE DYNAMOMETER.
APPLICATION FILED DEC. 23, 1907.

1,047,696.

Patented Dec. 17, 1912.

2 SHEETS—SHEET 1.



Witnesses:
John Enders
Chas. H. Buell

Inventors:
John E. Phillips
Samuel T. Park
By *Sheridan & Dickinson*
Atty's.

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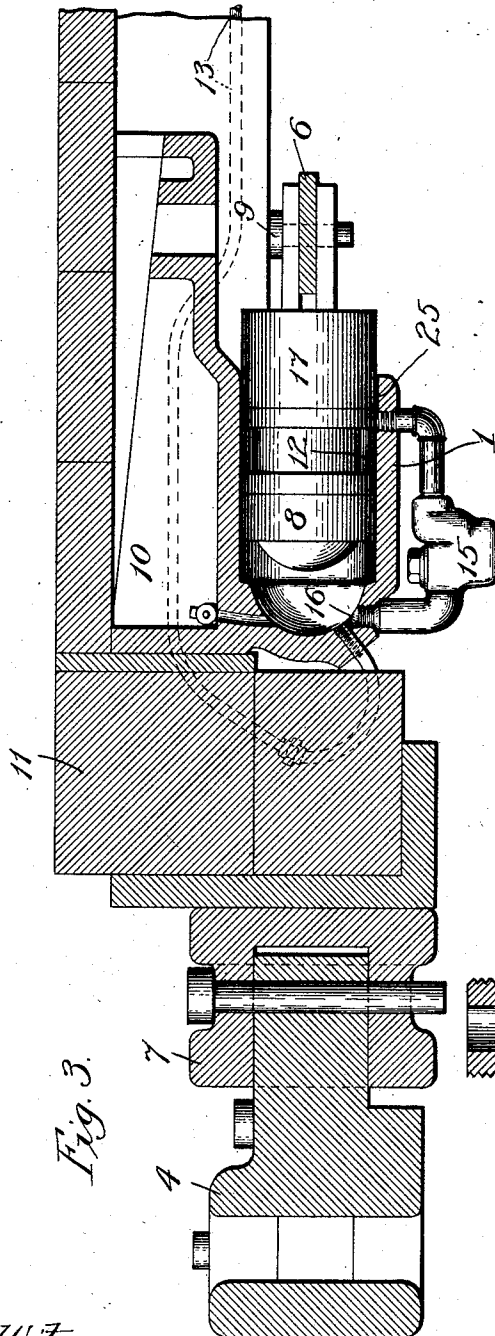


Fig. 3.

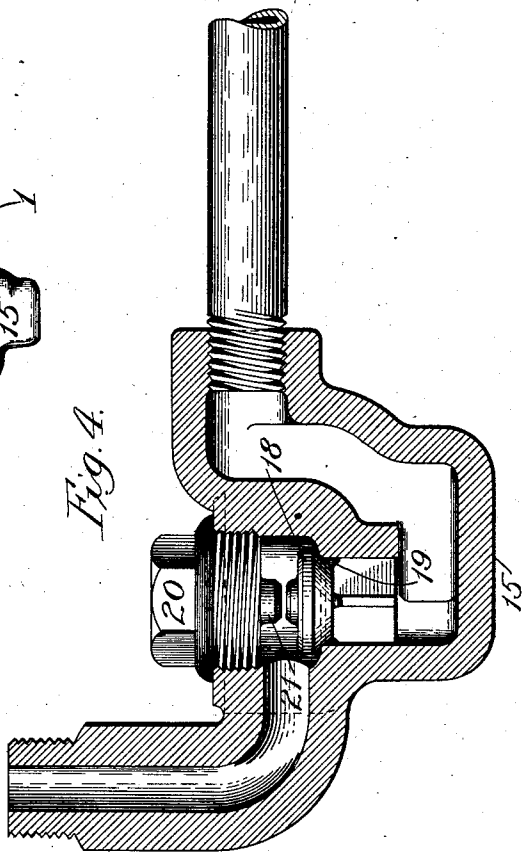


Fig. 4.

Witnesses:

John Enders
Chas. H. Buell.

Inventors:
John E. Phillips.
Samuel T. Park.

By Sheridan & Dickinson
Atty's

UNITED STATES PATENT OFFICE.

JOHN E. PHILLIPS AND SAMUEL T. PARK, OF DANVILLE, ILLINOIS, ASSIGNORS TO
LOCOMOTIVE RECORDING DYNAMOMETER COMPANY, OF CHICAGO, ILLINOIS, A COR-
PORATION OF MAINE.

LOCOMOTIVE-DYNAMOMETER.

1,047,696.

Specification of Letters Patent.

Patented Dec. 17, 1912.

Application filed December 23, 1907. Serial No. 407,721.

To all whom it may concern:

Be it known that we, JOHN E. PHILLIPS and SAMUEL T. PARK, citizens of the United States, both residing at Danville, in the county of Vermilion and State of Illinois, have invented certain new and useful Improvements in Locomotive-Dynamometers, of which the following is a specification.

Our invention is an improvement in locomotive dynamometers of the form in which the tractive force exerted by the locomotive is indicated and recorded by means of the pressure imposed upon a liquid, such as oil, contained in a cylinder secured to the locomotive or tender and acted upon by a plunger secured to one of the cars of the train. In operating devices of this kind it has been found that a certain amount of oil passes between the plunger packing and the walls of the cylinder, resulting not only in the loss of oil but also, when the leakage has proceeded far enough, interfering with the proper action of the apparatus.

The object of our invention is to restore the liquid which passes between the plunger packing, and the walls of the cylinder to operative position inside of the cylinder, and to keep the cylinder supplied with oil.

In the drawings—Figure 1 is a view, partly in section, of the cab of a locomotive and its tender, our improved device being shown thereon. Fig. 2 is a fragmentary view of the pressure cylinder and connected parts. Fig. 3 is a sectional view on the line 3 of Fig. 2, and Fig. 4 is a longitudinal vertical section of the by-pass and valve for restoring the oil or other liquid to operative position inside of the cylinder, and for keeping the cylinder supplied with oil.

In the present instance we have shown the pressure cylinder 1 mounted upon the locomotive tender. In some instances, however, it may be found advantageous to mount this part directly upon the locomotive. The operation of the device will be substantially the same in either case, and in referring to it as mounted upon the locomotive, we intend to convey the idea that it is mounted either directly upon the locomotive or upon its tender. The coacting part of the apparatus, namely, the plunger 2, is mounted upon the draw-bar of the locomotive or tender in such manner that the tractive force between the locomotive and

the train tends to cause the plunger to move inwardly in the open ended cylinder 1.

In the present instance the coupler 4 of the locomotive is connected to a yoke consisting of bars 5 and cross members 6 and 7. The plunger 8 is secured to the cross member 6 by means of the pin 9. The cylinder 1 is formed with an upwardly projecting part 10 adapted to rest against the end sill 11 of the car and to be secured by suitable means to the underframing of the car. The plunger 8 is formed, preferably, with an annular groove or depression 12, forming a space in which oil leaking past the head of the plunger may be retained until drawn back to operative position—as hereinafter described. The cylinder is connected by means of pipe 13 with a suitable registering device 14 in the cab of the locomotive. This registering device may either indicate or record the pressure upon the oil contained in the cylinder 1, or it may perform both of these functions.

It will be apparent that tractive force acting through the coupler 14 will tend to move the plunger 8 inwardly in the cylinder 1 and thus compress the oil contained therein. In order to restore to operative position any oil which may leak past the head of the plunger 8, we provide the by-pass 15 communicating at 16 with the end of the cylinder 1 and at 17 with the side of the cylinder at a point back of the head of the plunger 8. About midway of the by-pass 15 we provide a one-way valve 18 coacting with a suitable seat 19 formed in the by-pass. In order to facilitate access to this valve we provide a screw threaded plug 20 provided on its lower side with a stop 21 adapted to limit the movement of the valve 18.

It will be apparent that when the oil contained in the cylinder is under compression, due to the tractive force exerted by the locomotive, there will be no passage of oil through the by-pass, movement of oil in that direction being prevented by the one-way valve 18. Under buffing strain, however, the plunger 8 will move outwardly in the cylinder 1, thus forming a partial vacuum in the cylinder, which will have the effect of drawing through the by-pass in the direction from 17 to 16 any oil which may have escaped past the head of the plunger 8, movement of oil in this direction being per-

mitted by the one-way valve 18. The by-pass may be initially filled with oil from end to end, and any oil leaking past the plunger 8 will drain through the opening 5 17 into the by-pass. In order to prevent any tendency for the forming of a partial vacuum behind the body of oil in the by-pass, we provide a small groove 25 for the purpose of admitting air.

10 It will be obvious that the apparatus may be kept charged with oil through any oil reservoir connected with the inner end of the cylinder and provided with a one-way valve opening inwardly. We have found, how- 15 ever, that by connecting the outer end of the oil inlet to the cylinder at a point back of the plunger head we are enabled to save the oil which would otherwise be wasted through leakage between the plunger and 20 cylinder wall.

We claim:

1. A locomotive dynamometer comprising a cylinder, a plunger, pressure-registering means connected with said cylinder, a by- 25 pass communicating with said cylinder on opposite sides of said plunger, and a one-way valve in said by-pass.

2. A locomotive dynamometer comprising a cylinder connected to the locomotive, a 30 plunger operating in said cylinder and connected to the train, the parts being so arranged that the tractive force exerted by the locomotive acts to compress liquid contained in the cylinder, a by-pass communicating 35 with said cylinder at points on opposite sides of said plunger, and a one-way valve in said by-pass, said valve operating to prevent passage of liquid through said by-pass under pressure of said plunger, but permit- 40 ting liquid to be drawn therethrough by the outward movement of said plunger.

3. A locomotive dynamometer comprising a cylinder, a plunger having a depression 45 and operating under the tractive force of the locomotive to compress liquid contained

in the cylinder, and means for automatically returning to operative position liquid which passes between the plunger and the walls of the cylinder, to said depression.

4. A locomotive dynamometer comprising 50 a cylinder, a plunger, pressure registering means connected with said cylinder and operated by the pressure of the liquid therein, a liquid container communicating with said cylinder, and a one-way valve between said 55 container and said cylinder, said valve opening toward said cylinder.

5. A locomotive dynamometer comprising a cylinder, a plunger having a depression 60 and operating under the tractive force of the locomotive acting in one direction to compress a liquid contained in the cylinder, and means by which said plunger may operate under the tractive force acting in another 65 direction to move the liquid from said depression to the operating side of said plunger.

6. A locomotive dynamometer comprising a cylinder, a plunger having a depression 70 and operating under the tractive force of the locomotive to produce a pressure in a liquid in said cylinder, and means by which the tractive force may also cause said plunger to draw the liquid from said depression to the operating side of said plunger. 75

7. A locomotive dynamometer comprising a cylinder, a plunger having a depression 80 and operating under the tractive force of the locomotive to produce a pressure in a liquid in said cylinder, means by which the tractive force may also cause said plunger to draw the liquid from said depression to the op- 85 erating side of said plunger, and pressure-registering means actuated by said liquid.

JOHN E. PHILLIPS.
SAMUEL T. PARK.

Witnesses:

T. B. COSGROVE,
M. F. KEEGAN.