

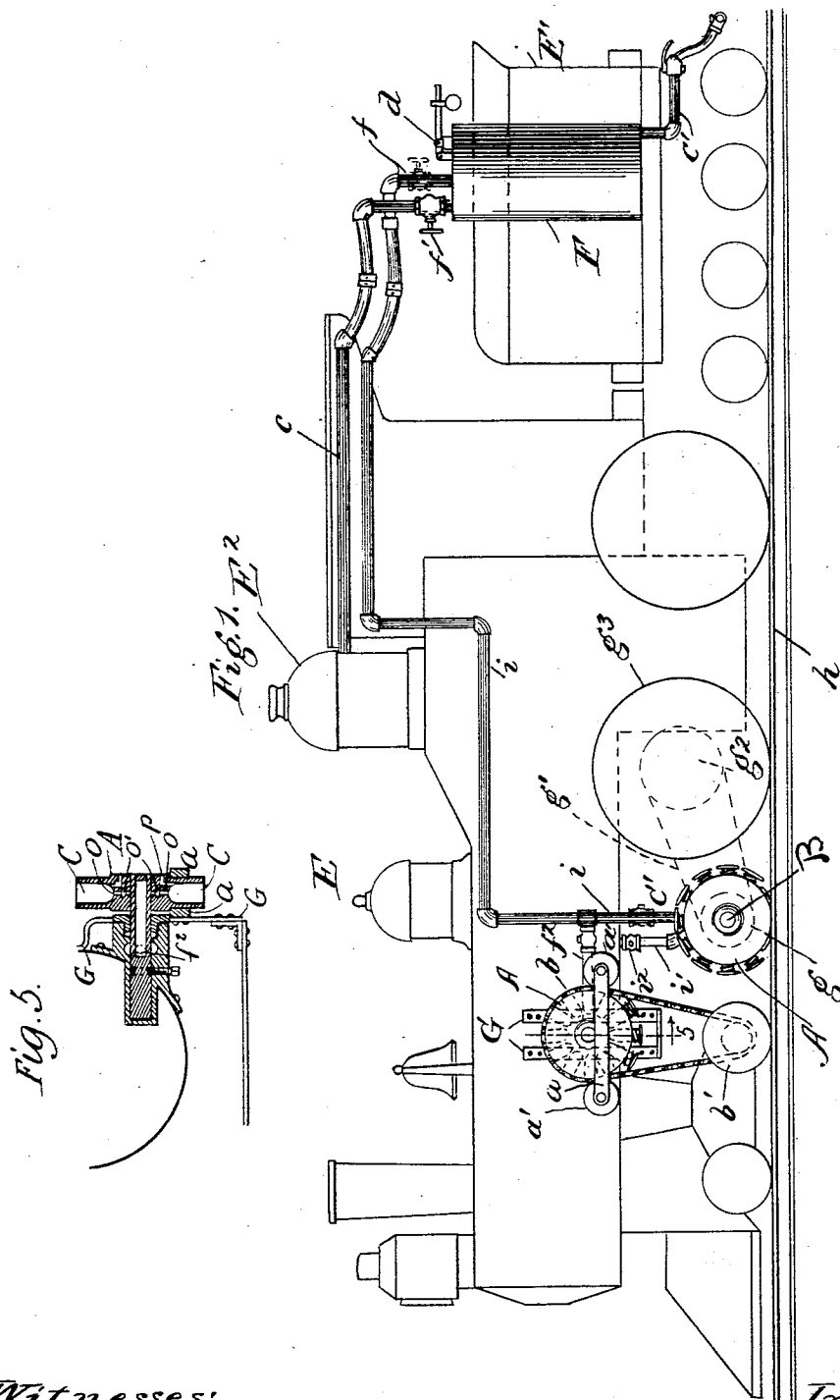
(No Model.)

2 Sheets—Sheet 1

I. T. DYER.
WHEEL PUMP.

No. 573,580.

Patented Dec. 22, 1896.



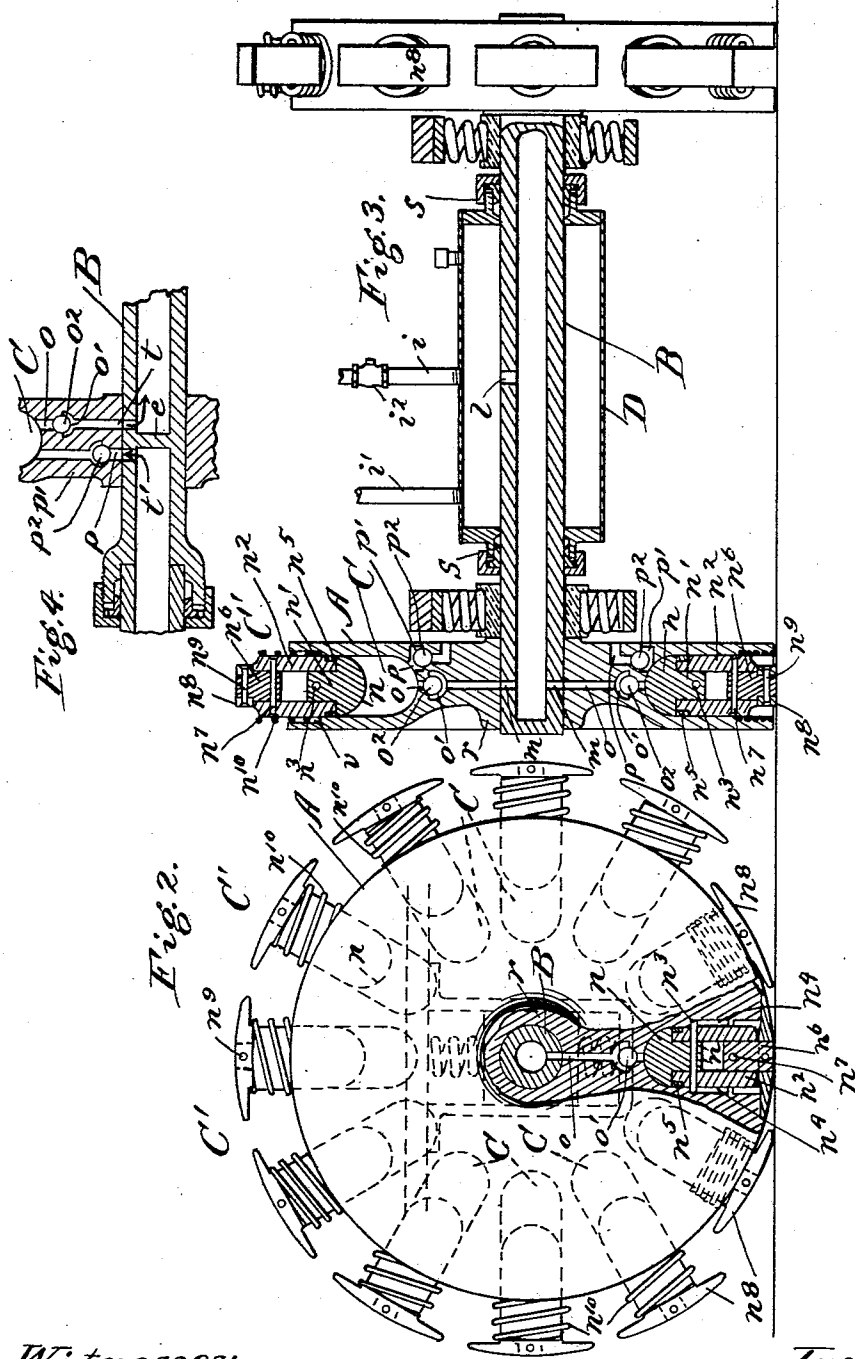
Witnesses:
Charles E. Burnap
R. Anderson

Inventor:
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UNITED STATES PATENT OFFICE.

ISAAC T. DYER, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE DYER POWER COMPANY, OF SAME PLACE.

WHEEL-PUMP.

SPECIFICATION forming part of Letters Patent No. 573,580, dated December 22, 1896.

Application filed March 30, 1896. Serial No. 585,389. (No model.)

To all whom it may concern:

Be it known that I, ISAAC T. DYER, 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 Wheel-Pumps, of which the following is a specification.

The object of my invention is to provide a novel construction of wheel-pump for application to a road-vehicle to utilize the motion of the vehicle to generate, through the medium of the pump, fluid-pressure for use as power; and my invention consists in the construction of the wheel-pump and also in the manner of its combination with a road-vehicle, such as a locomotive-engine, a car, or a wagon.

Referring to the accompanying drawings, Figure 1 is a view in side elevation of a locomotive-engine equipped with my wheel-pump device, showing the latter applied in two different ways; Fig. 2, a view in side elevation, partly broken and sectional, of the pump device; Fig. 3, a view, partly broken, showing one of the wheel-pumps and the hollow axle upon one end of which it is carried, as also the receiver for compressed fluid, in sectional elevation and the other wheel-pump, at the opposite end of the hollow axle, in peripheral elevation; Fig. 4, a broken sectional view of a modification for adapting the wheel-pump to be applied to a wagon; and Fig. 5, an enlarged broken section taken at the line 5 on Fig. 1 and viewed in the direction of the arrow, but omitting from the wheel-pump the pistons and their operating-belt.

A is a wheel formed, preferably, of metal by casting, with a hollow hub or center r , at which it is shrunk or otherwise securely fastened upon a hollow axle B, one of the wheels being shown in Fig. 3 to be provided on each end of the axle, though only one of the wheel-pumps need be used, when, particularly in connection with a wagon, the application may best be made in accordance with the modification illustrated by Fig. 4 and hereinafter described.

In the wheel A are formed in circumferential series radial chambers C, preferably of cylindrical form and concavely rounded at their inner ends, at which they are provided

each with an outlet-opening o and inlet-opening p , the former extending through the hub r and having an enlargement forming a valve-chamber o' , containing an inwardly-opening check-valve o^2 , and the latter extending out through the inner side of the wheel and having an enlargement forming a valve-chamber p' , containing an outwardly-opening check-valve p^2 .

In each cylinder C is reciprocally confined a piston C' , the preferred construction of which is that illustrated, comprising a convex head n , having a neck n' , which enters a tubular piston-stem n^2 and is confined therein by a transverse pin n^3 , projecting at its opposite ends into guide-grooves n^4 , provided opposite each other in the wall of the cylinder to limit the stroke of the piston. At its inner end the stem n^2 is surrounded by suitable packing n^5 , and at its outer end, which is shown to be reduced in cross-section, it contains a plug n^6 , fastened in place by a pin n^7 and projecting beyond the end of the stem n^2 to afford a bearing for a rocking shoe n^8 , pivotally supported on the plug by a pin n^9 , and the stem is surrounded by a spiral spring n^{10} , confined between a shoulder at v in the outer end portion of the cylinder C and the rocking shoe n^8 .

The hollow axle B contains openings m , registering with the openings o at the hub.

D is a receiver for the compressed fluid surrounding the axle B, between the wheel-pumps on its opposite ends, and closed at its opposite ends by stuffing-boxes s s , the receiver being rigidly supported to permit the axle, which opens into it through a port l , to rotate inside it.

Any desired number of outlet-pipes from the receiver D may be provided, two being shown at i and i' in Fig. 3, and each of which should be provided with an outwardly-opening check-valve i^2 .

The operation of my improved wheel-pump may be described in connection with a locomotive-engine E, to which it may be applied to cause the pumps at the ends of the axle B to run on the rails h of the track with a sprocket-wheel, one of which is indicated at g in Fig. 1, on each end of the axle (then properly extended to receive it) and connect-

ed by a chain (indicated at g') with a sprocket-wheel (indicated at g^2) on the axle of a drive-wheel g^3 of the engine. The receiver D may be connected by the pipe i , which should contain a shut-off valve f , with a storage tank or holder F, supported on the locomotive-tender E' and equipped with a safety-valve d , and the tank may communicate through a pipe c , containing a shut-off valve f' , with the steam-dome E², and compressed air may be supplied from the tank to other parts of the train, for ventilating and power purposes, through a pipe c' , equipped with a shut-off valve and leading from the bottom portion of the tank.

Thus my improved wheel-pump is adjusted to generate and store compressed air by the motion of the engine, whereby the wheel of each of the pumps is rotated on the rails of the track to cause each piston-rod, as its shoe treads or steps on the rail, to be forced into its cylinder and compress air, which enters it through its port p , out through its port o into the axle B, whence it enters the receiver D, and is thence forced through the pipe i into the holder F or through a pipe i' into the boiler of the engine, or into both the holder and boiler. As each shoe n^8 is turned by the rotation of the wheel from bearing on the track the spring n^{10} , controlling its piston, throws the latter out to suck in air through the port p .

Instead of connecting the wheel-pump with the engine in the manner described, one may be journaled on a frame G at each side of the locomotive-boiler to be rotated by a suitable band or chain b , encircling the circumferential series of shoes and extending down about the axle of a wheel b' of the engine. From the pumps thus placed a pipe i may connect the receiver D with the holder, and if two of the pumps be placed on a single engine, as represented in Fig. 1, a branch pipe f^2 , containing a suitable check-valve, may connect the receiver of the pump supported on the frame G with the pipe i . In connection with this last-named wheel-pump I show a tightener for the belt b , comprising a frame a , transversely embracing the pump and carrying at its opposite ends rollers a' , bearing against the belt to insure compressing it against the shoes n^8 to force in the pistons.

When my wheel-pump is used on a wagon, the axle B thereof is made hollow with a diaphragm e near its center, (see Fig. 4,) about which the wheel is secured to cause the ports o and p in the base of each cylinder C to register, respectively, with ports t and t' in the axle at opposite sides of the diaphragm, whereby when in the progress of the wagon the wheel A is turned by contact of the shoes at its periphery with the ground the pistons will be actuated successively in the manner de-

scribed, the air being sucked into the cylinders C through the hollow axle at the ports t' and inlets p and being forced through the outlets o and ports t out through the axle into a suitable holder. (Not shown.)

While I have especially devised my improved wheel-pump for generating air for use as power, for ventilation, and the like, it may be used for compressing other fluids, including water.

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

1. A wheel-pump device comprising, in combination, a wheel A having a circumferential series of chambers C provided with valve-controlled inlets and outlets, pistons C' in said chambers, each comprising a head n on a hollow stem n^2 reciprocally confined in a chamber and provided with a plug n^6 at its outer end, a shoe n^8 pivotally connected with the plug, and a spring n^{10} confined about the stem, and a hollow axle on which the wheel is mounted and provided with inlets registering with the outlets of said chambers, substantially as and for the purpose set forth.

2. A wheel-pump device comprising, in combination, a wheel A having a hollow center, a circumferential series of chambers C provided with valve-controlled inlets p leading to a side of the wheel and valve-controlled outlets o leading through said center, pistons C' in said chambers, each comprising a head n fastened in a hollow stem n^2 by a pin n^3 projecting at its opposite ends into guide-grooves in the chamber, a plug n^6 in the outer end of the stem, a shoe n^8 pivotally connected with the plug and a spring n^{10} confined about the stem, and a hollow axle on which the wheel is mounted and provided with inlets registering with the outlets of said chambers, substantially as and for the purpose set forth.

3. In combination with a locomotive-engine, a wheel-pump device comprising a wheel A geared to an axle of the locomotive and having a circumferential series of chambers C provided with valve-controlled inlets and outlets and pistons C' in said chambers, each comprising a head n on a hollow stem n^2 reciprocally confined in a chamber and provided with a plug n^6 at its outer end, a shoe n^8 pivotally connected with the plug, and a spring n^{10} confined about the stem, a hollow axle B on which the wheel is mounted and provided with inlets registering with the outlets of said chambers and an outlet l , a receiver D surrounding the axle, and one or more valve-controlled outlet-pipes leading from said receiver, substantially as and for the purpose set forth.

ISAAC T. DYER.

In presence of—

J. H. LEE,
R. T. SPENCER.