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W. R. PRATT.

COMPRESSED AIR LOCOMOTIVE.

APPLICATION FILED OCT. 8, 1901.

NO MODEL.

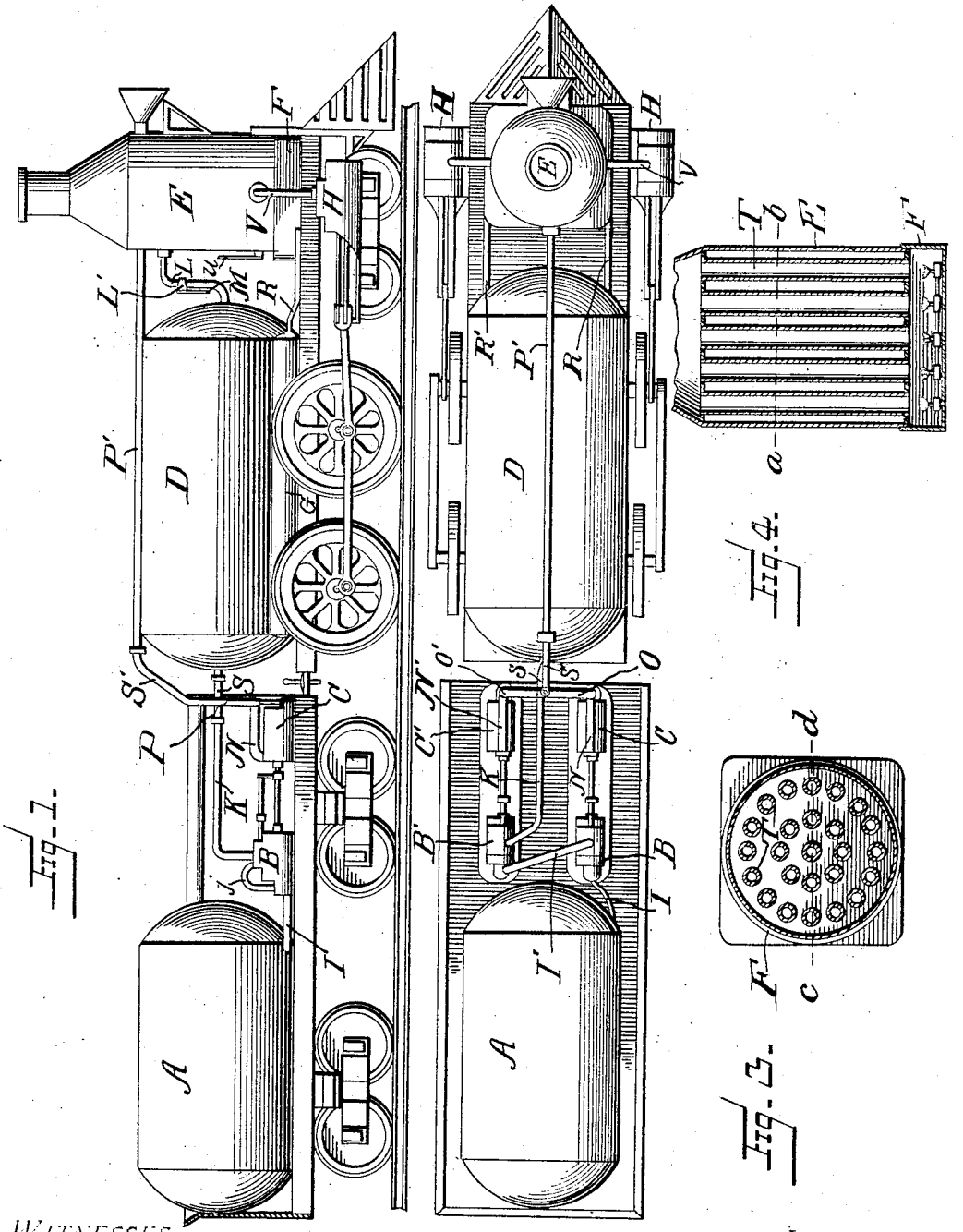

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

WITNESSES:

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No. 774,778. Patented November 15, 1904.

UNITED STATES PATENT OFFICE.

WILSON R. PRATT, OF TOPEKA, KANSAS.

COMPRESSED-AIR LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 774,778, dated November 15, 1904.

Application filed October 8, 1901. Serial No. 77,942. (No model.)

To all whom it may concern:

Be it known that I, WILSON R. PRATT, a citizen of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented certain new and useful Improvements in Compressed-Air Locomotives; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in compressed-air locomotives in which a portion of the air is stored at high pressure; and the object of my invention is to utilize the differences between the high pressure and the low pressure to which it is reduced for use in the compression of free air and also to add to the units of energy contained in the air in its compressed form by heating the same at the immediate point of consumption.

I attain these objects by the mechanical devices illustrated in the accompanying drawings, in which—

Figure 1 is represented as a side elevation of the locomotive. Fig. 2 is a plan view of same. Fig. 3 is a section taken through the line *a b* of Fig. 4; and Fig. 4 is an enlarged section of the heater, taken through the line *c d* of Fig. 3, the same being considered as a plan view for this purpose.

Similar letters refer to similar parts throughout the several views.

In the views given of the engine and tender I have simply outlined those parts in common use.

In my device the water-tank and coal-bin of the tender in common use are replaced by a high-pressure air-tank A and the free-air compressors C and C′, having suitable driving-motors B and B′, and in the engine proper the boiler is replaced by a secondary air-tank D and a heater E. As will be seen, the air-compressors are not specialized, this being also true of the heater, as in the forms devised for the special service required of them in my invention I hold them subject-matter of separate patent.

A is the air-tank of greatest pressure and is of form and material that shall tend to eliminate any danger of explosion that might arise from changes of temperature. In the present arrangement, exhibiting two air-compressors, it should be capable of sustaining pressure of seven hundred and fifty pounds per square inch. The air-compressors C C′ should likewise be capable of sustaining pressure of about seven hundred and fifty pounds. The secondary reservoir D should be capable of sustaining pressure of about three hundred and fifty pounds per square inch, as also the heater E. The strength of the various pipes and fittings should be in harmony as to strengths with the reservoirs to which they are attached or connected.

The engine B of the first air-compressor is directly connected with the air-reservoir A by the conduit-pipe I. This connecting-pipe is preferably, as shown, without a stop-cock. The said pipe I heads direct to the valve-chest of the said engine B and through said valves to the cylinder. The exhaust of the first cylinder is through the pipe I′, which leads direct to the valve-chest of the second engine B′ and through the valves of the said engine B′ to the cylinder of same, as in the first engine. The exhaust of this second engine passes through the pipe K and the hose S into the secondary reservoir D. Leading from the front end of this reservoir is the pipe L, with its stop-cock L′, controlled and operated by the lever M, the said pipe L connecting the air-tank D with the heater E.

The air-compressor cylinders C and C′ have pipes N N′ and O O′, that connect with the valve-chambers in said cylinders and lead the air compressed therein, via the conduit-pipe P, hose S′, and the connecting-pipe P′, direct to the heater E.

On each side of the reservoir D are the gasolene or crude-oil tanks G, that connect, through the feed-pipes R R′, with the burners S (see Fig. 4) of the fire-box F of the heater E, which is set with the vertical flues T.

In operation my invention works as follows:

The tank A is filled with compressed air, say at, five hundred pounds pressure, this pressure varying according to the number of free-air compressors used in the combination and the number of pounds pressure required to run the engines of the locomotive. With two air-compressors, as shown, and the heater-pressure set at one hundred and fifty pounds the tank A should contain air compressed to about five hundred pounds pressure. This pressure of the primary reservoir would call for air at about two hundred pounds pressure in the secondary reservoir D and at about one hundred pounds pressure in the heater E. The air being stored in the various reservoirs in the proportions named, a fire is started in the fire-box F. On the opening of the throttle-valve U the compressed air will be admitted to the cylinders H via the pipes V Y, and the pressure in the heater is of necessity reduced. This reduction of pressure in the heater E is compensated for by admitting air into the said heater from the secondary tank D by the opening of the valve L′ by the engineer in charge. Upon reduction of the pressure in the tank D the engines B B′ are operated by the expansive force of the compressed air of the tank A, which passes therethrough direct to the bank D to establish equilibrium of pressures throughout the apparatus. The passing of this air by operating the engines works the air-compressors C and C′, and the free air compressed thereby is conducted through the conduit-pipe P, connecting-hose S′, and pipe P′ into the heater E. This air from the compressors serves to economize the use of the air from the tank A, and it flows into the heater E until the back pressure from the heater overcomes the force thereof, whereupon the air-compressors stop working, and the engines being checked in their movement no further flow of compressed air takes place between the tanks A and D. When the valve L′ is opened to introduce compressed air from D to the heater E, the operation above described is repeated, the air from tank A resupplying tank D and the free air compressed by the air-compressors being led to the heater E. This operation will continue to be carried on as long as there is enough pressure in the reservoir-tank A to overcome the resistance of the air-compressors C C′ and operate the engines B B′.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The combination with a locomotive-engine and tank, of a compressed-air tank on the tender, air engines and compressors driven thereby also on the tender, a second tank on the locomotive-engine taking the exhaust from the air-engines, a heater also on the locomotive-engine receiving air from the compressor and from the second tank and delivery-pipe from the heater to the driving-cylinder of the locomotive-engine.

In testimony whereof I affix my signature in the presence of two witnesses.

WILSON R. PRATT.

Witnesses:
EDNA F. PRESCOTT,
W. F. SCHOCH.