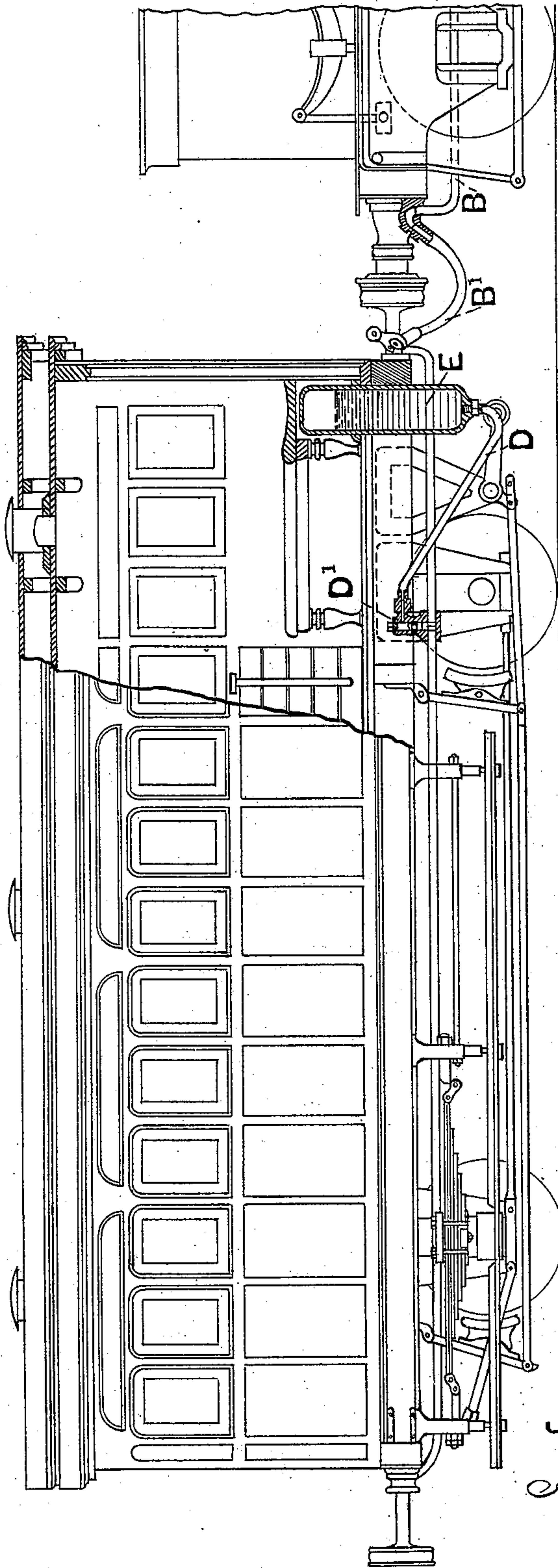


J. WOODS.
Steam-Railway Brake.
No. 227,400. Patented May 11, 1880.

Fig. 1.



WITNESSES:

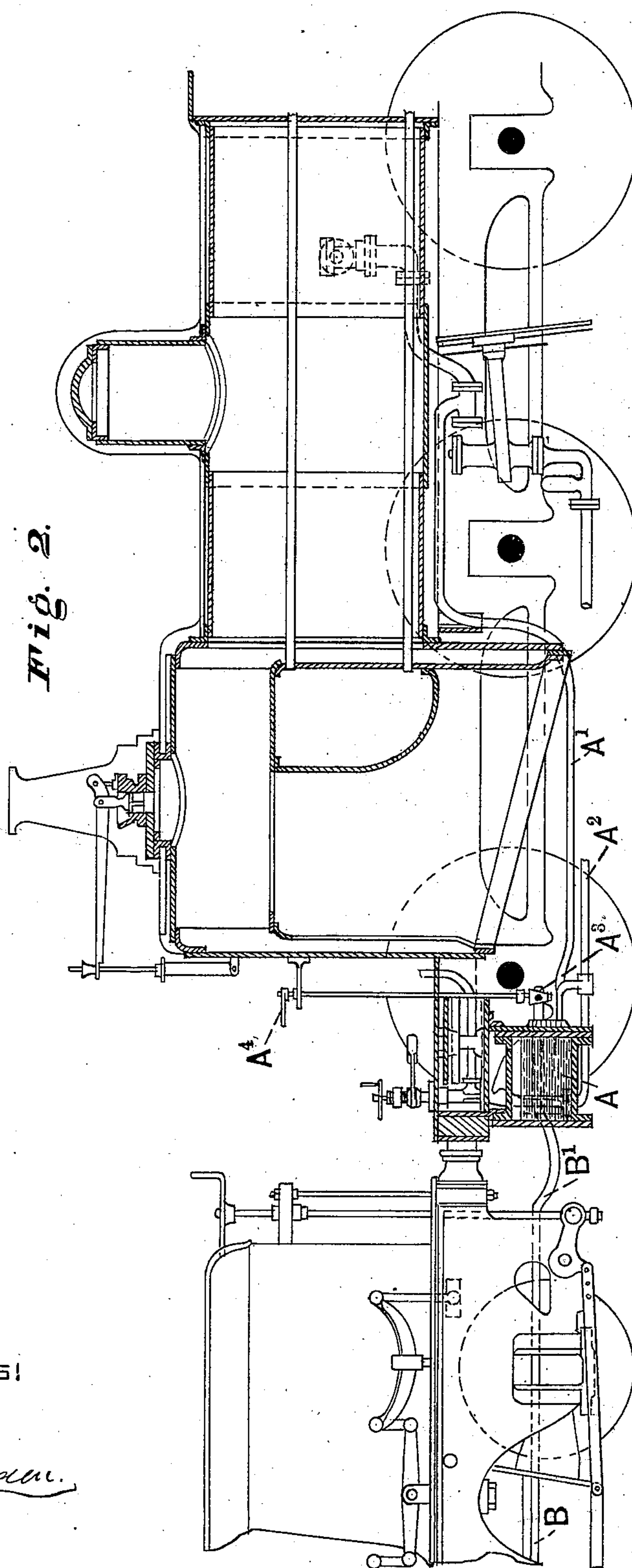
V. L. West
H. Snowden.

INVENTOR:
JOHN WOODS,
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ATTYS.

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Steam-Railway Brake.

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Patented May 11, 1880.



WITNESSES!

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Fig. 4.

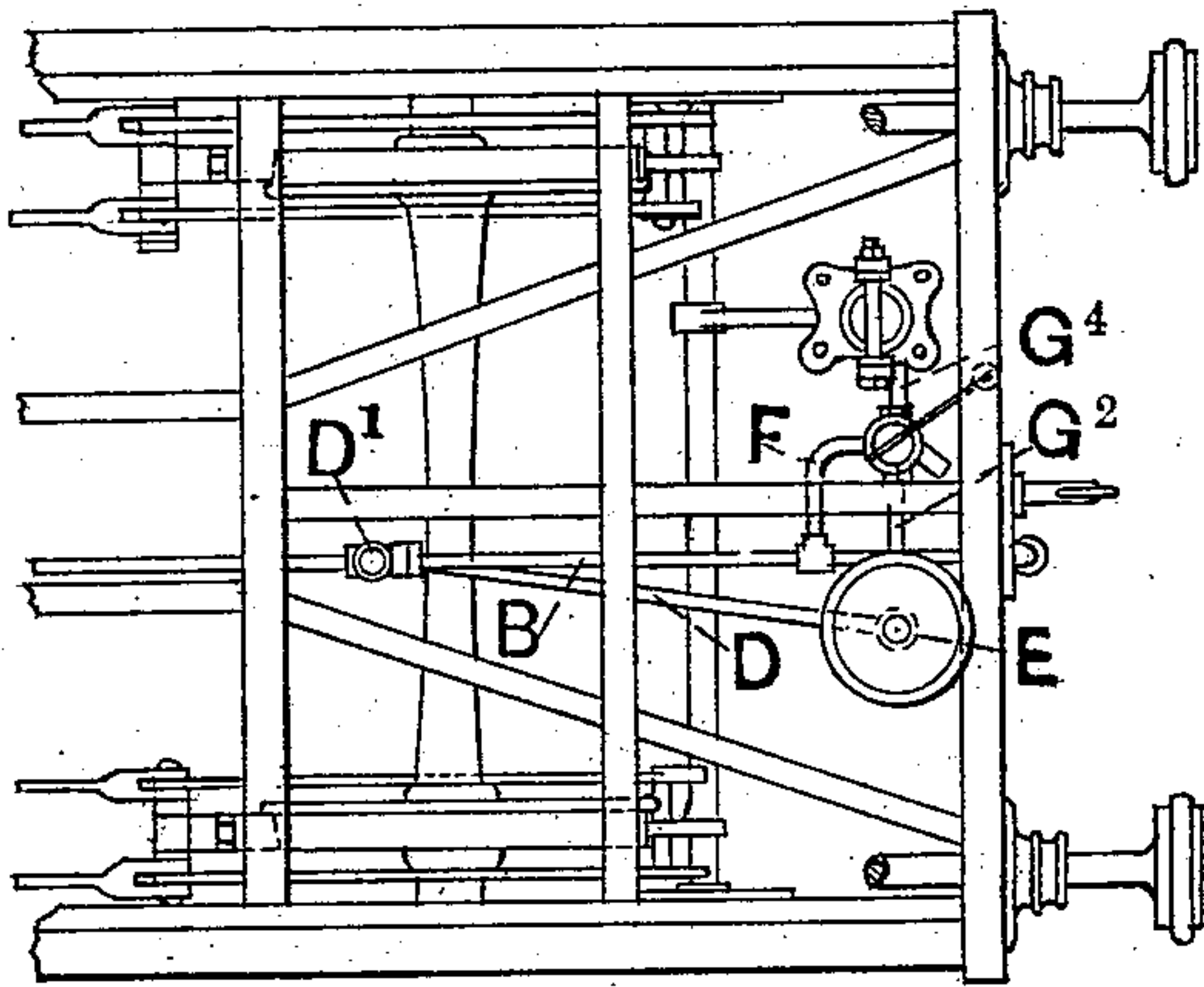


Fig. 3.

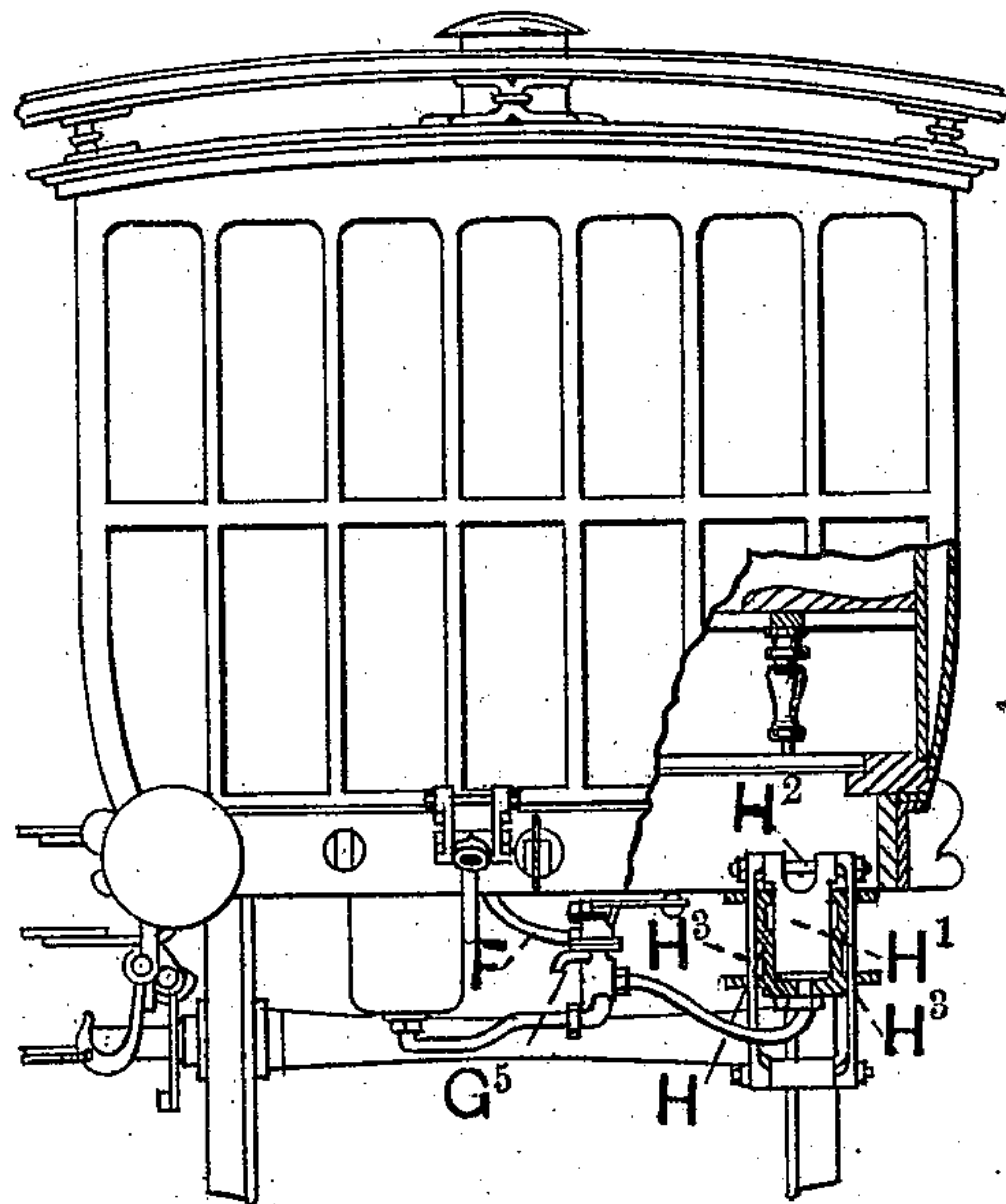


Fig. 6.

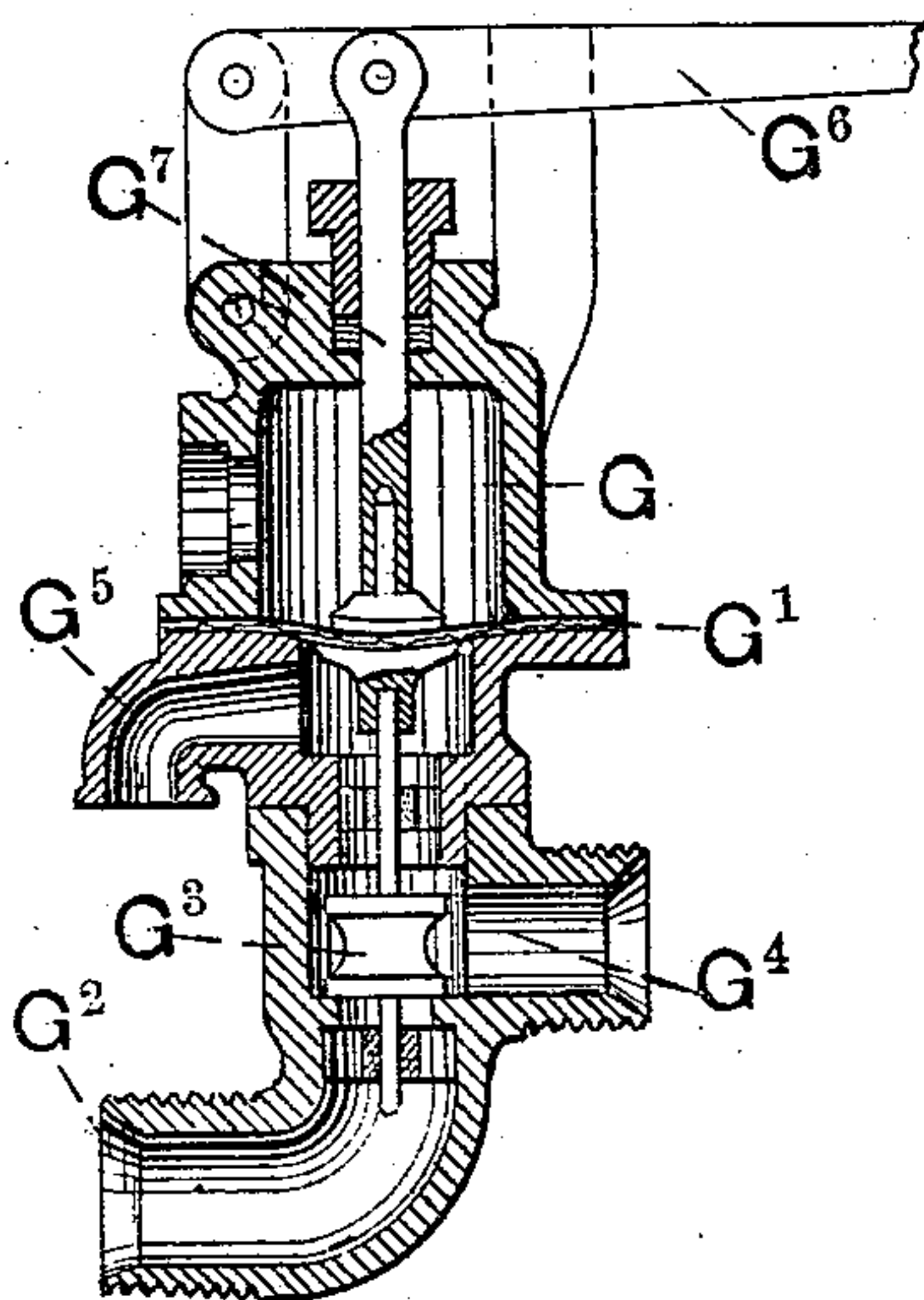


Fig. 5.

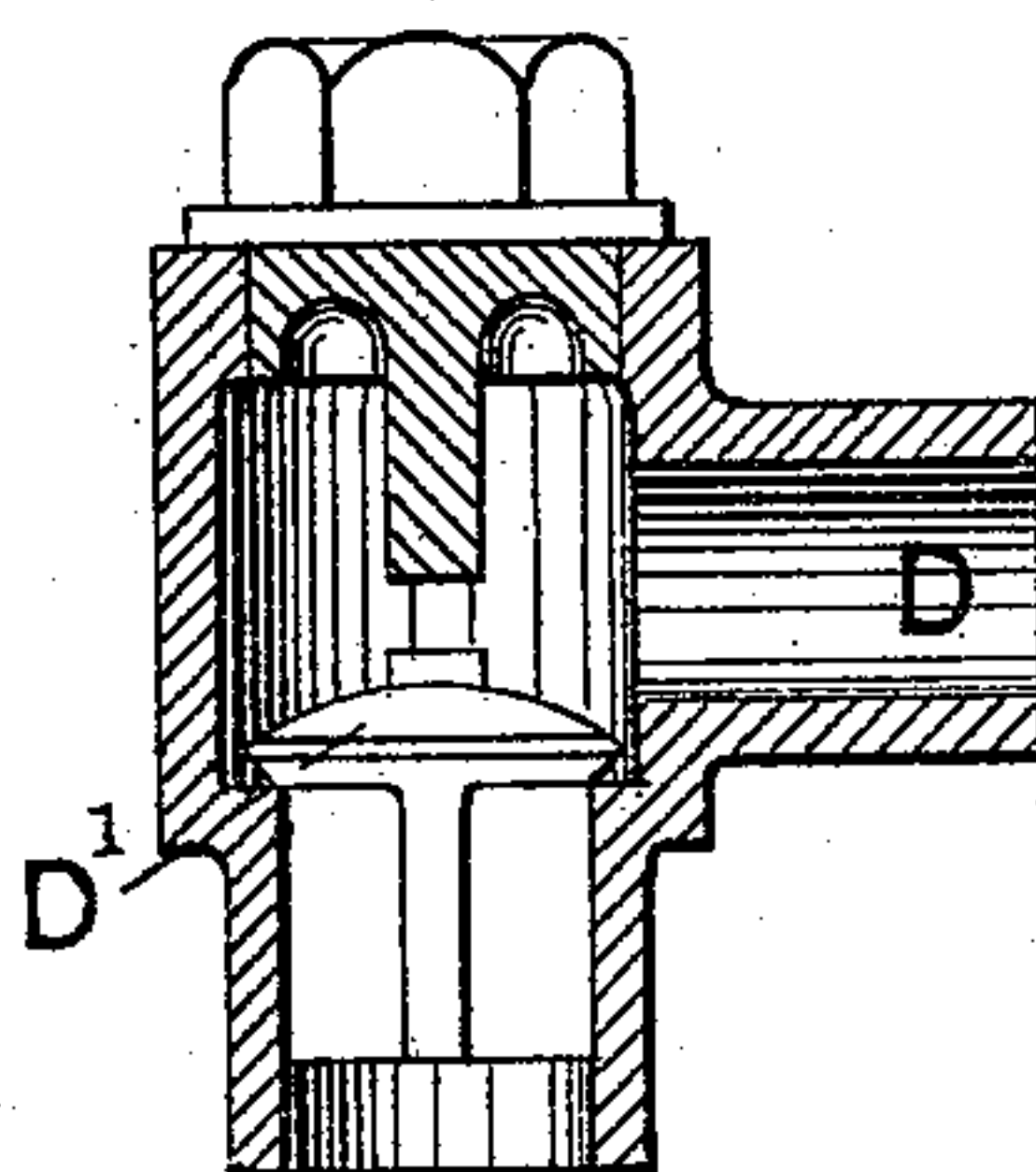
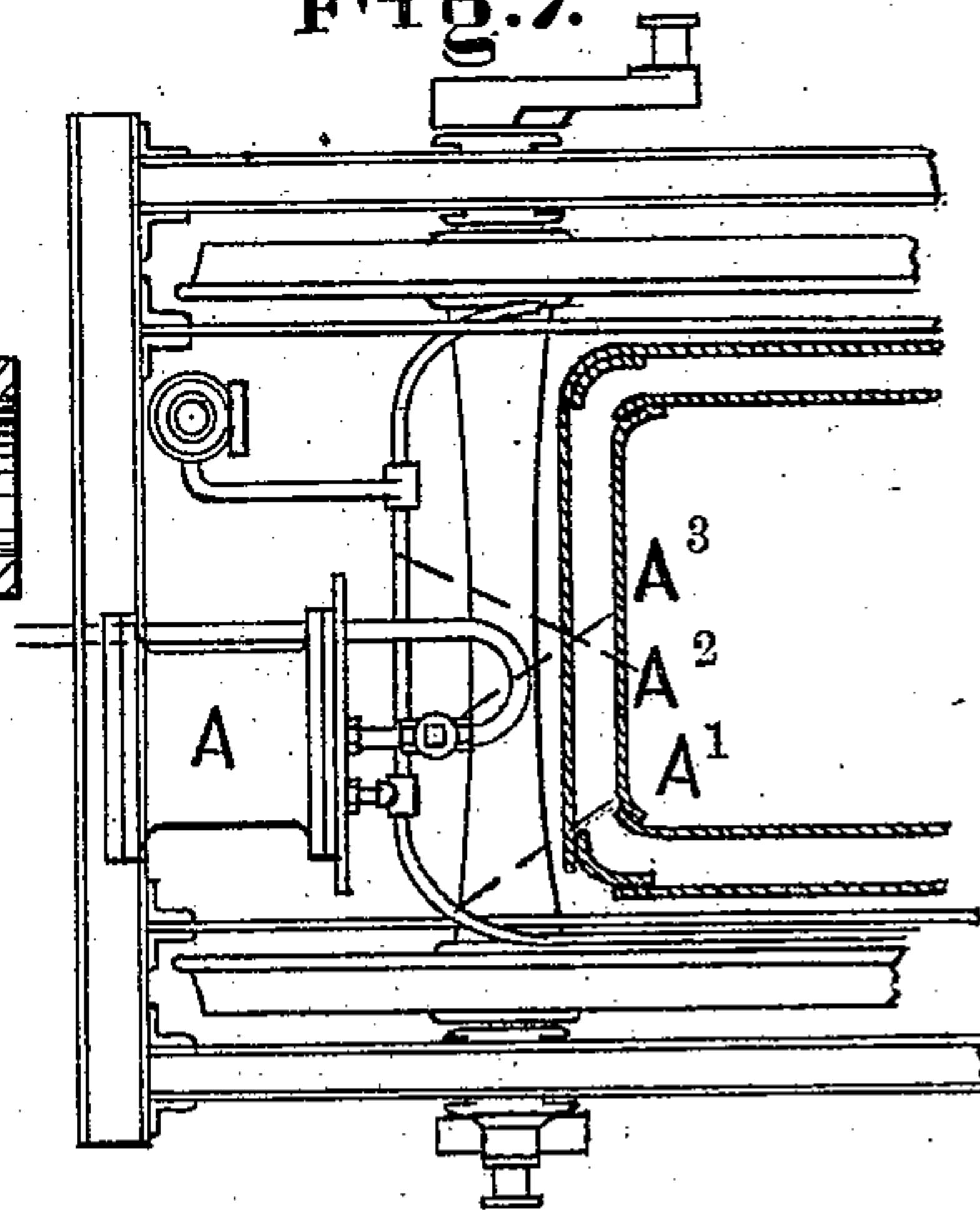


Fig. 7.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN WOODS, OF MELBOURNE, VICTORIA.

STEAM RAILWAY-BRAKE.

SPECIFICATION forming part of Letters Patent No. 227,400, dated May 11, 1880.

Application filed November 12, 1878.

To all whom it may concern:

Be it known that I, JOHN WOODS, of Melbourne, in the Colony of Victoria, (minister of railways,) have invented new and useful
5 Improvements in Railway-Brakes, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

This invention consists of a continuous railway-brake in which the blocks are applied to the wheels by hydraulic pressure from an accumulator attached to each carriage, which pressure is held in check by an equal hydraulic pressure on a line of high-pressure piping common to all such carriage-accumulators, as well
15 as to an engine-accumulator at one end, so that whenever the pressure in such piping is withdrawn, either by accident or design, the pressure held in the carriage-accumulators
20 forces the brake-blocks on the wheels through the medium of certain mechanical contrivances, which may be altered or varied without departing from the nature of my invention.

I supply the pressure to both engine and carriage accumulators by forcing water into the engine-accumulator, and from thence, through a line of high-pressure piping running lengthwise under the under frame of each vehicle and through branch pipes therefrom, to each
30 carriage-accumulator, so that the same pressure is current in both engine and carriage accumulators and along the whole line of piping; and in order to preserve this pressure in the carriage-accumulators I place a check-valve
35 in each of the said branch pipes, so as to prevent its return to the main, thus sealing up a certain amount of pressure, to be used for forcing the brake-blocks on the wheels, as hereinafter described. When the pressure is withdrawn from the main piping I use this sealed
40 pressure by conducting it through a reversing-valve to the face of a plunger connected to the rods which work the brake-blocks.

The pressure in the main piping may be so
45 withdrawn either by purposely opening a cock and allowing the water to escape or by the accidental breaking of such main pipe or its connections.

The pressure to the accumulators may be
50 supplied in any approved manner; but I pre-

fer to supply it either through the ordinary feed-pump of the engine or through its injector. By this means the pressure in the brakes may be regulated up to the pressure of the steam in the boiler, but not beyond it, inas-
55 much as when this is reached the water will run into the boiler and not into the brake mechanism.

In order, however, that my invention may be more distinctly understood, I will now refer to the drawings hereto attached, where—

Figures 1 and 2 show a side elevation (partly in section) of an engine, tender, and railway-carriage with my brake attached; Fig. 3, end view of carriage, with part of the end
65 broken away in order to show more distinctly the working parts; Fig. 4, plan of same; Fig. 5, vertical section of check-valve; Fig. 6, vertical section of self-acting reversing-valve; Fig. 7, plan of engine-accumulator and its con-
70 nections.

A, Figs. 2 and 7, is the engine-accumulator, supplied with water either from the engine-pump, through pipe A', or from the injector, through pipe A². A³ is a three-way cock
75 worked by handle A⁴, Fig. 2. B is the main line of high-pressure piping, B' being its flexible connections between each vehicle of the train. D is a branch pipe leading to the bottom of carriage-accumulator E. D' is check-
80 valve. F is another branch pipe, leading from main pipe to the upper part, G, of self-acting reversing-valve. G' is a flexible diaphragm therein. G² is a pipe from bottom of carriage-accumulator to bottom of said valve. G³ is a
85 valve therein. G⁴ is a pipe leading to the cylinder H, and G⁵ is escape for the waste. H' is a plunger connected by bolt H² to rods H³, which work the brake-blocks. G⁶ is a hand-lever, and G⁷ spindle for forcing valve
90 G³ down to its seat, in order to release the wheels from the blocks when the carriage is detached.

The mode of operation is as follows: I first force a supply of water to the accumulators
95 and piping by either the engine-pump or the injector. This forces all the air out of the piping into the accumulators, where it is compressed, and constitutes the power for working the brake-blocks. This supply is con-
100

tinued until a sufficient pressure is obtained. The brakes are now off, and will remain off so long as the pressure continues in the main piping. This pressure may be purposely withdrawn by the engine-driver turning the handle A^4 , so as to open the cock A^3 and let out the water in the main piping and seal the engine-accumulator. The compressed air in the carriage-accumulator then expands as it forces the water through pipe G^2 against the lower side of valve G^3 , lifting it up, (by reason of the pressure in the upper part, G , having been withdrawn,) and passing through pipe G^4 presses against the face of plunger H' , lifting it up, and so throwing the brake-blocks on the wheels.

The pressure in the main piping may be accidentally withdrawn through the connections becoming disconnected, when the brake-blocks are automatically and instantaneously applied.

When the blocks are required to be withdrawn the three-way cock A^3 is again opened, so as to admit the pressure held in the engine-accumulator to the main piping, and also to admit the fresh supply of water forced, as before, with this result: that it presses down the flexible diaphragm G^2 in the self-acting reversing-valve, forcing the lower valve, G^3 , down to its seat, thus again cutting off the connection between the carriage-accumulator and the cylinder H . The water in the cylinder then escapes through waste-port G^5 , and the plunger H' falls to its original position by its own weight, (or by means of a spring,) freeing the brake-blocks from all pressure. This operation of freeing the brake-blocks from the wheels is almost instantaneous.

It is evident that the brake might also be brought within the power of the guard by the addition of a discharge-cock at the end, or at

any point along the main piping, if a handle were provided conveniently fitted for working it.

I attach a pressure-gage to the engine-accumulator, conveniently fitted for examination by the engine-driver, and I reserve to myself the right of pumping air into either of the accumulators should I consider it desirable.

By this method of construction and arrangement I am enabled to produce a railway-brake which answers all the requirements demanded by scientific men. It is continuous, simple, and cheap, safe and instantaneous in its action, and is, moreover, perfectly automatic in case of accident.

I desire it to be distinctly understood that I do not claim to be the inventor of hydraulic railway-brakes, nor of any of the parts of the apparatus shown in my drawings separate and apart from their arrangement and connection in the manner and for the purposes substantially as herein described and explained; and I desire, further, that it may also be distinctly understood that I do not confine myself to the precise mechanical arrangement shown in my drawings, as it is evident that it might be altered or varied without departing from the nature of my invention; but

I claim as my invention—

The combination of the engine-accumulator A , main piping B , branch pipes D , carriage-accumulators E , check-valve D' , branch pipe F , self-acting reversing-valve, pipes G^2 and G^4 , cylinder H , and plunger H' , constructed and arranged as shown, and for the purpose described.

Witnesses:

JOHN WOODS.

EDWD. WATERS,
W. S. BAYSTON.