

(No Model.)

2 Sheets—Sheet 1.

F. H. RICHARDS.
COMPRESSED AIR TRAMWAY SYSTEM.

No. 452,051.

Patented May 12, 1891.

Fig. 1

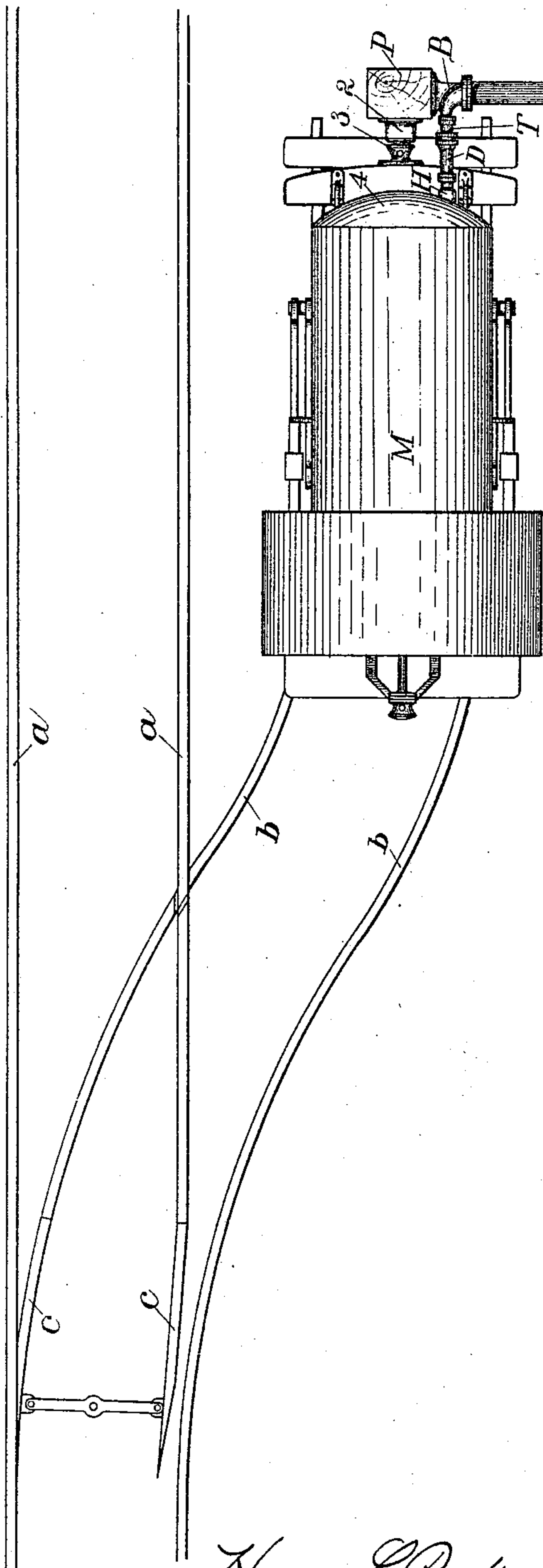
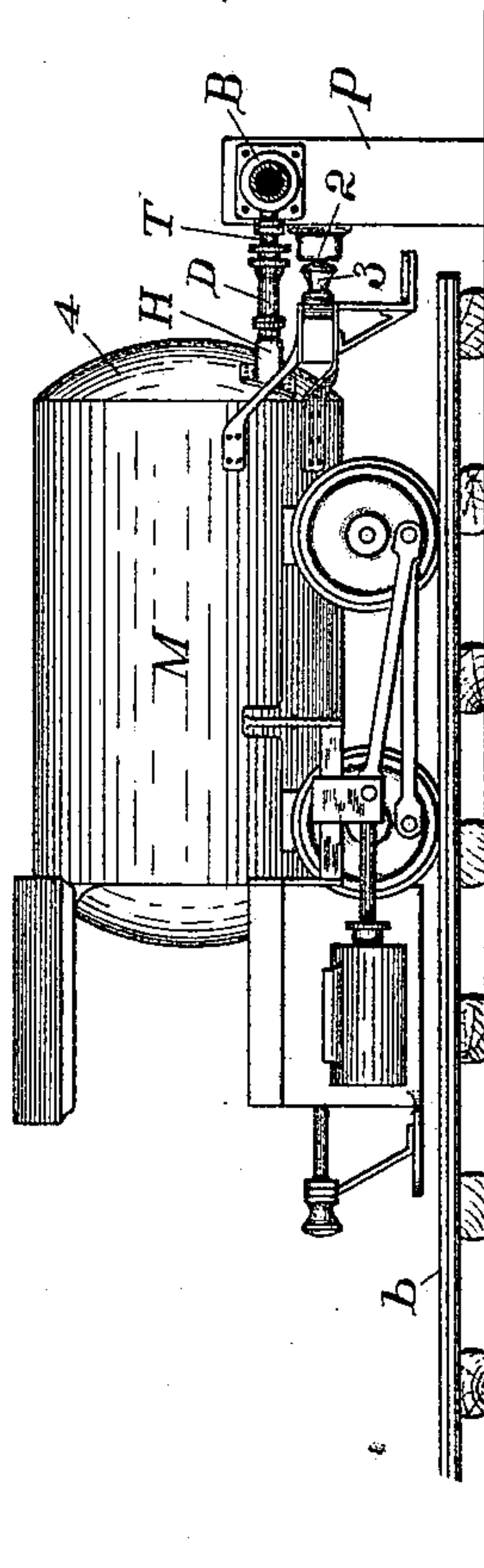


Fig. 2



Witnesses:

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L. C. Heermann.

Inventor:

Francis H. Richards.

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Fig. 5

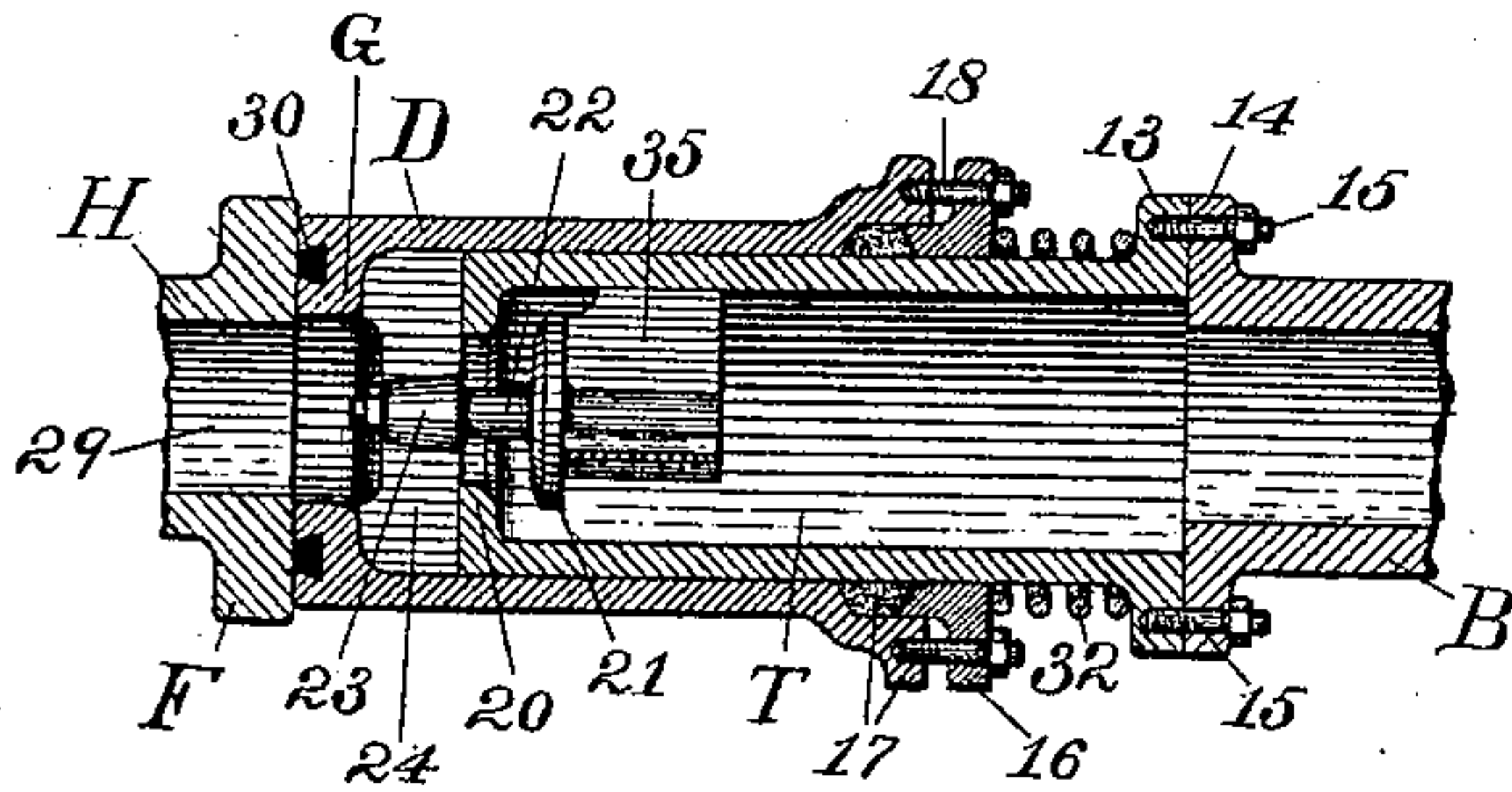


Fig. 4

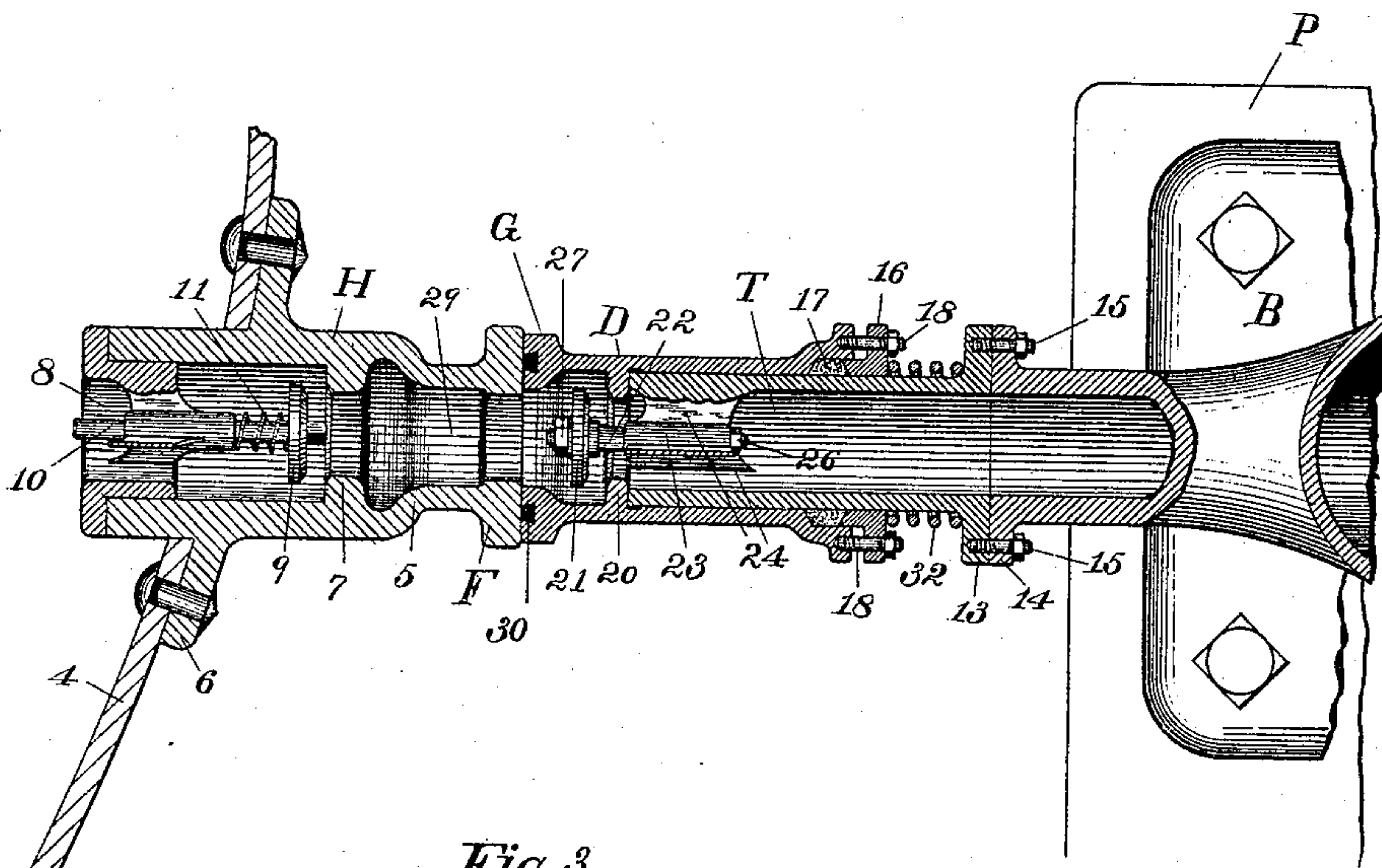
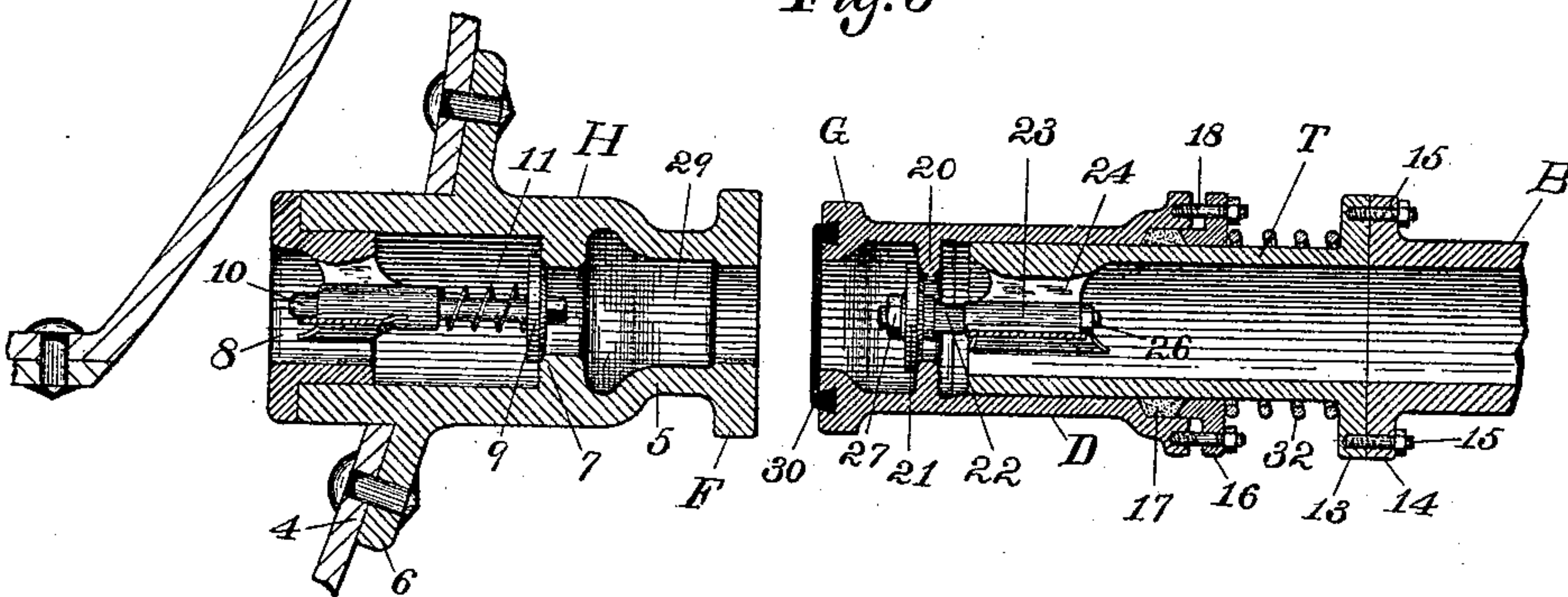


Fig. 3



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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT, ASSIGNOR TO ECKLEY
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COMPRESSED-AIR TRAMWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 452,051, dated May 12, 1891.

Application filed January 10, 1889. Serial No. 295,999. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Compressed-Air Tramway Systems, of which the following is a specification.

This invention relates to compressed-air tramway systems in which the motors are supplied from one or more reservoirs located along the line of tramway, the object being to furnish means or apparatus for supplying the compressed air to the motors in a more expeditious and convenient manner than heretofore employed.

To this end the invention consists in the improvements hereinafter more fully set forth.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view (drawn on a small scale) showing apparatus embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical sectional view (on a larger scale) through the supply-pipe and valves, showing the apparatus not in use. Fig. 4 is a similar view showing the apparatus in use. Fig. 5 illustrates one obvious modification within the scope and limits of my invention.

Similar characters designate like parts in all the figures.

The improved tramway system shown in the drawings consists of a tramway-line, a motor running on said line and provided with a receiver-head having a supply-passage normally closed by a suitable inwardly-opening check-valve, a supply-pipe leading to a point adjacent or contiguous to said tramway-line, and a delivery apparatus connecting with said pipe and having an outlet-valve adapted to be automatically opened by the movement of a head constituting a part of said apparatus, said delivery apparatus being supported in position to meet and deliver into said receiver-head on the approach of the motor and to limit the advance of the motor on said line.

My said improvements being especially designed for use in mines, I have shown the same in connection with a motor M, supposed

to be adapted for such service and to run on the tramways *a a* and *b b*.

The line *a a* represents the main line of a tramway system, while *b b* represents a "siding" or branch line, *c c* being an ordinary switch opening from the one to the other.

At the terminus of the track I place a post P, provided with a suitable buffer 2 to receive the impact of the draw-head 3 of the motor, and thus limit the forward movement thereof in the ordinary manner.

On the front plate 4 of the motor-tank (or, if preferred, on any other suitable part of the motor accessible from a forward direction) I place the receiver-head through which the compressed air (or other compressed gas for motive-power) is supplied to the tank. This head may be of various particular forms and arrangements; but the construction shown in the drawings I consider a suitable one for the purpose. This head, designated in a general way by H, consists of a tubular part 5, having a flange 6 for attaching the same to the motor-tank, and having the supply-passage 29 and valve-seat 7, and means (as the "spider" 8 or the like) for supporting the check-valve 9 by its stem 10. A spring 11 is or may be provided for assisting to close said valve. The forward end of the head H is preferably enlarged or flanged, as at F, to secure a larger surface on which to receive the impact of the retreating head of the delivery apparatus, and thus to provide for a proper alignment of the said heads with each other should the tank vary a little, as in ordinary practice, in its position relative to the track.

The delivery apparatus consists, essentially, of two parts, one fixed and one movable or "retreating," the delivery-passages extending through both parts and having in one part a delivery-valve operated from or by the other part. This apparatus, like the head H, may be constructed of various forms and arrangement, of which that shown in the drawings I deem suitable for the required work or service. The movable or retreating head D is bored to slide on a delivery-tube T, which is carried by a bracket and elbow B, that is supported by the post P, and is connected (by a pipe 12 or otherwise) with a source of sup-

ply—as, for instance, the reservoir R. Said fixed part T is or may be connected to said part B by means of the ordinary flanges 13 14, formed one on each of said parts and secured together by bolts 15.

To prevent leakage, the delivery-head D is or may be provided with a gland 16 and packing 17 and bolts 18, which together constitute a well-known form of “stuffing-box” for the said purpose. As shown in Figs. 3 and 4, the head D has a valve-seat 20 for the delivery-valve 21, which is carried by a stem 22, that is affixed to the tube T by the central hub 23 and wings 24. In practice the said valve may be removably secured to or in said hub 23 by a nut 26, and the valve to the said stem by the nut 27. Said valve by these means serves as a stop to limit the forward movement of the head D, and may be readily removed when it is desired to take the said head off from the said fixed part T. The front (or forward) end of the head D, I enlarge about as shown at G, similar to the flange F, and insert therein a projecting ring 30, Fig. 3, of rubber or the like packing material. This packing-ring, however, may be fitted into the flange F, or a ring may be used in each of said flanges. When the motor approaches the delivery-head and drives the same back, as shown in Fig. 4, this packing-ring is forcibly compressed, as in Fig. 4, and (if well made) forms an air-tight connection between the flanges F and G. To secure a sufficient or an increased resistance for this purpose, I provide a resistance spring 32, which also serves to overcome in part or wholly the friction of the said stuffing-box, and thus assist in closing the valve. These several functions in the form of apparatus shown in the drawings are performed in some measure by the pressure of air within the head D against the inner side of the annular valve-seat 20. Thus the pressure of the air-supply and the force of the spring co-operate to perform the same work.

As an illustration of the manner in which the said apparatus may be modified within the scope and limits of my invention, I have shown in Fig. 5 a reversed arrangement of the delivery-valve. In this figure the hub 23 and wings 24 are formed within the head D, and the valve-seat 20 within the part T. The said valve 21 is also here shown provided with guide-wings 35, that are fitted to slide within said part T in a well-known manner.

In operating my improvements the motor-driver or “engineer,” when it is necessary to replenish the supply of air in the motor-tank, switches the motor onto the side line *b b* and runs it against the buffer and holds it there, which he may do by putting on the usual brakes (not shown) or by omitting to cut off the supply of air to the motor-cylinders. In approaching the buffer the head H meets the head D and forces the latter to retreat from its position in Fig. 3 to its position in Fig. 4,

thereby opening the delivery-valve and permitting the high-pressure air from the supply-pipe to flow through into the motor-tank. A sufficient supply of air being received therein, the motor is retracted and the spring or the internal pressure aforesaid (or both, as herein shown) force forward the movable head D and close the valve. Thus by means of my improvements the motor-engineer is enabled to quickly supply his machine with compressed air, accomplishing the same in a few seconds and avoiding the delays and difficulties incident to the cumbrous modes heretofore employed.

In another application, Serial No. 296,000, filed January 10, 1889, I have described an improvement on the apparatus shown herein, and in which the delivery-head has a swinging movement; but said improvement is deemed to be within the claims of the present application and to be covered thereby.

Having thus described my invention, I claim—

1. In a tramway system, the combination, with the tramway-line and a supply-pipe or reservoir at a point adjacent to said line, of a motor adapted to run on said line and provided with a receiver-head, substantially as described, a delivery apparatus connected with said source of supply and located to meet said receiver-head on the approach of the motor and to limit the advance of the motor on said line, said delivery apparatus having the retreating delivery-head adapted to be driven back by the motor, and the delivery-valve within said delivery-head, the delivery-head being connected with the delivery-valve to open said valve during the retreating movement of said head, substantially as described.

2. In apparatus for supplying compressed-air motors, the combination of a fixed tube located to deliver toward the approaching motor, the sliding delivery-head on said tube, and the delivery-valve within said head and connected, substantially as described, to be closed by the forward movement and opened by the retreating movement of said head on said tube, substantially as described.

3. In apparatus for supplying compressed-air motors, the combination of the tube T, the movable delivery-head D, having a valve-seat 20 therein, and the valve 21, connected to said tube and taking its bearing on said seat, substantially as described.

4. In apparatus for supplying compressed-air motors, the combination of the fixed tube, the delivery-head movable on said tube, the delivery-valve supported and seated substantially as shown, and the resistance-spring acting to move forward said head to close said valve, substantially as described.

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Witnesses:

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