(No Model.) 2 Sheets—Sheet 1.

L. J. GENETT.

FLUID PRESSURE BRAKE MECHANISM FOR RAILWAY CARS.

No. 563,158. Patented June 30, 1896.

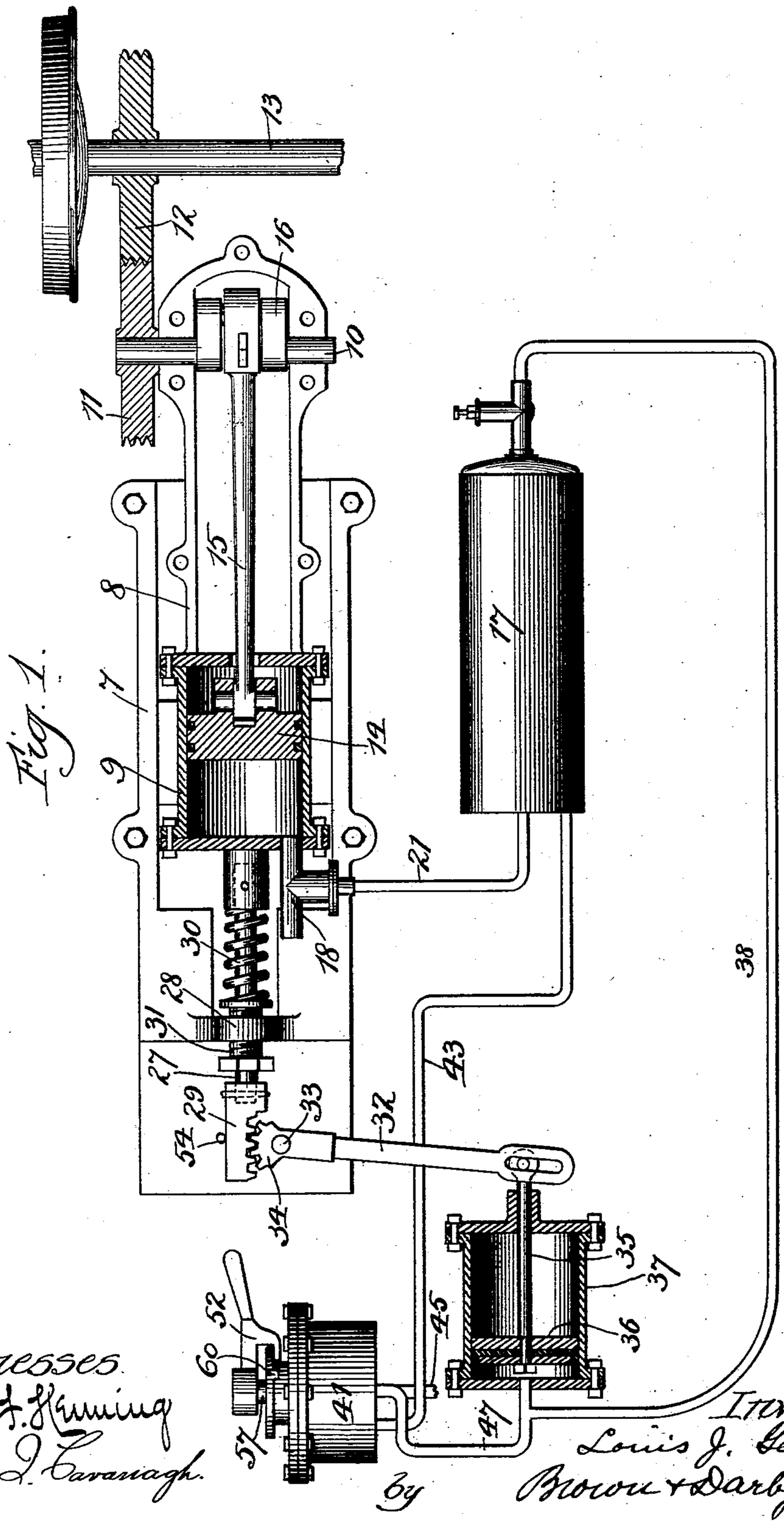

Fig. 1.

Witnesses.
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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

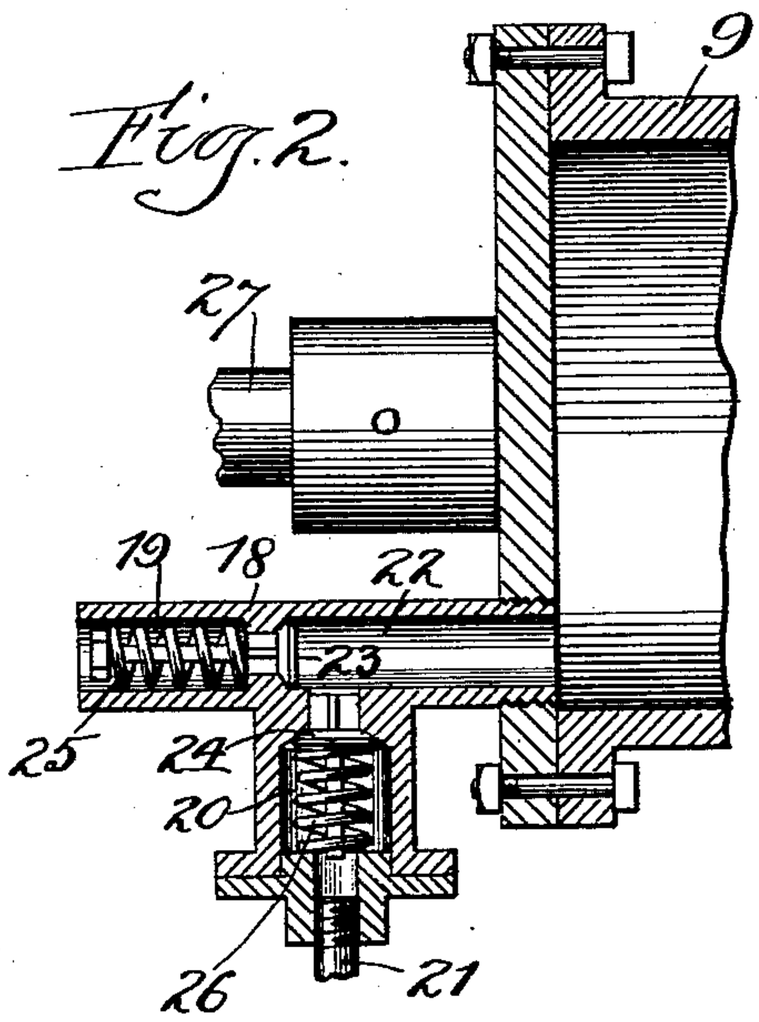


Fig. 3.

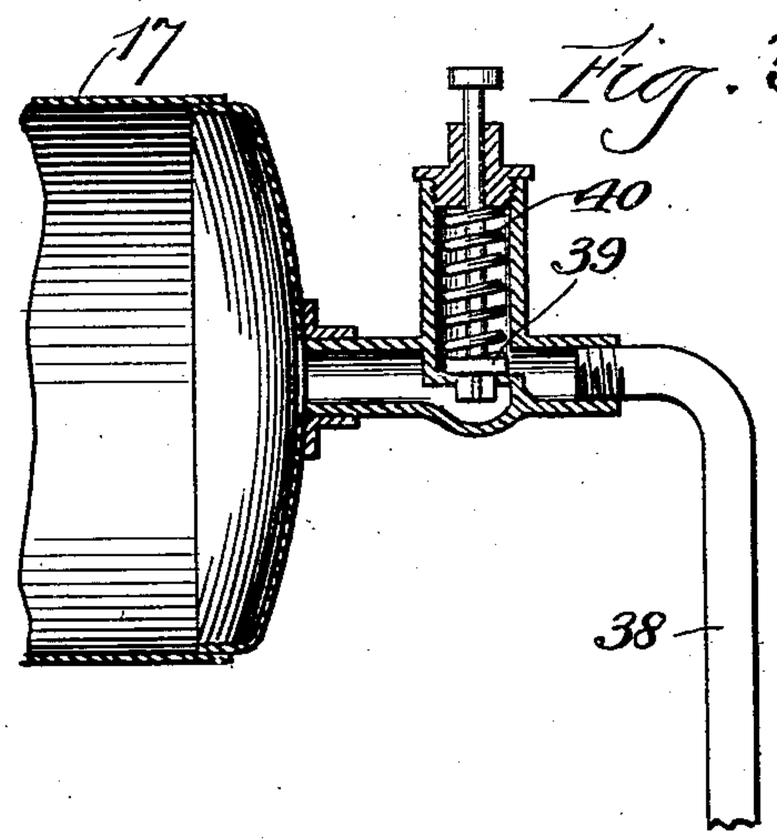


Fig. 4.

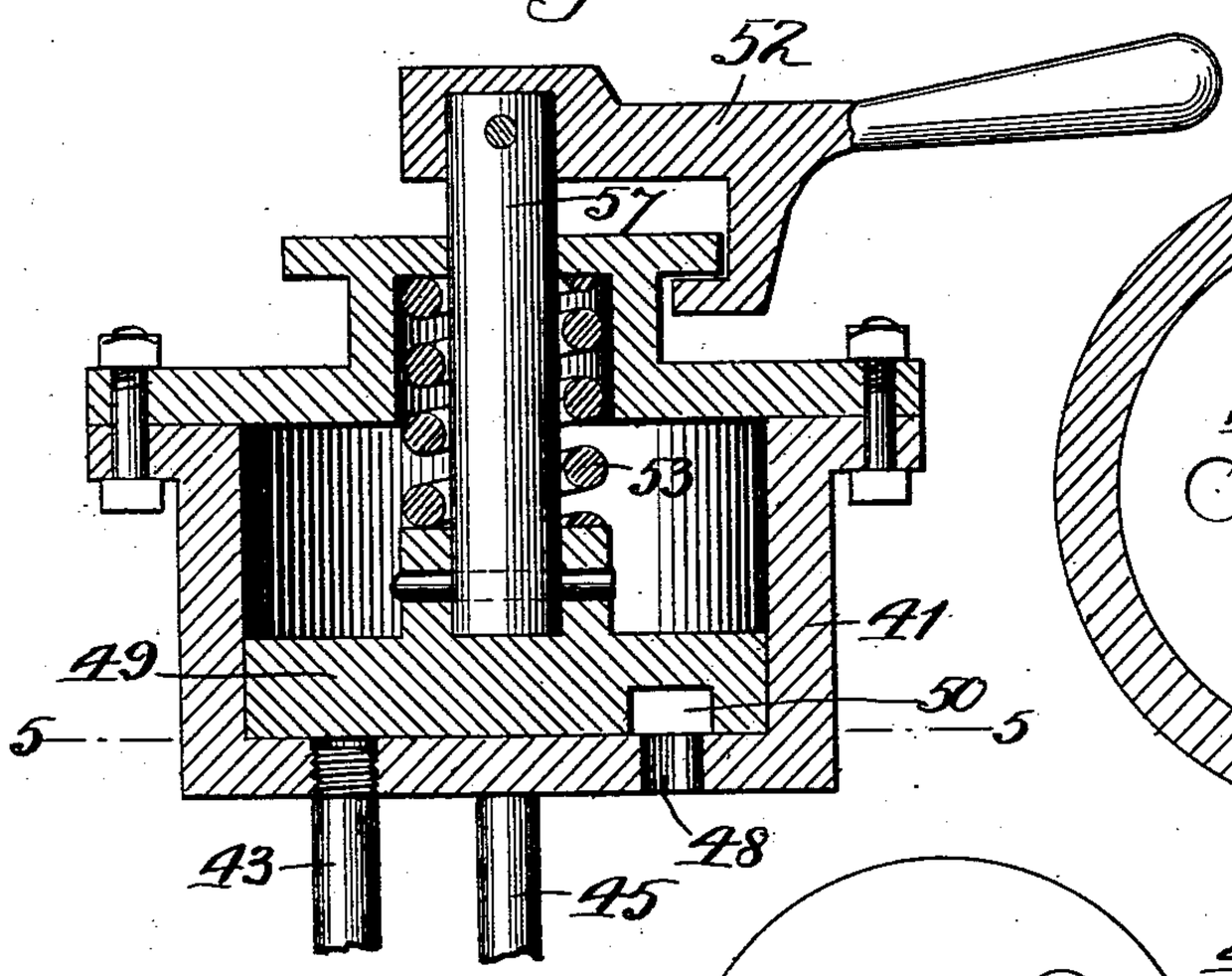


Fig. 5.

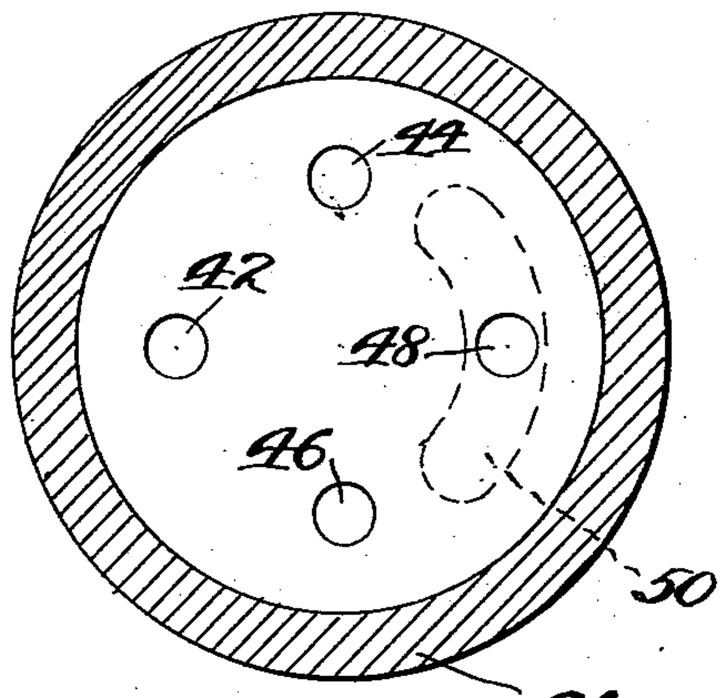
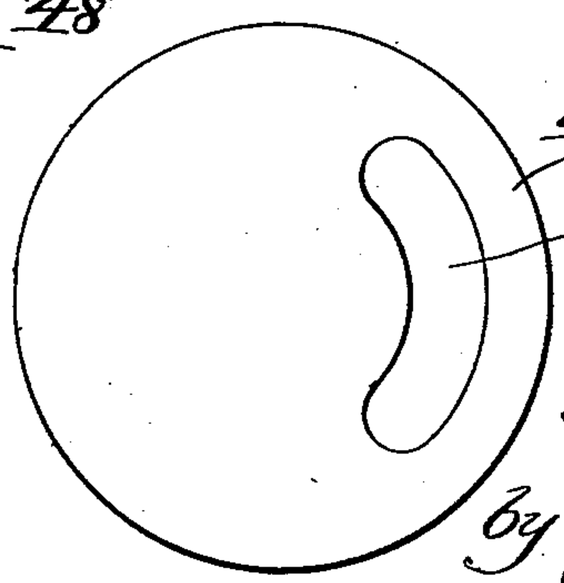


Fig. 6.



Witnesses.
Wm. L. Fleming
H. L. Cavanagh.

Inventor
Louis J. Genett
By Brown & Darby Attys

UNITED STATES PATENT OFFICE.

LOUIS J. GENETT, OF CHICAGO, ILLINOIS, ASSIGNOR TO GEORGE B. FREI, OF MARQUETTE, MICHIGAN.

FLUID-PRESSURE BRAKE MECHANISM FOR RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 563,158, dated June 30, 1896.

Application filed May 18, 1895. Serial No. 549,754. (No model.)

To all whom it may concern:

Be it known that I, LOUIS J. GENETT, 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 Fluid-Pressure Brake Mechanism for Railway-Cars, of which the following is a specification.

This invention relates to fluid-pressure brake mechanism for railway-cars, and is designed as an improvement upon my application for air-brake mechanism, Serial No. 524,643, filed October 1, 1894.

The object of the invention is to simplify the construction of fluid-pressure brake mechanism for railway-cars, and to render the same more positive and efficient in action.

The invention consists, substantially, in the construction, combination, location, and relative arrangement of parts, all as will be more fully hereinafter described, as shown in the accompanying drawings, and finally more specifically pointed out in the appended claims.

Referring to the accompanying drawings and to the various views and reference-signs appearing thereon, Figure 1 is a plan view of an apparatus embodying my invention, parts being in horizontal section and the brake-valve shown in side elevation. Fig. 2 is a detail view in section of the end of the air-pump cylinder, illustrating the construction and arrangement of air supply and delivery nozzles and valves. Fig. 3 is a detail view in section of the end of the air-reservoir, showing the construction and arrangement of the relief check-valve. Fig. 4 is a detail view in section of a form of brake and release valve. Fig. 5 is a detail view in section illustrating the openings to the brake and release valve chamber. Fig. 6 is a detailed bottom plan view of the valve for controlling the openings in the brake and release valve chamber.

The same reference-signs are used to designate the same part wherever it occurs throughout the several views of the drawings.

Reference-sign 7 designates a suitable casting bolted or otherwise suitably or conveniently secured upon the truck-frame of a railway-car, and constructed to slidingly receive a housing 8, carrying an air-pump 9 and a shaft 10. Upon shaft 10 is mounted a gear-wheel 11, adapted to be moved in a direction to engage or disengage a gear 12, mounted upon a car-axle 13. The cylinder 9 is adapted to receive a piston 14, reciprocated by means of a connecting-rod 15 from a crank 16 upon shaft 10.

I will now describe the construction whereby the reciprocations of piston 14 draw a charge of air into the cylinder 9 when said piston is moved in one direction, and discharge said charge of air into the reservoir when said piston is moved in the opposite direction, particular reference being had to Figs. 1 and 2, wherein reference-sign 18 designates a casting having two passages 19 20 therein, passage 19 communicating with the outer air, and passage 20 communicating with the air-reservoir 17 through a suitable connection 21, both of said passages 19 20 communicating with a common chamber or pipe 22, which opens into the interior of cylinder 9. A valve 23 is arranged to close the passage 19, and a valve 24 is arranged to close the passage 20.

Suitable springs 25 26 may be arranged and provided with any suitable means of adjustment for normally holding valves 23 24 to their seats. Valve 23 is arranged to be seated upon an outward movement thereof from the cylinder 9 and to be opened upon a reverse movement thereof, and valve 24 is arranged to be seated upon an inward movement toward the passage 22, leading to the cylinder 9, and to be unseated upon an outward movement therefrom. By this construction it will be observed that when piston 14 is moved by its connecting-rod 15 in one direction in cylinder 9 a charge of air is drawn into cylinder 9 from the outer atmosphere through passage 19 and chamber or passage 22, the valve 23 opening for that purpose and the valve 24 being closed by the same movement; and upon a reverse movement of piston 14 in the opposite direction valve 23 is seated to close the passage 19, and the charge of air in cylinder 9 is forced out of said cylinder through chamber or passage 22, unseating valve 24, seating valve 23, and through passage 20 and pipe connection 21 into the air-reservoir 17. By this construction only a single opening in the cylinder-head is required, thereby reduc-

ing to a minimum the openings where objectionable leakages may occur.

By the operation of the air-pump as above described air is supplied to the reservoir 17. In order to prevent overcharging of the air-reservoir 17, it is important that the operation of the air-pump be automatically arrested.

I will now describe an exceedingly simple and effective construction for arresting, by excess of pressure in the air-reservoir 17, the action of the pump.

As above explained, the housing 8, carrying the pump-actuating shaft 10 and its gear 11, is slidingly mounted in the casting 7. A rod 27 is suitably secured to the cylinder 9 or housing 8 at one end, and, after passing through a suitable guide 28, carries at the opposite end a rack-bar 29. A spring or other suitable tension device 30 serves to normally maintain the housing 8 in a position for gears 11 and 12 to engage each other, the tension of spring 30 being adjusted by means of a threaded sleeve 31, against the end of which the spring 30 bears. A lever 32, pivoted as at 33, adjacent to the rack 29, carries a segmental gear 34, having gears adapted to engage the gear-teeth upon rack 29, as shown in Fig. 1. The opposite end of lever 32 is arranged to be loosely engaged by the end of the piston-rod 35, actuated by a piston 36 in an auxiliary cylinder 37, adapted to connect, through suitable pipe connection 38, with the air-reservoir 17. Arranged in connection 38 is a check-valve 39, provided with a tension device or spring 40, arranged to bear thereon and to maintain said valve 39 normally seated to close the pipe connection 38.

The tension of spring 40 is adjusted to the point where the valve 39 will be opened by air-pressure from the reservoir 17 when the air-pressure in said reservoir exceeds a given point, thereby permitting the connection 38 to be opened, and hence the piston 36 in the auxiliary cylinder 37 to be actuated, thereby rocking lever 32, and through the engagement of the gear 34, carried thereby, with the rack 29, moving the connecting-rod 27 against the action of spring 30, and thereby sliding the housing 8 in its guides in casting 7, and hence withdrawing gear 11 from engagement with gear 12, and thereby arresting the action of the air-pump, and hence arresting the further delivery of air to the reservoir 17. The parts will remain in this relative position with the pump in inoperative position until the pressure in the auxiliary cylinder 37 is released, thereby permitting spring 30 to return the pump to operative position, that is, permitting the gears 11 and 12 to again engage each other, this action of the spring 30 also returning the piston 36 in the auxiliary cylinder 37 to its normal position at the air-receiving end of said auxiliary cylinder through the engagement of the rack 39 with the gear 34 upon pivoted lever 32, it being understood that when the pressure in the reservoir 17 falls below the amount at which valve 39 is operated said valve 39 again seats itself and cuts off the further supply of air from said reservoir to said auxiliary cylinder.

I will now describe the construction and arrangement and mode of operation of a simple apparatus for releasing the piston 36 in the auxiliary cylinder 37 in order to permit the air-pump to be again brought into action, particular reference being had to Figs. 1, 4, 5, and 6. Reference-sign 41 designates the brake-valve-operating chamber carried by the car and conveniently arranged for the gripman or motorman to operate the same in order to admit the air-pressure from the reservoir 17 to the brake-operating mechanism. Communicating with the valve-chamber 41 is an opening 42, communicating with the air-reservoir 17 through a suitable pipe or other connection 43. A suitable opening 44 in the valve-chamber 41 communicates through a suitable pipe or other connection 45 with the brake-setting mechanism. An opening or port 46 in valve-chamber 41 communicates through a suitable pipe or other connection 47 with an auxiliary cylinder 37, and an opening or port 48 in the valve-chamber 41 communicates with the outer air. In the form shown the valve-chamber 41 comprises a circular chamber, and the several ports or openings 42 44 48 46 are conveniently arranged therein with respect to each other, but preferably in a circular path with respect to each other. A valve-plate 49, provided with a slot or recess 50 in one face thereof, is arranged in said chamber 41 to control said openings or ports in said valve-chamber, the recess 50 being of a length to simultaneously include or to open communication between two adjacent openings when moved to the proper position therefor, as will be understood by reference to Fig. 5. The plate 49 is mounted upon and carried with a stem 57, adapted to be engaged by a suitable handle or other operating device 52, whereby said stem may be rocked to move said plate 49 in any desired direction. Any suitable stop may be provided for limiting the movement of said arm 52 when desired. A spring 53 may, if desired, be arranged to bear upon plate 49, in order to maintain said plate tightly against its seat in the valve-chamber.

From the above description it will be seen that when plate 49 is moved to simultaneously bring the openings 44 and 42 into communication with each other, through the recess 50, air will be supplied from the reservoir 17, through the connection 43, to the valve-chamber 41, through opening 42, the recess 50, the opening 44, and connection 45 to the brake-setting mechanism. When it is desired to release the brake-setting mechanism, movement of plate 49 in a suitable direction closes or cuts off communication through opening 42 to the reservoir, and permits the air contained in the brake-pipes to escape through the opening 44, recess 50, and

opening 48 to the outer air when the plate is moved a sufficient distance. When a sufficient quantity of air stored in the reservoir 17 is withdrawn therefrom through the process above described and utilized for setting the brake mechanism to reduce the air-pressure in the reservoir 17 to a point below effective working pressure, the gripman or motorman, by moving the handle 52 in the proper direction and a proper distance, will cause the openings 46 and 48 in valve-chamber 41 to communicate with each other through recess 50 in plate 49, thereby permitting the air contained in the auxiliary cylinder 37 to exhaust through connection 47, opening 46, recess 50, and opening 48 to the outer air, leaving the piston 36 free to move toward the end of the cylinder 37, receiving a connection 38 from the reservoir 17, and hence permitting spring 30 to come into play to move the air-pump into position to be actuated by the engagement of its driving-gears 11 12.

Any suitable guide, as 54, may be provided to resist the thrust of the engagement of gear 34 with the rack-gear 29 and to guide the rack 29 in its movements.

I have found it convenient in practice to employ friction-gears 11 and 12 with grooved engaging peripheries, as shown in Fig. 1, as gears so constructed are deemed more efficient and subjected to less injurious wear than other styles of friction-gearing.

From the foregoing description it will be seen that when the air-pump has supplied the air-reservoir with a sufficient pressure of air the pump-driving mechanism is disengaged, and remains disengaged until the air-pressure in the reservoir 17 is reduced to a point where its efficiency as an operating medium of the brake-setting mechanism is impaired, when, through the simple manipulation of the same valve that is employed to set the brake mechanism, the air-pump is again placed in operative position with respect to its driving mechanism, and more air is forced into the reservoir to supply the degree of pressure therein, and hence the driving-gears of the pump are subjected to the least possible amount of wear, as the moment the proper amount of pressure is attained in the reservoir the pump-driving mechanism is disengaged, and so remains until the pressure in the reservoir is reduced by the withdrawal therefrom of the air for use.

By the construction above described an exceedingly simple and directly-acting mechanism is provided for automatically disengaging the pump-driving mechanism.

While I have shown a specific form of mechanism embodying my invention, I desire it to be distinctly understood that I do not limit myself to the specific details of construction shown and described, as many variations and alterations therein would readily suggest themselves to persons skilled in the art to which this invention relates and still fall within the spirit or scope of my invention; but,

Having now described the object and nature of my invention and a form of apparatus embodying the same, and having explained the function and mode of operation of such apparatus, what I claim as new and of my own invention, and desire to secure by Letters Patent of the United States, is—

1. In an air-brake mechanism, an air-reservoir, a pump for supplying air thereto, guides for said pump, means for actuating said pump, devices for moving said pump bodily back and forth in its guides to connect or disconnect the same with its operating means, said devices normally acting to connect said pump with its driving means, and means for releasing said devices when the same are actuated to move said pump out of connection with its operating means; as and for the purpose set forth.

2. In an air-brake mechanism, an air-reservoir, a pump, guides therefor, means for operating said pump, devices actuated by excess of pressure in said reservoir for moving said pump back and forth in said guides and into and out of connection with the pump-operating means, and means for controlling the action of said devices; as and for the purpose set forth.

3. In an air-brake mechanism, an air-reservoir, a pump, a casing carried thereby, a shaft mounted in said casing, gearing for actuating said shaft from the car-axle, means for actuating the pump from said shaft, guides for said pump, devices actuated by excess of pressure in said reservoir for moving said pump, casing and shaft bodily in said guides to disengage said gearing, and means under the control of the gripman for moving said pump, casing and shaft in said guides to engage said gearing; as and for the purpose set forth.

4. In an air-brake mechanism, an air-reservoir, a pump, guides for said pump, a shaft carried by said pump for actuating the same, gearing for actuating said shaft from the car-axle, devices actuated by excess of pressure in said reservoir for moving said pump in said guides, thereby moving said shaft out of engagement with said gearing, means normally tending to move said pump and shaft in the opposite direction, and means under the control of the gripman for releasing said devices; as and for the purpose set forth.

5. In an air-brake mechanism, an air-pump, including a cylinder and piston, gearing for actuating said piston, guides in which said cylinder may be moved back and forth to engage or disengage said piston-actuating gearing, and means, under the control of the motorman for moving said cylinder back and forth in said guides; as and for the purpose set forth.

6. In an air-brake mechanism, an air-pump, means for actuating the same, guides in which said pump may be moved bodily means for automatically moving said pump in said

guides to disengage the same from its operating means, and means, under the control of the gripman for moving said pump in said guides to engage the same with its operating means; as and for the purpose set forth.

7. In an air-brake mechanism, a pump, guides therefor an air-reservoir, an auxiliary cylinder, a pipe communicating between said reservoir and auxiliary cylinder, a piston arranged in said auxiliary cylinder and adapted to be actuated by excess of pressure in said reservoir, a pivoted lever connected with said piston and having gear-teeth formed thereon, a rack carried by said pump, adapted to be engaged by said gear-teeth, whereby, when said piston is actuated, said pump is moved back and forth in said guides; as and for the purpose set forth.

8. In an air-brake mechanism, a movable pump, guides therefor a rack attached thereto, driving mechanism for said pump, means for normally maintaining said pump in operative relation with respect to its driving-gear, an air-reservoir, an auxiliary cylinder and piston, adapted to be actuated by excess of pressure in said reservoir, a pivoted lever actuated by said auxiliary piston, carrying gear-teeth adapted to engage said rack, whereby said pump is moved in said guides into or out of operative relation with respect to its driving-gear when said auxiliary piston is moved; as and for the purpose set forth.

9. In an air-brake mechanism, a movable pump-cylinder, a piston-gearing for driving the same, means for normally maintaining said gearing in engagement, a rack carried by said pump-cylinder, a pivoted lever carrying gear-teeth, adapted to engage said rack, means for rocking said lever, whereby said pump-cylinder is moved in a direction to disengage said piston-driving gearing, an air-reservoir, and connections whereby said lever is rocked by excess of pressure in said reservoir; as and for the purpose set forth.

10. In an air-brake mechanism, a movable pump-cylinder, a piston mounted therein, gearing for driving said piston, means for normally maintaining said gearing in operative relation, a rack carried by said pump-cylinder, a pivoted lever carrying gear-teeth adapted to engage said rack to move said cylinder and piston out of operative relation with respect to the piston-driving gearing, an auxiliary cylinder and piston adapted to rock said lever, an air-reservoir, and connections whereby said auxiliary piston is moved in one direction by excess of pressure in said reservoir, and means for releasing said auxiliary piston; as and for the purpose set forth.

11. In an air-brake mechanism, an air-reservoir, a movable pump for supplying air thereto, guides for said pump an auxiliary cylinder and piston, said piston adapted to be moved in one direction by excess of pressure in said reservoir, connections between said auxiliary piston and pump for moving the latter in said guides out of action and means for releasing said auxiliary piston, comprising a valve, and means for operating the same, whereby said pump is moved in said guides into action; as and for the purpose set forth.

12. In an air-brake mechanism, a movable pump, an air-reservoir, an auxiliary cylinder and piston, connections between said auxiliary piston and pump for throwing the latter out of action guides in which said pump moves connections whereby said auxiliary piston is moved in one direction by excess of pressure in said reservoir, and means for releasing said piston, comprising a valve-chamber and valve, constructed and suitably arranged to open said auxiliary cylinder to the air; as and for the purpose set forth.

13. In an air-brake mechanism, a movable pump, guides adapted to receive said pump, gearing for actuating said pump, means normally tending to move said pump in its guides in a direction to maintain said gearing in operative relation, a reservoir, an auxiliary cylinder and piston, connections between said auxiliary piston and pump for moving the latter in said guides in a direction to disconnect said pump-actuating gearing, connections whereby said auxiliary piston is actuated in one direction by excess of pressure in said reservoir, and means for releasing said auxiliary piston, comprising a valve-chamber opening to the outer air and connections between said valve-chamber and auxiliary cylinder, whereby the excess of pressure from said reservoir is released to the outer air; as and for the purpose set forth.

14. In an air-brake mechanism, and in combination with suitable guides an air-pump, adapted to be received in said guides, a reservoir and an auxiliary cylinder and piston, and means for moving said pump in said guides, thereby disengaging the driving-gearing of the pump by the actuation of said piston, and connections whereby said piston is actuated by excess of pressure in said reservoir, of a valve-chamber having port-openings communicating respectively with the brake mechanism, with the reservoir, auxiliary cylinder and the outer air, and a valve arranged to control said port-openings; as and for the purpose set forth.

15. In an air-brake mechanism, and in combination with a framework having guides formed therein, a movable pump adapted to be received in said guides, gearing for actuating said pump, a reservoir, an auxiliary cylinder and piston, and connections between said auxiliary cylinder and said pump for moving the latter in said guides to connect or disconnect said gearing, a single valve-chamber communicating respectively with the brake mechanism, the reservoir, the auxiliary cylinder and the outer air, and a valve arranged in said chamber adapted to

throw any two of said communications into connection with each other; as and for the purpose set forth.

16. In an air-brake mechanism, a frame-work having guides, a movable pump adapted to be received in said guides, gearing for driving the same from the car-axle, means for moving said pump in said guides in a direction to normally maintain said gearing in engagement, an air-reservoir, an auxiliary cylinder communicating with said reservoir, a piston arranged therein, adapted to be actuated by excess of pressure in said reservoir, connections between said piston and pump, whereby, when said piston is actuated by excess of pressure, said pump is moved to disengage the same from its driving-gearing, and means under the control of the gripman for opening said auxiliary cylinder to the outer air, whereby said pump is moved to engage its driving-gearing; as and for the purpose set forth.

In witness whereof I have hereunto set my hand this 16th day of April, 1895.

LOUIS J. GENETT.

In presence of—
S. E. DARBY,
M. I. CAVANAGH.