(No Model.) 5 Sheets—Sheet 1.

T. J. HOGAN.

AIR BRAKE.

No. 482,058. Patented Sept. 6, 1892.

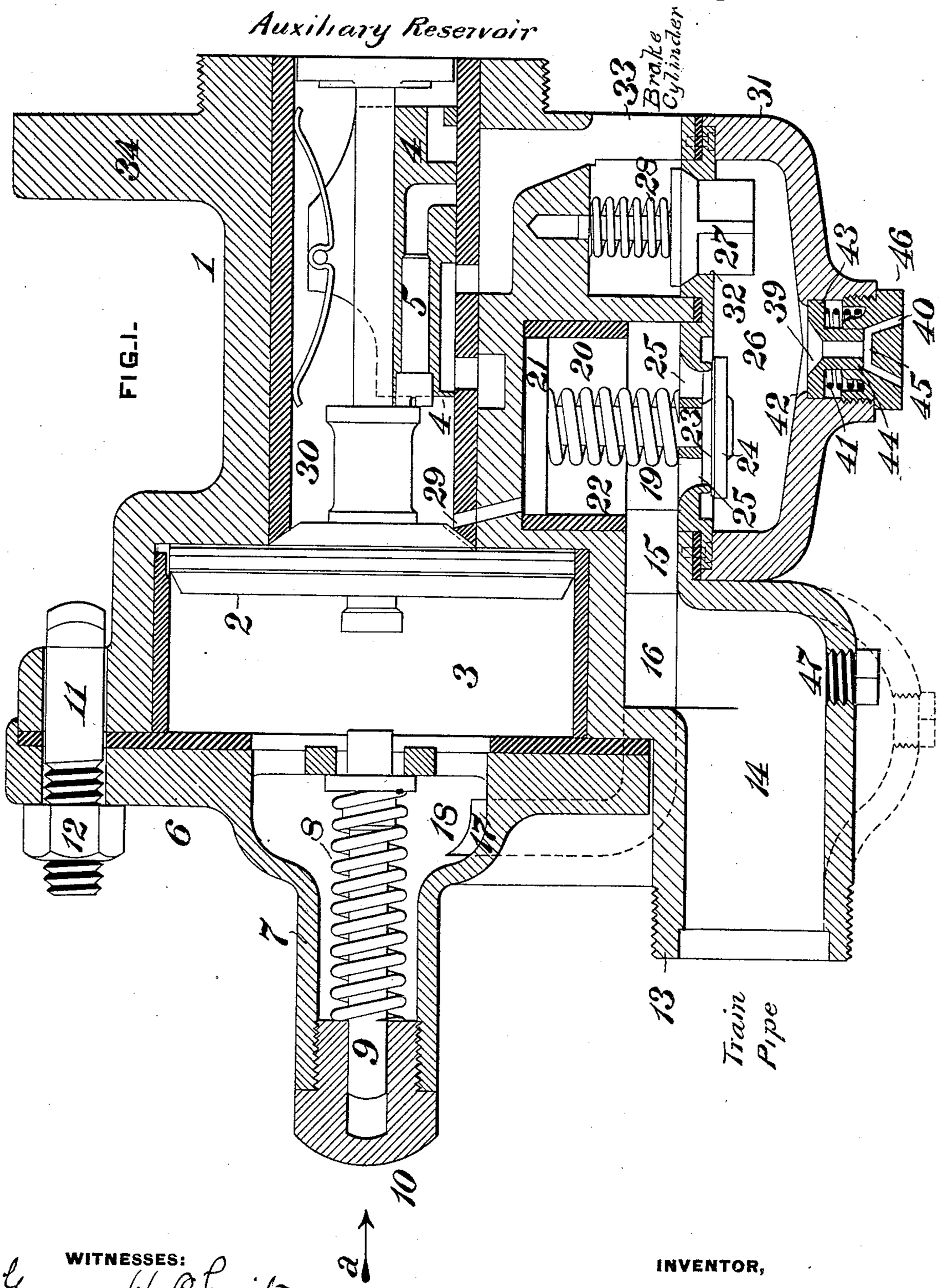

FIG. 1.

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5 Sheets—Sheet 2.

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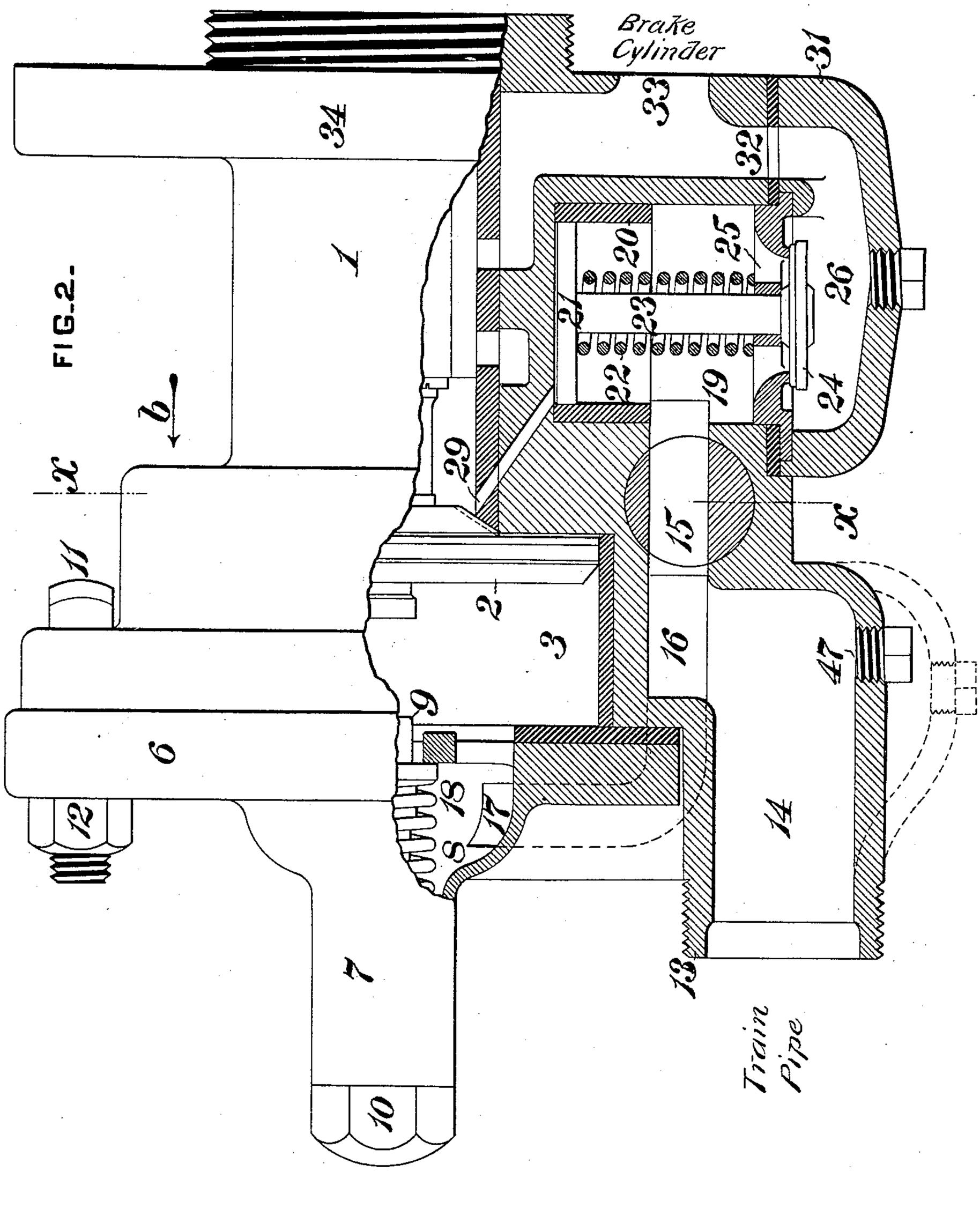
FIG. 2.



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(No Model.) 5 Sheets—Sheet 3.

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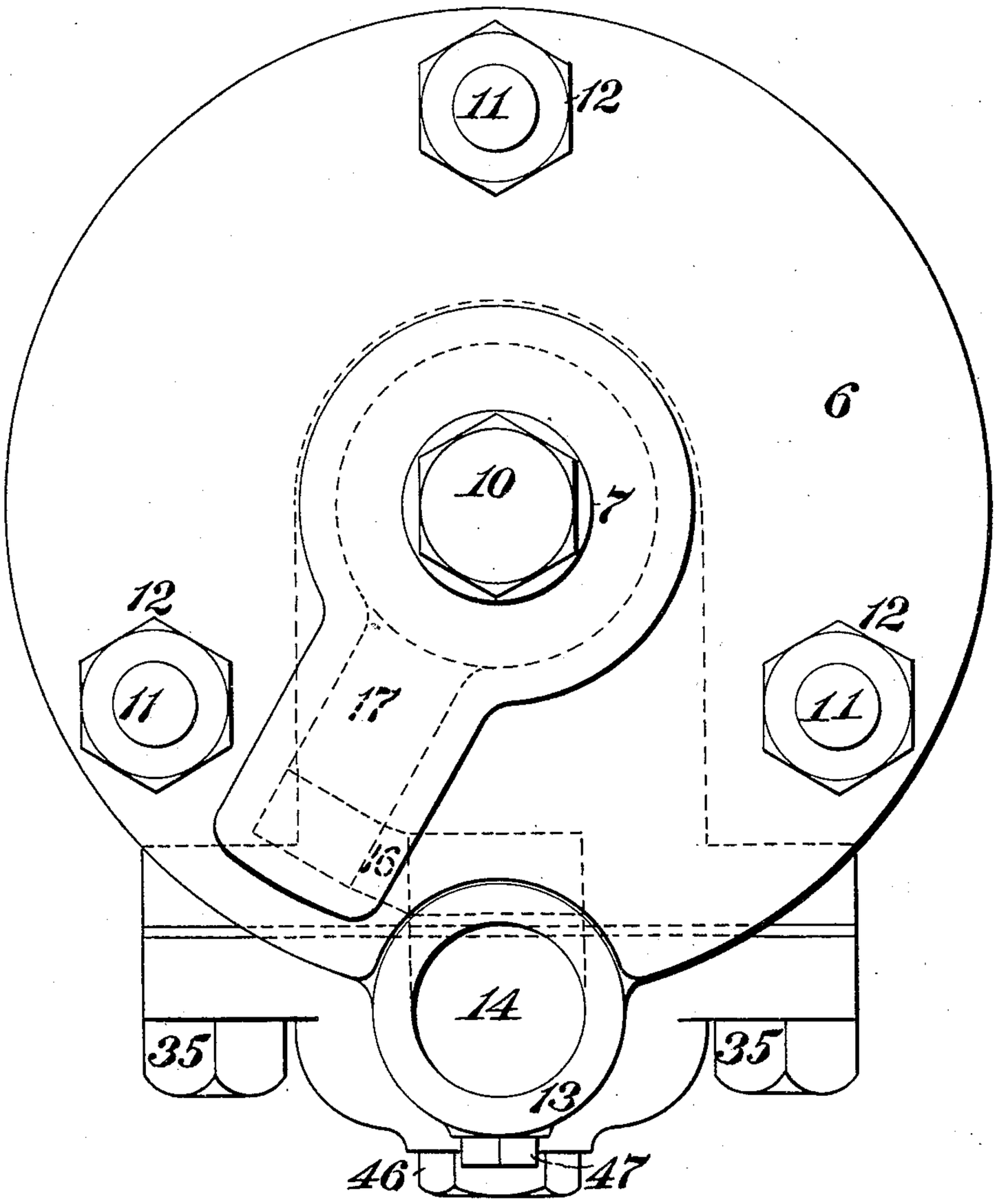
No. 482,058. Patented Sept. 6, 1892.

FIG. 3.



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(No Model.) 5 Sheets—Sheet 4.

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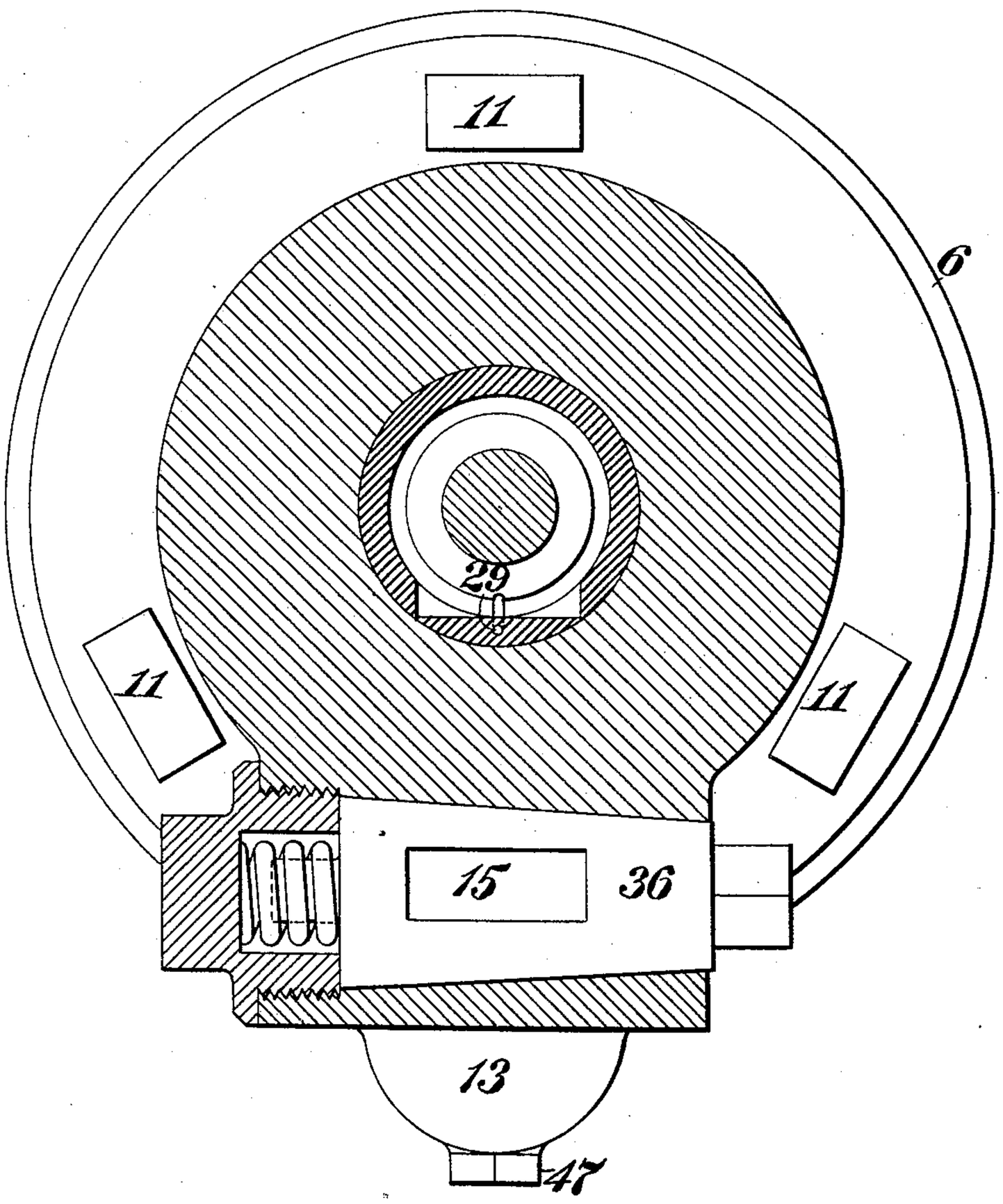
No. 482,058. Patented Sept. 6, 1892.

FIG. 4.



WITNESSES:

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(No Model.) 5 Sheets—Sheet 5.

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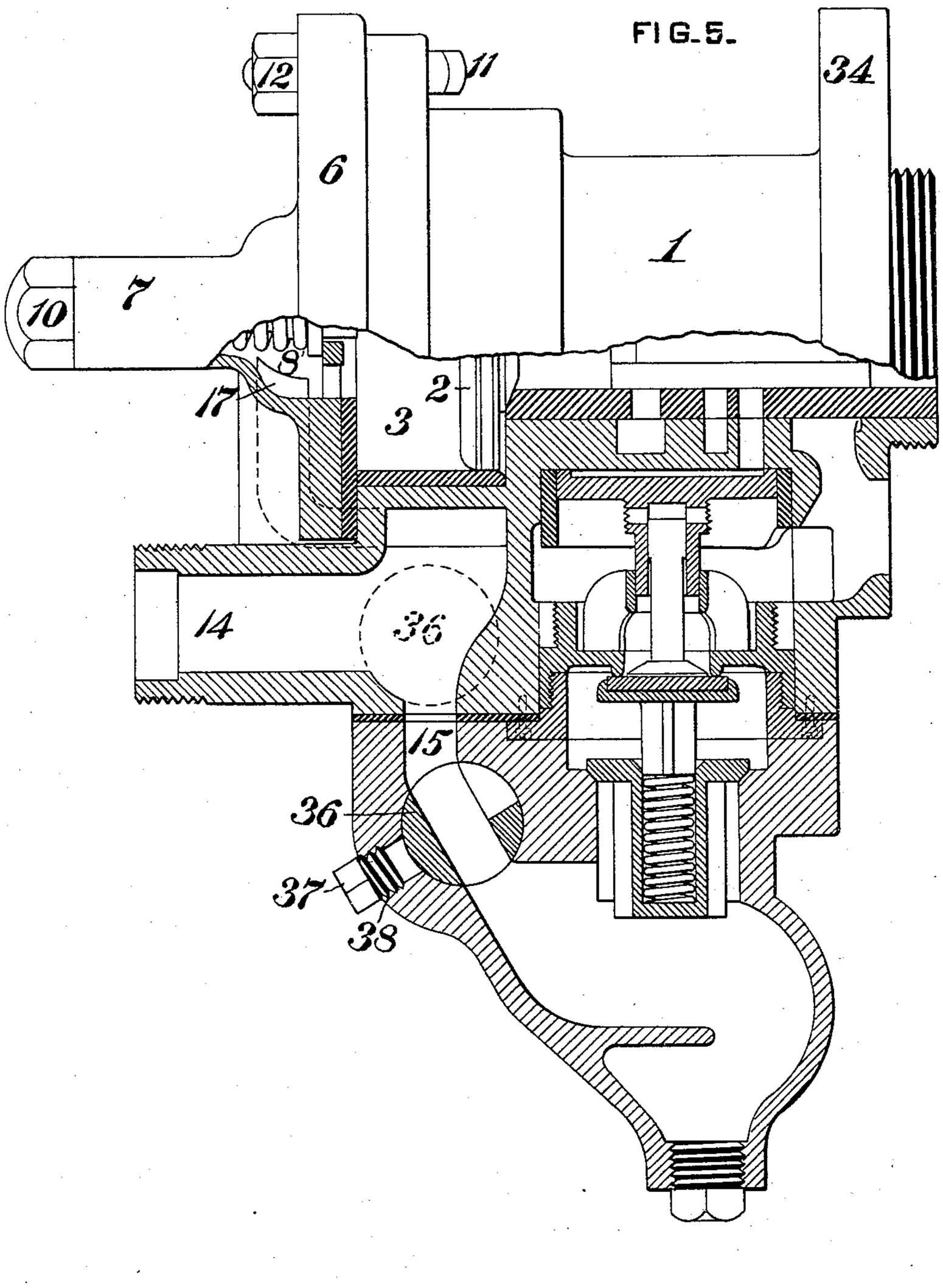
No. 482,058. Patented Sept. 6, 1892.

FIG. 5.



WITNESSES:

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UNITED STATES PATENT OFFICE.

THOMAS J. HOGAN, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF SAME PLACE.

AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 482,058, dated September 6, 1892.

Original application filed June 20, 1891, Serial No. 396,937. Divided and this application filed August 4, 1892. Serial No. 442,108. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. HOGAN, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Air-Brakes, of which improvements the following is a specification.

The object of my invention is to improve the construction of quick-acting triple valves of the kind shown in patents to Westinghouse, No. 376,837, dated January 24, 1888, and No. 448,827, dated March 24, 1891, whereby the train-pipe air is released to the brake-cylinder on a reduction of train-pipe pressure; and to this end it consists in improvements whereby the branch-pipe connection is brought nearer to the bottom of the car and the quick-action devices are more easily accessible for inspection or repair without disturbing the connections with the train-pipe or auxiliary reservoir or brake cylinder head, which connections are thereby made permanent and not necessarily liable to be disturbed whenever it becomes necessary to remove, inspect, repair, or replace any of the triple-valve or quick-acting devices.

In the accompanying drawings, which illustrate my improvements, Figure 1 is a vertical longitudinal section through the quick-acting triple valve; Fig. 2, a modification, shown partly in section and partly in elevation; Fig. 3, an end elevation looking in the direction of the arrow *a* in Figs. 1 and 2; Fig. 4, a transverse section on the line *x x* of Fig. 2, looking in the direction of the arrow *b;* Fig. 5, a view showing my improvement applied to the form of quick-acting triple valve now commonly used in the Westinghouse brake system.

As shown in the drawings, 1 is the triple-valve casing.

2 is the main piston of triple valve, which moves in the piston-chamber 3 and operates the usual slide-valve 4 and graduating-valve 5. The piston-chamber 3 is closed by a cap 6, which has an extension 7 formed on it to receive the graduating-spring 8 and stem 9, which is guided by the screw-plug 10, closing the end of the extension 7. The cap, bonnet, or cover 6 is secured to the main body of the triple-valve shell or casing by bolts 11.

Integral with the main shell or casing of the triple valve is formed a nozzle or connection 13 for attachment to the branch pipe from the train-pipe. The passage-way 14 through this nozzle communicates with two passages formed in the main shell or casing, one of which 15 leads to the quick-action valve device and the other 16 connects with the passage 17 in the cap 6. The passage 17 opens into the space 18 and forms the communication through which air from the train-pipe passes to the main piston of the triple valve. The space 18 need be only large enough to form a free passage for the air to the piston-chamber 3, and the usual drain-cup formed around the graduating-stem and spring is dispensed with, because the axis of the triple valve is intended to be horizontal and the cap 6 no longer forms the bottom of the triple valve. It is therefore only necessary to make the extension 7 of great enough diameter to receive the stem and spring. The passage 15 opens into a chamber 19, one end of which is in constant communication with the auxiliary-reservoir space 30 through the passage 29. A supplementary piston 21 is fitted in chamber 19 and is exposed at all times on one side to auxiliary-reservoir pressure and on the other side to train-pipe pressure. The normal position of the piston 21 is that shown in the drawings, and it is held in that position by the train-pipe pressure and spring 22, which surrounds the stem 23. Attached to the stem 23 is a valve 24, which controls the openings 25 through which train-pipe air passes to the brake-cylinder when train-pipe pressure is sufficiently reduced to permit the auxiliary-reservoir pressure acting on one side of the piston 21 to overcome the train-pipe pressure and spring 22 on the other side. The piston 21 then compresses spring 22 and opens valve 24. When the valve 24 is open, train-pipe air passes through passage 15 and openings 25 into passage 26, formed in the cap 31, then through passages 32 and 33 to the brake-cylinder.

In Fig. 1 I have shown a check-valve 27 between the valve 24 and the brake-cylinder connection 33 to prevent a return flow of air from the brake-cylinder to the train-pipe. This check-valve may be dispensed with, as

shown in Fig. 2, because the valve 24 will act as a check-valve to close communication between the brake-cylinder and the train-pipe when a predetermined pressure exists in the brake-cylinder. Whenever there is this predetermined pressure in the brake-cylinder, which will be some pressure less than that required in making the lightest service application of the brakes, the brake-cylinder pressure on one side of valve 24 will more than counterbalance the train-pipe pressure on the other side, which has been reduced to admit air to the brake-cylinder through the slide-valve of triple valve and the spring 22, with the train-pipe pressure acting on the lower side of piston 21, will counterbalance the auxiliary-reservoir pressure on the other side. In other words, the piston 21, valve 24, and spring 22 will be so proportioned that if there is no pressure but atmospheric pressure or a slightly greater than atmospheric pressure below valve 24 a given predetermined reduction of train-pipe pressure will permit the auxiliary-reservoir pressure to open valve 24; but after air has been admitted to the brake-cylinder from the auxiliary reservoir the brake-cylinder pressure acting below valve 24 and the reduced auxiliary-reservoir pressure acting above piston 21 will permit the spring 22 and train-pipe pressure to close valve 24. Of course the check-valve 27, if employed, will act as an additional safeguard to prevent the return of air from the brake-cylinder in case valve 24 gets caught and held open.

The triple-valve casing shown in my drawings is intended to be connected with its axis horizontal and with the flange 34 bolted to the brake-cylinder or auxiliary reservoir in the manner now practiced with the Westinghouse air-brake, and it is especially with this arrangement that my construction is advantageous.

In connecting my device for operation under a car the parts of the triple valve are first properly put together with the caps 6 and 31 bolted on. The flange 34 is then bolted permanently in place and the nozzle 13 joined to the branch pipe. It is important that the joint between the triple valve and the auxiliary reservoir or brake-cylinder head and between the triple valve and branch pipe should be as permanent as possible and not necessarily broken in order to inspect the triple-valve piston or slide-valve or the quick-acting valve, and it will be seen that with my construction there will be no necessity to break these joints, because when it is desired to inspect the main slide-valve or its piston for oiling or repairs it will only be necessary to remove the head 6 without disturbing any of the other joints, and to inspect the quick-acting mechanism it will only be necessary to remove the cap 31, which is held in place by the bolts 35, Fig. 3.

In case the quick-acting valve 24 should be held from its seat by any substance getting into the passages or by the breakage of the spring 22 or for any other reason, I have shown a plug-valve 36, which may be arranged between the passage 14 and the chamber 19, so that the quick-acting device may be cut out without affecting the operation of the triple valve for service-stops. This plug-valve will also be of use in case it is found necessary to inspect the quick-acting valve without releasing the air from the train-pipe in case it is necessary to make an examination while in service.

In Fig. 5 I have shown the train-pipe connection and plug-cock 36 of my construction adapted to be used with the quick-action device shown in Patent No. 376,837 to Westinghouse, dated January 24, 1888. The plug-cock may either be in the position shown in dotted lines or in the position shown in full lines in Fig. 5, it only being necessary to locate it between the passage 14 and the quick-acting device. As shown in Fig. 5 in full lines, the plug-cock is arranged so that when it is turned to cut out the quick-acting device it opens the passage 15 to an opening 38, closed by a screw-plug 37, by means of which the triple valve and branch pipe may be drained.

As the passage 26 through the cap 31 normally contains air under atmospheric pressure only and as there is no object in keeping this passage closed from the atmosphere except when the brakes are on, I have shown a drain-valve 39 for draining off the water of condensation which is normally open. This valve is of peculiar construction and is arranged to be seated by air under pressure to close the openings 40 and to be opened by a spring 41 when the pressure is relieved. The valve consists of a disk 43 of sufficient area to be easily seated by the pressure on its inner face, which is so formed as to incline toward a central opening in the stem 44, the outer end of which forms the valve and acts to close the ports 40 when pressed on the seat 45 in the plug 46. The edges of the disk bear against a projection 42 on the inner side of the cap 31, where it is normally held by the spring 41. The valve is then in position to drain the passage 26, and when used with the construction shown in Fig. 2 it also drains the brake-cylinder. When pressure is admitted to passage 26, it acts on the valve to force it to its seat 45, thereby closing ports 40. It remains in this position until pressure is released from the brake-cylinder. This valve is specially adapted for use in the position shown in Fig. 1. The bottom of the nozzle 13 slopes toward the plug 47, which may be removed to drain off water of condensation, and, as shown in dotted lines, this slope may be made as great as required to collect water of condensation from the branch pipe and triple valve.

It will be seen that by forming the connecting-nozzle 13 integral with the main shell or body of the triple-valve casing and locating it as I do, the branch pipe is brought nearer to the bottom of the car and out of the way

of flying stones or other substances which are liable to come in contact with it. Arrangements have been shown in which the branch pipe is connected to the cap 6; but this is objectionable on account of the frequent necessity for removing the cap 6 to inspect or remove the triple-valve piston and slide-valve, which necessitates the breaking of the joint with the branch pipe. Besides, when the connection is made in this way the contracted passages which are cast in the triple-valve casing, and particularly those required for the quick action, are made too long and tortuous and, besides being difficult to cast properly, interfere with the quick action, even when the passages are clear, besides being more liable to clog up and make it difficult to clear them out. Similar objections exist to the construction now in use, in which the branch pipe is connected to the cap which covers the quick-action devices, as the same necessity exists for breaking the joint with the branch pipe. By my construction it is not necessary to break any of the joints by which the triple-valve casing or body should be permanently connected to the other parts of the brake system. The caps 6 and 31 may be taken off and every piece of the mechanism removed without disturbing the connections to the branch pipe or brake-cylinder and every passage is then open to inspection. Besides, the passages are made short and direct.

The quick-acting devices are compactly arranged within the main body of the triple-valve casing, thus avoiding the necessity for an additional separate structure, and the mechanism for that purpose is of unusual simplicity. I do not wish, however, to claim the particular form of quick-acting devices shown in this application, because I have shown, described, and claimed them in my pending application, Serial No. 396,937, filed June 20, 1891, of which this application is a division.

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

1. In a quick-acting automatic fluid-pressure brake system, the combination, with the main body or shell of the triple-valve casing, of a nozzle or connection formed integral therewith for connection with the train-pipe, whereby the train-pipe, triple valve, and brake-cylinder or auxiliary reservoir, to whichever the triple valve may be directly connected, may form a permanent rigid structure beneath the car, a separate removable head for the triple-valve piston-chamber, and a separate removable head for the quick-acting devices, whereby the triple valve or the quick-acting devices, or both, may be removed or examined without breaking the continuity between the triple-valve casing and the train-pipe, substantially as set forth.

2. In an automatic fluid-pressure brake system, a quick-acting triple-valve casing consisting of a main body or shell containing the triple valve and its piston, a nozzle or connection formed on the main body or shell for connection with the train-pipe, a passage from this nozzle or connection to the triple-valve piston-chamber, another passage from the nozzle to the quick-acting valve, a separately-removable cover for the triple-valve piston-chamber, and a separately-removable cover for the quick-acting valve devices, whereby the triple valve and quick-acting devices are accessible for examination or repair without disturbing the rigid permanent structure formed by the train-pipe, triple valve, and brake-cylinder or auxiliary reservoir, substantially as set forth.

3. In an automatic fluid-pressure brake system, the combination, with the triple valve, of a train-pipe nozzle or connection formed integral with the main body of the triple-valve casing for permanent connection to the train-pipe, passages in the main body or casing and leading from said nozzle or connection to the triple-valve piston-chamber and to the quick-action valve, a valve in the latter passage for connecting or disconnecting the quick-action devices, and separately-removable heads or covers for the triple-valve piston-chamber and quick-acting devices, whereby these parts may be removed without breaking connection with the train-pipe, substantially as set forth.

4. In an automatic fluid-pressure brake system, the combination, with a quick-acting triple-valve casing, of a passage from the train-pipe to the brake-cylinder controlled by the quick-acting valve, a valve in said passage for cutting out the quick-acting valve from communication with the train-pipe, and a separately-removable cover for the quick-acting devices, whereby the quick-acting devices may be examined or repaired without opening the train-pipe to the atmosphere, substantially as set forth.

5. In an automatic fluid-pressure brake system, the combination, with a triple-valve casing, of a quick-acting valve controlling communication from the train-pipe to the brake-cylinder, and an automatic drain-valve located in the chamber or passage between the quick-acting valve and the brake-cylinder and so constructed as to close automatically when said chamber is subjected to pressure by the opening of the quick-acting valve and to open automatically and drain the water of condensation from said chamber when the brakes are released, substantially as set forth.

In testimony whereof I have hereunto set my hand.

THOMAS J. HOGAN.

Witnesses:
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F. E. GAITHER.