

(No Model.)

3 Sheets—Sheet 1.

H. H. WESTINGHOUSE & J. CALDWELL.
AIR BRAKE.

No. 592,461.

Patented Oct. 26, 1897.

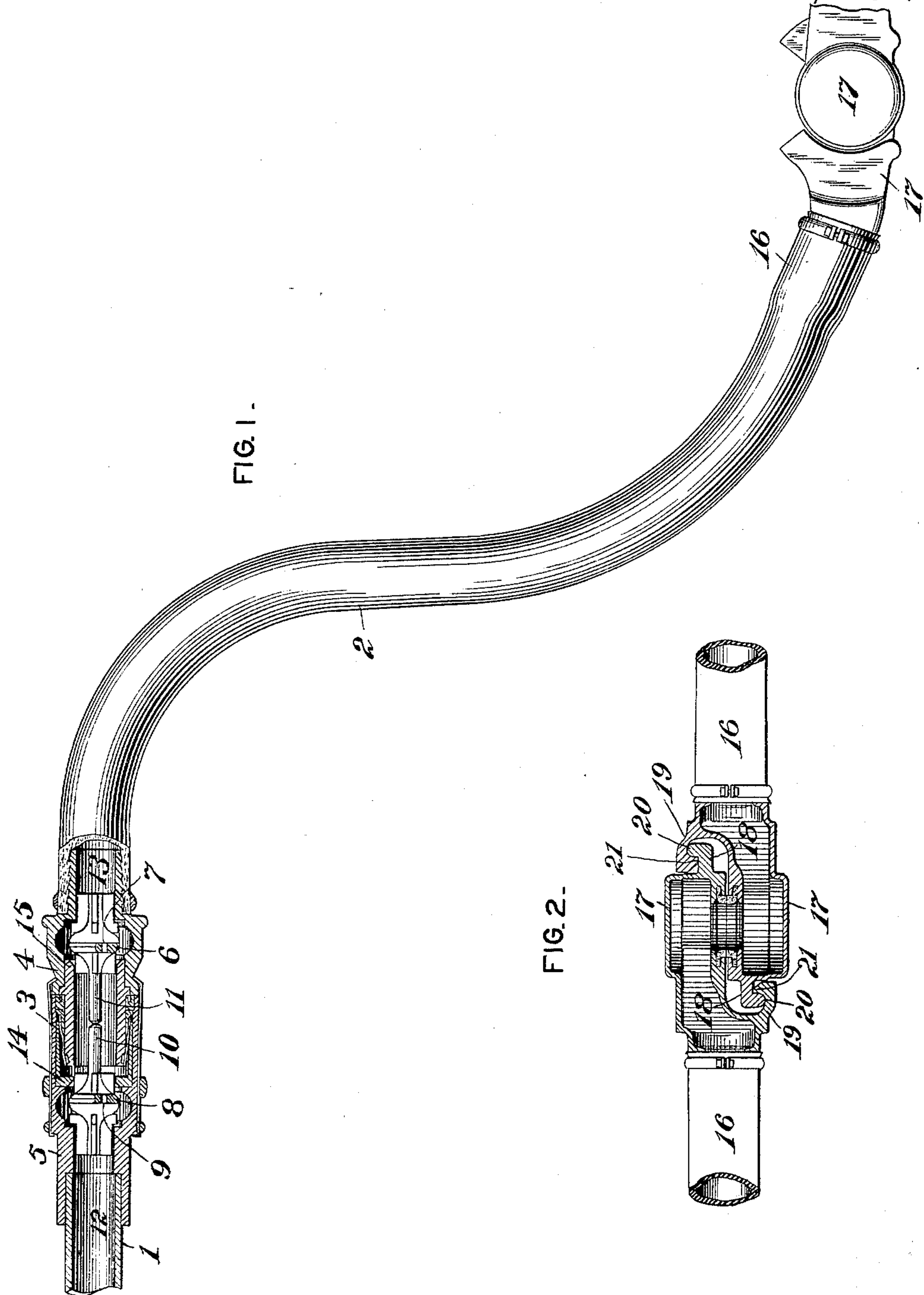
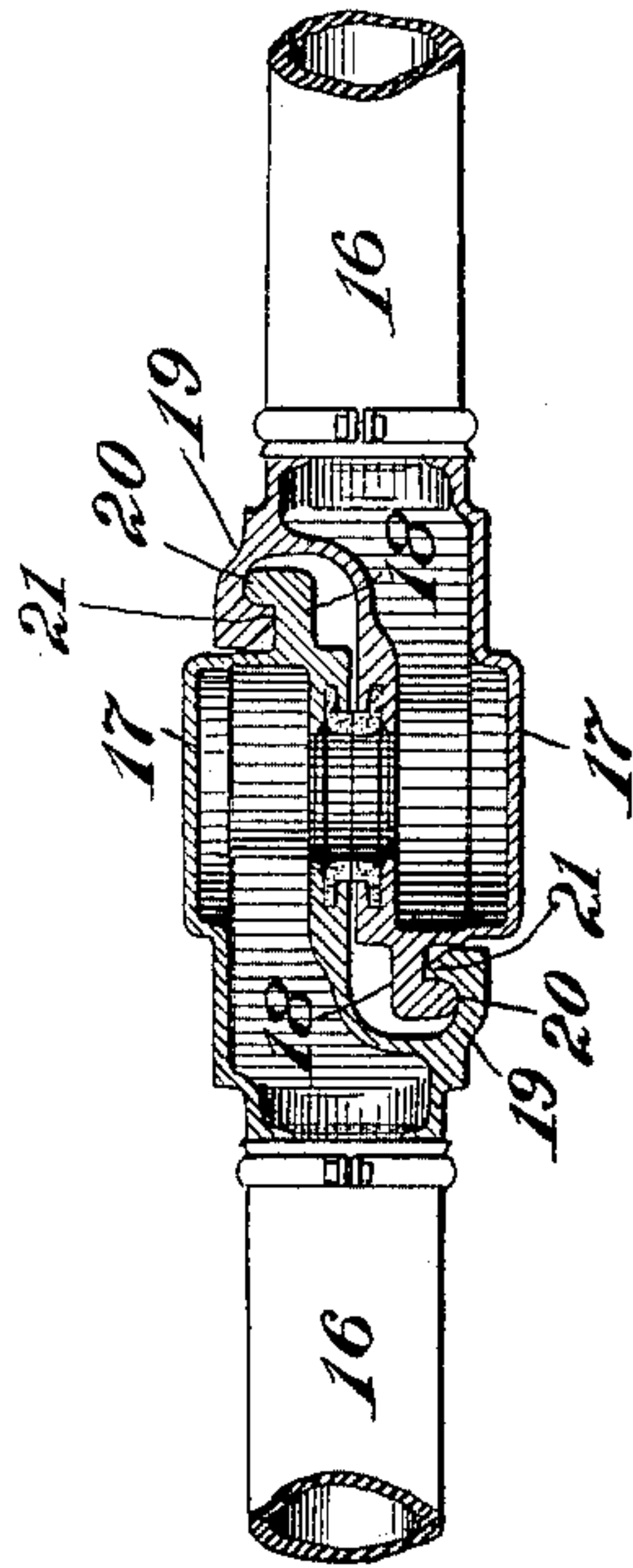


FIG. 1.

FIG. 2.



WITNESSES:

T. J. Hogan.
F. E. Gaither

INVENTORS,

H. H. Westinghouse
John Caldwell
by J. Snowden Bell.

Att'y.

(No Model.)

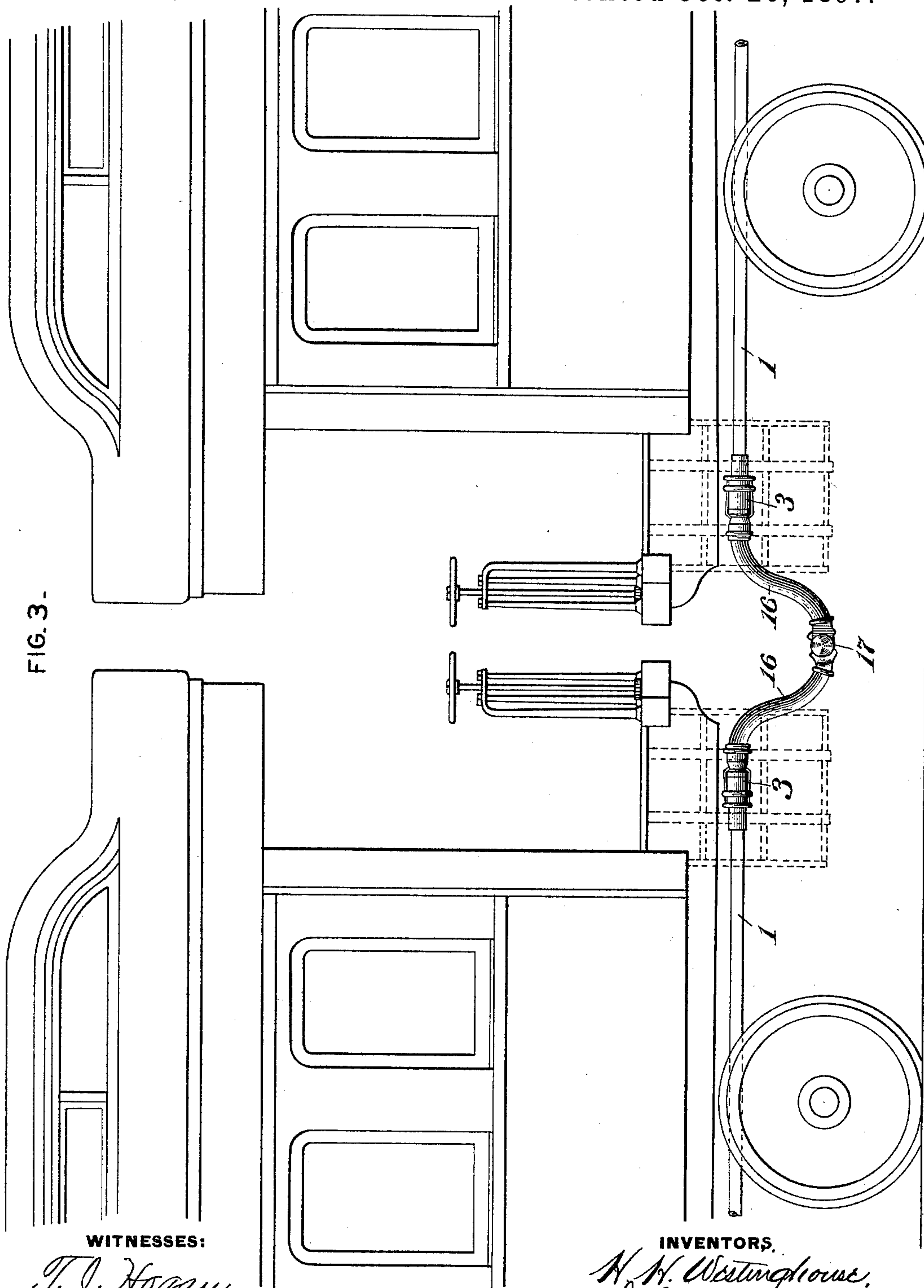
3 Sheets—Sheet 2.

H. H. WESTINGHOUSE & J. CALDWELL.
AIR BRAKE.

No. 592,461.

Patented Oct. 26, 1897.

FIG. 3—



WITNESSES:

T. J. Hogan.
A. E. Gaither.

INVENTORS.

H. H. Westinghouse.
John Caldwell.
By J. H. Rowden Bell.
Att'y.

(No Model.)

3 Sheets—Sheet 3.

H. H. WESTINGHOUSE & J. CALDWELL.
AIR BRAKE.

No. 592,461.

Patented Oct. 26, 1897.

FIG. 4.

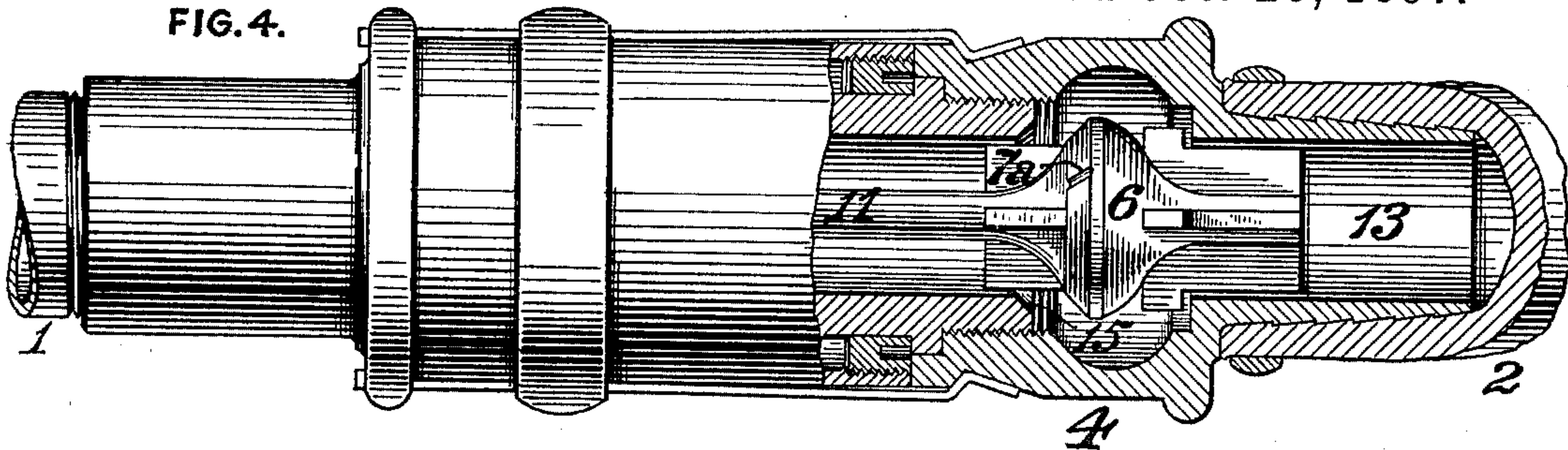


FIG. 5.

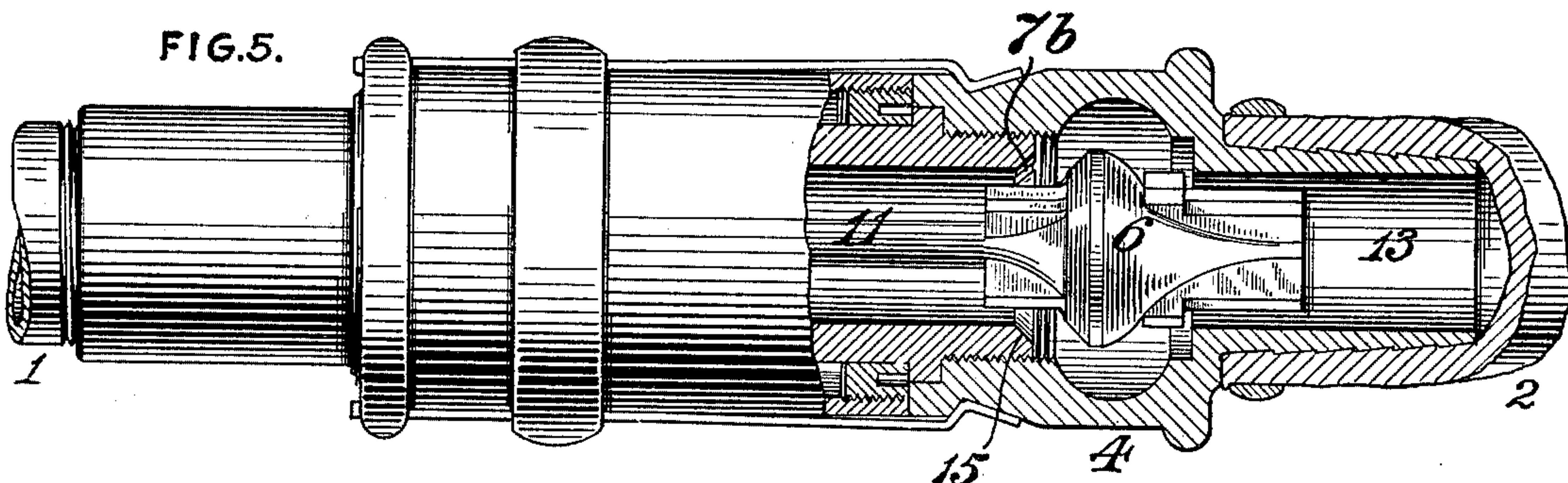


FIG. 6.

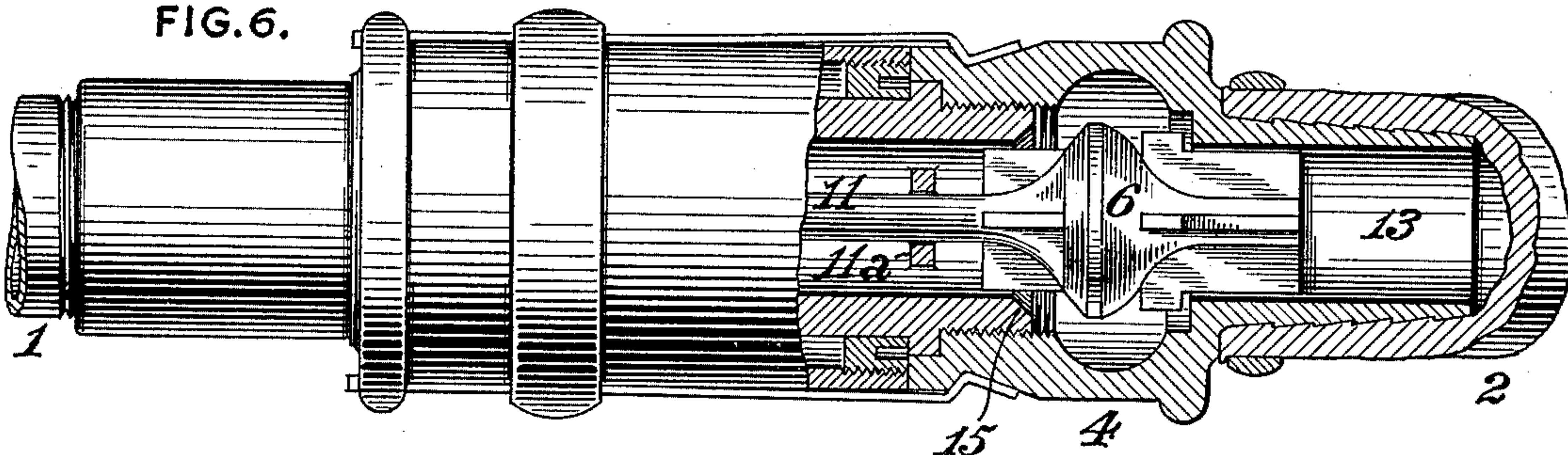
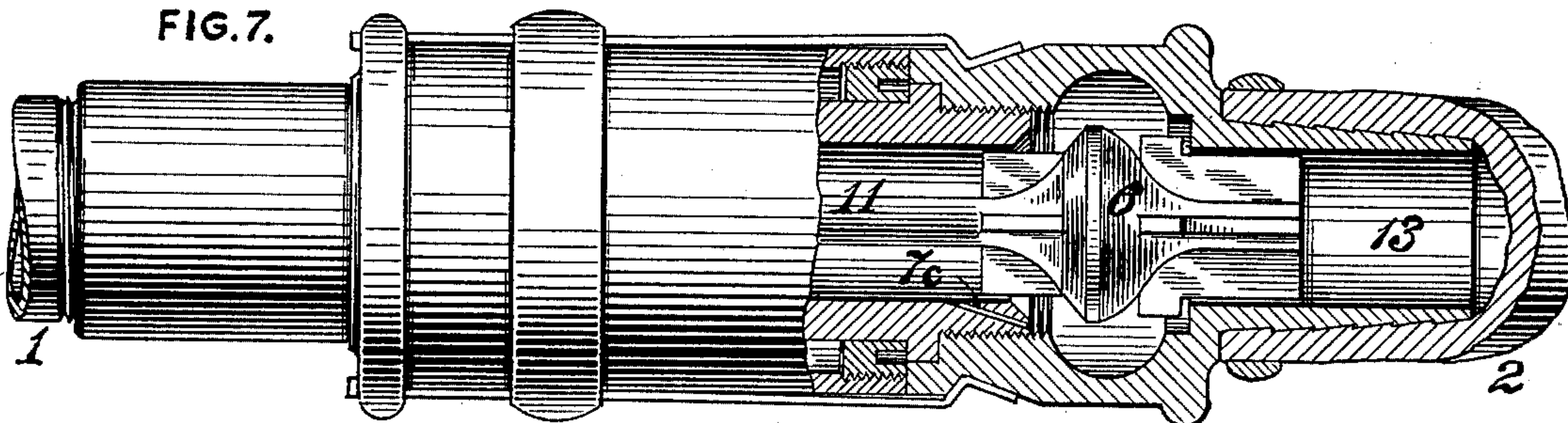


FIG. 7.



WITNESSES:

T. J. Hagen
J. E. Gaither

INVENTORS,

H. H. Westinghouse.
John Caldwell
By J. H. B. Bell

Att'y.

UNITED STATES PATENT OFFICE.

HENRY HERMAN WESTINGHOUSE AND JOHN CALDWELL, OF EDGEWOOD, PENNSYLVANIA, ASSIGNORS TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF PITTSBURG, PENNSYLVANIA.

AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 592,461, dated October 26, 1897.

Application filed October 24, 1894. Serial No. 526,858. (No model.)

To all whom it may concern:

Be it known that we, HENRY HERMAN WESTINGHOUSE and JOHN CALDWELL, citizens of the United States, residing at Edgewood borough, (post-office address Pittsburg,) in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Air-Brakes, of which improvement the following is a specification.

The object of our invention is to provide means for regulating the character of the application of the brakes effected in and by the breaking in two of a train by controlling the exhaust of fluid under pressure from the train-pipe when two sections of train-pipe are disconnected by the parting or breaking in two of the train whereby a service application of the brakes may be effected and an emergency application prevented.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a side elevation and partial section illustrating an application of our invention; Fig. 2, a section through the coupling connecting the sections of hose on two adjacent cars of a train; Fig. 3, an elevation showing the adjacent ends of two cars with our improvement applied thereto, the flexible hose and couplings being larger in proportion than the other parts; and Figs. 4 to 7, inclusive, views, partly in elevation and partly in section and on an enlarged scale, of a valved coupling, illustrating modifications of the means for limiting the escape of air.

It has been customary heretofore in automatic fluid-pressure brake systems to permanently connect a section of flexible hose to the train-pipe at each end of a car and to provide the free end of the flexible hose with a valveless half-coupling which is adapted to couple with a similar half-coupling on the flexible hose of the adjacent car, the half-couplings being so constructed as to pull apart on the breaking in two of a train and thereby permit a sufficiently great and rapid reduction of train-pipe pressure to cause an emergency application of the brakes.

In case of the breaking in two of a train

there is usually no necessity for an emergency application, and it may be undesirable on account of the discomfort or possible injury to passengers due to the shock caused by the sudden stopping of the cars by which passengers may be thrown from the seats or against them or thrown down if standing or walking through a car.

In emergency applications the shock due to collision between the two detached sections of the train in case the forward section of the train is made up of lighter cars than the rear section may be very severe on account of the sudden stopping of the front section with a short distance between the two sections which is passed over by the rear section at a high rate of speed. In service applications no such sudden stopping or checking of the front section in the path of the rear section can occur, and if the two sections come together it will be with a gradual approach and when the speed of both sections has been much reduced and nearly equalized. Our improvement is therefore intended to prevent an emergency application by the breaking in two of the train and to secure a service application instead.

In the embodiment of our invention, as shown in the drawings, the train-pipe 1 and flexible hose 2, instead of being directly and permanently connected, are detachably connected by means of a valved coupling 3, formed in two parts. One of the parts is permanently secured to the end of the metallic section of the train-pipe 1 under each car, and the other part, with which it couples, is permanently secured to the end of the flexible hose 2, and they are adapted to couple together and to remain coupled under any of the usual strains to which they may be subjected and to be separated by the breaking in two of the train or by hand, if necessary. The part 4 of the coupling 3 is provided with a valve 6 and the part 5 with a valve 8, and when the two parts of the coupling are connected, as shown in the drawings, the stems 10 and 11 are in contact and hold the valves in position to permit a free passage of fluid through the coupling, but when the parts 4 and 5 are separated the fluid-pressure in the

passages 12 and 13, acting on the back of the valves 6 and 8, will force the valves against the seats 14 and 15. This seating of the valves 6 and 8 prevents a great and rapid reduction of train-pipe pressure, such as is necessary to effect an emergency application of the brakes, and if no other provision were made for the escape of fluid from the train-pipe the separation of the two parts of the coupling would not cause the application of the brakes.

In order to secure a service application of the brakes with the valves on their seats, we provide an opening 7 through the valve 6 and a similar opening 9 through the valve 8 of such capacity as to permit a sufficiently rapid reduction of train-pipe pressure to produce a service application of the brakes, but not large enough to produce an emergency application.

To the end 16 of each section of flexible hose is secured a half-coupling 17, which is adapted to couple with a similar half-coupling on the adjacent section of flexible hose. This coupling, which is made up of the two halves, one on each section of flexible hose, has no valves in it and may be in all respects similar to the coupling usually employed in the Westinghouse system of air-brakes, with the exception that it is not automatically detachable—that is, that it does not uncouple when the flexible hose is drawn taut or pulled into a horizontal or nearly horizontal position by the separation of two adjacent cars when the train breaks in two. It is, however, adapted to be uncoupled by hand, but only when the two halves have been turned to the relative positions in which they must be placed before coupling.

In order that the half-couplings 17 may not be automatically detachable, the hooked portions 18 and 19, which hold them together, are so formed that they overlap each other to the same extent in every position in which one of the hooks engages with any part of the other, the hooks having their edges 20 and 21 formed parallel with the plane of the face of its coupling instead of being tapered or inclined, as in automatically-detachable couplings.

When the train is in running order and the train-pipe connections made, as in Fig. 1 of the drawings, there is a continuous passage for fluid through the train-pipe from one end of the train to the other, and so long as the train-pipe connections are not broken the engineer has full control of the brakes for service or emergency applications.

In case the train breaks in two the half-couplings 17 remain coupled, but the coupling 3 on one side or the other of the coupling 17 is disconnected by the pull on the flexible hose, and the valves 6 and 8 are forced to their seats by the fluid-pressure within the train-pipe, thereby preventing an emergency application of the brakes, but the ports or passages 7 and 9 permit a sufficient release of

fluid from the train-pipe under each section of the train to cause a service application of the brakes on each section.

If preferred, the ports or passages 7 and 9, instead of extending through the valves 6 and 8, may be in the form of grooves 7^a in the edges of the valves, as shown in Fig. 4, or grooves 7^b in the valve-seats, as shown in Fig. 5, or they may be passages 7^c in the casing extending around the valve-seats from one side to the other, as shown in Fig. 7, so as to form in any case an outlet from the train-pipe when the valves are seated. The same object may be accomplished if the valves are so arranged that they never rest against their seats, but approach them only near enough to prevent too great and rapid a reduction of train-pipe pressure.

Fig. 6 shows a stop 11^a, against which the wings of the valve 6 abut so as to prevent it from resting against its seat when the sections of the coupling are separated.

We claim as our invention and desire to secure by Letters Patent—

1. The combination with a section of flexible pipe, or hose, of a half-coupling at one end of the section which is adapted to couple with a similar half-coupling on another section of flexible pipe, or hose, and to maintain a continuous passage through the two half-couplings except when disconnected by hand, an automatically-detachable half-coupling at the other end of the section of flexible hose which is adapted to be coupled to the section of train-pipe under a car, and a valve device for reducing the capacity of the passage through the automatically-detachable coupling when disconnected, substantially as set forth.

2. In a fluid-pressure brake system, the combination, with a rigid or fixed section of train-pipe, of a flexible section or hose, an automatically-detachable coupling for connecting one end of the flexible section or hose to the fixed section of train-pipe, a valve in the detachable coupling for closing the passage through which fluid escapes when the coupling is detached, means for permitting a reduced escape of the fluid from the valve-closed hose, and a half-coupling for connecting the other end of the flexible section or hose to a similar half-coupling on another flexible section or hose, substantially as set forth.

3. In a fluid-pressure brake system, the combination, with a train-pipe, of two sections of flexible hose, a coupling which is adapted to keep the two sections of hose coupled together in case the train breaks in two, an automatically-detachable coupling connecting each section of flexible hose with the train-pipe, and means for reducing or limiting the escape of fluid through each of the parts of the automatically-detachable coupling when the parts are separated, substantially as set forth.

4. In an automatic fluid-pressure brake system, the combination, with a train-pipe, of a flexible hose connecting the sections of

train-pipe on two adjacent cars, an automatically-detachable coupling connecting the flexible hose with the section of train-pipe on each car, a valve device in each half of each
5 coupling for preventing an exhaust of fluid from the train-pipe when the parts of the coupling are separated, and a passage for permitting at the same time a gradual exhaust of fluid from the train-pipe sufficient to effect a

service application of the brakes, substantially as set forth.

In testimony whereof we have hereunto set our hands.

HENRY HERMAN WESTINGHOUSE.

JOHN CALDWELL.

Witnesses:

JOHN F. MILLER,

T. J. HOGAN.