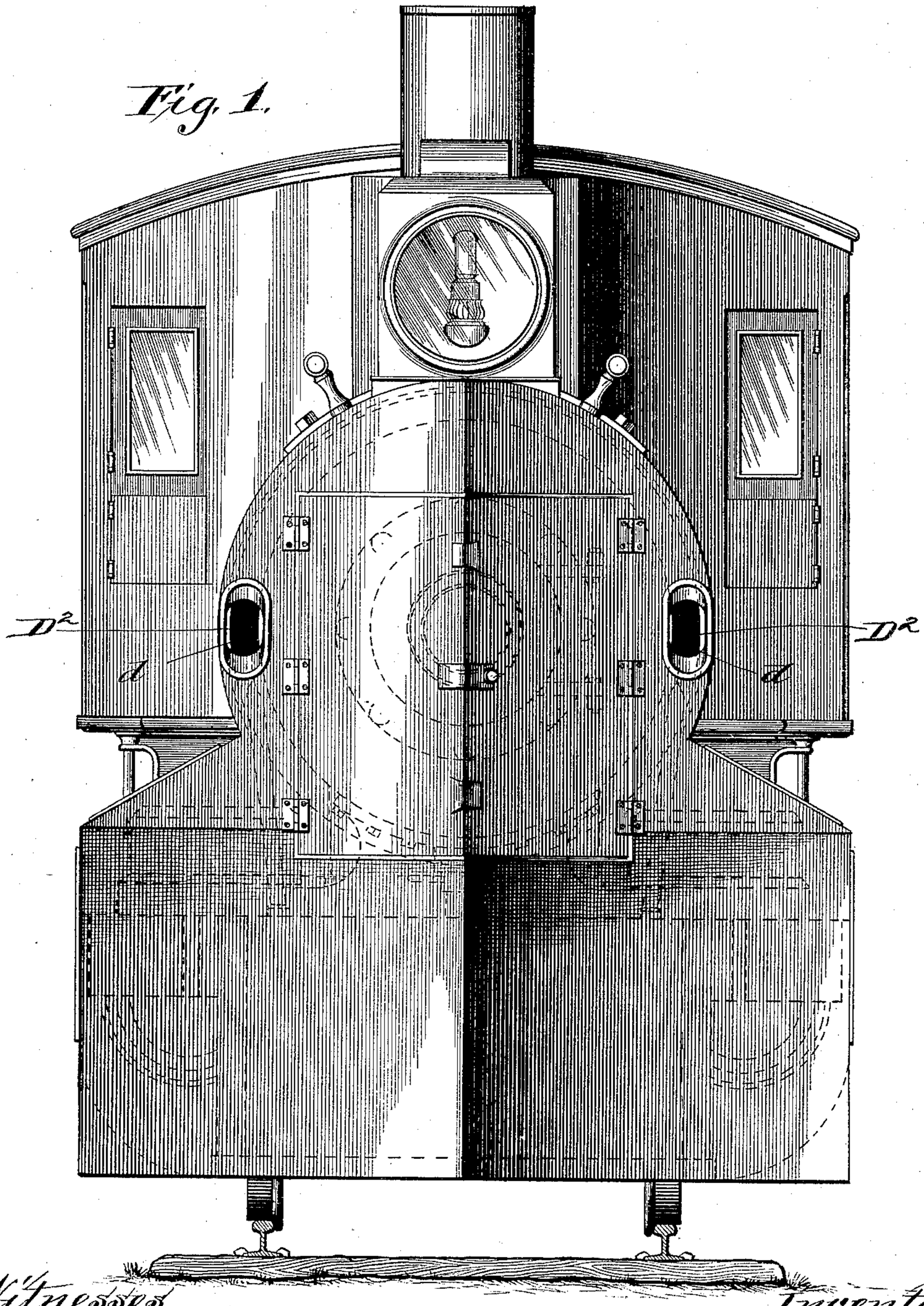
(No Model.) 12 Sheets—Sheet 1.

F. U. ADAMS.

AIR SUPPLY DEVICE FOR RAILWAY CARS.

No. 489,910. Patented Jan. 17, 1893.

Fig. 1.



Witnesses
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(No Model.) 12 Sheets—Sheet 2.

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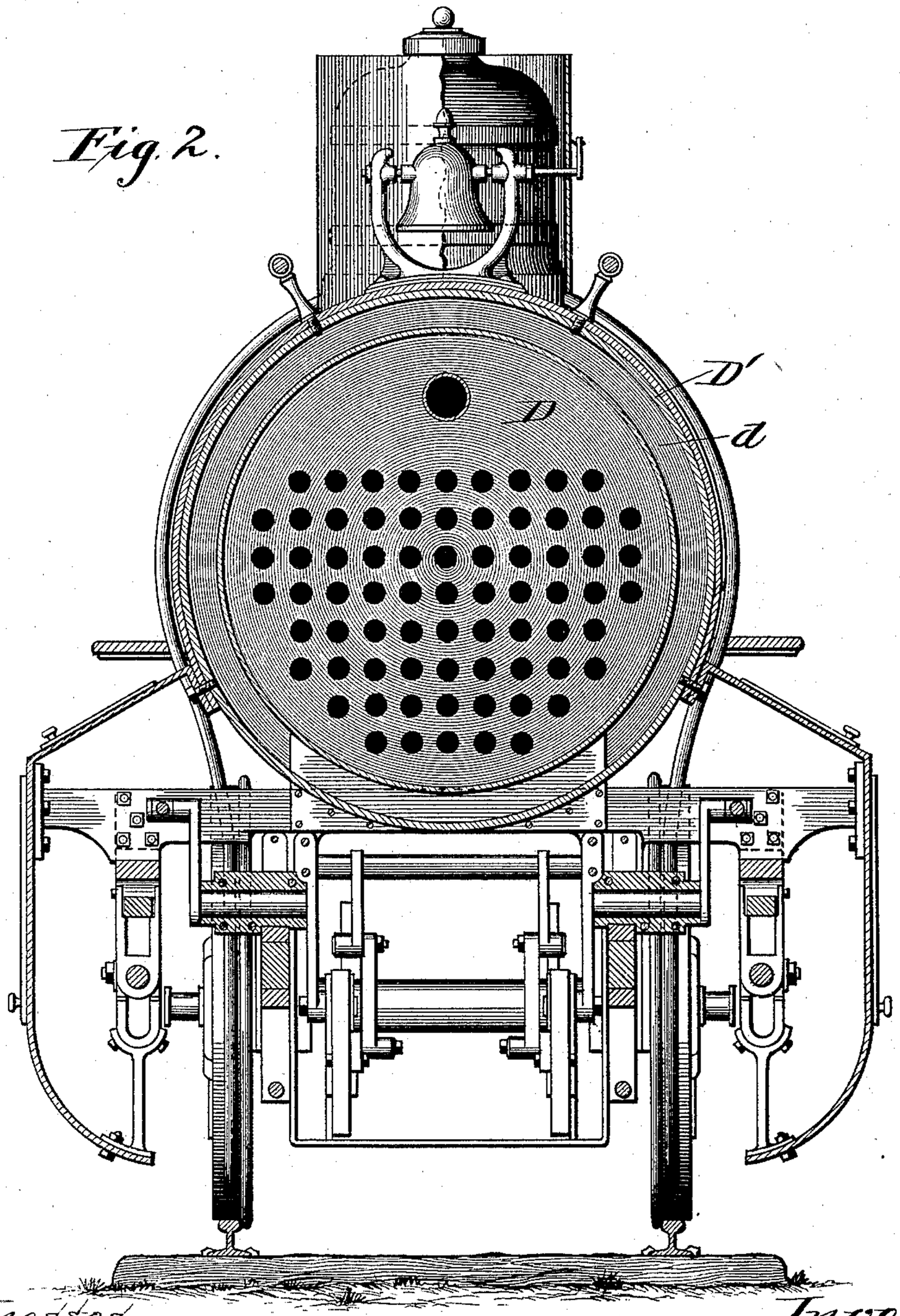
Fig. 2.



Witnesses
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(No Model.) 12 Sheets—Sheet 3.

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AIR SUPPLY DEVICE FOR RAILWAY CARS.

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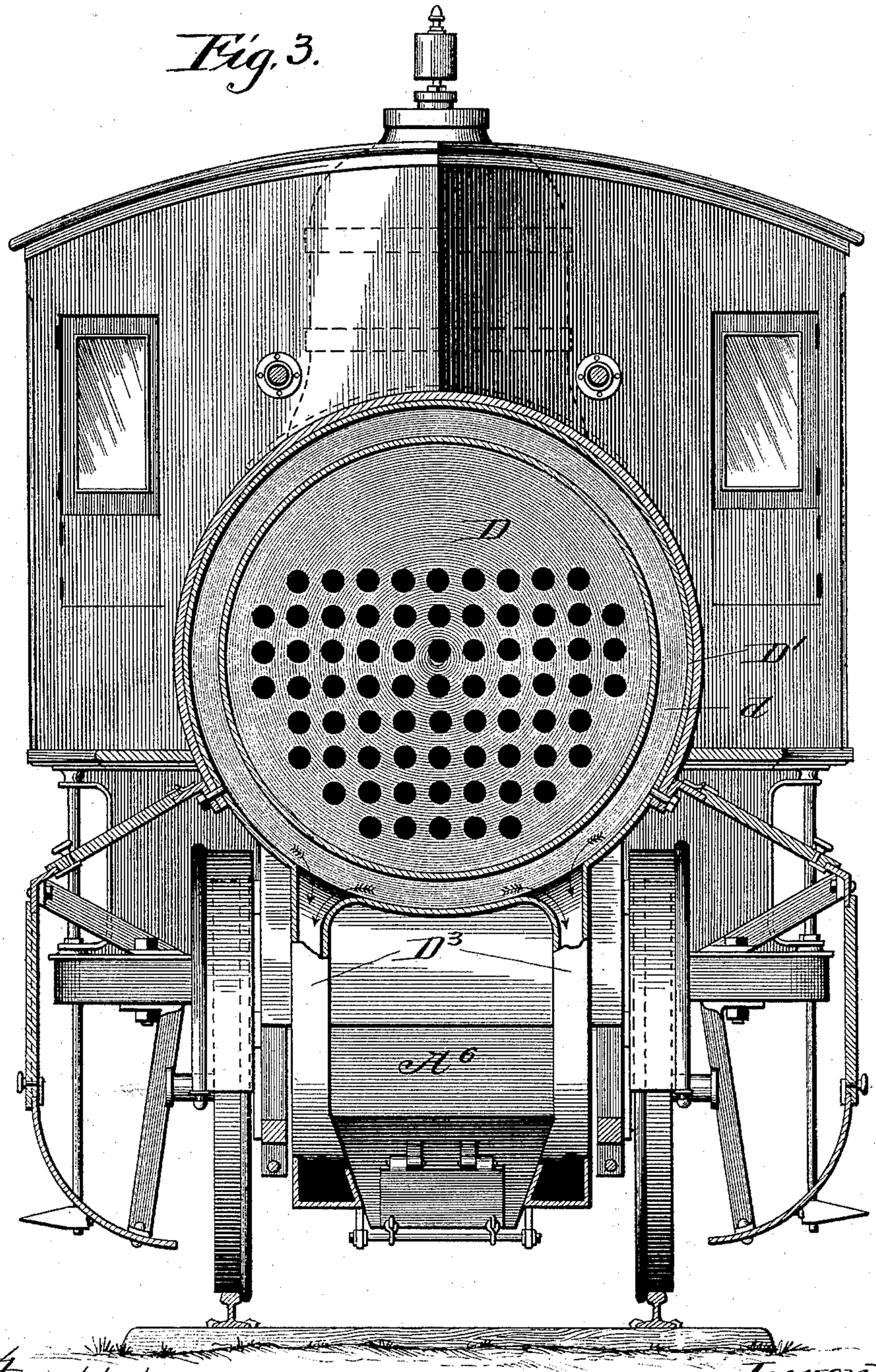
Fig. 3.



Witnesses
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(No Model.) 12 Sheets—Sheet 4.

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AIR SUPPLY DEVICE FOR RAILWAY CARS.

No. 489,910. Patented Jan. 17, 1893.

Fig. 4.

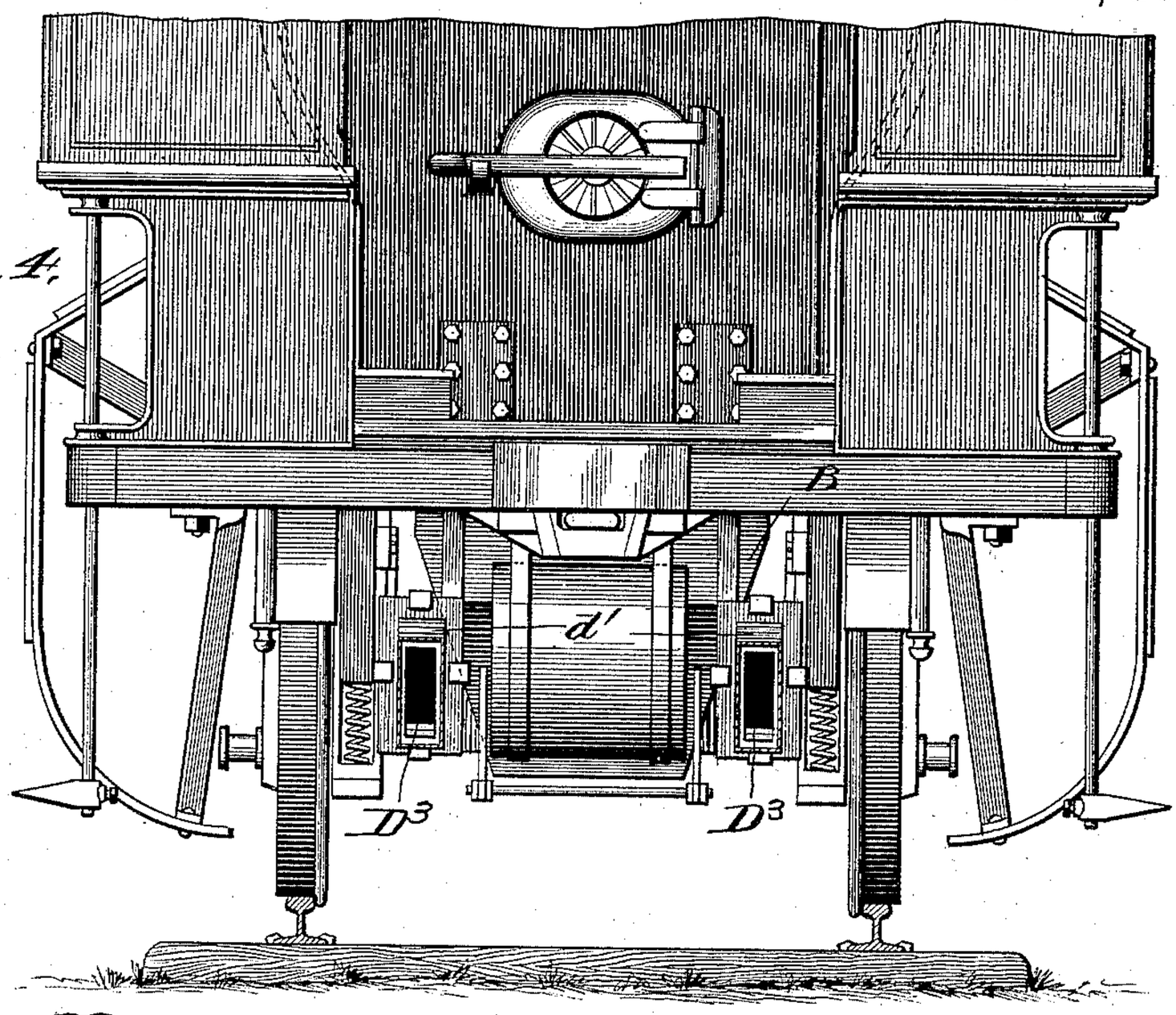

Fig. 5.

Witnesses
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(No Model.) 12 Sheets—Sheet 5.

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AIR SUPPLY DEVICE FOR RAILWAY CARS.

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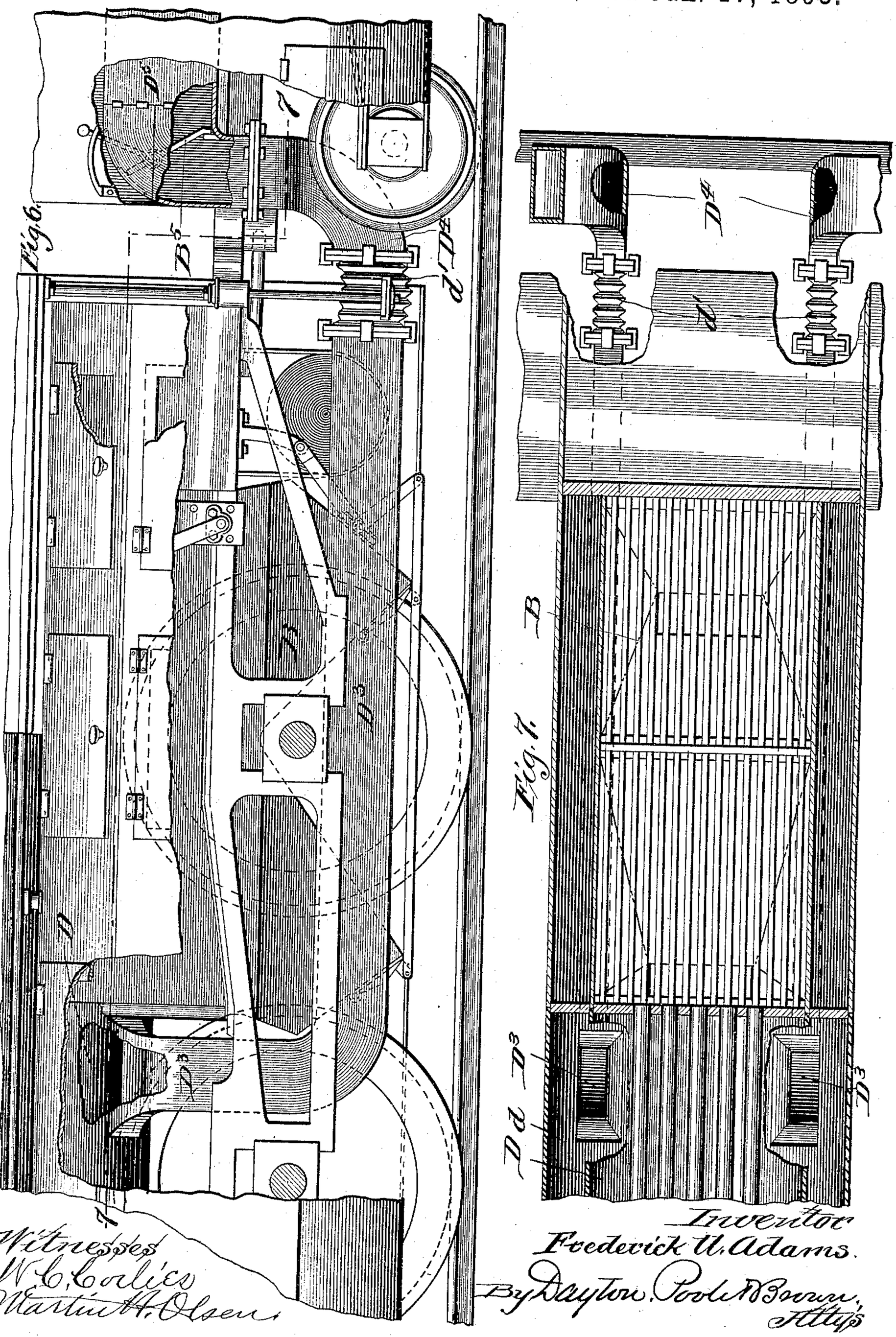

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F. U. ADAMS.

AIR SUPPLY DEVICE FOR RAILWAY CARS.

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Fig. 9.

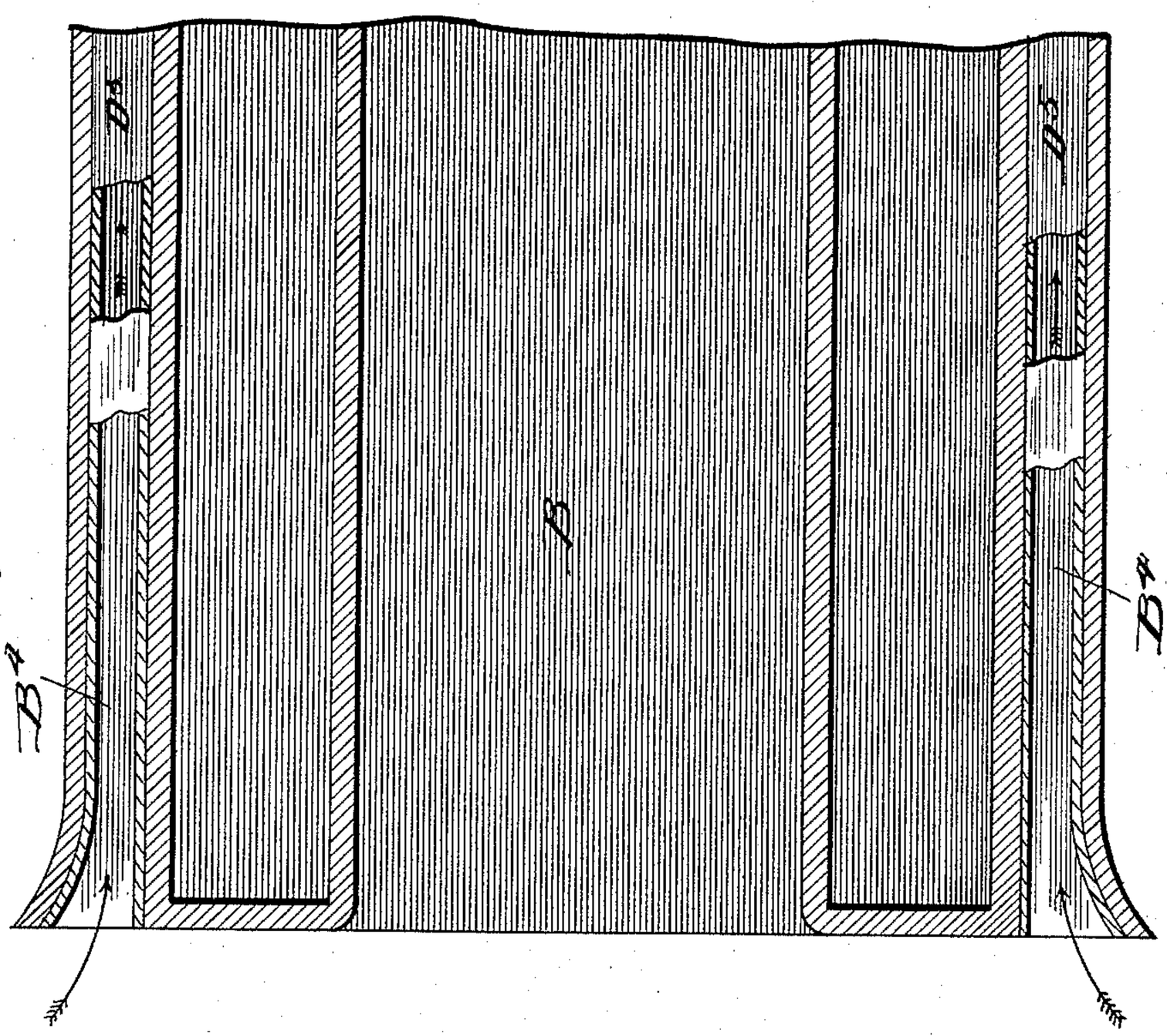
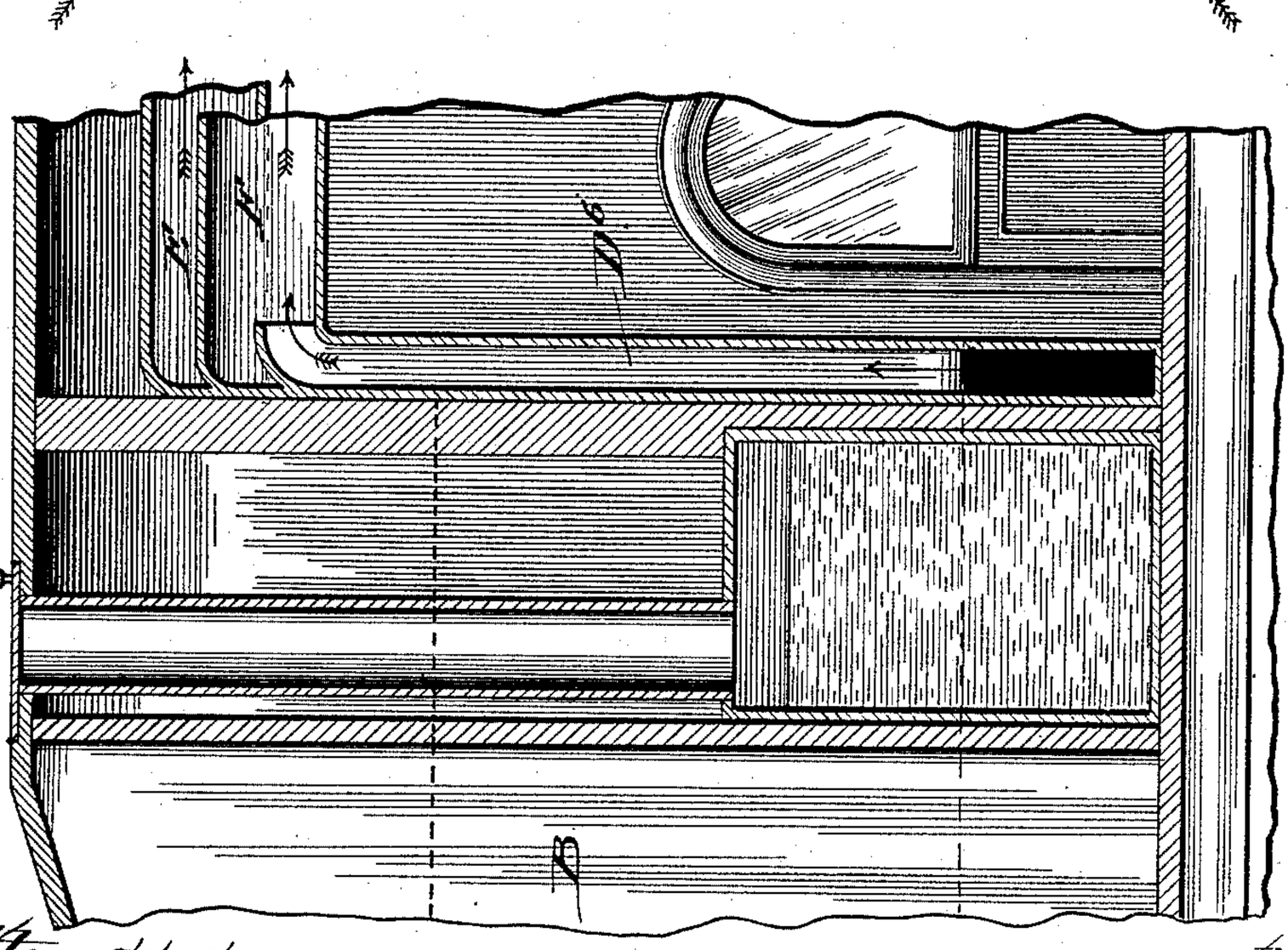


Fig. 8.



Witnesses
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(No Model.) 12 Sheets—Sheet 7.

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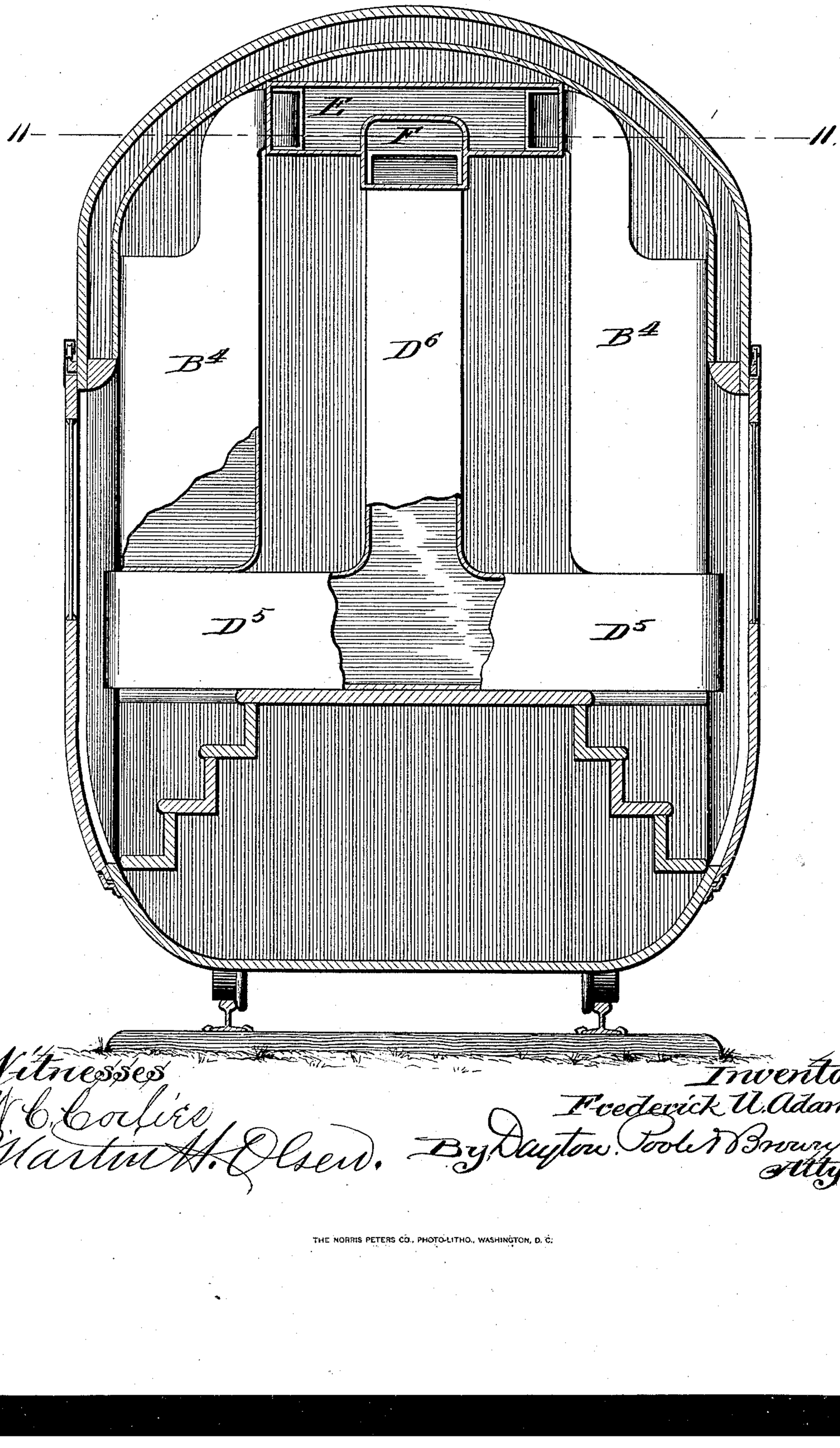
No. 489,910. Patented Jan. 17, 1893.

Fig. 10.



Witnesses
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12 Sheets—Sheet 8.

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AIR SUPPLY DEVICE FOR RAILWAY CARS.

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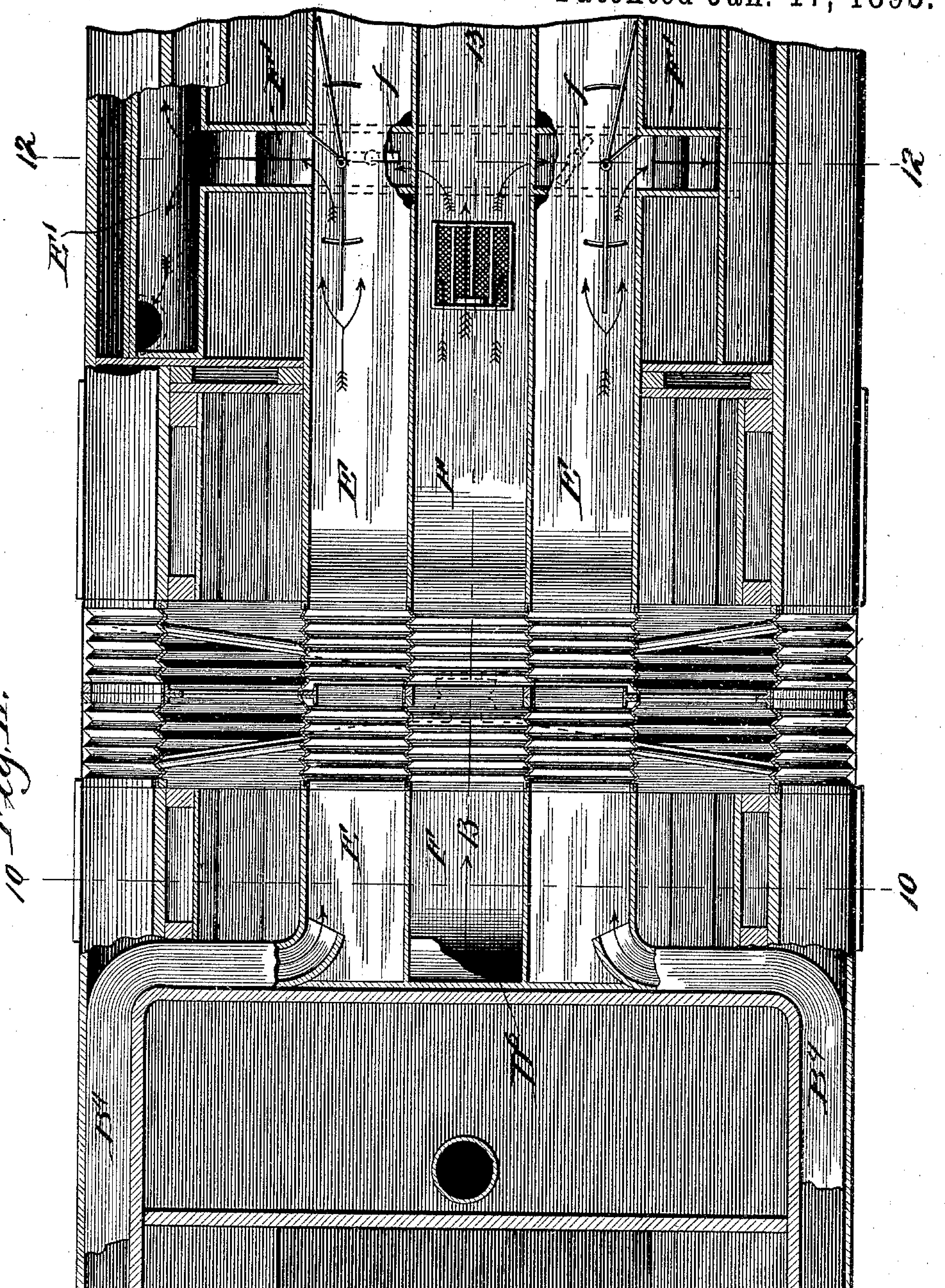

Witnesses
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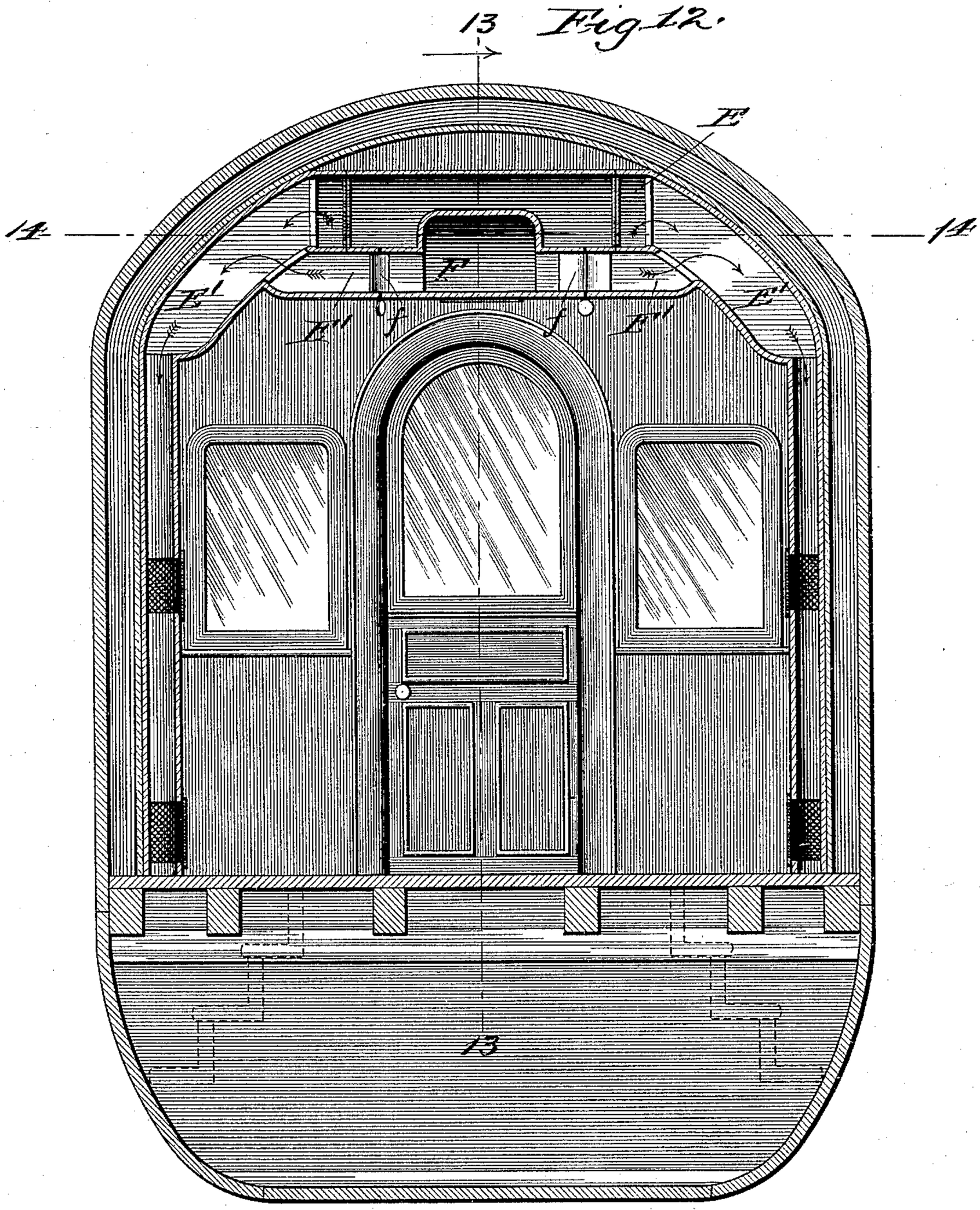
AIR SUPPLY DEVICE FOR RAILWAY CARS.

No. 489,910. Patented Jan. 17, 1893.

Fig. 12.



Witnesses
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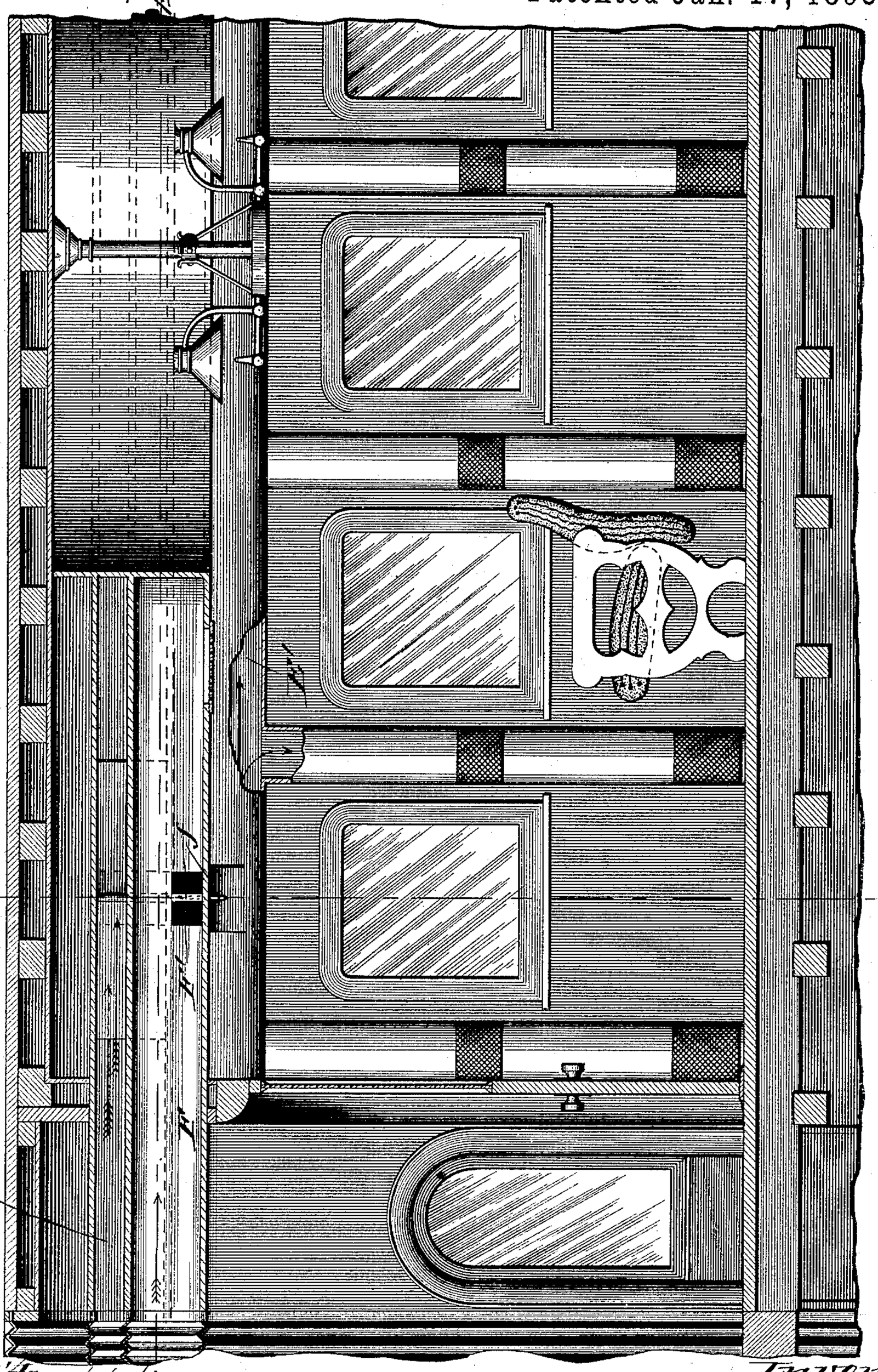

Fig. 13.

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(No Model.) 12 Sheets—Sheet 11.

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AIR SUPPLY DEVICE FOR RAILWAY CARS.

No. 489,910. Patented Jan. 17, 1893.

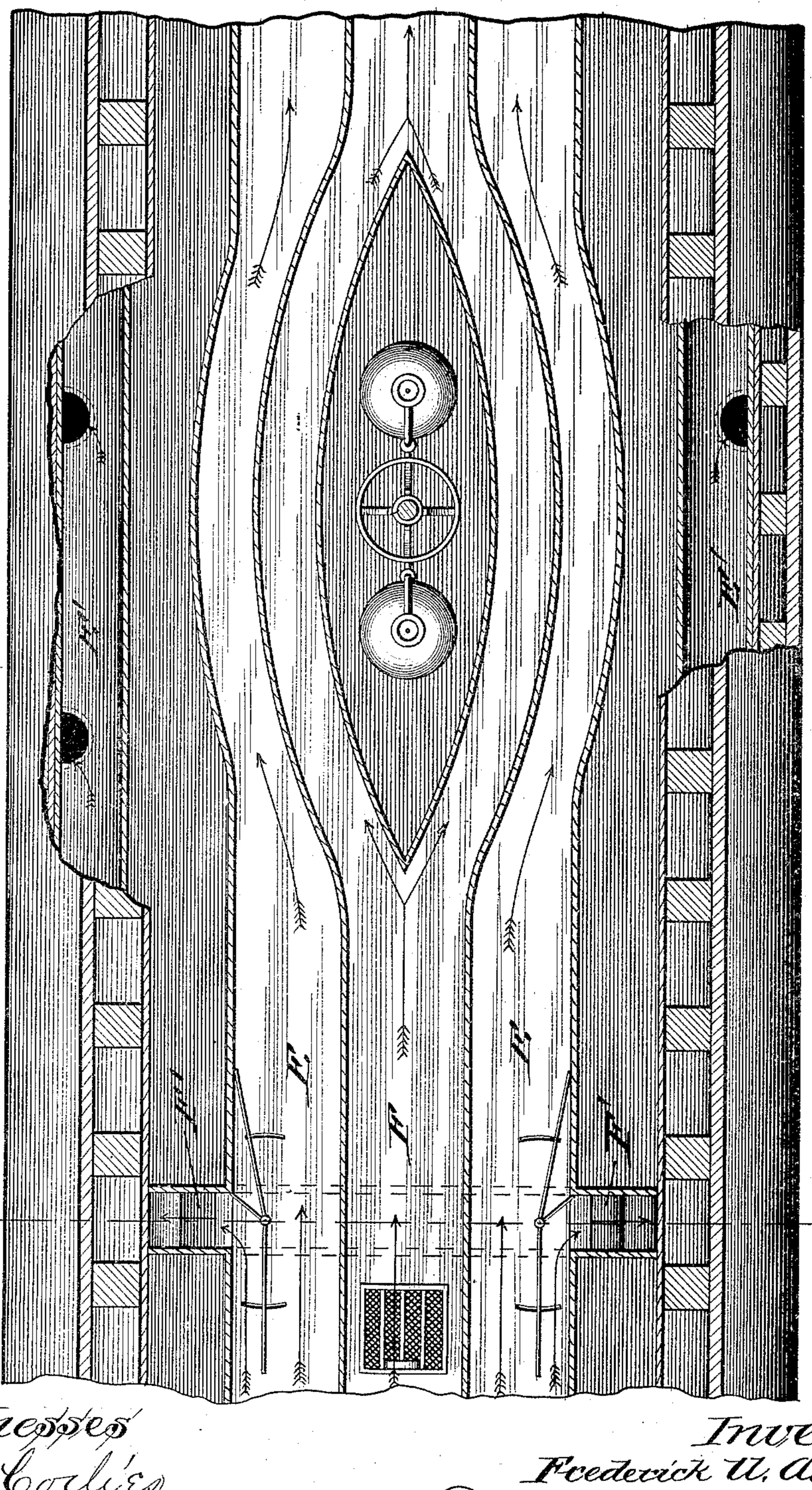

Fig. 14.

Witnesses
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AIR SUPPLY DEVICE FOR RAILWAY CARS.

No. 489,910. Patented Jan. 17, 1893.

Fig. 15.

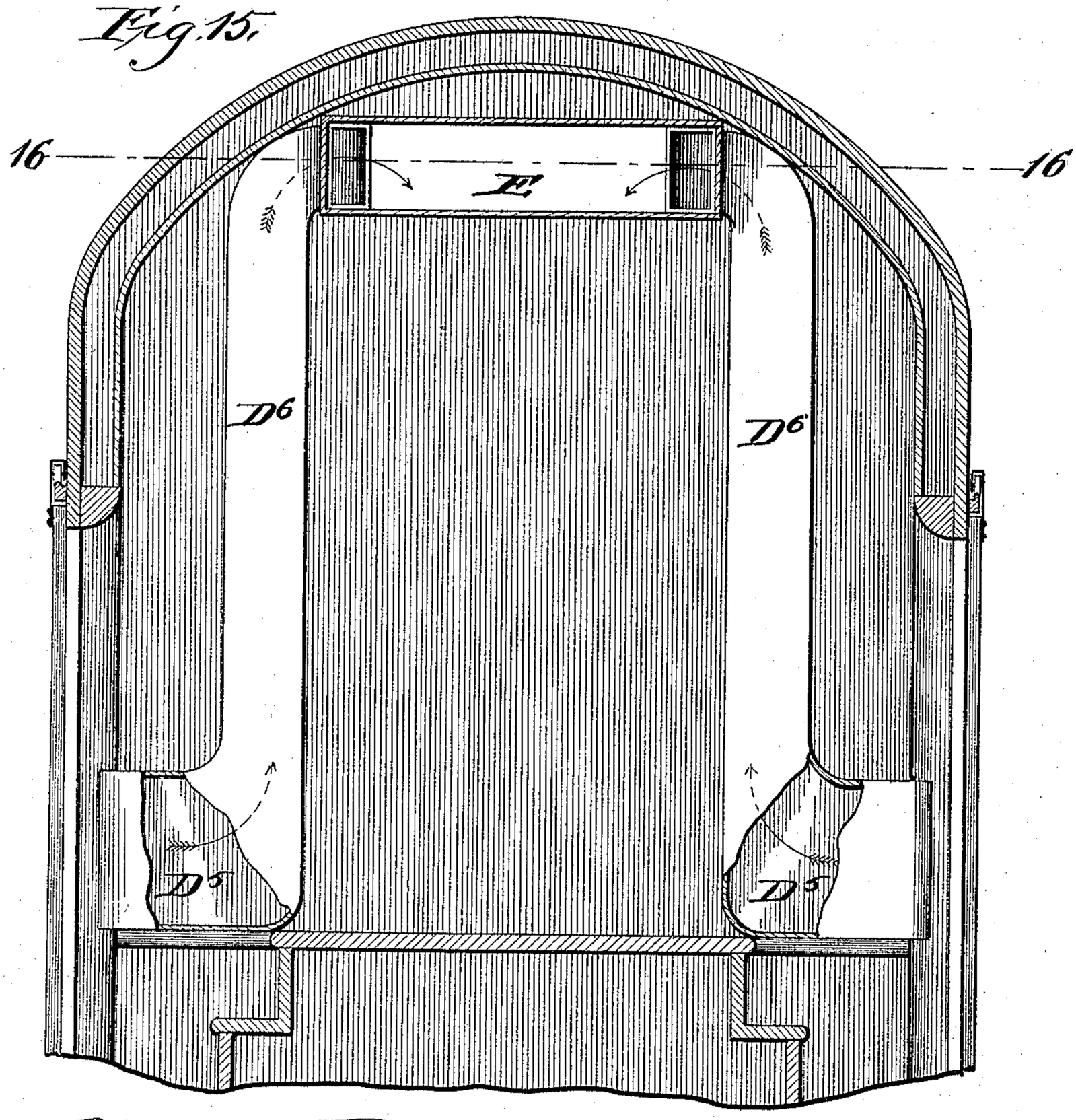
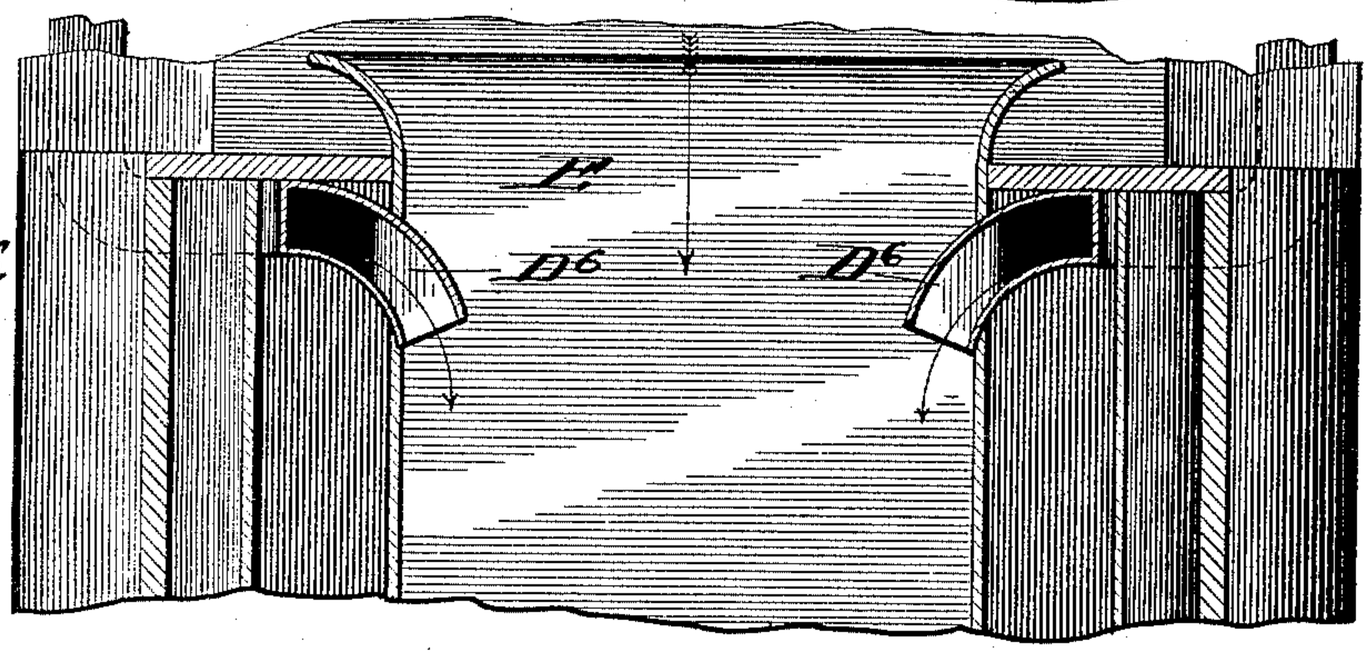


Fig. 16.



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UNITED STATES PATENT OFFICE.

FREDERICK U. ADAMS, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO ROBERT S. McCORMICK, OF SAME PLACE.

AIR-SUPPLY DEVICE FOR RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 489,910, dated January 17, 1893.

Application filed February 8, 1892. Serial No. 420,747. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK U. ADAMS, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Air-Supply Devices for Railway-Cars; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a system of air supply for the interior of the passenger cars of railway trains and has for its object to provide a construction by which, in cold weather, the air delivered into a car may be brought to the desired temperature before or at the time of its admission, and by which any desired temperature may be given to the interior of either car of a train independently of that of any other car.

The invention has special significance and utility in connection with cars constructed for high speeds and which therefore should not be supplied with fresh air for the occupants through open doors or windows.

The invention is illustrated in connection with cars and an engine provided with housings which contribute to the attainment of higher speeds than are common by lessening the atmospheric resistance, but these features are not herein claimed.

In the accompanying drawings which illustrate a practical form of my present invention: Figure 1 is a front view of the engine or locomotive, houses as proposed for high speed, and showing at its front, inlets of two air ducts for the admission of air to be heated on its way to the train. Fig. 2 is a transverse vertical section of the engine in front of the driving wheels. Fig. 3 is a transverse vertical section of the engine between the driving wheels. Fig. 4 is a rear end elevation of the lower portion of the locomotive, showing the air heating pipes applied thereto. Fig. 5 is a front end view of the tender, parts being broken away to illustrate the air passages leading from the engine. Fig. 6 is a side view of the rear lower portion of the locomotive and front lower portion of the tender, portions being broken away to show the air passages. Fig. 7 is a horizontal section in the indirect line 7—7 of Fig. 6. Fig. 8 is a central, vertical section of the rear end of the tender. Fig. 9 is a horizontal section of the front portion of the tender through the cold air pipes. Fig. 10 is a central vertical section in the line 10—10 of Fig. 11 looking forwardly, said view representing the rear end of the tender as being adapted to couple with the front of an adjacent car by means of a flexible hood and provided with a rear platform. Parts of the hot and cold air pipes are in this figure also shown broken away. Fig. 11 is a horizontal section of the rear end of a tender and the front end of a car coupled therewith, in the line 11—11 of Fig. 10. Fig. 12 is a transverse vertical section of a car in the line 12—12 of Figs. 11, 13 and 14. Fig. 13 is a central vertical section in the line 13—13 of Figs. 11 and 12. Fig. 14 is a horizontal section in the line 14—14 of Figs. 12 and 13. Fig. 15 illustrates a modification of Fig. 10. Fig. 16 is a horizontal section in the line 16—16 of Fig 15.

The passenger car as here shown in illustration of my invention has two main air flues extending longitudinally through it, one for warm and the other for cool air, the warm air flue being arranged beneath and partially embraced by the cool air flue while its lower surface is exposed to the car interior. By this means any heat radiated from the warm air pipe is taken up by the air within the car or by the cool air in the adjacent cool air pipe. Except in those claims which specifically define this construction, however, the invention is not limited to the said particular arrangement.

The illustrations further show branched flues or ducts leading from both the main air flues to common openings which deliver into the car interior. This is an essential feature of my invention and by it is attained the object of initially delivering air into the car interior at the proper temperature, as distinguished from the delivery of cool air at one point thereof and warm air at another.

Means are provided by which the relative quantities of warm and cool air taken from the main flues into the car interior may be regulated to suit the comfort of passengers, and the construction, as a whole, is such that

the relative quantities of cool and warm air delivered into one car may be varied from those delivered into another, so that the temperatures of different cars may be independently regulated and a desired temperature may be obtained in a car remote from the source of heat notwithstanding the loss of heat suffered by the warmed air on its way to such remote car. Both the cold and the warm air flues of the several cars open at their ends when the cars are detached and said pipes of the cars and tender register with each other at their ends so as to make the flues continuous throughout the train. The cool air may be taken into the appropriate flue either at the tender, at the head of a service car, or at any desired point upon the locomotive.

For the general purposes of my invention the air to be sent into the main warm air flue may be heated by any suitable means, being taken from a forward point on the train where it will enter free from dust and impurities. As here shown the air for this flue is taken into a pipe opening forwardly at the head of the locomotive whence it passes through ducts arranged adjacent to, or bounded by, heated surfaces of the locomotive.

More fully describing the devices here illustrated for admitting and regulating the distribution of air to the train, it will be seen from Figs. 2 and 3 that the boiler D of the locomotive is embraced by a shell D′ which incloses a space *d* around the boiler. Leading into this space are two pipes D^2 which present their open ends at the front of the boiler, as seen in Fig. 1. From the space *d* lead two pipes D^3, as seen in Figs. 3 and 6, said pipes D^3 being directed, first, downwardly and then rearwardly on opposite sides of the fire-box A^6 and in contiguity with the latter, as illustrated in Figs. 2, 4 and 6. These pipes D^3 terminate at their rear ends at or near the end of the cab of the locomotive and join with continuations D^4 of said pipes attached to the tender B, by means of flexible and extensible connections or sections of pipe *d′* (Figs. 4, 5 and 6). The pipes D^4 find their continuation in passages D^5 located between the outer tank wall of the tender and the outer casing thereof, as shown especially in Figs. 5 and 6. The pipes D^5 pass to the rear end of the tender where they are directed inwardly and converge in a single vertical pipe D^6, as indicated in Fig. 10. Above the lateral pipes D^5, at the sides of the tender B, are pipes B^4 which have their front ends open at the front of the tender, as indicated in Fig. 9. These pipes or passages, which are intended to receive cold air for delivery into the cars of the train, are also directed inwardly at the rear end of the tender where they rise, as also shown in Fig. 10.

At the upper portion of the back of the tender are provided short sections of the main cold and warm air ducts which continue through all the cars of the train and which are respectively marked E and F in all the figures of the drawings wherein they appear; that is, E represents the cold air duct and F the warm air duct running from the tender to the rear of the train. As represented, for example, in Figs. 10, 11 and 13, the cold air duct E is broader than the warm air duct F and the warm air duct has its upper portion within the cold air duct. This is a preferable but not a necessary construction, the desirable object of such construction being to cause the cold air to pass as largely as practicable in contact with the thin wall of the warm air duct so that when both ducts are used, one for cold and the other for warm air, the cold air may take on a quantity of heat from the warm air by such contact with the wall of the warm air duct. In case the warm air flue proceeds from a heating device in a service car it may obviously be given the same relation to the cold air flue, if desired, in which case only cold air ducts will be provided on the tender or tender and engine.

The ducts or flues E and F are fixtures in the several cars and are provided at their ends with short flexible and extensible sections which form a suitable close junction between the flues or ducts of one car and those of the next, these connections, as illustrated, being similar to those set forth in one of my prior applications above mentioned; although for the purposes of the invention herein claimed, they may be of that or any other construction.

As illustrated in Figs. 11, 12, 13 and 14, each car is provided with lateral branches leading from the several main flues E and F into vertical branches provided with openings or registers for the delivery of their contents into the car at desirable points. In my preceding application, Serial No. 412,924, I have described the same distributing ducts in connection with a single main air duct, and have illustrated and explained substantially the same means that are herein shown for diverting a required amount of air from a main air duct into the lateral branches of each car. The only additional feature necessary to be here pointed out is that illustrated particularly in Figs. 11 and 12 in which it is shown that branches F′ lead from the main hot air pipe F into the branches E′ of the cold air flue E, and that the said branches F′ are provided with dampers or flues *f*. By these means it is evident that any relative quantity of warm air may be delivered with the cold air into the discharging flues, and also that either the cold air or the hot air may be cut off altogether, thus enabling the attendants to supply air of any desired temperature to the interior of any car.

In addition to the flue valves *f* for regulating the passage of hot air to the interior of the car, the hot air pipes are desirably provided with valves which may be controlled by the engineer or fireman, and one form and location of such valves are shown at B^5, Figs. 5 and 6, applied to the tender. Their construc-

tion is obvious. Similar or any suitable form of valves may also be applied to the cold air pipes either in position to be operated by the engineer or by the conductor.

It will be observed that by the system above set forth the warmed air taken from the head of the train may be supplied in greater relative quantities to cars more remote from the source of heat, as will evidently be often required, for the reason that on its longer course to such cars it will have lost a portion of its heat and that, therefore, by the use of unequal quantities of warmed air, uniform temperatures may be obtained in all of the cars or by use of appropriate proportions of warm and cool air in either car any desired temperature may be obtained for said car. It will also be observed that by commingling warm and cool airs before they are delivered into the car interior instead of admitting cold air at one opening and hot air at another, objectionable drafts and unequal temperatures will be avoided.

The contiguous relation of the hot and cold air pipes shown and described manifestly will give, if employed, the advantage of economy of heat, since the heat radiated from the hot air pipe will be taken up either by the cold air in the contiguous pipe or by the atmosphere within the car.

I claim as my invention:

1. In an air supply system for railway passenger trains, the combination, in a passenger car, of two main longitudinal pipes, one for cold and the other for heated air, adapted to communicate each with a corresponding pipe of an adjacent car, openings into the interior of the car and passages giving communication from both said main pipes to said openings, whereby warm and cold air, both derived from a source external to the car, may be mixed at or on their way to said openings.

2. In an air supply system for railway passenger trains, the combination, with a passenger car, of two main longitudinal pipes, one for cold and the other for warmed air, adapted to communicate with corresponding pipes on an adjacent car, distributing pipes adapted to deliver into the car interior and pipes leading from both main pipes to said distributing pipes.

3. In an air supply system for railway passenger trains, the combination, with a passenger car, of two main longitudinal pipes, one for cold and the other for warm air, adapted to communicate with corresponding pipes on an adjacent car, distributing pipes for delivering air at various points to the car interior, branch pipes leading from both main pipes to said distributing pipes, and means for controlling the relative quantities of air delivered from said main pipes to the distributing pipes.

4. In combination with a passenger car having two main longitudinal pipes, one for cold and the other for warmed air, passages leading from both said pipes to common openings into the car interior, and means for regulating the relative quantities of cold and warmed air on its way from the main pipes to said openings, a car or other member of the train provided with fixed sections of both cold and warm air pipes opening to the outer air at or near the head of the train, and means for heating the contents of the warm air pipe on its way to the passenger car.

5. In an air supply system for railway passenger trains, the combination, with a cold air main pipe extending lengthwise through a car or cars and taking its supply at or near the head of the train, and a second pipe for heated air also leading through the car or cars of the train, and meeting passages within the car leading from both said pipes to common delivery openings into the car interior, of a duct applied to the locomotive and heated from the heated surfaces of said locomotive, said pipe for heated air opening to the outer air and being adapted to connect with the car pipe for warmed air.

6. In an air supply system for supplying mingled hot and cold air to passenger cars of railway trains, the combination, with longitudinal hot and cold air pipes leading through a passenger car or cars of a train, of a fixed section of each of said pipes applied to the locomotive tender, the cold air pipe section opening at the tender into the outer air and the hot air section of pipe being extended into contiguity with heating surfaces of the locomotive and being open to receive air in front of such heating surfaces.

7. In an air supply system for railway trains, a fixed section of a main air supply pipe applied to the locomotive tender exterior to a side wall of the water tank and deflected inwardly at the rear of said tender into line with a central continuation of said pipe applied to an adjacent car.

8. In an air supply system for railway passenger trains, the combination, with a passenger car, of two main longitudinal pipes, one for cold and the other for heated air, for the delivery of air to the interior of said car, said pipes having a common wall separating them whereby heat may be transmitted from the hot air pipe to the contents of the cold air pipe.

9. In an air supply system for railway passenger trains, the combination, with a passenger car, of two main longitudinal pipes, one for cold and the other for heated air, for the delivery of air into the car interior, said two pipes being separated by a common wall and a portion of the wall inclosing the heated air pipe being exposed to the car interior.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

FREDERICK U. ADAMS.

Witnesses:
M. E. DAYTON,
TAYLOR E. BROWN.