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PATENTED FEB. 6, 1906.

T. E. BRANSON.
PNEUMATIC LIFTING MEANS FOR GRAIN DOORS.

APPLICATION FILED MAR. 23, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

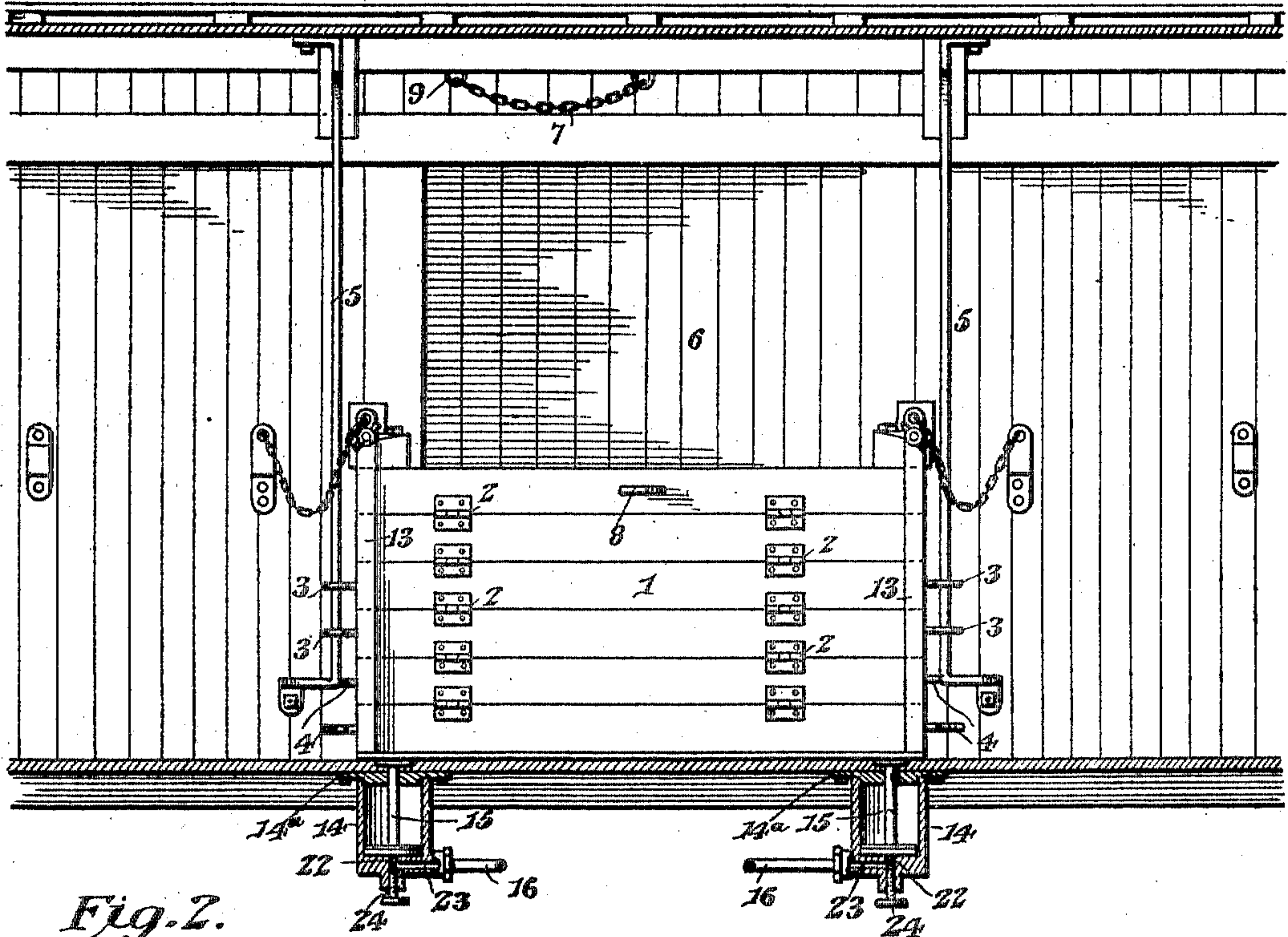
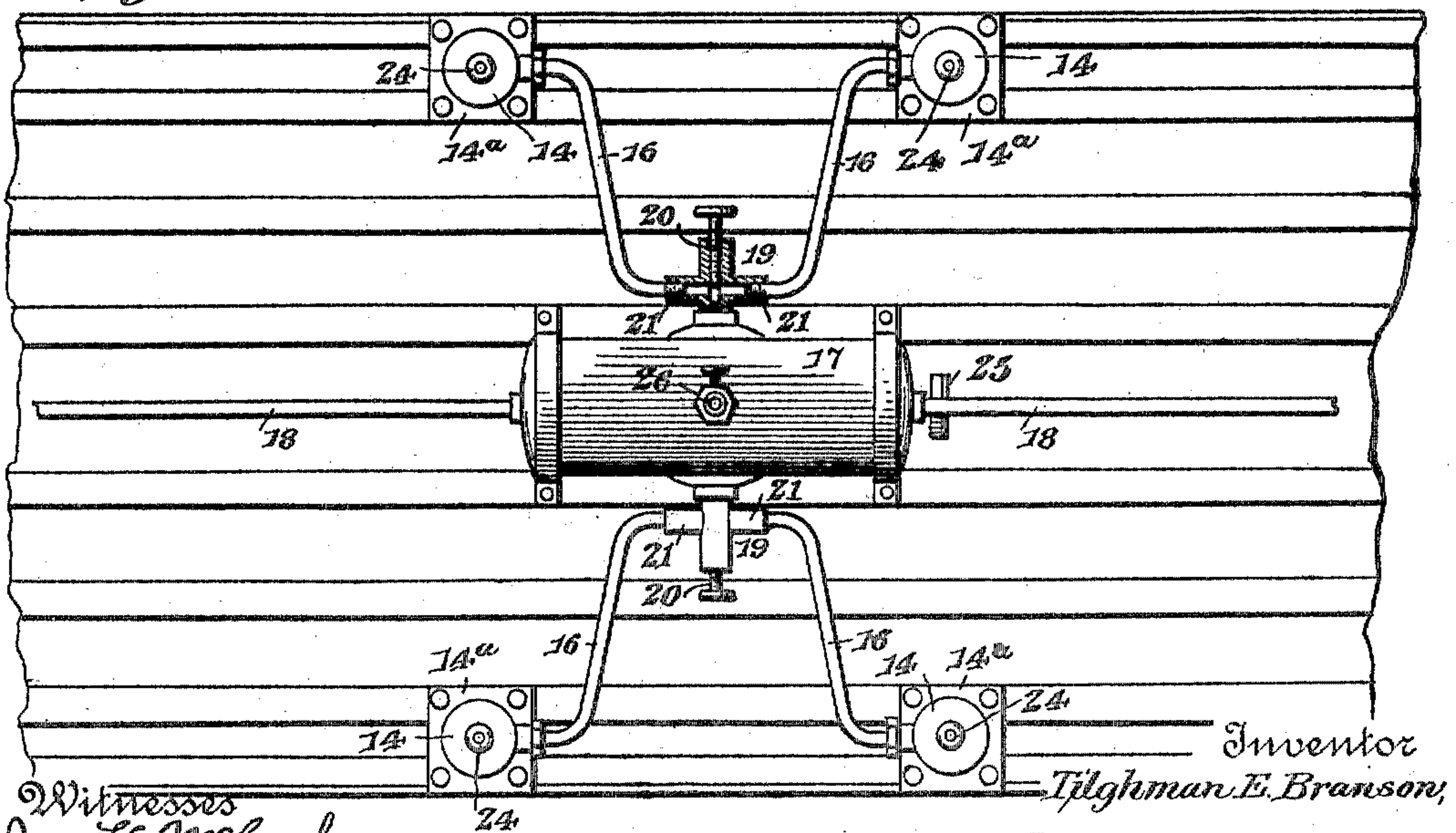


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

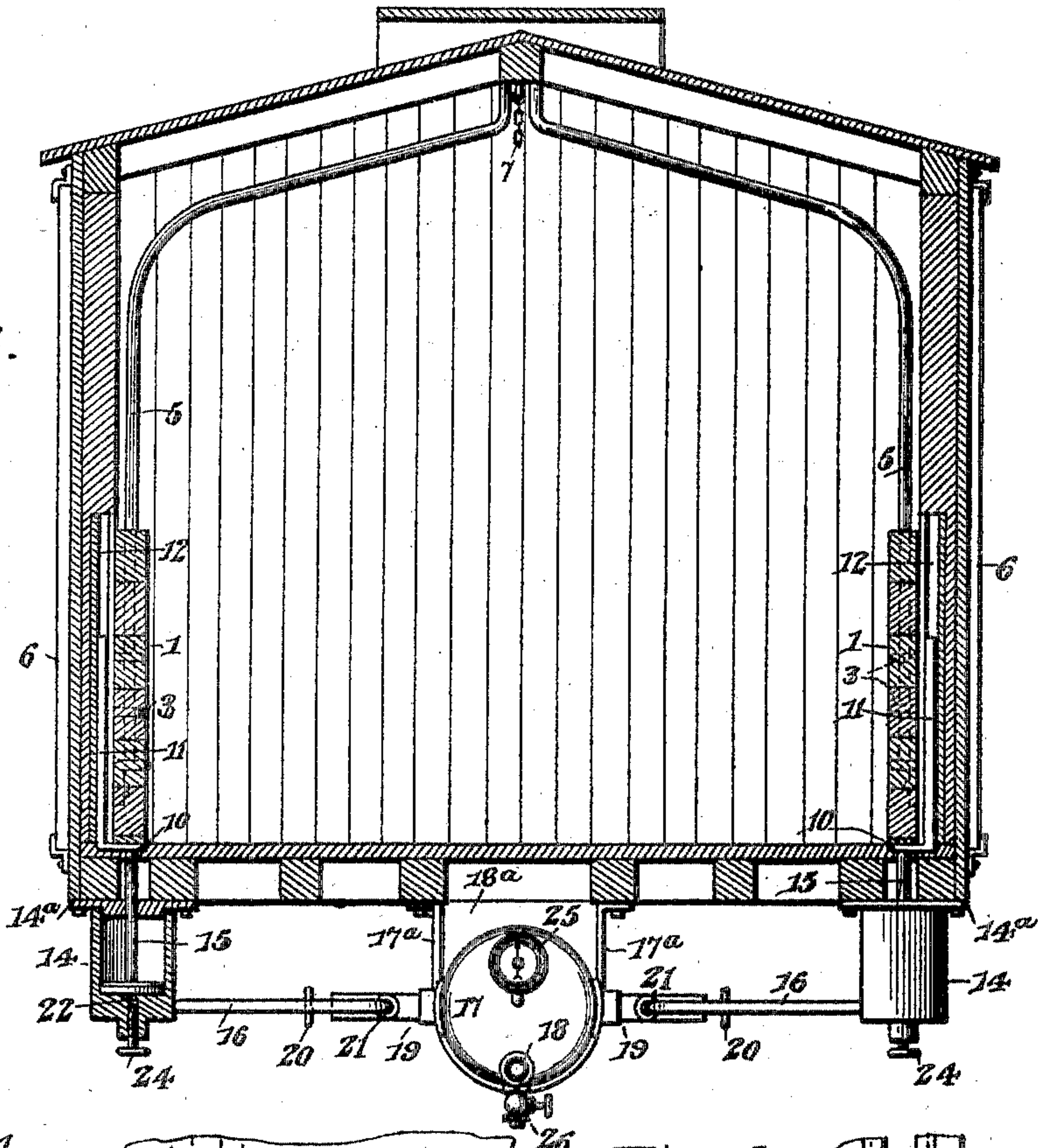


Fig. 4.

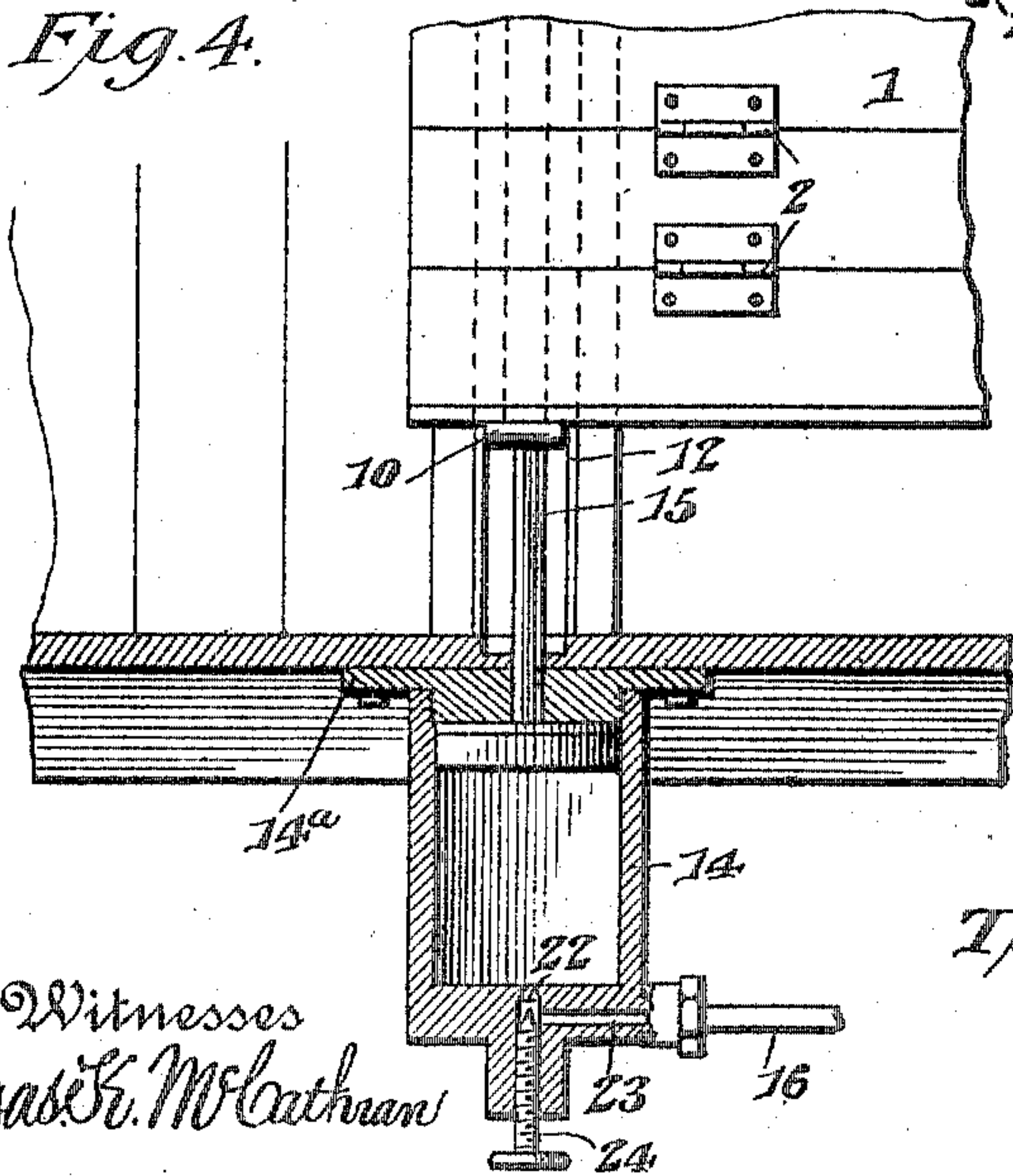
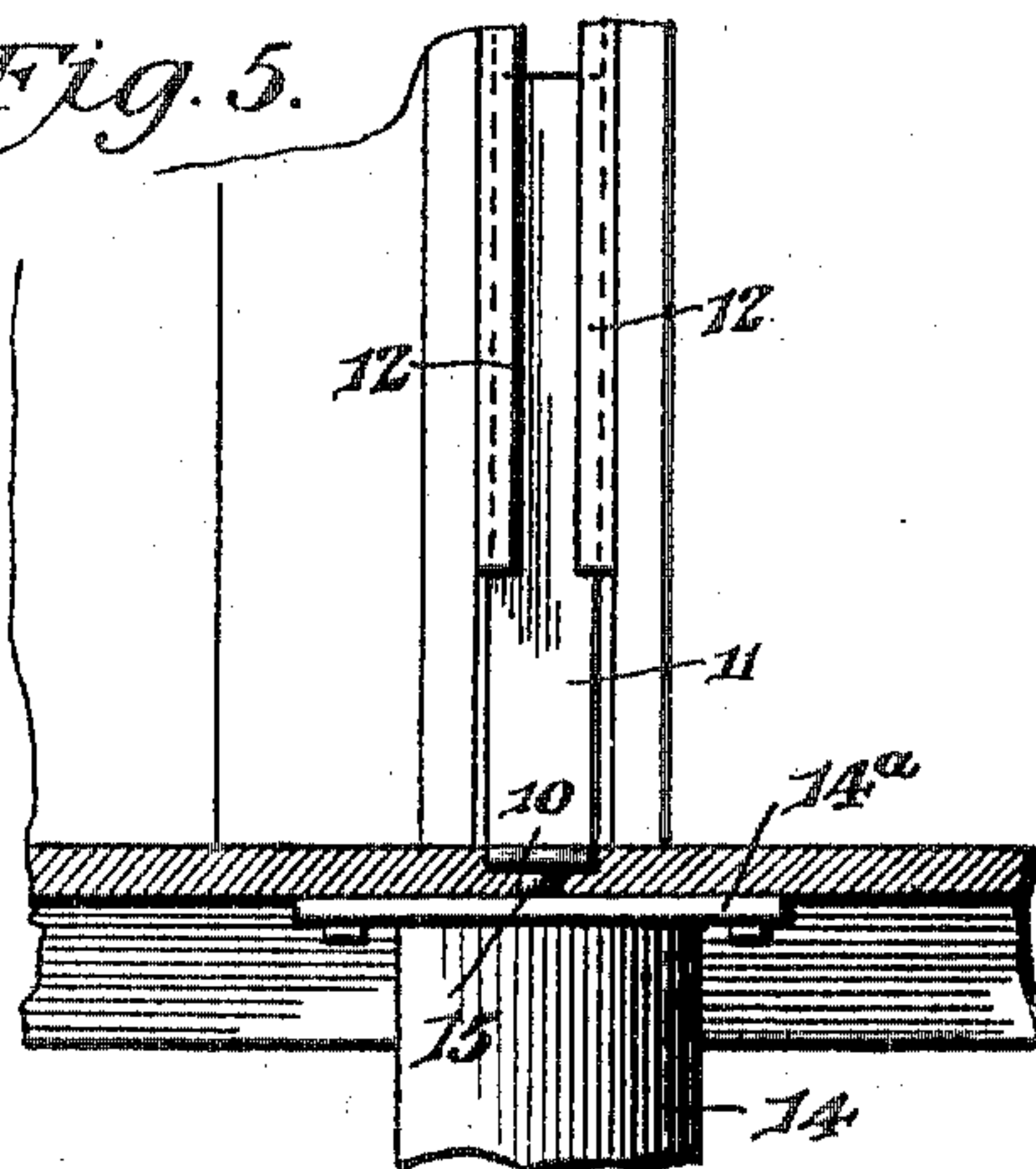


Fig. 5.



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UNITED STATES PATENT OFFICE.

TILGHMAN E. BRANSON, OF BELLEPLAINE, KANSAS, ASSIGNOR OF ONE-THIRD TO HARRY HATFIELD AND ONE-THIRD TO W. S. FOSTER, OF BELLEPLAINE, KANSAS.

PNEUMATIC LIFTING MEANS FOR GRAIN-DOORS.

No. 811,690.

Specification of Letters Patent.

Patented Feb. 6, 1906.

Application filed March 23, 1905. Serial No. 251,668.

To all whom it may concern:

Be it known that I, TILGHMAN E. BRANSON, a citizen of the United States, residing at Belleplaine, in the county of Sumner and State of Kansas, have invented a new and useful Pneumatic Lifting Means for Grain-Doors, of which the following is a specification.

The invention relates to pneumatic lifting means for grain-doors.

The object of the present invention is to improve the construction of means for lifting grain-doors when the same are subjected to internal pressure resulting from a load of grain and to enable a grain-door to be readily started and partially opened to relieve it of pressure without the use of crowbars, tools, or other instruments liable to injure either the door or the car and produce leaks.

A further object of the invention is to provide simple, inexpensive, and efficient means for enabling a grain-door to be opened by compressed air, capable of use when it is desired to unload a car.

With these and other objects in view the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion, size, and minor details of construction within the scope of the claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a longitudinal sectional view of a portion of a car provided with pneumatic grain-door-lifting means constructed in accordance with this invention. Fig. 2 is a reverse plan view illustrating the arrangement of the storage reservoir or tank, one of the lateral valves thereof being in section. Fig. 3 is a transverse sectional view. Fig. 4 is an enlarged detail sectional view of one of the vertical cylinders, the piston or plunger being raised. Fig. 5 is an enlarged detail view illustrating the construction of the carrier and the guideway for the same.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

1 designates a grain-door composed of sections or panels pivotally connected by means of hinges 2. The grain-door is provided at

opposite sides with eyes 3 and hooks 4, adapted to slide on guide rods or tracks 5, which are located at opposite sides of the doorway 6, as clearly shown in Fig. 1 of the drawings. The eyes receive the guide rods or tracks and are located at the intermediate portion of the door, and the hooks, which are arranged at the lower portion of the door, are adapted to slide on and off the guide rods or tracks, which have their lower ends terminated short of the floor of the car and secured to the side thereof. The guide rods or tracks, which are arranged in pairs at the sides of the car, are curved inwardly at the top thereof and are secured to the same at the median line of the car. The flexible grain-door is adapted to be moved by hand to the upper portion of the guide rods or tracks, and it is secured at the top of the car by means of a holding device 7, consisting of a short chain secured at one end to the top of the car and provided at the other end with a hook for engaging a loop or handle 8 of the door. The loop 9 is arranged at the top of the car to receive the free end of the holding device when the latter is not in use.

The lower edge of the door, which is reinforced by a metal bar or strip, is adapted to be engaged by projecting supporting portions or feet 10 of slidable carriers 11, mounted in suitable guides 12 of the car and arranged substantially flush with the side and floor thereof when at the lower limit of their movement. The grain-door is secured in its closed position by fastening-bars 13, having their lower ends detachably interlocked with the floor of the car and provided at their upper ends with fastening means for engaging the sides of the same. The means for slidably mounting the grain-door and the means for fastening the same and the particular construction of the carriers and the means for mounting the latter are all constructed similar to that shown, described, and claimed in an application for Letters Patent, Serial No. 251,667, executed by me of even date herewith. Coming now to the present invention, 14 designate vertical cylinders arranged in pairs at opposite sides of the car and located beneath the bottom thereof and having pistons or plungers 15, provided at their lower ends with heads, and having their upper ends arranged beneath the lower edge of the grain-

doors and in the same vertical plane as the said doors and adapted to engage the projecting supporting portions or feet of the carriers for moving the same upward. The cylinders, which are provided at their upper ends with attachment-flanges 14^a and which are bolted or otherwise secured to the frame of the car, are connected by supply-pipes 16 with a reservoir or tank 17, which is designed to be connected by a line of pipe 18 with the air-pump of the locomotive, whereby it is charged with air at the desired pressure. The train-line of the air-brake system of a train may be employed for charging the reservoir or tank with compressed air, suitable valves being provided to prevent back pressure, so that an application of the brakes will not affect the pressure within the reservoir or tank. As the pneumatic grain-door-lifting mechanism is operated only when lifting the door, it will not affect the operation of the brakes while a train is running. The reservoir 17 may be located at the center or either end of the car or at any other desired point, and it may be connected at either or both ends with the charging-line either directly or by means of branch feed-pipes, as will be readily understood. The reservoir is mounted in suitable hangers 17^a, approximately U-shaped, as clearly shown in Fig. 3 of the drawings, and suitably secured at the upper ends of the sides to the frame of the car. The rounded lower portions of the hangers 17^a conform to the configuration of the reservoir, which is preferably cylindrical, and the said reservoir is held firmly in the hangers by means of blocks 18^a, having concaved lower faces to fit the reservoir and interposed between the same and the frame of the car.

The reservoir is provided at opposite sides with discharge-apertures and the discharge of the compressed air is controlled by valves 19. The body or casing of each valve 19 is mounted on the cylinder and is provided with a suitable valve-seat adapted to receive the inner end of a valve-plug 20, which extends through a threaded opening of the valve body or casing and which is provided at its outer end with a suitable head. The valve-seat is conical and the inner end of the valve-plug is tapered to fit the valve-seat. Each valve casing or body is provided with laterally-disposed nipples 21, to which are coupled the inner ends of the transversely-disposed branch pipes 16. The valve-seat is located at a point between the laterally-extending nipples and the interior of the reservoir or tank, so that when the valve-plug is forced against the seat the escape of air to the transverse branch pipes will be effectually cut off.

The outer ends of the branch pipes are suitably coupled to nipples or extensions of the lower ends of the vertical cylinders 14, which are provided with horizontal vertical passages, as clearly shown in Fig. 1 of the draw-

ings. Tapered or conical valve-seats 22 are provided at the juncture of the passages and are located above the inner end of the horizontal passages 23, which extend to the outer ends of the branch pipes 16. Threaded valve-plugs 24 are mounted in threaded openings of the lower ends of the cylinders and have tapered upper ends for engaging the conical valve-seats 22 and are adapted to control the admission of air to the cylinders.

When it is desired to operate the grain-doors, the valve 19 is first opened and then the valve-plugs 24, which are disposed vertically, are operated to admit compressed air to the lower ends of the cylinders. The vertically-movable pistons or plungers are thereby raised and carry with them the grain-door, which is opened sufficiently to permit the grain to escape freely at the bottom, thereby relieving the grain-door of internal pressure and of enabling the said door to be moved upward on the guide rods or tracks by hand. Prior to operating the pneumatic lifting mechanism the fastening-bars are loosened at the top to permit the grain-door to move vertically. The upper ends of the plungers directly engage the vertically-movable carriers; but the latter may be omitted and the upper ends of the pistons or plungers may directly engage the lower edge of the door. The reservoir or tank 17 is provided with a suitable gage 25 for indicating the pressure, and a suitable drain-cock 26 is also preferably employed. After the grain-door has been raised by the pneumatic lifting mechanism the valve 19 is closed, and the pressure beneath the pistons or plungers may be removed by withdrawing the valve-plugs 24, or suitable blow-off cocks may be provided at the lower ends of the vertical cylinders for this purpose.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a car having a grain-door, of a cylinder having a grain-door-lifting piston, said grain-door being movable independently of the piston, and means for actuating the piston to raise the door.

2. The combination with a car having a grain-door, of a vertical cylinder located beneath the door and having a piston for partially opening the same, said door being movable independently of the piston to enable it to be completely opened, means for actuating the piston in its door-opening movement, and means for permitting the said piston to return to its initial position after the door has been partially opened.

3. The combination with a car having a vertically-movable grain-door, of a grain-door carrier arranged to detachably receive the door and slidable on the car, and permitting the door to have an independent opening and closing movement and pneumatic lifting

mechanism embodying a cylinder having a piston or plunger arranged to move the carrier upward.

4. The combination with a car having opposite grain-doors, of a storage tank or reservoir, vertical cylinders mounted beneath the car and having pistons or plungers arranged to raise the grain-doors to partially open the same, pipes connecting the cylinders with the storage tank or reservoir, and means for controlling the admission of fluid-pressure to the cylinders for permitting an independent operation of the doors.

5. The combination with a car having a grain-door, of lifting mechanism embodying a storage tank or reservoir, cylinders located beneath the car and having pistons for lifting the door, pipes connecting the cylinders with the storage tank or reservoir, and a valve located between the inner ends of the pipes for controlling the discharge of the fluid-pressure from the storage tank or reservoir and the admission of the same into the cylinders.

6. The combination with a car having a grain-door, of lifting mechanism embodying a fluid-pressure storage tank or reservoir, vertical cylinders located beneath the door and having pistons for lifting the same, branch pipes connecting the storage tank or reservoir with the lower ends of the cylinders, a valve located at the storage tank or reservoir for controlling the discharge of the fluid-pressure, and independent valves mounted on the cylinders for controlling the admission of the fluid-pressure to the cylinders.

7. The combination with a car having opposite grain-doors, of a fluid-pressure storage

tank or reservoir, cylinders arranged in pairs for lifting the grain-doors, branch pipes also disposed in pairs and extending from the storage tank or reservoir to the cylinders, and independent valves for controlling the discharge of fluid-pressure from the tank or reservoir and the admission of the same into the cylinders.

8. The combination with a car having a grain-door, of a fluid-pressure storage tank or reservoir, cylinders having pistons for raising the grain-door, branch pipes extending from the storage tank or reservoir to the cylinders, a valve mounted on the tank or reservoir, and having lateral passages communicating with the said branch pipes, said valve-casing being provided between the passages and the storage tank or reservoir with a valve-seat, and a valve-plug arranged to engage the seat for controlling the discharge of the fluid-pressure.

9. The combination with a door, of hoisting mechanism arranged normally in position for engaging the door to partially open the same, said hoisting mechanism having a detachable connection with the door to permit the latter to have a continued independent movement after the hoisting mechanism has raised the door and dropped back to its normal position.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

TILGHMAN E. BRANSON.

Witnesses:

IVAN HATFIELD,
LOYD T. DODSON.