

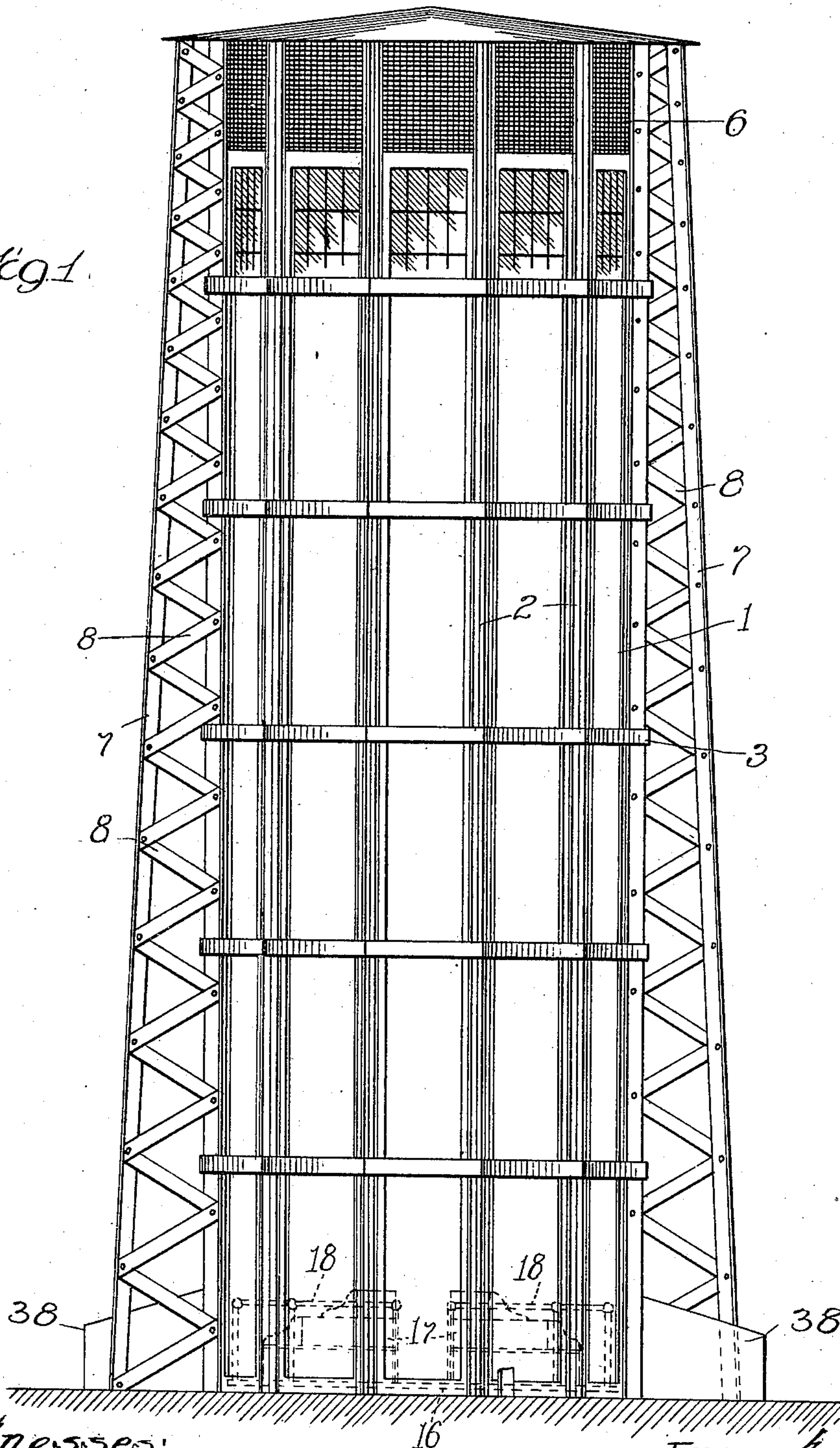
989,821.

J. J. STOETZEL.  
PNEUMATIC OBSERVATION TOWER,  
APPLICATION FILED MAR. 21, 1910.

Patented Apr. 18, 1911.

3 SHEETS—SHEET 1.

*Fig. 1.*



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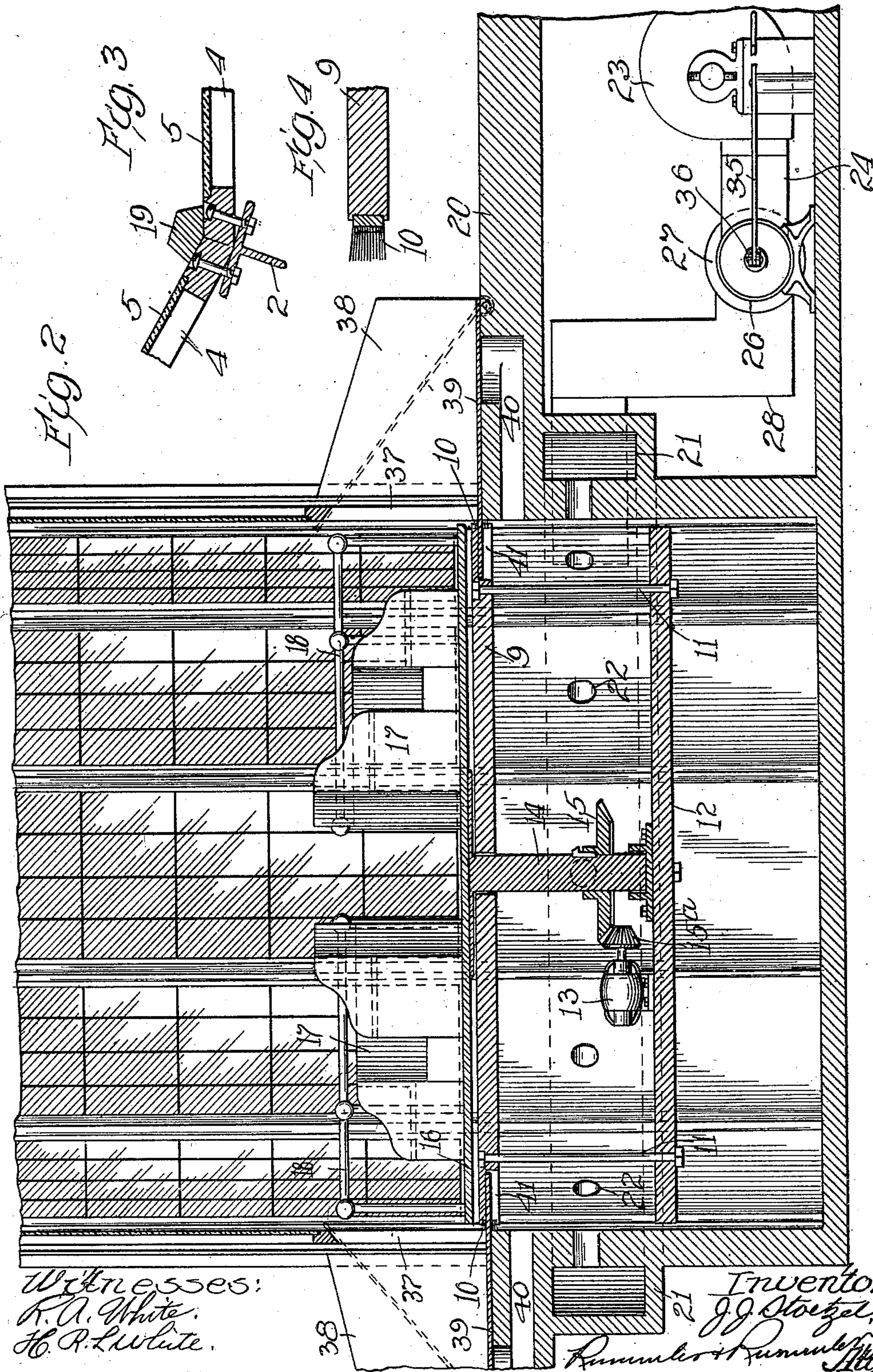


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3 SHEETS—SHEET 2.



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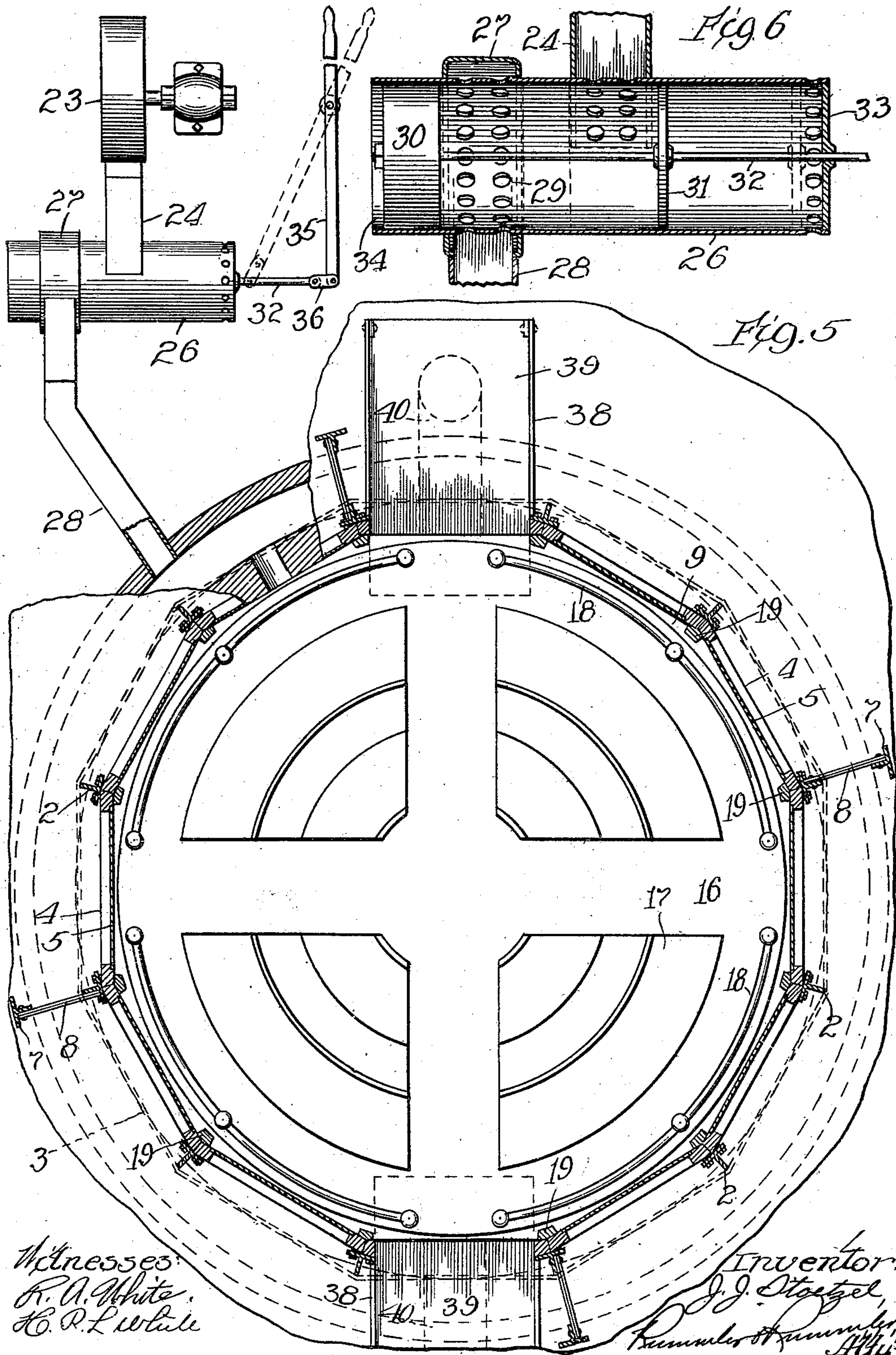


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# UNITED STATES PATENT OFFICE.

JOSEPH J. STOETZEL, OF CHICAGO, ILLINOIS.

PNEUMATIC OBSERVATION-TOWER.

989,821.

Specification of Letters Patent.

Patented Apr. 18, 1911.

Application filed March 21, 1910. Serial No. 550,787.

*To all whom it may concern:*

Be it known that I, JOSEPH J. STOETZEL, a citizen of the United States of America, and a resident of Chicago, county of Cook, State of Illinois, have invented certain new and useful Improvements in Pneumatic Observation-Towers, of which the following is a specification.

The main objects of this invention are to provide an improved form of observation tower especially adapted for use as an amusement device; to provide such tower in which a car capable of carrying passengers is buoyantly supported on a column of air and in which the inflow and escape of air is controllable at the will of an operator so as to cause the car to rise and fall through varying distances, the space below the car being arranged to serve as a dash pot for resiliently stopping the fall of the car and being arranged to prevent danger to the passengers through accident, inadvertence or inattention of the operator; to provide such observation tower having improved mechanism adapted to carry passengers to and from its top and to permit the passengers to view the surrounding country in all directions without changing their positions relative to the carrying mechanism; and to provide a strong and durable tower having a passenger car therein adapted to simultaneously travel vertically and to rotate about a vertical axis, so as to continuously change the passenger's point of view; a further object of this invention is to provide a form of amusement device in which passengers in a car may be given the sensation of falling through considerable distances and at the same time provide means whereby the fall will be checked in such manner as to avoid the possibility of accidental injury to the passengers; and to provide means whereby the supporting air column may be controlled in such manner as to support the car in a position of rest at any desired elevation within the limits of the apparatus or to cause it to travel at any desired speed within certain limits.

A specific construction embodying the in-

vention is illustrated in the accompanying 50 drawings, in which—

Figure 1 is a side elevation of an observation tower embodying this invention. Fig. 2 is an enlarged, fragmentary vertical section of the tower showing the car and the 55 operating mechanism therefor. Fig. 3 is an enlarged fragmentary section of the tower, showing details of the wall construction. Fig. 4 is an enlarged fragmentary section of the piston. Fig. 5 is a transverse section of the tower, with the car in plan view. 60 Fig. 6 is an enlarged section of the controlling mechanism for the car.

In the construction shown, the tower 1 comprises a plurality of upright frame 65 members or posts 2, which are connected together at proper intervals throughout their lengths by bands or bars 3. Rigidly secured to the inner faces of the uprights 2 are the frames or sash 4 which fit tightly together 70 at their top, bottom and lateral edges, and in each of which is tightly secured a glass 5, so that the tower is provided with practically airtight, transparent side walls which form a pneumatic cylinder. The glass walls 75 extend to near the top of the tower, and the upper portion of the tower is provided with an openwork frame or screen 6 which affords ventilation for the tower and prevents passengers from falling when they are carried 80 to the upper portion of the tower. The lower part of the tower is so arranged that it will serve as a dash pot for confining the air and resiliently cushioning the fall of the passenger car so that the car will be brought 85 to rest without violent shock, even though it is allowed to fall throughout the entire height of the interior of the tower.

For the purpose of bracing the tower laterally, anchor posts 7 are placed at intervals about the tower and are connected to the uprights or posts 2 by means of braces or ties 8. 90

Within the cylinder is a piston 9, which, as shown more clearly in Fig. 4, is provided 95 on its periphery with a packing 10 of suitable material, preferably a brush, which fits closely to the side walls of the cylinder and



provides a joint between the piston and the walls, which is sufficiently airtight for the purpose. Beneath the piston 9, and supported therefrom by means of bolts or up-  
 5 rights 11, is a platform 12 on which is mounted a motor 13. A shaft 14 is journaled in suitable bearings in the piston and platform and projects slightly above the piston. For the purpose of rotating the shaft  
 10 14, a beveled gear 15 is carried on the shaft and meshes with a pinion 15<sup>a</sup> on the motor shaft.

Rigidly secured on the upper end of the shaft 14 and adapted to rotate therewith is  
 15 the car, which comprises a floor 16 on which are seats 17, so arranged that the passengers face the walls of the tower. The floor is provided near its edges with railings 18 which prevent the passengers from coming  
 20 in contact with the walls of the tower when the car is in motion, and openings are left in the railing to afford an entrance to and an exit from the car.

For the purpose of truly guiding the piston in the cylinder two or more guides or  
 25 ways 19 are formed on the inner sides of the walls opposite the uprights 2, and the piston is notched to receive the guides.

The lower portion or base of the tower  
 30 extends below the level of the floor or ground 20 so that the floor 16 of the car may be brought down to the ground or floor level to load and unload passengers.

The car is adapted to be operated by  
 35 pneumatic pressure acting beneath the piston 9, and for this purpose an air passage 21 is formed around the base of the tower, and ports 22 open from the passage 21 into the  
 40 base of the tower below the lower limit of movement of the piston.

For the purpose of supplying air pressure to operate the piston 9, a blower 23 is provided with a pipe 24 which leads from its  
 45 outlet port and opens into the side of the cylinder 26 of a controlling valve. The cylinder 26 is provided with a channel or chamber 27, which is spaced a distance from the pipe 24 and extends around the cylinder. A pipe 28 leads from the chamber 27 and  
 50 opens into the passage 21. A plurality of rows of ports 29 open from the cylinder 26 into the chamber 27 and permit the passage of air from the cylinder to the pipe 28 or vice versa.

Within the cylinder are two pistons 30  
 55 and 31, which are rigidly connected together by means of a piston rod 32 which projects from the head 33 of the cylinder. The piston 31 is adapted to travel between  
 60 the pipe 24 and the head 33 of the cylinder, and the piston 30 is adapted to travel over and control the ports 29, which are situated at the side of the pipe 24 opposite from the piston 31. The piston 30 is of such length  
 65 that when in a position midway between the

limits of its movement, it will close all of the ports 29 and prevent communication between the cylinder and the pipe 28. When the piston 30 is shifted from its central position toward the open end 34 of the cylinder,  
 70 it opens the ports 29 and permits the passage of air from the pipe 24 through the cylinder to the pipe 28, and when shifted in the opposite direction beyond its central position it permits the passage of air from the pipe 28  
 75 to the cylinder and from the open end of the cylinder to the atmosphere. The projecting end of the rod 32 is provided with an operating lever 35 which is connected to the rod by means of a link 36. 80

The tower is provided with doorways 37 through which passengers may enter or leave the car when the car is at the lower limit of its movement. Each doorway opens  
 85 into a hall or vestibule 38 on the outer side of the tower and of the same width as the doorway. The door 39 for each doorway is hinged at one end to the floor of the hall and the other end thereof projects through  
 90 the doorway into the tower a sufficient distance so that when the inner end of the door is raised to the top of the doorway, as shown in dotted lines in Fig. 2, said inner end will project slightly into the cylinder beyond the  
 95 door cap. Air passages 40 lead from the base of the tower and open into the halls 38 beneath the doors 39. When the car is at the lower limit of its movement the doors project at their inner ends beneath the edge of  
 100 the piston 9 which is provided with recesses 41 to receive the doors 39 and permit the piston to be brought down to as low a level as possible.

The operation of the construction shown is as follows: When the car is at the lower  
 105 limit of its movement the doors 39 are held down by the piston and the car may be filled with passengers, who enter through the halls 38 and the doorways 37. When it is desired to elevate the car, the piston 30 of  
 110 the valve is shifted so that air may pass from the cylinder 26 through the pipe 28 and to the base of the tower or cylinder. The pressure of the air beneath the piston 9 raises the piston and car, and as the piston  
 115 rises, the air acting through the passages 40 raises the inner ends of the doors 39 to the tops of the doorways so as to prevent the escape of air through the halls 38. By moving the piston 30 back and forth in the cylinder, the air is permitted to enter the pipe  
 120 28 and pass to the cylinder, or exhaust from said pipe to the atmosphere. The car is thus moved up and down in the cylinder at the will of the operator by simply varying the  
 125 air pressure. If it is desired to hold the car at any desired point the piston 30 is so adjusted that only enough air will enter the tower to compensate for leakage past the  
 130 piston. As the car approaches the bottom



of the cylinder the inner ends of the doors 39 are caught beneath the piston 9 and are returned to a horizontal position.

Reference has been made hereinabove to the fact that the space below the car may serve as a dash pot to stop the fall of the car, without danger to the passengers, through accident, or inattention on the part of the operator. It will be observed that when the car is at the bottom of the tower, as shown in Fig. 2, the platform 12 is below the level of the openings 22 which lead to the passage 21 and thus communicate with the air controlling valve 26. If, through accident, or inadvertence, the valve be left wide open, thus permitting the car to descend at full speed until the bottom of the tower is reached, there will be a space below the platform 12 from which the air cannot quickly escape and which will form a cushion to receive the platform and the car. The falling car forces the air out through the openings 22, passage 21, pipe 28, and valve cylinder 26, until the platform 12 passes the openings 22, when the impact of the platform, which forms in effect a loosely fitting piston, upon the elastic body of air in the space below the openings 22 arrests the fall of the car. The escape of air past the edge of the platform now permits the car to settle to the position in which it is shown in Fig. 2, with the doors 39 held down in open position to permit the exit of the passengers.

The cylinder 26 is provided with apertures adjacent to the head 33 so as to prevent an air cushion behind the piston 31, and as the pistons 30 and 31 are balanced they operate with comparative ease.

While the car is being raised and lowered in the tower cylinder, it is slowly rotated by the motor to enable the passengers to view the surrounding country in all directions.

While but one specific embodiment of the invention has been shown, it will be understood that various details of the construction shown may be varied without departing from the scope of the invention.

I claim:—

1. An observation tower, comprising a tower, having airtight walls, a piston fitting closely between the walls, rotative passenger carrying mechanism mounted on the piston, and means for pneumatically operating the piston.

2. An observation tower, comprising a tower having airtight side walls, a car in the tower, pneumatically operated means adapted to raise and lower the car, and means adapted to rotate the car.

3. An observation tower, comprising a tower cylinder having airtight side walls, a piston in the cylinder, a rotative car mounted on the piston, and means for admitting and releasing air pressure to the cylinder beneath the piston.

4. An observation tower, comprising a tower having airtight, transparent side walls, a pneumatically operated car in the tower, and means for rotating the car.

5. An observation tower, comprising a cylinder having a doorway, a piston movable in the cylinder, a door for said doorway arranged to be opened by said piston when the latter moves downward to a position in front of said doorway, means for supplying fluid under pressure to the cylinder below the piston, and means for closing said door when the piston rises above said doorway.

6. An observation tower, comprising a cylinder, a piston movable in the cylinder and arranged to carry passengers, means for supplying fluid under pressure beneath said piston, means for controlling the pressure of the fluid delivered to said cylinder, said cylinder having a doorway at its lower end and a door for said doorway arranged to be opened by the piston when the latter descends to the bottom of the cylinder, and means for closing said door when the piston rises.

7. An observation tower, comprising a cylinder having airtight transparent walls, a piston in the cylinder, a shaft journaled in the piston, means for rotating the shaft, a car mounted on the shaft above the piston, means for admitting air under pressure to the cylinder beneath the piston, and means for varying the air pressure to raise or lower the piston.

8. An observation tower, comprising a plurality of uprights rigidly connected together, transparent airtight walls secured to said uprights, a piston inclosed by said walls, a car supported on the piston, and means for pneumatically operating the piston.

9. An observation tower, comprising a cylinder having substantially airtight transparent walls, a piston in said cylinder, an air outlet at the upper end of said cylinder, and means controlled by a single operating element located exterior to the cylinder for controlling the admission and escape of air from said cylinder below said piston.

10. The combination of a hollow tower, a piston movable in said tower and arranged to carry passengers, means for supplying fluid under pressure to said tower beneath said piston, and means for controlling the admission of the fluid to said tower, the tower having a controlled exit for the fluid and having a space below said exit to form a dash pot, said piston having means thereon arranged to pass into said dash pot space and fit loosely therein and thus gradually arrest the motion of the piston when the latter descends to the bottom of the tower.

11. The combination of a hollow tower, a piston movable therein and arranged to



carry passengers, and means for supplying fluid under pressure to said tower beneath said piston, the tower having a controlled exit for the fluid and having a dash pot  
5 space below the exit, said piston having a part arranged to enter said dash pot space, and said part being arranged to permit fluid to pass the same slowly, whereby the piston

is gradually brought to rest after said part has entered the dash pot space. 10

Signed at Chicago this 17th day of March 1910.

JOSEPH J. STOETZEL.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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