N. LOMBARD.

MOTOR.

APPLICATION FILED OCT. 18, 1909.

962,711.

Patented June 28, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

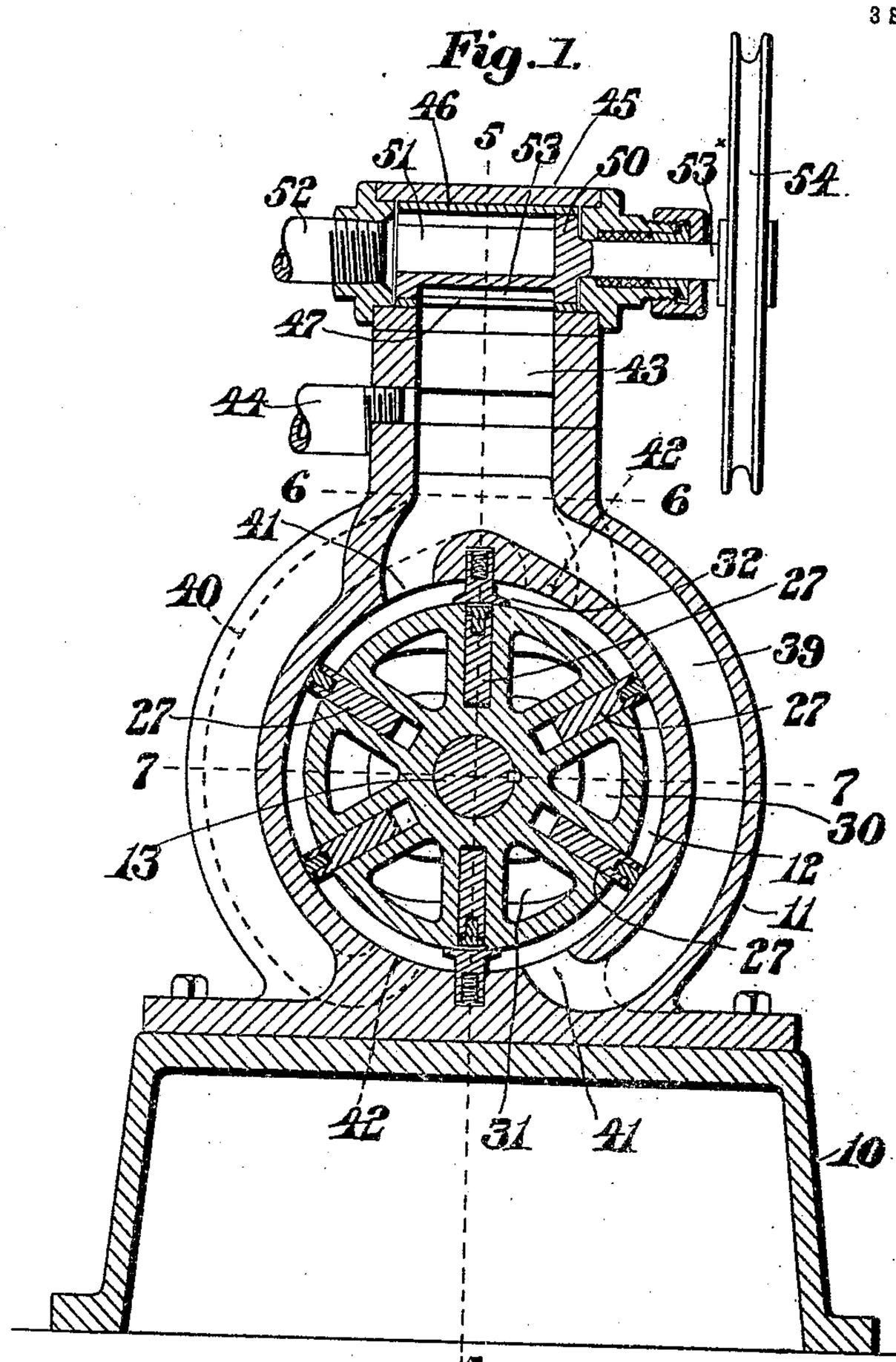
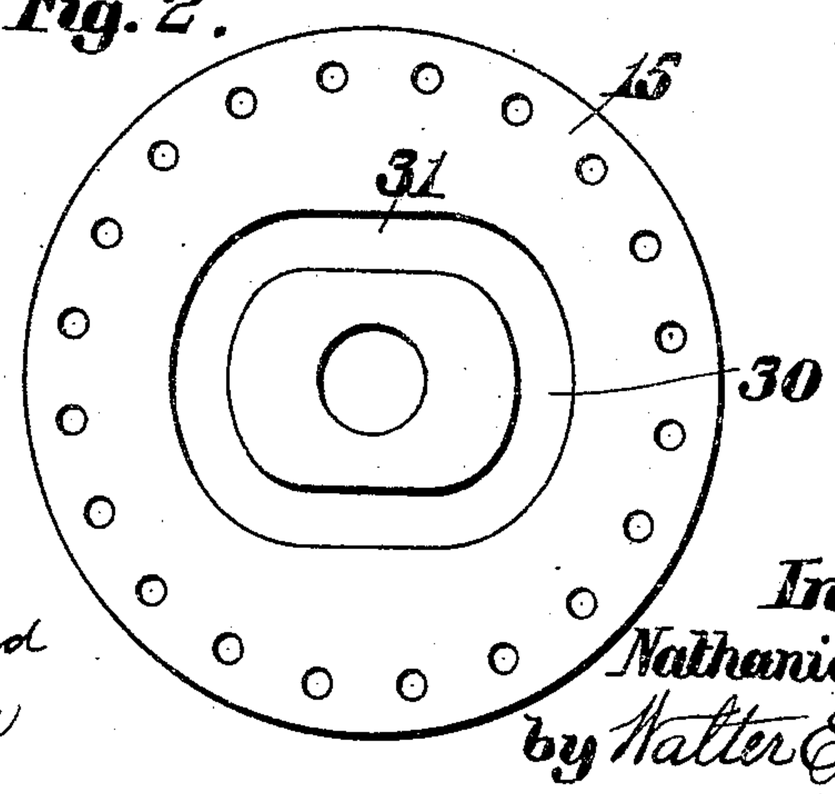


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 6.

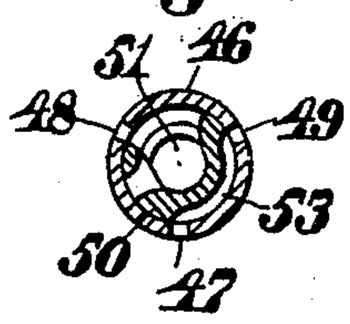
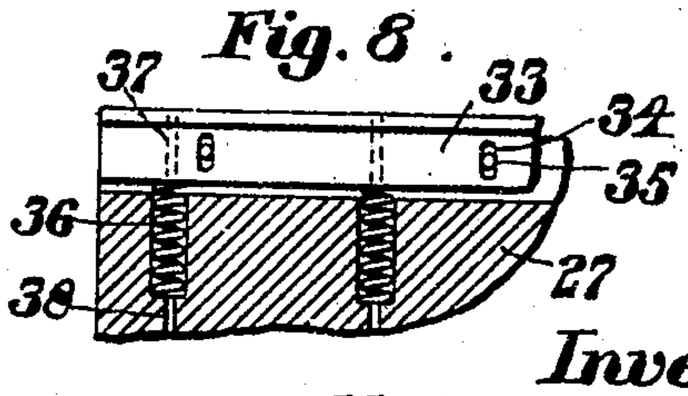


Fig. 3.

Fig. 7.

Fig. 8.



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3 SHEETS—SHEET 3.

Fig. 4.

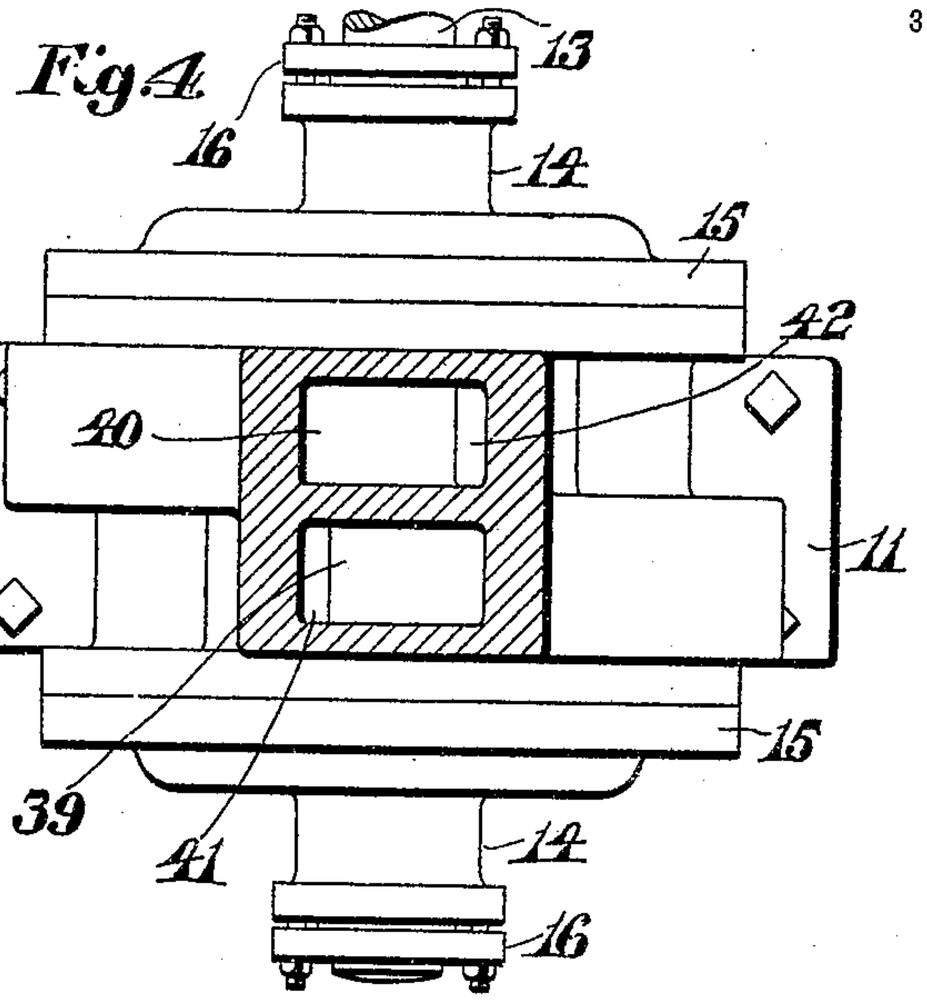
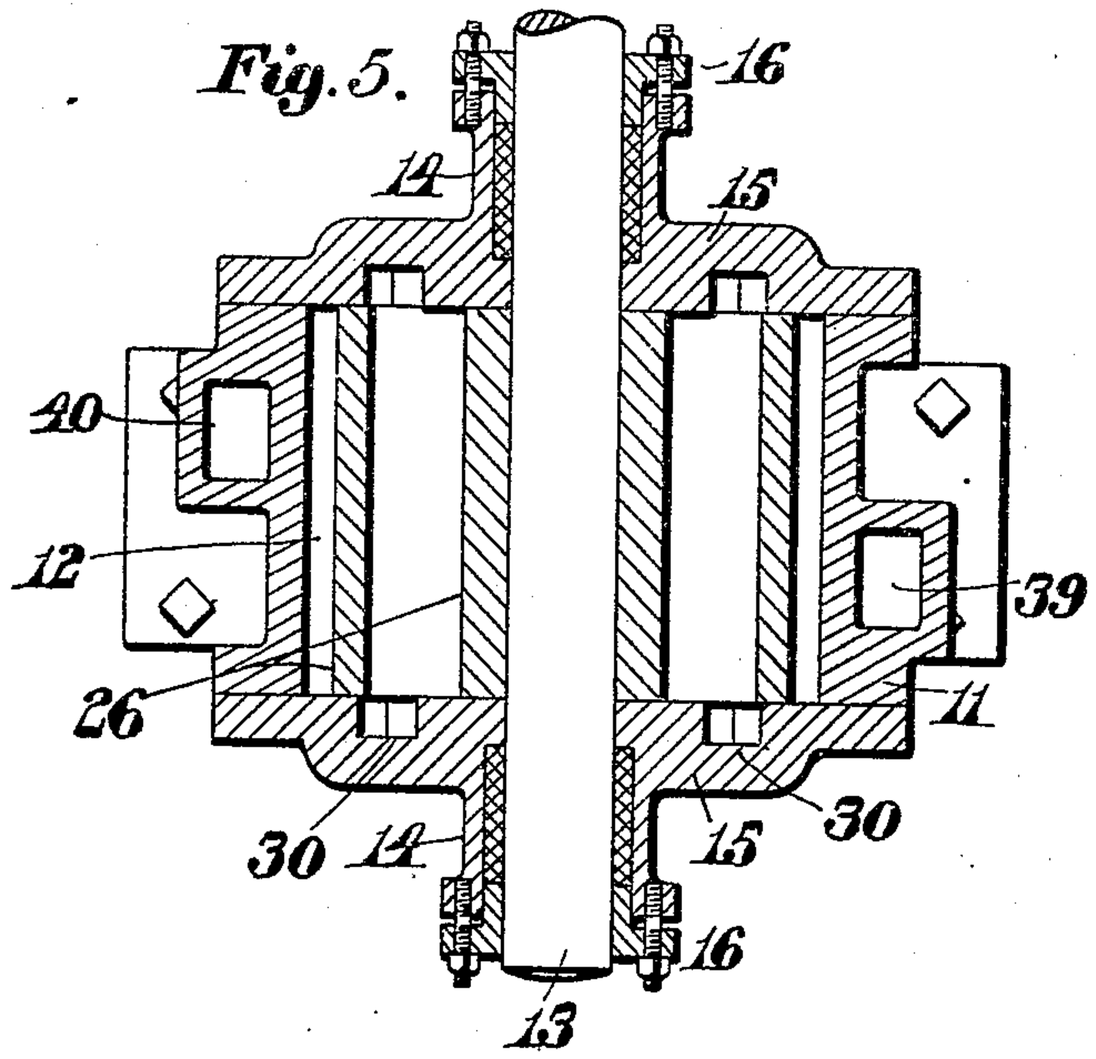


Fig. 5.



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UNITED STATES PATENT OFFICE.

NATHANIEL LOMBARD, OF WINTHROP, MASSACHUSETTS.

MOTOR.

962,711. Specification of Letters Patent. Patented June 28, 1910.

Application filed October 18, 1909. Serial No. 523,348.

To all whom it may concern:

Be it known that I, NATHANIEL LOMBARD, a citizen of the United States of America, and a resident of Winthrop, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Motors, of which the following is a specification.

This invention relates to motors and has for its object the provision of a motor which may be secured directly to an actuating shaft for the purpose of driving at a moderate speed any mechanism which it is desired to operate in either direction intermittently and lock when at rest to prevent undesired movement thereof.

The apparatus is particularly adapted for use in operating elevators, occupying as it does but very little space in comparison with the usual elevator-operating mechanisms while effectively raising or lowering the car at the will of the operator and locking it in position when the power is shut off.

The invention consists primarily of a fluid-controlled member secured directly to the actuating shaft, and means for applying to opposite sides of said blades an equal pressure and simultaneously increasing the pressure on one side of the blades while proportionately reducing the pressure upon the opposite side thereof.

The invention further consists in certain novel features of construction and arrangement of parts which will be readily understood by reference to the description of the drawings and to the claims hereinafter given.

Of the drawings: Figure 1 represents a vertical transverse section of the same, the cutting plane being on line 3—3 on Fig. 3. Fig. 2 represents a side elevation of one of the side plates to the motor. Fig. 3 represents a vertical section of the motor and valve for controlling the same, the cutting plane being on line 5—5 on Fig. 1. Fig. 4 represents a horizontal section of the motor, the cutting plane being on line 6—6 on Fig. 1. Fig. 5 represents a horizontal section of the motor, the cutting plane being on line 7—7 on Fig. 1. Figs. 6 and 7 represent sections of the fluid-controlling valve in different positions, and Fig. 8 represents a detail of the movable blade of the shaft actuating member.

Similar characters designate like parts throughout the several figures of the drawings.

In the drawings, 10 represents a suitable base to the upper surface of which is secured the casing member 11 provided with an inner cylindrical chamber 12, through the center of which extends the actuating shaft 13 mounted in suitable bearings 14 formed upon the end plates 15 to the casing member 11. The bearings 14 are each provided with suitable stuffing boxes 16 to prevent the fluid contained within the inner chamber from escaping therefrom.

Secured to the shaft 13 between the end plates 15 secured to the casing member 11 is a member 26 provided with a plurality of radial slots in each of which is mounted a blade 27.

Each blade 27 has at either end a trunnion 28 upon which is a roller 29 fitting a cam path 30 formed in the inner face of the end plates 15. This cam path 30 has two portions concentric to the axis of the shaft 13 and two other straight portions opposite each other, as indicated at 31. The casing member 11 is provided opposite to the centers of the flattened portions 31 with spring-pressed abutments 32, the contacting faces of which are of much greater width than the width of the radial slots in the member 26.

The abutments 32 extend into the chamber 12 into contact with the periphery of the member 26 which is of less diameter than the cylindrical wall of said inner chamber and the spring pressure acting upon said abutments retain their contacting faces at all times in contact with the periphery of said member during its rotation.

The outer edge of each blade 27 is slotted and has mounted in said slots a T-shaped contacting shoe 33 provided with slots 34 through which extend pins 35 secured to the blade 27 which serve the purpose of limiting the outward movement of said shoe 33.

Behind the shoe 33 in suitable sockets in the blade 27 are a plurality of springs 36 which serve to force the shoe 33 outwardly into contact with the cylindrical wall of the inner chamber 12. The inner chamber 12 is filled with suitable fluid and passages 37 through the shoe 33 and passages 38 through the blade 27 provide a means for equalizing the pressure upon the outer and inner edges

of the blades, thus facilitating their radial movement. This radial movement never occurs while there is any side pressure on the blade.

As the member 26 rotates within the inner chamber 12 the trucks or rollers 29 projecting from the ends of the blades 27 will keep the shoes 33 in firm contact with the cylindrical wall of the chamber 12 except when they pass along the flattened portion 31 of the cam path, at which time the blades will be withdrawn within the slots in the member 26 so that the outer contacting face of the shoes 33 is well within the periphery of said member 26. This permits the member to rotate without the blades coming into conflict with the abutments 32, the parts being so constructed that as soon as the blades have passed the abutments 32 the cam path 30 will act thereon to again move the blades outwardly with their shoes 33 in contact with the cylindrical wall of the chamber 12.

The casing member 11 is provided with two passages 39 and 40, these passages 39 and 40 communicating respectively by means of the ports 41 and 42 with the inner chamber 12, the ports 41 being diametrically opposite each other and the ports 42 being similarly positioned. Between the passages 39 and 40 the casing member 11 is provided with an outlet passage 43 communicating with an outlet pipe 44. Secured to the upper face of the casing member 11 is a valve casing 45 in which is mounted a tubular member 46 provided with an outlet port 47 and ports 48 and 49. In this tubular member 46 is mounted a rotary valve 50 which is provided on one side with an inlet chamber 51 at the top to communicate with an inlet pipe 52 while its peripheral face is provided with a passage 53 which is adapted by turning the valve 50 to provide a communication between the port 47 and the port 49 as indicated in Fig. 8 of the drawings. The valve 50 is provided with a stem 53* to the outer end of which is secured a sheave 54.

When the valve is in the position indicated in Fig. 8 of the drawings the fluid entering by means of the pipe 52 is permitted to pass through the port 48 into the passage 39 and then into the chamber 12 where it will act upon the blades 27 to move the member 26 contra-clockwise, the fluid on the other side of the blades 27 passing from the chamber 12 through the passage 40 and port 49 along the passage 53 of the valve 50 through the port 47 into the chamber 43 and outlet pipe 44. When this operation occurs the blades 27 are subjected to the full force of pressure exerted by the entering fluid and cause the car to be raised. It is obvious that by operating the rope or cable the operator within the car may control the speed of the car during its upward movement by regulating the movement of the valve 50.

In lowering the car it is obvious that there is no necessity for the same amount of pressure to move the car downward as to move it in the opposite direction and as a consequence when this movement occurs it is essential that the outlet port 47 be closed and a communication be provided between the ports 48 and 49, as clearly indicated in Fig. 7 of the drawings. When the valve 50 is in the position shown in this figure, an equal amount of pressure passes through the ports 48 and 49 so that the pressure within the passages 39 and 40 and on either side of the blades 27 is balanced except for the pressure exerted by the weight of the car and its occupants.

The pressure normally on either side of the blades 27 being balanced, when this additional weight is brought to bear upon the actuating shaft it will tend to move the member 26 clockwise and increase the pressure thereby upon the fluid in advance of the blades 27 over the pressure to the rear of said blades 27. This additional pressure in advance of the blades 27 will serve to retard the rotation of the actuating shaft 13 and the lowering of the car 22. With this additional pressure within the passages 39 and the chamber 12 in advance of the blades 27, it is obvious that the retarding of the lowering of the car may be increased or decreased at the will of the operator by throttling the port 48 to a greater or less extent.

When the valve is in the position indicated in Fig. 5 of the drawings with both the ports 48 and 49 covered, no fluid can be admitted or exhausted from the passages 39 and 40 so that whatever fluid is contained within the various passages and chambers is equal on both sides of the blades 27, thus rigidly locking the member 26 and preventing any rotation of the shaft 13.

It is obvious that by regulating the amount of opening of the ports 48 and 49 the speed of the actuating shaft may be regulated to a nicety.

This makes a very simple apparatus for operating elevators and similar devices, and as it may be connected directly to the operating drum it dispenses with much of the mechanism which is now used, thus forming an apparatus which is very compact and occupies very little room, which obviously is of great advantage.

Another advantage of the apparatus is that when the elevator is not being moved by the operation of the actuating shaft the fluid contained within the casing member 12 will lock the shaft securely so that the car will maintain any desired position.

It is believed that the operation and many

advantages of the invention will be fully understood from the foregoing.

Having thus described my invention, I claim:

1. In a device of the class described, the combination of a revoluble shaft; a fluid cylinder surrounding said shaft the casing of which is provided with an inlet chamber and an outlet chamber connected by an outlet port, while said inlet chamber is also connected through two ports with two passages communicating with the interior of said fluid cylinder; an abutment extending into said cylinder between said passages; a member secured to said shaft with its periphery always in contact with said abutment and provided with radial movable blades adapted to be acted upon by the fluid passing through said cylinder to effect a revolution of said shaft; and a rotary valve in said inlet chamber provided with a peripheral groove adapted to connect said outlet passage with one of said inlet passages and having ports adapted to register with said inlet pipe and the other inlet passage or both of said inlet passages.

2. In a device of the class described, the combination of a revoluble shaft; a fluid cylinder surrounding said shaft the casing of which is provided with an inlet chamber and an outlet chamber connected by an outlet port, while said inlet chamber is also connected through two ports with two passages communicating with the interior of said fluid cylinder; an abutment extending into said cylinder between said passages; a member secured to said shaft with its periphery always in contact with said abutment and provided with radial movable blades adapted to be acted upon by the fluid passing through said cylinder to effect a revolution of said shaft; an inlet pipe communicating with the end of said inlet chamber; and a rotary tubular valve in said inlet chamber, the bore of which communicates with said inlet pipe and having ports extending from said bore to the periphery of said valve, one of which is adapted in the oscillation of said valve to register with one inlet port while the other is adapted to register with either port, said valve also being provided with a peripheral groove adapted in certain positions of said valve to serve as a means of communication between said outlet port and one of said inlet ports.

3. In a device of the class described, the combination of a revoluble shaft; a fluid cylinder surrounding said shaft the casing of which is provided with an inlet chamber and an outlet chamber connected by an outlet port, while said inlet chamber is also connected through two ports with two passages communicating with the interior of said fluid cylinder; an abutment extending into said cylinder between said passages; a member secured to said shaft with its periphery always in contact with said abutment and provided with radial movable blades adapted to be acted upon by the fluid passing through said cylinder to effect a revolution of said shaft; a rotary tubular valve in said inlet chamber provided with a peripheral passage and two ports from its bore to its periphery; and means for oscillating said valve to close both of said inlet ports and said outlet port, to register each of said valve ports with an inlet port, or to register a valve port with an inlet port and said peripheral groove with the other inlet port and said outlet port.

4. In a device of the class described, the combination of a casing inclosing a fluid cylinder and an inlet connected thereto by two passages; an inlet pipe thereto; an outlet from said inlet chamber; a revoluble member within said fluid cylinder provided with radial movable blades the outer ends of which normally are in contact with the cylinder wall; an abutment extending into said cylinder between said passages and into contact with said revoluble member; and means within said inlet chamber for closing the outlet passage and connecting both passages to the fluid cylinder with the inlet pipe, for connecting the outlet passage with one of said passages to the fluid cylinder and the other passage with the inlet pipe, and for closing all of said passages and preventing further admission or exit from said fluid cylinder of said fluid.

Signed by me at 4 Post Office Sq., Boston, Mass., this 15th day of October, 1909

NATHANIEL LOMBARD.

Witnesses:

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EDNA C. CLEVELAND.