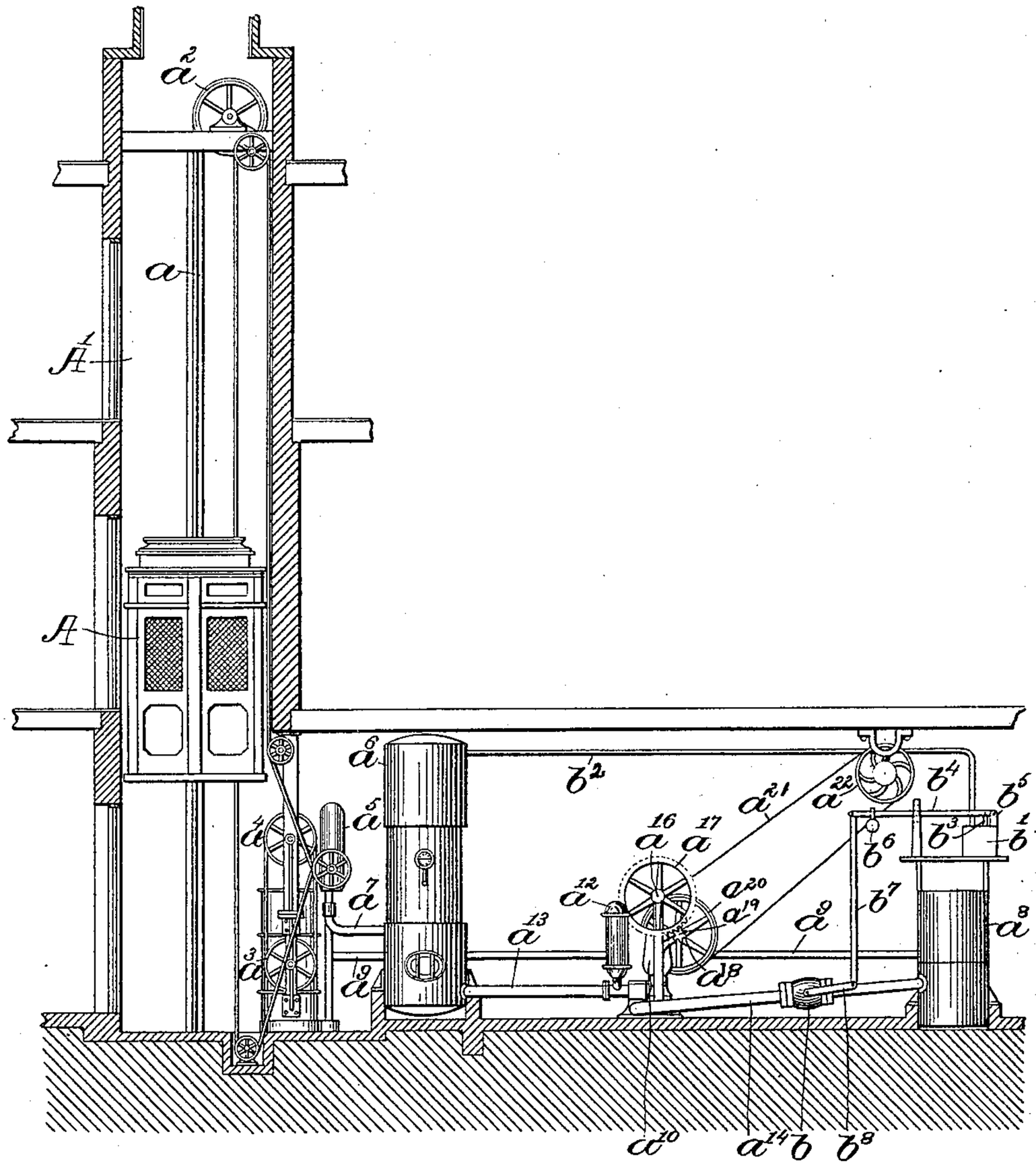
(No Model.)

R. H. ALDRICH.

ELEVATOR MECHANISM.

No. 459,695. Patented Sept. 15, 1891.



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UNITED STATES PATENT OFFICE.

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ELEVATOR MECHANISM.

SPECIFICATION forming part of Letters Patent No. 459,695, dated September 15, 1891.

Application filed February 25, 1891. Serial No. 382,689. (No model.)

To all whom it may concern:

Be it known that I, ROSCOE H. ALDRICH, of Seneca Falls, county of Seneca, State of New York, have invented an Improvement in Elevator Mechanisms, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention relates to elevator mechanism of that class in which the elevator is operated by means of a fluid contained in a tank under pressure and in which the actuating-fluid is forced into the pressure-tank by means of a pump.

My invention has for its object to provide apparatus as will be described, whereby the quantity of fluid supplied to the pressure-tank by a continuously-running pump may be varied according to the demands and so that the power or energy accumulated in the air-chamber of the pump and in the pipes connected to the pressure-tank is maintained after the pressure in the tank has reached a predetermined point and the supply of fluid to the said tank has been cut off.

In accordance with my invention I provide the suction or inlet pipe to the pump with a valve operatively connected to a regulator communicating with the pressure-tank and adapted to be operated by variation of the pressure in the tank to control the position of the valve in the suction or inlet pipe to the pump, so that the said valve is opened sufficiently to supply to the pump an amount or quantity of fluid equal to the amount or quantity discharged by the pressure-tank, and thereby maintain the power or energy in the air-chamber of the pump and in the pipes connected to the pressure-tank, so that when the pressure in the tank falls below the predetermined point and fluid is again forced into the pressure-tank by the pump the power or energy in the air-chamber of the pump and in the pipes connected to the pressure-tank is utilized.

The particular features of my invention will be pointed out in the claims at the end of this specification.

The drawing shows an elevator and its operating mechanism embodying my invention.

The elevator A, suspended in the elevator shaft or well A′ by one or more ropes *a*, passed about sheaves a^2 at the top of the elevator well or shaft and about sheaves a^3 a^4, located, as represented, in the basement of the building; the valve a^5, controlling the operating mechanism to produce travel of the sheave a^4 in one direction; the pressure-tank a^6, connected to the inlet-port of the controlling-valve a^5 by the pipe a^7; the waste or storage tank a^8, connected by the pipe a^9 to the outlet-port of the controlling-valve a^5, and the pump a^{10}, provided with the air-chamber a^{12} and having its outlet-pipe a^{13} joined to the pressure-tank and its suction or inlet pipe a^{14} connected, as shown, to the waste or storage tank, are and may be of any usual or well-known construction, such as now commonly used.

The pump a^{10} is herein represented as a hydraulic pump having its plunger or plungers operated from a crank-shaft a^{16}, on which is mounted a gear a^{17}, rotated by a pinion a^{18} on a shaft a^{19}, provided with a pulley a^{20}, the latter being shown as connected by a belt a^{21} to a pulley a^{22}, which in practice is preferably rotated continuously in any usual or well-known manner.

In order that the amount or quantity of fluid supplied to the pressure-tank by the continuously-running pump may be varied according to the variations of the pressure in the tank and also to maintain the power of energy accumulated in the air-chamber a^{12} of the pump and in the pipe a^{13}, connected to the pressure-tank, a valve *b* is provided in the inlet or suction pipe a^{14} for the pump a^{10}, and the said valve is operatively connected to a regulator *b*′, which may be of any usual or well-known construction—such, for instance, as the well-known Clark diaphragm-regulator—it consisting of a vessel connected by a pipe b^2 to the pressure-tank and containing a diaphragm having secured to it a stem b^3 in engagement with a lever b^4, pivoted to a standard b^5 and provided with an adjustable weight b^6, the said lever being joined, as shown, by a link b^7 to a lever or arm b^8 on the stem of the valve *b*. The pump a^{10} may be run continuously or intermittingly, as desired, by any usual motive power.

When the elevator is in use, the pressure in

the tank a^6 is below the normal or predetermined point and fluid is being forced by the pump through the pipe a^{13} into the said tank. The pump continues to force fluid into the tank until the pressure therein has reached the predetermined point, which is regulated by the ball or weight b^6 on the lever b^4. When the pressure in the tank a^6 has reached the predetermined point, the said pressure, through the regulator, lifts the lever and closes the valve b in the suction-pipe and prevents additional pressure being stored up in the pressure-tank. It will be seen that as soon as the valve b is closed the power or energy in the air-chamber of the pump and in the pipe a^{13} is maintained, so that when the pressure in the tank falls below the predetermined point, as by starting the elevator in operation, the power or energy in the air-chamber of the pump and in the pipe a^{13} is utilized. The valve b is opened when the pressure falls below the predetermined point, and the degree to which the said valve is opened is governed by the amount or quantity of fluid drawn from the pressure-tank.

In practice one pressure-tank may be employed to operate a plurality of elevators, which, for sake of illustration, may be supposed to be three in number, the said elevators being of varying lifting capacity and requiring different quantities of water to operate them. To illustrate, let it be supposed that the three elevators are represented by A B C, and that when in operation A draws from the pressure-tank one hundred gallons of water per minute, B one hundred and fifty gallons, and C two hundred gallons; also, let it be supposed that the pressure in the tank is one hundred pounds when the valve b is closed and the elevators are at rest. If now the elevator A is started in operation and withdraws from the pressure-tank one hundred gallons of water per minute, the pressure in the said tank falls to, say, ninety pounds. The valve b in the suction-pipe of the pump will be opened by the diminution of pressure in the pressure-tank and will be partially opened, but sufficiently wide to supply to the pump an amount of water equal to the amount drawn off from the pressure-tank. If now a second elevator, as B, is put in operation, the pressure-tank is discharging two hundred and fifty gallons per minute, and the pressure in the tank falls still lower, say, to seventy-five pounds. When the pressure in the tank falls to seventy-five pounds, the valve b in the suction-pipe is opened still wider, so as to supply to the pump an amount of water equal to the amount discharged from the pressure-tank. If the elevator C is put in operation while the elevators A and B are running, four hundred and fifty gallons of water will be discharged from the pressure-tank and the valve b will be opened wide, so that the pump will supply to the pressure-tank four hundred and fifty gallons, which may be the full capacity of the pump. It will thus be seen that, although the pump is continuously running, it can force into the pressure-tank only such a quantity of water as will compensate for the quantity discharged from the pressure-tank, and this quantity is controlled by the valve in the suction-pipe of the pump, which valve is regulated by the pressure in the tank.

I claim—

1. In an elevator-operating mechanism, the combination of the following instrumentalities: an elevator, a pressure-tank to contain fluid employed to actuate the elevator, a pump to supply said fluid to the pressure-tank, a regulator operated by variations in the pressure-tank, and means operated by the regulator to govern the supply of fluid to the pump in accordance with the variation of pressure in the tank, substantially as described.

2. The combination, with an elevator, a pressure-tank to contain fluid employed to actuate the elevator, and a pump to supply said fluid to the pressure-tank, of a valve to control the suction or inlet of the said pump and a regulator connected to said valve and actuated by the pressure in the said tank, to operate substantially as described.

3. The combination, with an elevator, a pressure-tank to contain fluid to actuate the elevator, a storage or waste tank, and a pump having its outlet-pipe connected to the pressure-tank and its inlet or suction pipe connected to the storage-tank, of a valve in said inlet or suction-pipe and a regulator connected to said valve and actuated by the pressure in the pressure-tank when the said pressure reaches a predetermined point, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROSCOE H. ALDRICH.

Witnesses:

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