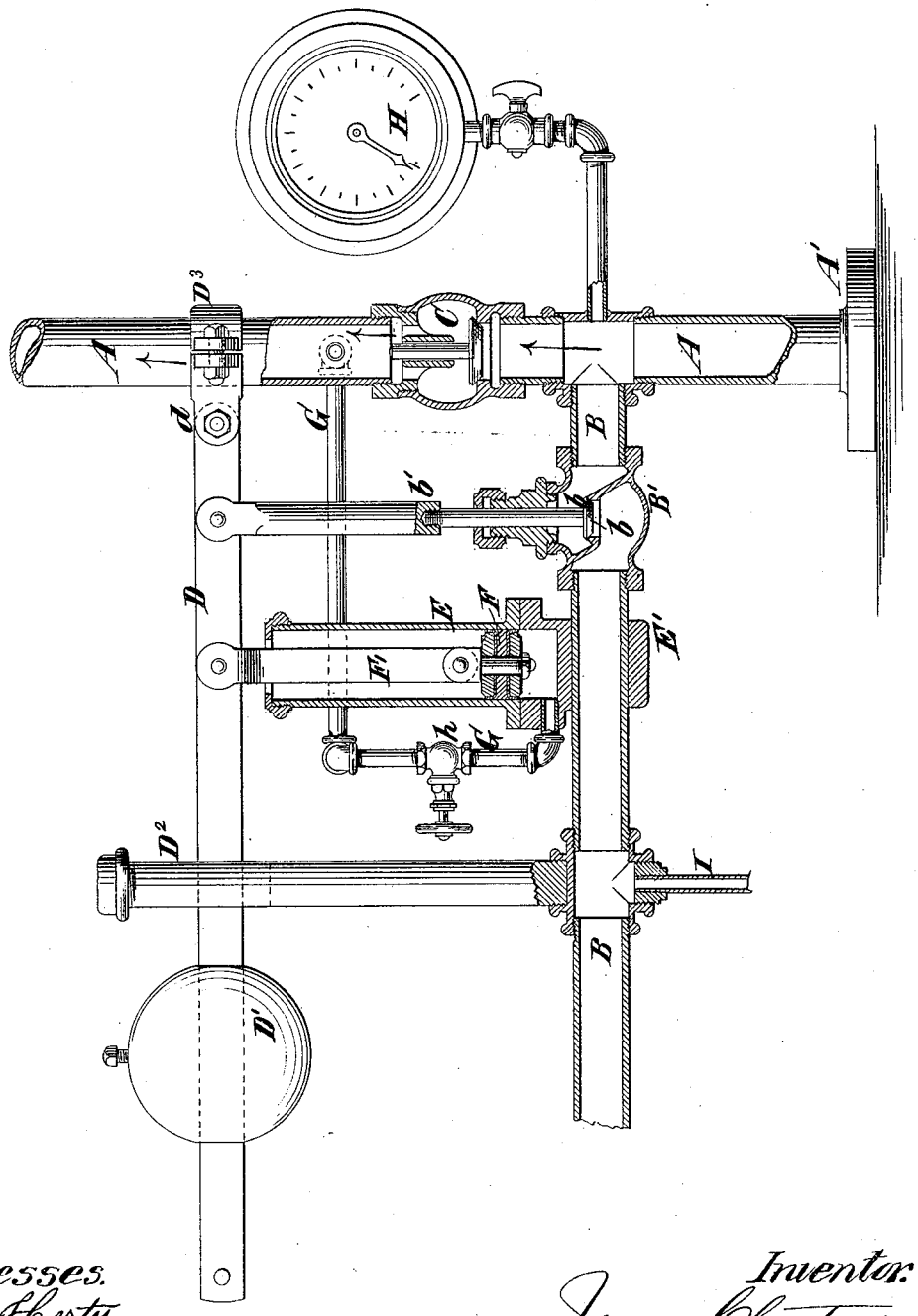
(No Model.)

J. CLAYTON.

REGULATOR FOR PUMPS OR COMPRESSORS.

No. 351,043. Patented Oct. 19, 1886.



Witnesses.
Emil F. Certer.
C. L. Sundgren

Inventor.
James Clayton
by his attys
Brown & Hall

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

JAMES CLAYTON, OF BROOKLYN, NEW YORK.

REGULATOR FOR PUMPS OR COMPRESSORS.

SPECIFICATION forming part of Letters Patent No. 351,043, dated October 19, 1886.

Application filed May 26, 1886. Serial No. 203,290. (No model.)

To all whom it may concern:

Be it known that I, JAMES CLAYTON, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Regulators or Governors for Fluid Pumps or Compressors, of which the following is a specification.

My invention is applicable to pumps or compressors of various kinds, by the operation of which a supply of fluid is maintained under a predetermined and desired pressure within a reservoir, such fluid to be employed for operating rock-drills and other machines.

The object of my invention is to provide a governor or regulator, which, when the pressure of fluid exceeds that desired, will open an outlet from the delivery-pipe, whereby fluid under pressure is delivered from the pump or compressor, and will enable the pump or compressor to deliver fluid directly to the atmosphere and relieve it of the resistance offered by the fluid which is under pressure in the delivery-pipe and receiver until such time as the pressure in the receiver shall fall below the desired degree. My invention is, however, more particularly intended for use in connection with a delivery-pipe through which air under pressure is delivered by an air-compressor to a compressed air receiver or reservoir.

The invention consists, essentially, in the combination, with a pipe for the delivery of fluid under pressure from a pump or compressor, and an outlet therefrom provided with a puppet-valve held to its seat by fluid-pressure, the said pipe being provided with a check-valve beyond said outlet, of a weight, also holding the outlet-valve to its seat, and a motor to be operated on by the compressed fluid delivered through said pipe and acting upon the weight in a direction to raise it and open said outlet-valve. In such a combination the weight and the pressure of fluid both act to hold the outlet-valve to its seat, and the motor acts in the reverse direction to raise the weight and open the valve. As soon as the outlet-valve is raised very slightly from its seat by the action of the motor, it is at once relieved of the pressure which holds it to its seat, and the weight is instantly raised and the outlet-valve thrown wide open to afford a free opening to the atmosphere, the check-valve in the delivery-pipe closing to prevent the escape of compressed fluid from the receiver with which said pipe is connected.

The invention also consists in other combinations of parts hereinafter described, and pointed out in the claims.

The accompanying drawing represents a sectional elevation of an apparatus embodying my invention.

A designates a delivery-pipe, which may surmount the discharge-chest of an air-compressor, and is shown as provided at the lower end with a flange, A′, whereby it may be secured to the compressor. This pipe A is for the delivery of compressed air from the compressor, and leads usually to an air tank or receiver wherein air is contained under pressure for supplying rock-drills or other machines. The pipe A has extending from it an outlet-pipe, B, which is open to the atmosphere and immediately above the entrance to the pipe B, the pipe A has in it a check-valve, C, which will open to permit air to pass in the direction of the arrows, and will close automatically and prevent the return of any air from the air tank or receiver.

In the outlet-pipe B, leading to the atmosphere, is a valve-casing, B′, containing a puppet-valve, *b*, which moves upward in opening, and is held to its seat by the air-pressure upon it. The stem *b′* of this valve is prolonged upward, and is, as here shown, connected with a lever, D, which is provided with an adjustable weight, D′, by which the valve *b* is loaded. As here represented, the lever D is fulcrumed at *d* to a collar or clamp, D^3, applied to the pipe A, and said lever is guided in a post or pipe, D^2, which may extend upward from a suitable fitting in the air-outlet pipe B. It will be understood that the weight D′ and the pressure of air upon the valve *b* both tend to hold the valve to its seat; and in order to exert a force upon the lever D in an upward direction or in a direction opposite to that in which the weight acts, I employ a motor, which is acted upon by compressed air taken from the pipe A at a point beyond the check-valve C, or, if desired, from the air tank or receiver to which the air-pipe A leads. The motor here represented consists of a cylinder, E, which may be sup-

ported by a collar, E′, fitting the outlet-pipe B, and within which is fitted a plunger or piston, F, provided with suitable packing and connected by a rod, F″, with the lever D.

G designates a pipe leading from the air-pipe A to the motor-cylinder E, below the piston or plunger F, and in which is provided a stop-valve, *h*, for controlling the passage through said pipe. A pressure-gage, H, may be connected with the pipe A below the check-valve for indicating the pressure of air delivered from the compressor.

In the ordinary operation of the compressor the weight D′ is adjusted so that the weight upon the lever D and the pressure of air upon the valve *b* will be balanced by the upward pressure upon the motor-piston F when the air in the air tank or receiver and delivery-pipe A is of the maximum pressure desired. For example, if it is desired to maintain a pressure of seventy-five pounds per square inch, then the weight D′ is adjusted so that the downward pressure of the weight and air acting upon the valve *b* will be just balanced by the upward pressure of seventy-five pounds per square inch acting upon the motor-piston F. So long as this maximum pressure is not exceeded the valve *b* will remain closed, and air will be delivered uninterruptedly through the pipe A by the compressor. If, however, the maximum pressure of seventy-five pounds per square inch be exceeded, then the upward pressure on the motor-piston F will act to raise the valve *b* very slightly from its seat, and as soon as this is done the pressure of air will no longer hold the valve *b* to its seat, and the excess of power in the motor will instantly raise the lever D to its full height and fully open the valve *b*. The check-valve C will be instantly closed by the pressure above it, and thereafter the air delivered from the compressor through the pipe A will pass through the outlet-pipe B and the valve *b* directly to the atmosphere, and the compressor will be relieved of the labor of delivering air against the maximum pressure which is in the air tank or receiver. As soon as the pressure of air in the tank or receiver and air-pipe A falls a little below seventy-five pounds (say to seventy-one or seventy-two pounds) the weight will overcome the upward force exerted on the motor-piston F and will return the valve *b* to its seat. The reduction in pressure below the point at which the apparatus is set, and which is necessary to return the valve *b* to its seat, will, of course, vary according to the size of the valve *b* relatively to the motor-piston F.

From the above description it will be understood that when the valve *b* is raised and the check-valve C closes the air-compressor will deliver all the air which is discharged from it through the outlet-pipe B to the atmosphere, and therefore will be relieved of the resistance of the air-pressure in the air tank or receiver. This is particularly advantageous in connection with air-compressors run by belt or other gearing, and results in an actual saving of the power necessary to run the compressor. The pipe B may be continued to any desired point, and through a drain-pipe, I, may escape any oil or water which may pass over from the compressor with the air.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a pipe for the delivery of fluid under pressure from a pump or compressor, and an outlet therefrom provided with a puppet-valve held to its seat by fluid-pressure, the said pipe being provided with a check-valve beyond said outlet, of a weight also holding the outlet-valve to its seat, and a motor to be operated on by the compressed fluid delivered through said pipe and acting upon the weight in a direction to raise it and open said outlet-valve, substantially as herein described.

2. The combination, with a pipe for the delivery of fluid under pressure from a pump or compressor, and which is provided with a check-valve, of an outlet below or inward of the check-valve, provided with a downwardly-closing puppet-valve held to its seat by fluid-pressure, a weighted lever loading the valve, and a motor supplied with fluid under pressure from a point beyond or above the check-valve, and acting to lift said lever and open the outlet-valve, substantially as herein described.

3. The combination, with the delivery-pipe A, provided with a check-valve, C, of the outlet-pipe B, open to the atmosphere, leading from the pipe A below the check-valve, and provided with the downwardly-closing puppet-valve *b*, the weighted lever D, loading said outlet-valve *b*, the motor-cylinder E, receiving fluid under pressure from a point beyond the check-valve, and the motor plunger or piston F, acting on said lever to lift it and open the outlet-valve *b*, substantially as herein described.

JAMES CLAYTON.

Witnesses:
FREDK. HAYNES,
HENRY J. MCBRIDE.