

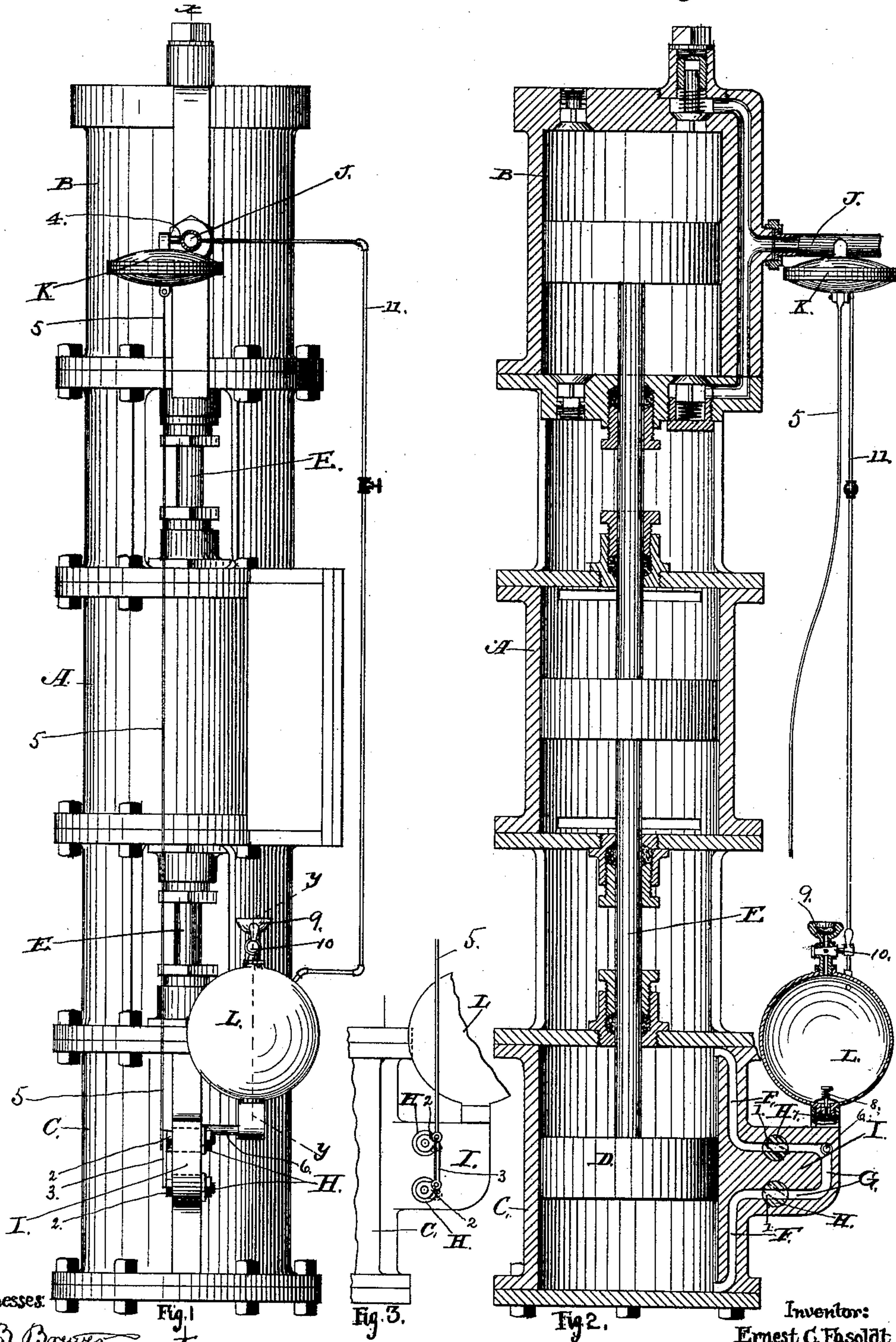
(No Model.)

E. C. FASOLDT.

SPEED REGULATOR FOR AIR COMPRESSOR PISTONS.

No. 481,527.

Patented Aug. 23, 1892.



Witnesses:

S. B. Brown,
Stanley Jewell

Fig. 1

Fig. 3.

Fig. 2.

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UNITED STATES PATENT OFFICE.

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SPEED-REGULATOR FOR AIR-COMPRESSOR PISTONS.

SPECIFICATION forming part of Letters Patent No. 481,527, dated August 23, 1892.

Application filed December 29, 1891. Serial No. 416,441. (No model.)

To all whom it may concern:

Be it known that I, ERNEST C. FASOLDT, of the city and county of Albany, in the State of New York, have invented new and useful Improvements in Speed-Regulators for Air-Compressor Pistons, of which the following is a specification.

Heretofore much difficulty has been experienced in regulating the rate of speed of air-compressors which are actuated by steam-power, for the reason that when the degree of compression of the air in the apparatus is insufficient to prevent an exceeding rate of speed by its resistance the normal pressure of steam used to operate the air-compressor will cause the latter to move at a speed that frequently endangers the integrity of the machine.

The object of my invention is to provide suitable facilities for producing an approximately uniform rate of speed of the air-compressor regardless of the fluctuations in the pressure of the compressed air, and I attain this object by the mechanism illustrated in the accompanying drawings, which, being herein referred to, form part of this specification.

In said drawings, Figure 1 is a front elevation of a steam-actuated air-compressor provided with my improvement. Fig. 2 is a vertical section of the same, the section of the air-compressor being taken at the line X X and the section of the water-feeder being taken at the line Y Y, both on Fig. 1; and Fig. 3 is a detached side elevation of the valve mechanism for regulating the water-resistance.

As represented in the drawings, A designates the steam-cylinder of an air-compressor, and B an air-compressing cylinder, of which there may be a single one, as shown in the drawings, or there may be several of different diameters to produce a progressive compression of the air; but it should be understood that means shown for compressing air forms no part of this invention.

C designates a fluid-resistance cylinder in which a piston D is fitted to reciprocate, said piston being secured to a piston-rod E, that is common to the pistons of the cylinders A

and B. The cylinder C is provided with a passage F, which forms a communication between the opposite ends of said cylinder, the said passage having the form of a loop, as at G, for the purpose of receiving retarding-cocks H, one of said cocks being located in each limb of the said loop. Said retarding-cocks are made cylindrical and are fitted to oscillate in the breast I of the cylinder C. Each of said cocks is provided with a diametrically-arranged opening 1, which when said cocks are in the position shown by full lines in Fig. 2 coincide with the corresponding parts of the passage F and thereby form a full open communication between opposite ends of the cylinder C; but when said valves are returned to bring the openings 1 into the position indicated by dotted lines in Fig. 2, the communication through the passage F will thereby be entirely closed, and by turning said valves into positions that are intermediate between the two extreme positions shown in Fig. 2 a correspondingly-reduced area of opening will be obtained and a corresponding retardation of the flow of fluid through the passage F will be obtained. Each of the valves or cocks H is provided with an arm 2 and the two arms are connected by a link 3, so that both of said cocks will be moved in unison by means hereinafter described.

J designates an eduction-pipe from the air-compressing cylinder B to convey the compressed air to any required point. A branch pipe 4 connects said eduction-pipe with a pressure-reducer or diaphragm K, that is arranged to be operated by the compressed air in such manner that by a too rapid discharge of the compressed air the diaphragms will be moved apart from each other and thereby the cocks H, which are connected to the diaphragm K by a rod 5, will be oscillated to regulate the area of the opening through the passage F.

L designates a chamber for containing water or other fluid, from which any leakage of the fluid from the cylinder C can be compensated for. A pipe 6 connects said chamber with the passage F for the purpose of conveying the liquid from said chamber into the cylinder C. In the lower part of the chamber L a downwardly-opening valve 7 is fitted to close the

opening through the pipe 6, and a delicate spring 8 is provided to retain said valve to its seat, the strength of said spring being just sufficient to overcome the weight of said valve.

5 A feeder 9 is fixed in the top of said chamber for the purpose of refilling the latter with fluid when required. Said feeder is provided with a stop-cock 10 for the purpose of closing the opening therethrough. When preferred,
10 a compressed-air pipe 11 may be employed to convey compressed air into the chamber L for the purpose of effecting a certain discharge of the fluid contained in said chamber into the cylinder C, and said pipe may form
15 a connection from the eduction-pipe J or other convenient point for taking the compressed air with the chamber L, so as to deliver said air above the fluid contained in said chamber.

20 When preferred, the means hereinbefore described for automatically regulating the retarding cocks H may be dispensed with and said cocks may then be regulated by hand as occasion may require; but preferably I use
25 said automatic regulation for the retarding-cocks.

My invention operates in the following manner: When the air-compressor is first started, the retarding-cocks H will be in the position
30 shown by the full lines in Fig. 2 and will continue in that position until the maximum pressure for which the apparatus is arranged is nearly reached; but during the time that is required for the air-compressor to attain said
35 maximum pressure of the compressed air the resistance opposed to the piston D in forcing the fluid through the passage F from one end of the cylinder C to the opposite end of the same will prevent the moving parts of the
40 air-compressor from attaining an excessive rate of speed, and when the maximum pressure of the compressed air is approximately attained the pressure between the diaphragms K will cause the latter to bulge outwardly
45 and thereby gradually effect the closing of the water-way through the passage F. When said water-way is entirely closed, the reciprocating movements of the piston of the air-compressing cylinder B will be prevented by

reason of the incompressibility of the fluid in 50 the cylinder L.

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

1. In a steam-actuated air-compressor, and in combination therewith, a liquid-containing 55 cylinder provided with a reciprocating piston which is connected with the air-compressing mechanism, a passage which forms a free communication between the opposite ends of the interior of said cylinder, a pair of retard- 60 ing-cocks arranged transversely of said passage and fitted to partially rotate therein, and a diaphragm operated by compressed air and connected to said retarding-cocks for auto- 65 matically operating the latter to vary the area of said passage, as and for the purpose herein specified.

2. In an air-compressor, the combination of a cylinder which is approximately filled with liquid, a piston fitted to reciprocate in said 70 cylinder in such manner that the liquid will be alternately transferred to opposite ends of said cylinder, the latter having a passage which forms a communication between said opposite ends, retarding-cocks arranged in 75 said passage for the purpose of regulating the area of the opening therethrough, and mechanism, substantially as set forth, whereby said retarding-cocks will be automatically controlled by the varying pressure of the com- 80 pressed air, as and for the purpose herein specified.

3. In an air-compressor, the combination of a cylinder approximately or entirely filled with liquid and provided with a piston fitted 85 to reciprocate therein, as herein described, a replenishing-chamber containing liquid and connected to said cylinder by a pipe connection, whereby the loss of liquid from said cylinder by reason of leakage therefrom will be 90 compensated for, and a pipe for conveying compressed air from the eduction-pipe into said replenishing-chamber, substantially as specified.

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Witnesses:

WM. H. LOW,
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