

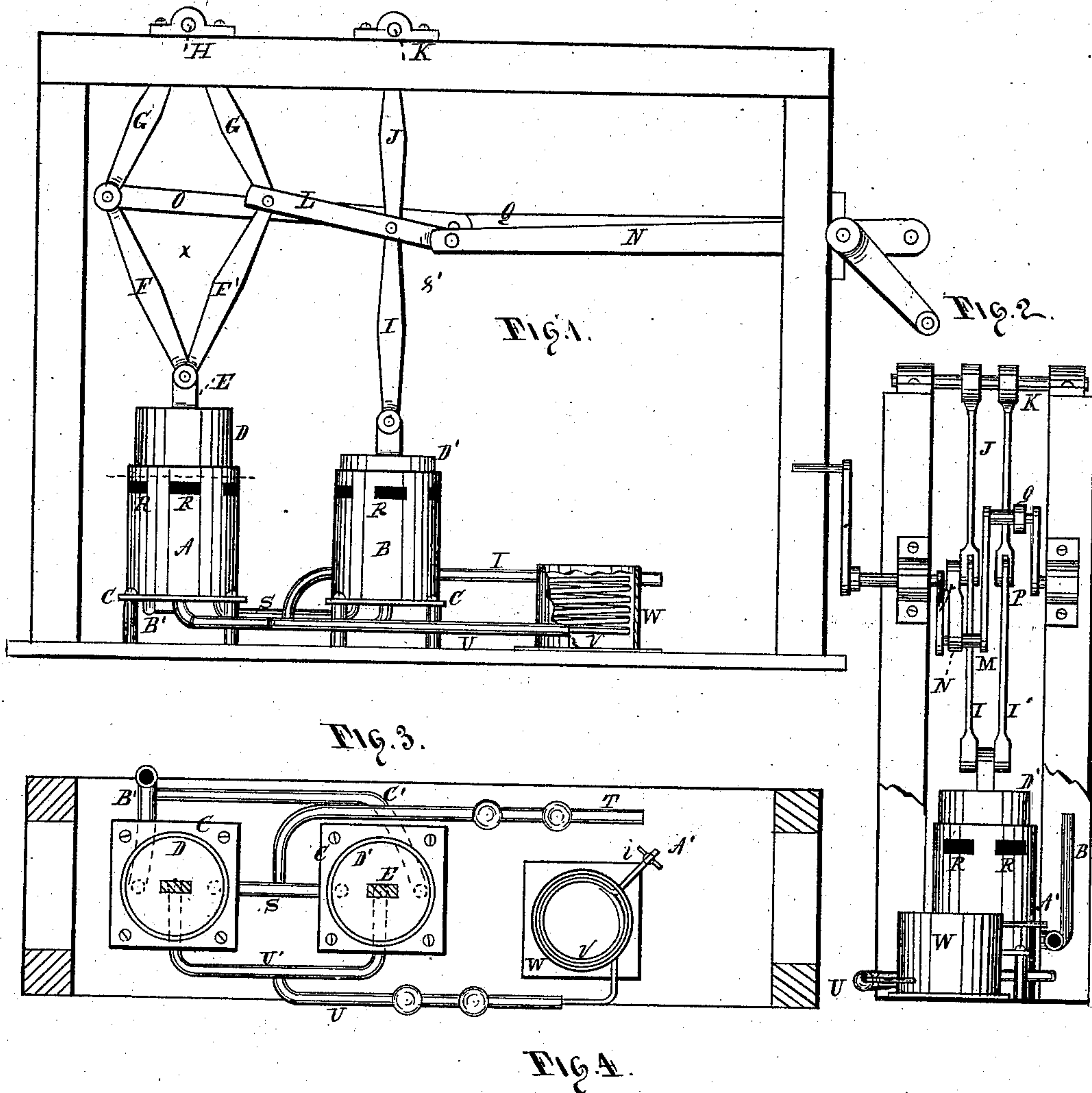
(No Model.)

C. SEYLER.

Apparatus for Cooling and Purifying Air.  
No. 221,027.

**No. 231,937.**

**Patented Sept. 7, 1880.**



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR COOLING AND PURIFYING AIR.

SPECIFICATION forming part of Letters Patent No. 231,937, dated September 7, 1880.

Application filed April 24, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, CARL SEYLER, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and Improved Apparatus for Cooling and Purifying Air; and I do hereby declare that the following is a full, clear, and complete description thereof.

The purpose of this invention is to withdraw the warm and foul air from a cellar, vault, and other places containing such conditioned air, and to return the same thereto in a cool and purified state. The apparatus may also be employed for cooling warm currents of air down to a low degree of temperature for refrigerative purposes.

The construction of the above-said apparatus and the practical operation thereof are substantially as follows, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 shows a side elevation of the apparatus; Fig. 2, an end elevation; Fig. 3, a sectional plan view, and Fig. 4 a detached section.

Like letters of reference refer to like parts in the several views.

In a suitably-constructed frame is arranged a pair of hollow cylinders, A and B, elevated above the floor of the frame on stands C. In each of the cylinders is fitted, respectively, a hollow piston, D and D', operated reciprocally and alternately therein, as follows: On the top of the piston D is a stud, E, to which is pivoted the lower ends of the pitmen F F'. The upper ends of the pitmen are jointed respectively to the lower ends of the arms G, depending from a shaft, H, journaled in the top of the frame, and upon which shaft the arms vibrate for operating the piston. To the piston D' is attached, in like manner, pitmen I I', Fig. 2, the upper ends of which are connected respectively to the arms J, depending from the shaft K, also journaled in the top of the frame. The two pitmen I and F' and their respective arms are connected to each other by a link, L, Fig. 1, and to the crank M of a double crank by a connecting-rod, N, Fig. 1. In a similar manner the pitmen F and I' and their respective arms are connected to each other by a link, O, and to the crank P by a connecting-rod, Q.

By their several connections, on operating the crank the two pistons will be operated reciprocally and alternately, for a purpose presently shown.

In the sides of the upper end of each of the cylinders are made apertures R, which may be more or less in number.

The two cylinders are put in communication with each other by a pipe, S, the ends of which terminate near the top of the cylinders, just below the apertures R, as shown in Fig. 4. To the said pipe S is attached one end of the induction-pipe T, which forms a section of the pipe S.

U is an eduction-pipe, one end of which is attached to the branch pipe U', the ends of which respectively terminate in the cylinders a little above the apertures, as seen in Fig. 4.

The opposite end of the eduction-pipe U is connected to a worm, V, arranged in the tank W of said worm.

A' is the outlet. B' is an induction water-pipe, one end of which terminates in the cylinder A, near the bottom thereof. By means of a branch pipe, C', Fig. 3, said induction water-pipe communicates with the cylinder B, and terminates therein immediately above the bottom, as seen in Fig. 4.

The termination of the several pipes in the cylinders is indicated by the dotted lines in Fig. 3.

The practical operation of the above-described apparatus is substantially as follows: As hereinbefore said, the apparatus is for purifying and cooling foul and warm air. To this end the two cylinders A and B are filled with water up to the openings R. The water is admitted into the cylinders through the water-pipes B' and C' above described. At the cylinder end of each of the said pipes is a valve, a, Fig. 4, opening inwardly to allow the water to pass into the cylinder and to prevent its return through the pipe. The induction air-pipe T is put in communication with the place from which the foul air is to be drawn, and the end A' of the worm V is conducted to the place into which the purified and cool air is to be discharged. A valve, b, Fig. 4, applied to the ends of the pipes, permits the air to enter into the cylinders and prevents its escape that way. The piston D',



as shown in the drawings, is down in the cylinder the full stroke of the pitman, and is air-tight therein by virtue of being submerged in the water contained in the cylinder. Now, on  
 5 lifting the piston a partial vacuum will be formed in it above the water, which will be filled by the foul air drawn therein through the induction-pipe T and branch pipe S. The foul  
 10 air, on passing up into the rising piston, passes through the upper portion of the water, for the reason that the end of the pipe S is below the water-line, as will be seen in Fig. 4, in which the dotted line *c* indicates the water-line. The foul air, in passing into the cylinder and  
 15 piston through the water, is more or less purified thereby. The water charged with the impurities of the air flows from the cylinder through the apertures R, and when the lower end of the piston ascends above the water-line,  
 20 and also above the apertures, as seen at D of the cylinder A in Fig. 1, a portion of air from the outside passes into the piston through the apertures. Now, as the piston descends by the continued action of the crank the air is con-  
 25 densed in the piston, as it cannot escape through the pipes S and B', as they are closed by the valves. The condensed heated air, however, escapes through the eduction-pipe U to the worm, in which it is cooled by the water in the  
 30 tank surrounding the worm. The condensed and partially cooled air is conducted from the worm while yet under pressure and discharged into the place where it is required, wherein, by its sudden expansion into its normal state, is  
 35 produced a degree of cold commensurate with the degree of pressure to which it had been subjected.

The degree of pressure may be regulated and ascertained by a weighted safety-valve applied  
 40 to the outlet end A' of the worm. An ordinary stop-cock or valve, *i*, however, may be used in lieu thereof to retain the air in the worm, and for allowing the same to escape therefrom, to be conducted to the place where it is needed.

45 The operation of the two cylinders and pistons are substantially the same, and by their acting conjointly and alternately a constant current of air is drawn into the cylinders

through the induction pipe or pipes S and T and discharged therefrom through the eduction pipe or pipes U and U' into the worm, thence in a cool condensed state to the place where the presence of cold air is needed. The cylinders and pistons are kept comparatively cool by the cold water inducted therein  
 55 at each stroke of the piston and escaping therefrom as regularly through the apertures. The worm, on account of being surrounded by the flow of cold water, reduces the heat of the condensed air while being forced therefrom by  
 60 the action of the arms and pitmen, the effective power of which increases as they approach a vertical position, or from that shown at *x* to *x'* in Fig. 1. Hence the increasing resistance of the condensing air is met by the  
 65 increasing power of the compressing device.

A valve, *n*, Fig. 4, placed in the pipe U', prevents the compressed air from returning into the hollow piston when the said piston is moving upward, but opens as the stroke of the  
 70 piston is downward.

The induction air-pipe S may be shortened, so that the foul air may pass through more water in the event the air is much foul and warm.

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

1. In combination with the cylinders A and B, the water pipe or pipes B' and C', induction air-pipe T and its branches, eduction-pipe  
 80 U and branches U', and worm V, with their respective induction and eduction valves, constructed and arranged to operate in the manner substantially as described and for the purpose specified.

2. The combination of the cylinders A and B, provided with apertures R, water-pipes, and induction and eduction air-pipes, with their respective valves, hollow pistons, and mechanism for operating the same, and cooling-worm  
 90 V, as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

CARL SEYLER.

J. H. BURRIDGE,  
 K. E. KRITCH.