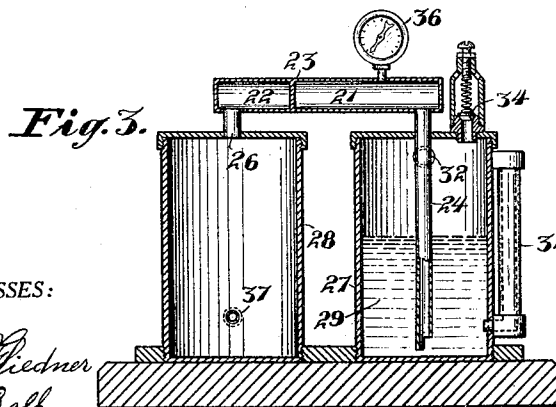
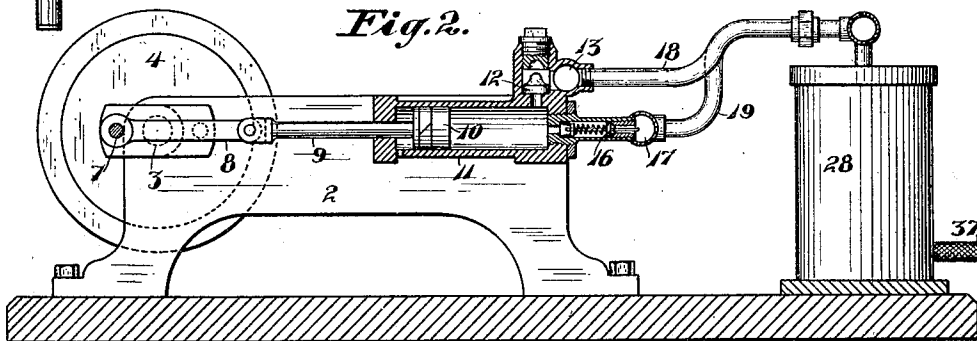
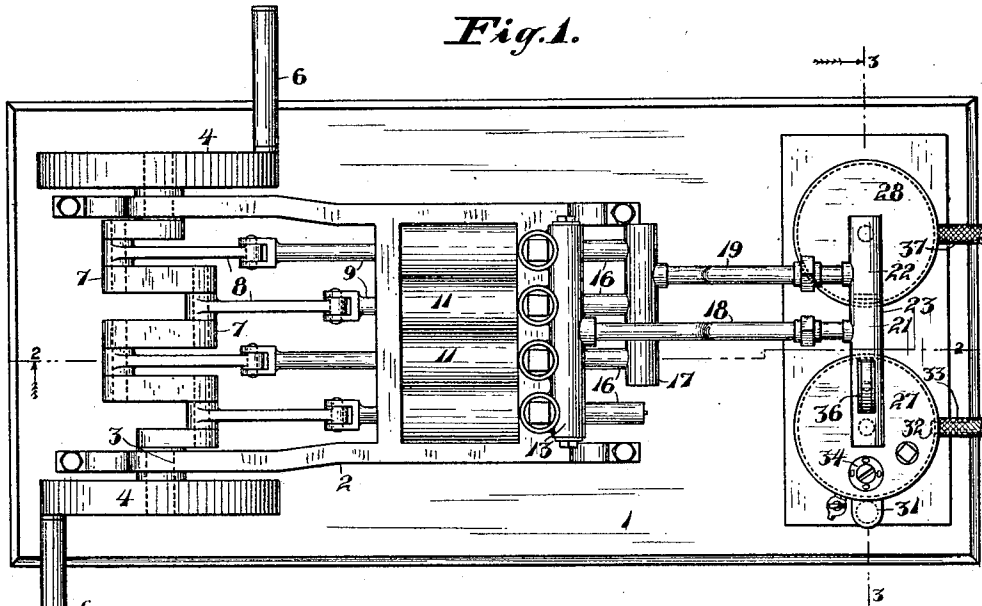


J. F. DERAY.
DIVER'S AIR PUMP.
APPLICATION FILED JUNE 16, 1913.

1,107,414.

Patented Aug. 18, 1914.



WITNESSES:

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JEAN F. DERAY, OF SUNNYVALE, CALIFORNIA, ASSIGNOR TO HIMSELF, CHARLES E. LEBRECHT, AND ARTHUR P. FREEMAN, ALL OF SUNNYVALE, CALIFORNIA, TRUSTEES.

DIVER'S AIR-PUMP.

1,107,414.

Specification of Letters Patent.

Patented Aug. 18, 1914.

Application filed June 16, 1913. Serial No. 773,951.

To all whom it may concern:

Be it known that I, JEAN F. DERAY, a citizen of the United States, residing at Sunnyvale, in the county of Santa Clara and State of California, have invented new and useful Improvements in Divers' Air-Pumps, of which the following is a specification.

The object of my invention is to provide an air pump for pumping air to a diver, by which the air may be automatically maintained sufficiently clean and fresh for inhalation, and its pressure can never become excessive.

In the accompanying drawing, Figure 1 is a plan view of my improved air pump; Fig. 2 is a vertical section on the line 2—2 of Fig. 1; Fig. 3 is a vertical section on the line 3—3 of Fig. 1.

Referring to the drawing, upon a suitable base 1, is erected a frame 2, in which is mounted a crank shaft 3, having two fly wheels 4, handles 6 and four cranks 7. The latter are connected by pitmen 8 to the rods 9 of plungers 10 which can slide in horizontal cylinders 11. At the ends remote from said crank shaft, said cylinders are provided with non-return outlet valves 12 connected with a cylindrical pressure chamber 13, and are connected through non-return inlet valves 16, three of them with a cylindrical exhaust chamber 17, and the fourth with the atmosphere. Said pressure and exhaust chambers are connected by pipes 18, 19, respectively with compartments 21, 22 of a cylinder 23, which compartments are connected by pipes 24, 26 respectively, with pressure and exhaust cylinders 27, 28, the pipe 26 connecting with the top of the exhaust cylinder 28, and the pipe 24 leading down to the bottom of the pressure cylinder 27 and discharging below the surface of suitable disinfecting and cleansing liquid 29 therein, the level of which is shown by the liquid gage 31.

Much of the discomfort to divers is caused by the air supplied to them being impregnated with oil and other more or less volatile substances taken up by the air in its passage through the pump. By insuring that the air supplied to the diver passes upward through a suitable cleansing liquid, this discomfort is avoided.

The compressed air is forced through an outlet opening 32 near the top of the cylinder 27, and passes by a flexible hose 33 to the diver's head-piece, not shown, the pressure of the air in said cylinder being limited by a safety valve 34, and its pressure being ascertained at any time by a pressure gage 36. From the diver's head-piece, the vitiated air returns by a flexible hose 37, which enters the exhaust cylinder 28 near the bottom.

I eliminate, or greatly reduce, the loud noise which is generally a source of great discomfort to a diver, by, first, increasing the number of plungers, so that they operate in succession, and the pumping pressure is subject to less variation, and, second, by connecting all of the pumping cylinders to a common pressure chamber, and three of them to a common exhaust chamber, which chambers severally communicate with comparatively large cylinders. Consequently the pressure is maintained substantially uniform. I provide for the renewal of the air supplied to the diver, by causing one of said cylinders to draw in the air from the atmosphere, which operation, while not seriously increasing the power required to raise the pressure of the air to the desired degree, supplies sufficient fresh air for the purpose of inhalation.

I claim:—

1. In a pump for divers, the combination of a plurality of cylinders, plungers therein, a common crank shaft from which said plungers are operated in succession to compress the air, individual release valves for releasing the air under pressure, individual exhaust valves for drawing the air into the cylinders, a pressure cylinder to which the air is conducted by said release valves, the inlet valve of one of said cylinders communicating with the atmosphere, and an exhaust cylinder from which the air passes to the other inlet valves.

2. In a pump for divers, the combination of a cylinder, a plunger therein, means for reciprocating said plunger, a release valve for releasing the air under pressure, an exhaust valve for drawing air into the cylinder, a pressure cylinder to which the air is conducted by said release valve, suitable cleansing fluid contained in said pressure

cylinder above the air inlet opening, an exhaust cylinder from which the air passes to said inlet valve, and pure and vitiated air pipes connected respectively to the pressure
5 and exhaust cylinders.

In testimony whereof I have hereunto set

my hand in the presence of two subscribing witnesses.

JEAN F. DERAY.

Witnesses:

B. REID,

CHAS. C. DEVERT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."