(No Model.)

C. H. TAYLOR.

HYDRAULIC AIR COMPRESSING APPARATUS.

No. 543,410. Patented July 23, 1895.

Fig. 1

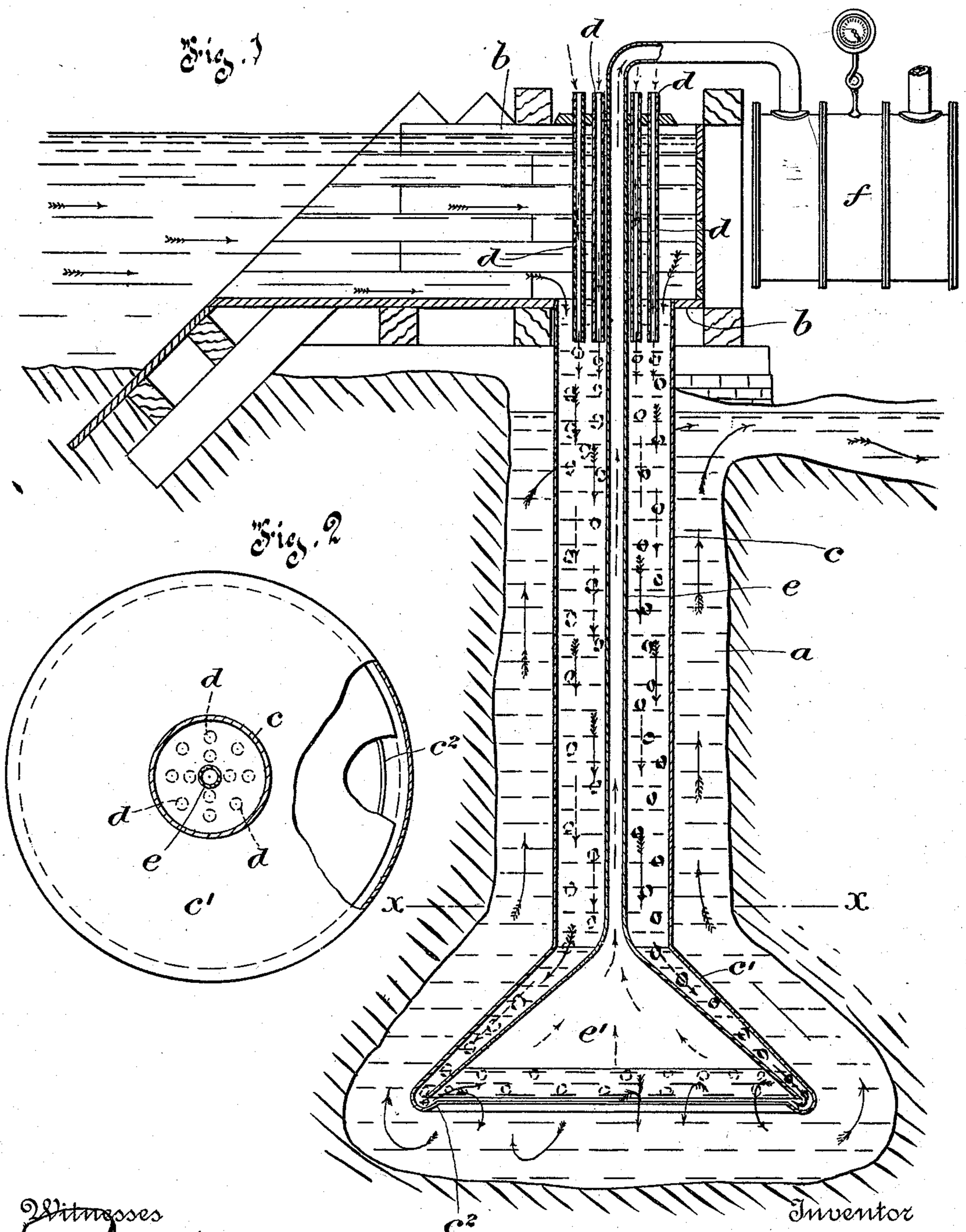

Fig. 2

Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES H. TAYLOR, OF MONTREAL, CANADA, ASSIGNOR OF ONE-HALF TO WALTER TYLER ROSS, ROBERT WILLIAM SUTHERLAND, AND HENRY MILLEN, OF SAME PLACE.

HYDRAULIC AIR-COMPRESSING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 543,410, dated July 23, 1895.

Application filed April 19, 1894. Serial No. 508,197. (No model.)

To all whom it may concern:

Be it known that I, CHARLES HAVELOCK TAYLOR, of the city of Montreal, in the district of Montreal and Province of Quebec, Canada, have invented certain new and useful Improvements in Hydraulic Air-Compressing Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to air-compressing apparatus, in which a falling body of water is used as the compressing agent, and has for its object to simplify such apparatus, with a view more especially to dispensing with the use of special compressing-cylinders, suction and outlet valves, and their operating mechanism; and to such end the invention consists in the construction, arrangement, and combination of parts hereinafter described, and particularly pointed out in the claim.

For full comprehension, however, of the invention reference must be had to the annexed drawings, forming a part of this specification, in which like symbols indicate corresponding parts, and wherein—

Figure 1 is a vertical sectional elevation of the apparatus; and Fig. 2, a horizontal section thereof on line *x x*, Fig. 1, partly broken away.

In carrying out my invention at points where the fall of the body of water is insufficient to secure a satisfactory head of pressure, I first sink or dig a well, as *a*, in the earth, adjacent to any flowing stream or body of water, to a depth dependent upon the amount of foot-pounds of pressure desired, and in most cases divert the necessary stream required by any suitable dam or other structure, such as *b;* although in some cases this will not be absolutely required. This well being formed, I next insert a vertical standpipe or conductor *c* long enough to extend from the top of the well to within a short distance of the bottom thereof, and being supported in any suitable way, preferably by suspending it from the lower timbers of the dam, as shown. The top of this conductor *c* is open and the bottom terminates preferably in a funnel or hood shaped section *c'*, having its edge c^2 preferably curved inward, for a purpose to be presently mentioned. This conductor serves to inclose the body of water falling to the bottom of the well, and if the top of the conductor is allowed to communicate with the atmosphere, whereby air can be introduced adjacent to the falling water, such air will be sucked or drawn downward through the conductor by the action of the water. This I have determined by experiment, and as a preferable means for introducing the air at the top of the conductor I use a series of small pipes or air-ducts *d d* arranged in line with the conductor *c*, extending from a short distance within the conductor through the body of water to the open air, and being carried in any suitable way by the dam-timbers, preferably suspended as shown.

At the foot of the conductor it is possible for the air to separate from the water, owing to the following arrangement: An air tube or conductor *e*, also preferably having a funnel or hood shaped section *e'* at its lower end, is located centrally within the water-conductor, preferably as shown, the lower edge of the hood being slightly above the lower inwardly-turned edge c^2 of the water-conductor. This air-conductor may be supported in any desirable way, either by stay connections between the two conductors or suspended, as shown, from the dam-timbers, and its upper end is extended to any suitable tank or receiver *f*.

In operation the body of water falling through the conductor *c* draws or sucks inward through the air-ducts *d d* quantities of air (indicated as globules by the dotted circles) and carries them down to the bottom between the inner and outer hood-sections, where, by an upward impetus given to the stream by the curved deflecting edge c^2 of the outer hood *c'* in the direction indicated by the dotted arrows and toward the opening in the head of the hood *e'*, such air-globules become separated from the body of water and occupy the space in the inner hood and air-conductor leading to the receiver above the level of the water in such space. The body

of water passes out through the bottom of the hood and ascends to the top of the well, around the conductor, whence it may be directed to another apparatus or to another point of the stream below the dam, the pressure of the air in the conductor *e* preventing the rising of the water therein.

From the foregoing it will be apparent that the air sucked in by the falling body of water and delivered into the air-receiver *f* through the air-conductor *e* will be subject to the full-weight pressure of the descending column of water in the conductor, and this pressure augmented by the ascending column outside of such conductor, with the result that a great degree of compression is effected.

Of course it will be understood that it is not always necessary to use a well, since in cases where a waterfall is convenient the water-conductor can be located to receive the stream and any suitable outflow or inclosure serve to contain such a quantity of the water leaving the conductor as may be desired to increase the compressing-weight upon the body of air, or an equivalent for the back-pressure afforded by the column of outflowing water might be used in the form of a weighted float or automatic blow-off valve, controlling the outflow in a horizontal direction.

What I claim is as follows:

In a hydraulic air compressing apparatus, the combination with a suitable dam and well, of a main conductor located in said well and having its upper receiving end open to receive a falling body of water directed to it by said dam, and its lower delivery end flared or terminating in a hood-shaped section with inwardly curved edge; open ended air tubes or ducts extending from a point within said conductor through the body of water to the open air or atmosphere; and an air conductor with open flared or hood-shaped lower end located within said main conductor and leading upward through same to any suitable tank or receiver, the space in said well surrounding said main conductor serving as an outflow for the body of water leaving said main conductor as described.

Montreal, 14th day of April, 1894.

CHARLES H. TAYLOR.

Witnesses:
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