

(No Model.)

2 Sheets—Sheet 1.

D. ROUSSEL & J. BOUCHER.
APPARATUS FOR ELEVATING LIQUIDS.

No. 539,146.

Patented May 14, 1895.

Fig. 1

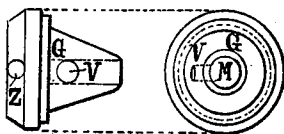
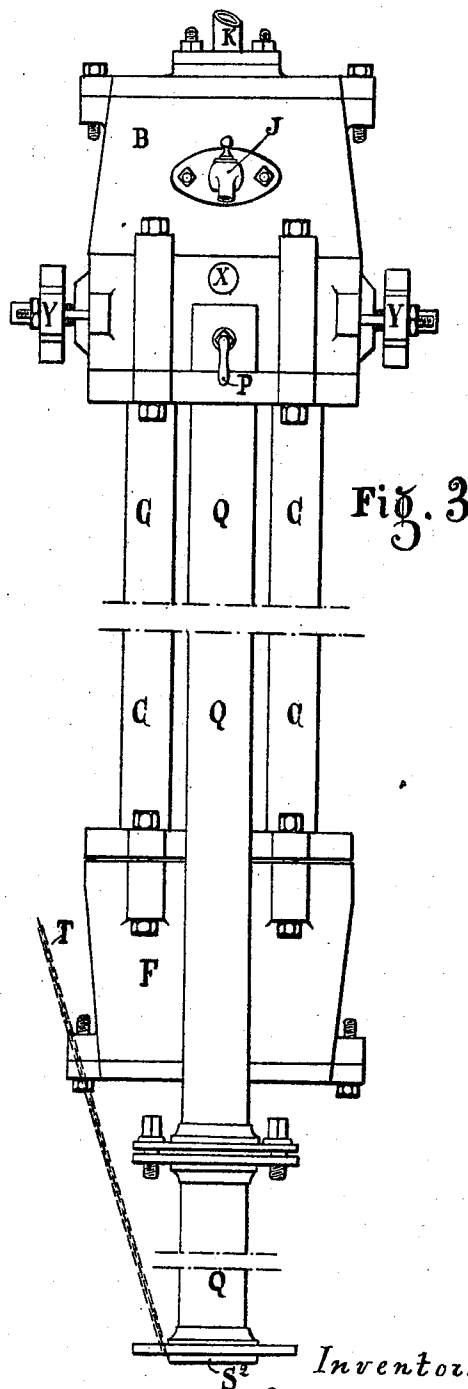
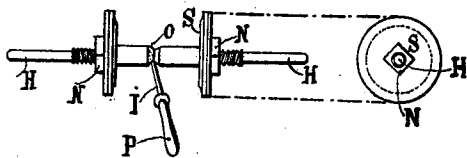


Fig. 2



Witnesses:

J. C. Lebrat.
O. Bloch.

Inventors:

Denis Roussel,
Jean Boucher,
By H. H. de Vos,
Attorneys.

(No Model.)

2 Sheets—Sheet 2.

D. ROUSSEL & J. BOUCHER.
APPARATUS FOR ELEVATING LIQUIDS.

No. 539,146.

Patented May 14, 1895.

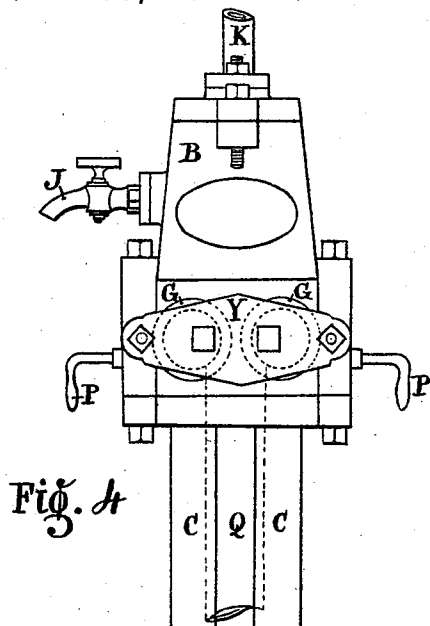


Fig. 4

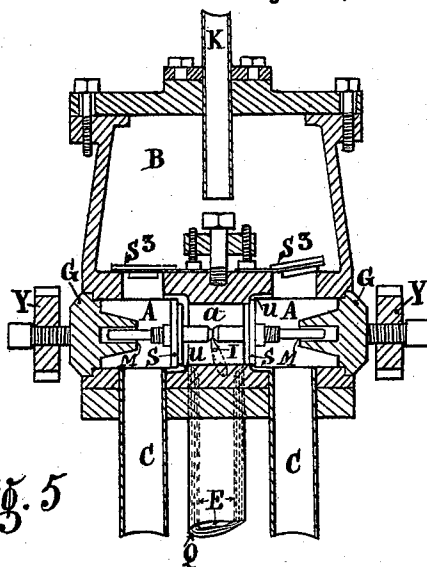


Fig. 5

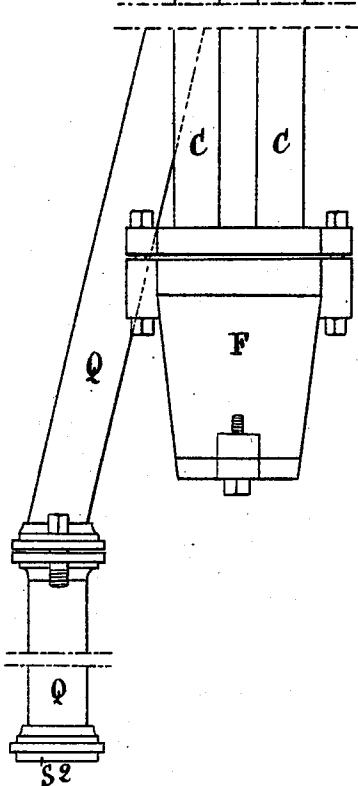
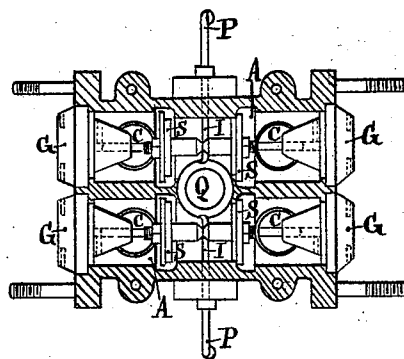


Fig. 6



Witnesses:

J. C. Rebert.
O. Block

Inventors:

Denis Roussel.
Jean Boucher.
By H. H. de Vos
attorney.

UNITED STATES PATENT OFFICE.

DENIS ROUSSEL AND JEAN BOUCHER, OF NIMES, FRANCE.

APPARATUS FOR ELEVATING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 539,146, dated May 14, 1895.

Application filed May 14, 1894. Serial No. 511,125. (No model.) Patented in France January 22, 1894, No. 235,627.

To all whom it may concern:

Be it known that we, DENIS ROUSSEL and JEAN BOUCHER, citizens of the French Republic, residing at Nimes, France, have invented a new and useful Apparatus for Elevating Liquids, (for which we have obtained Letters Patent in France, dated January 22, 1894, and numbered 235,627,) of which the following is a full, clear, and exact description.

Our invention has for its object an apparatus for elevating liquids so as to obtain a certain amount of power, wherever there is a sufficient quantity of water, no water-fall being necessary.

Our apparatus, the operation of which is based upon the principle of the siphon, consists essentially of two suction pipes, a descending pipe, a cylindrical chamber at the upper end of said suction and descending pipes, a reciprocating valve therein, and a lower chamber wherein the suction pipes end, and from which they derive their supply of water.

The capacity of our apparatus will be increased by increasing the number of pairs of suction pipes, the diameter of the descending pipe being correspondingly increased, and in the annexed drawings we have shown a double working apparatus, *i. e.*, with four suction pipes; but whatever the number of suction pipes may be, there is always only a single descending pipe, and a single upper and lower chamber, while the number of reciprocating valves in the upper chamber corresponds with the number of pairs of suction pipes.

In order to better explain the nature of our invention, we have illustrated the same in the annexed drawings, whereof—

Figure 1 is a side and front view of the stopper G. Fig. 2 is a side and front view of the reciprocating valve. Fig. 3 is a front elevation of the complete apparatus. Fig. 4 is a side elevation of the same. Fig. 5 is a vertical section of the same. Fig. 6 is a horizontal section on the axes of the stoppers G.

The suction pipes C, are open at both ends, and terminate at the lower end in the chamber F and at the upper end in the chamber A. The descending pipe Q, which is of larger diameter than the suction pipes and forms the long leg of the siphon, is equipped at its lower end with a downwardly opening valve S²,

which is kept on its seat by means of a chain T. In the upper part of the pipe Q is arranged a concentric pipe E of a smaller diameter, open at both ends. The upper end of the tube E, is connected with the tube Q around its entire circumference. The said pipe E may vary in length, but experience has shown us that the greatest regularity of operation is obtained by giving the pipe a length of about fifty-nine inches. A free annular space is left between the outer wall of the pipe E and the inner wall of the pipe Q, and the purpose of this space will be hereinafter explained.

The pipe Q being hermetically closed at its upper end by means of its circumferential connection with the pipe E the latter connects with the suction pipes C by way of the chamber A. The lower end of said pipe Q is bent sidewise, as shown.

The chamber A provides the communication between the suction pipes, and the pipe E as said, and contains the reciprocating valve and the conical stopper G, and is cylindrical, and has at *a*, between the openings of the suction pipes a narrower part, a circular groove or passage *u* being provided at both ends of the part *a*, as shown and which freely communicates with the pipe E.

The reciprocating valve, shown on a larger scale in Fig. 2, consists of a rod H upon which are suitably arranged stationary disks S, held in place by nuts N. At the center of the rod H is a circular groove O, and the ends of said rod H enter freely in bushes M of the stoppers G. Consequently the valve can freely reciprocate under the impulse of any suitable power, this movement being limited by the contact of the disks S with the end of the central narrower part *a*. The groove O is adapted to engage the end of a small lever I with which a reciprocating motion may be imparted to the valve if same should accidentally come to a stop. When the valve is in operation, the end of the lever I, is out of contact with the rod H, so as not to interfere with the reciprocating motion. The rod of this lever I slides in and out under strong friction in the wall of the chamber A.

A conical stopper G closes the chamber A at both ends, and is rigidly maintained in position by a plate Y. Said stopper G, which

is illustrated on a larger scale in Fig. 1, is provided in the direction of its axis with a bushing M, adapted to receive the ends of the rod H. At the end of this bushing is provided a discharge opening V. A hole Z, made in the outer part of the stopper G, is provided for the introduction of a suitable tool for the purpose of removing the stopper G. The chamber A is also equipped with an aperture X, adapted to receive a reversed cock, to fill the apparatus for the start.

The chamber B communicates with the chamber A through four openings opposite the four suction tubes C, C. The diameter of these openings is the same as that of the pipes C, and they are provided with light, readily moving and upwardly opening valves S³, kept in position by screws.

A cock J arranged above the aperture X of the chamber A, serves for the outflow of the water if it is not desired to raise it still higher, and in any case when open will indicate that the apparatus is filled.

The lower end of a pipe K enters into and terminates in the middle of the chamber B.

The lower ends of the suction pipes C, C, end flush with the cover of the chamber F. About the middle of the bottom of said chamber F is provided an opening for the introduction of the liquid and this opening is closed with an upwardly opening valve S'. If it should be desired to increase the height of the apparatus, an extension pipe may be arranged at the opening and the valve S' may be arranged at the lower end of this pipe.

The operation is as follows: The apparatus being placed in the source of the liquid that is to be raised, is kept in place by any suitable frame. The descending pipe Q and the chamber F may be placed as low as desired, but so that the height of chamber A above chamber F shall not exceed the height to which water can be raised by suction. The pipe Q goes of course outside of and lower than the level of the source. The apparatus is then charged. To this end the valve S² is kept on its seat at the end of pipe Q by means of the chain T, and the apparatus is filled through the opening X until the cock J which is kept open commences to flow. The apparatus is then full. The opening X is closed, the chain T is then released and the valve S² opens whereupon the apparatus is then ready for operation. The water, rising through a pipe C and going downward again through the pipe Q, will strike the disks of the reciprocating valve and flow through the annular groove *u* in order to penetrate into the narrow part *a*. The valve S is thus carried along and pushed against its seat, whereupon the passage is closed. The liquid thus suddenly stopped in its flow, receives a retrograde motion or shock, which will open the valve S³ and the liquid thus passes into the chamber B. The same action is then produced at the other end of reciprocating valve S, and by

these alternate motions the liquid rises and partly fills the chamber B. If it is not desired to raise the liquid any higher, it is allowed to flow off through cock J. If, however, it is to be raised higher, this cock is kept closed. The water, gradually increasing in the chamber B will more and more compress the air, which will thus exercise a certain pressure upon the same and force it upward in the tube K. In either case, the apparatus once started will operate automatically and continually. The water which falls back in the descending pipe Q, carries along in its fall all or part of the air, contained in the annular space around the inner tube E, so that a certain vacuum is formed in said space which would have a tendency to retain the liquid in its fall. This assures and regulates the operation of the apparatus.

In order to prevent the entrance of matter which may cause an obstruction, we may arrange a sieve or other suitable device under the valve S'. A single reciprocating motion imparted to the valves by means of the lever I, will, however, immediately remove any obstruction to the regular operation of the apparatus.

The form and dimensions of the several parts may be changed and the apparatus may be constructed of any kind of metal without departing from the scope of our invention, and we do not desire to limit ourselves to the exact construction as shown and described.

Having now fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. An apparatus for raising water automatically consisting of a lower chamber, an upper chamber, a plurality of pipes connecting said chambers, a descending pipe from a point in said upper chamber that is between the upper ends of said plurality of pipes to a point below the lower chamber, outlets from the upper chamber, and a laterally reciprocating valve arranged in said upper chamber between the orifices of each pair of the said plurality of pipes adapted to be operated automatically by the water in said chamber, substantially as described.

2. An apparatus for raising water automatically, consisting of a siphon provided with a plurality of ascending pipes and a descending pipe arranged between said ascending pipes, and a chamber at the top of the siphon containing a laterally reciprocating valve arranged in said chamber between the orifices of each pair of ascending pipes and adapted to be automatically operated by the water in said chamber, substantially as described.

3. In a water raising apparatus, the combination of a chamber A provided with a narrower internal part *a*, suction pipes C C, leading from the chamber A to a supply chamber F, descending pipe Q connected with the chamber A between the pipes C, C, a reciprocating valve arranged in said chamber A

between said pipes C, C, and passages *u* in said chamber A adjacent to the edges of said valve S, substantially as described.

5 4. In a water raising apparatus, the combination of a closed chamber B, discharge pipe K leading therefrom, valves S³ connecting said chamber B with a valve chamber A, laterally reciprocating valves in said chamber A, passages *u* in said chamber adjacent to
10 the edges of the valves, ascending pipes C leading from a supply to said chamber A at either side of said reciprocating valve, and a descending pipe Q leading from said cham-

ber A at a point between the orifices of said pipes C to a point below the supply and provided with a valve at its lower end, substantially as described. 15

In testimony that we claim the foregoing we have hereunto set our hands this 11th day of April, 1894.

DENIS ROUSSEL.
JEAN BOUCHER.

Witnesses:

VICTOR MABRAY,
FRIDIRIC MATSON.