

No. 645,528.

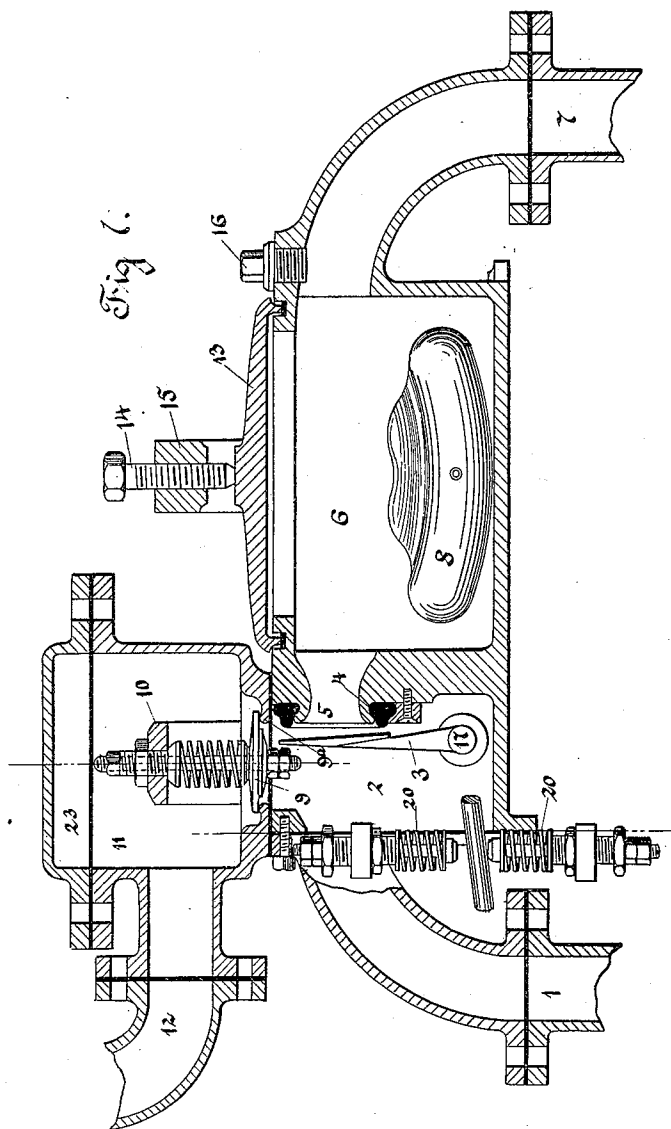
Patented Mar. 13, 1900.

J. LEMICHEL.  
SIPHON ELEVATOR.

(Application filed Oct. 3, 1895. Renewed Jan. 23, 1900.)

(No Model.)

4 Sheets—Sheet 1.



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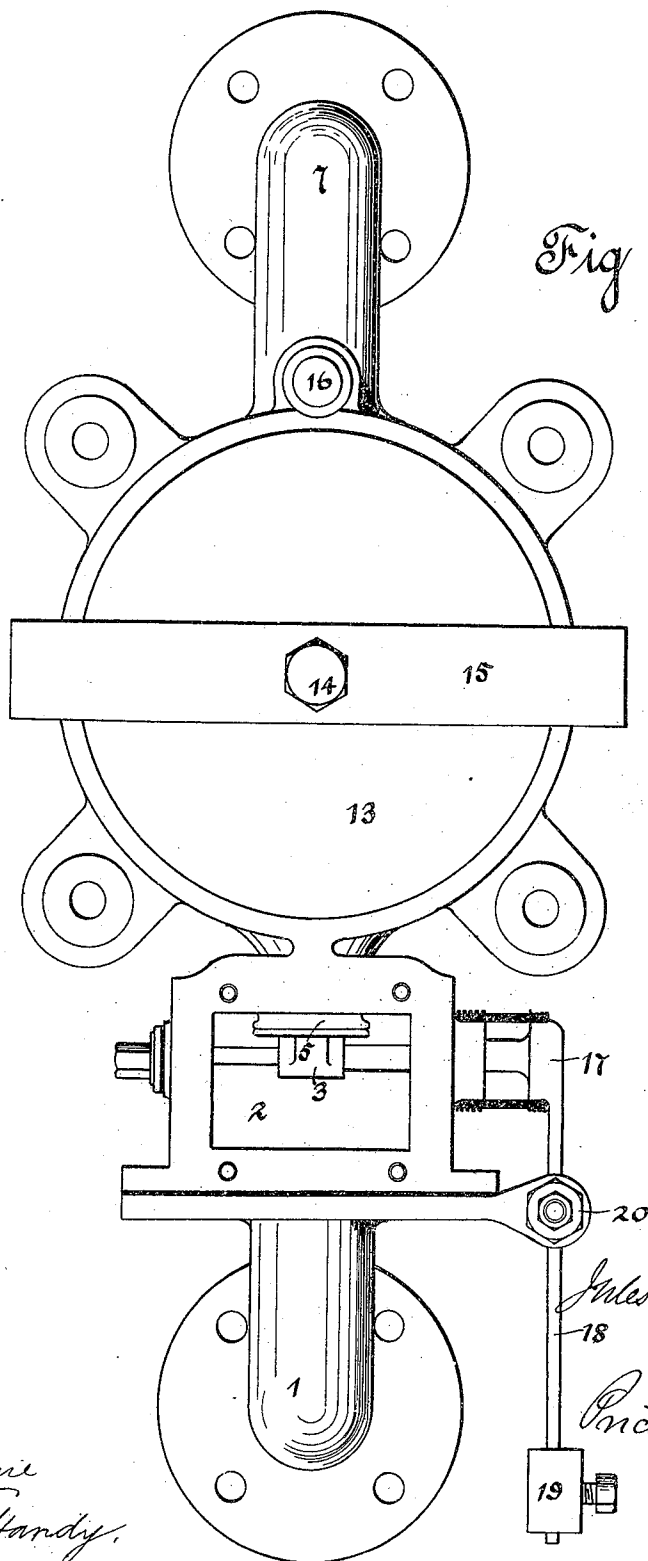
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Fig 2.



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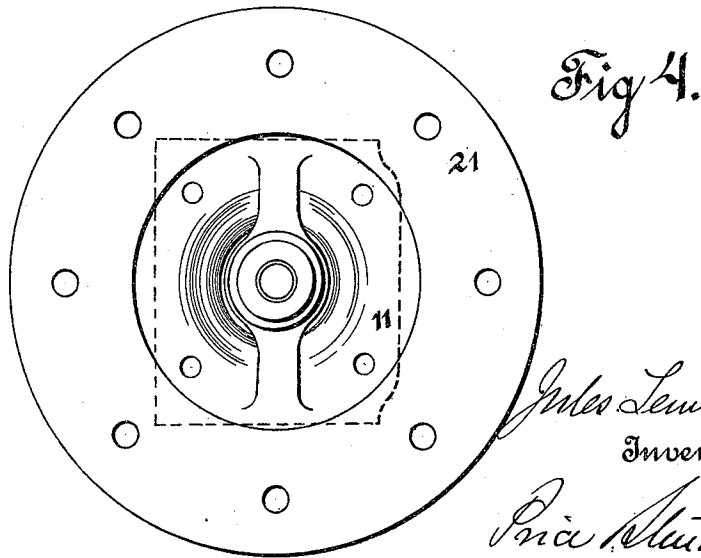
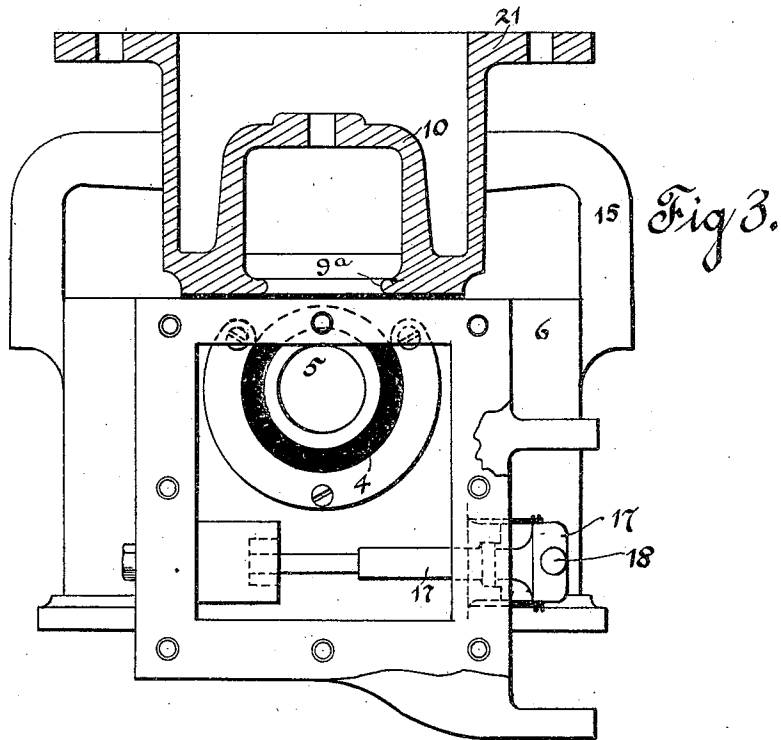
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4 Sheets—Sheet 3.



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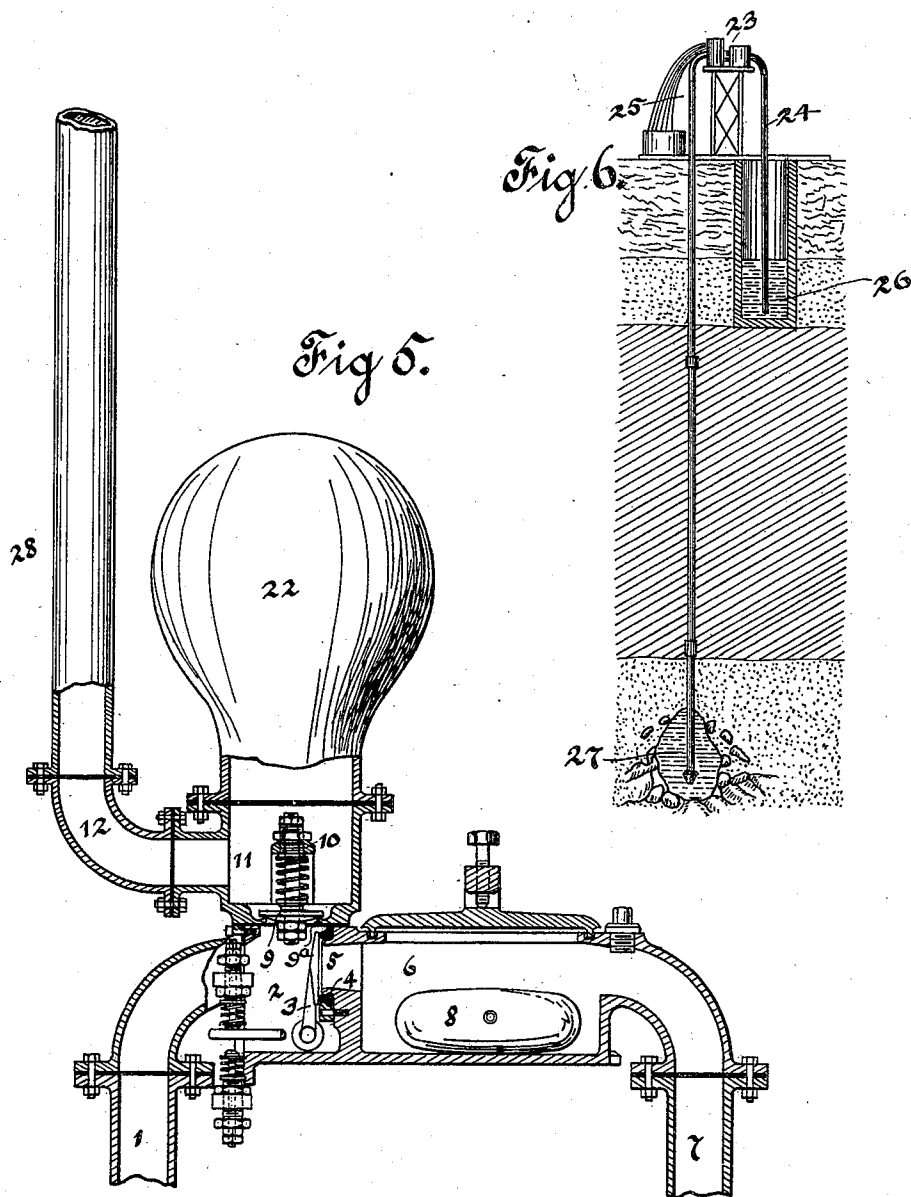
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4 Sheets—Sheet 4.



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# UNITED STATES PATENT OFFICE.

JULES LEMICHEL, OF PARIS, FRANCE.

## SIPHON-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 645,528, dated March 13, 1900.

Application filed October 3, 1895. Renewed January 23, 1900. Serial No. 2,510. (No model.)

*To all whom it may concern:*

Be it known that I, JULES LEMICHEL, a citizen of the Republic of France, and a resident of Paris, France, have invented certain new and useful Improvements in Siphon-Elevators, of which the following is a specification.

Heretofore Letters Patent No. 479,411, dated July 26, 1892, were issued to Eugene Etéve and Jules Lemichel, of Paris, France. The present application is an improvement upon the apparatus described in that patent. The particular elements of improvement consist in three essential features—the substitution of an elastic air-containing sack in the chamber, which in the former device had resilient walls, the superelevation device, by means of which water is forced upward above the level of the crown of the siphon, and the application of the invention shown in Fig. 6 of the drawings, by which water is raised from a well by means of a siphon, the two legs of which are inserted in two natural strata of water in the earth at different levels. These inventions will be described by reference to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of my siphon apparatus. Fig. 2 is a plan of the same with the superelevation apparatus removed from the top of the siphon. Fig. 3 is a vertical section through line *xx* of Fig. 1, the valves being removed. Fig. 4 is a plan view of the puppet-valve chamber. Fig. 5 is a horizontal vertical section of the same apparatus as shown in Fig. 1, showing a dome mounted upon the top of the siphon and a superelevation pipe connected therewith. Fig. 6 is a diagram showing the application of my siphon apparatus to raise water to the surface of the ground from the bottom of a well by the use of two natural water strata at different levels.

The apparatus described in the patent above referred to has been very successful in practice; but it has some mechanical limitations, and the subject-matter of this application is improvements which have been made in the course of the practical use of that apparatus which have resulted from calculation and experiment.

Referring to Fig. 1, 1 is the suction-pipe, by which water is drawn from a source of supply. It may be made of the same size or larger than the discharge-pipe, according to the requirements of the apparatus. 2 is a suction-chamber made of any suitable material, but closed and air-tight. Into this chamber the suction-pipe discharges its water. The chamber 2 is provided with two apertures, each closed by a valve, one opening outward and the other inward. 6 and 11 are two other chambers—the discharge-chamber and the superelevation chamber, respectively—both having rigid walls. Chamber 6 communicates with the suction-chamber 2 by the throat 5, which is closed by the clack-valve 3, and chamber 11 by the opening 9<sup>a</sup>, closed by the valve 9. The valve 3 is mounted upon the rocking shaft 17, which protrudes through the wall of the chamber 2 and is packed or made water-tight therein by a rubber sleeve, fully described in Patent No. 479,411. Surrounding the throat 5 is a valve-seat 4, made, preferably, of rubber. The chamber 6 has rigid walls, but has an open top, which is closed by a cover 13, which rests upon a gasket surrounding the opening. The cover is held in place upon the gasket by a screw 14, passing through a yoke 15. 7 is the discharge-pipe, connected to the discharge-chamber 6 and carrying off the water drawn into said chamber through the throat 5. In Patent No. 479,411 the top and bottom of the chamber 6 were made of elastic or resilient metal and were kept separated by means of a spiral spring placed between them. The function of the resilient chamber was to prevent the tendency to break the vacuum by the sudden discharge of the water in said chamber into the discharge-pipe during the instant when the clack-valve was closed and to avoid the formation of an excessive vacuum at the moment when the valve controlling the passage from the suction-chamber to the discharge-chamber is to be opened. Such excessive vacuum would tend to prevent the proper operation of the device by preventing the opening of said valve at the proper time. Under atmospheric pressure

from the exterior the resilient walls were pressed inward to take up the space left by the receding water. This apparatus, while satisfactory in some respects, is not quite so sensitive as is desirable for the perfect working of my apparatus. I have therefore substituted for the resilient walls an elastic bag 8, preferably of rubber, containing air or other gas, which is placed within the chamber 6 and surrounded by water. This bag is partially collapsed at atmospheric pressure. The natural expansion of the air under relief of atmospheric pressure will very quickly and positively take the place of the receding water in the chamber 6 and with equal sensitiveness and quickness yield to compression when the clack-valve is opened and water again flows into the chamber. 9 is a puppet-valve which closes the communicating passage-way between the suction-chamber 2 and the superelevation chamber 11. The valve 9 is mounted upon a stem and maintained by a yoke 10, secured to the interior of the chamber 11. This valve is seated on a valve-seat which surrounds the aperture 9<sup>a</sup>. It is forced upward and opened by the momentum of the water flowing up the suction-pipe and into the chamber 2 when clack-valve 3 is closed. 12 is a discharge-pipe in the side of the chamber 11. 23 is a cover secured to the top of the chamber 11, by which the apparatus may be converted into a superelevation device.

Referring to Fig. 2, the parts are there shown and numbered as before mentioned. The chamber 11, however, is removed in Fig. 2, showing its seat and the interior of the chamber 2. 17 is the rock-shaft upon which the clack-valve 3 is mounted. 18 is an arm secured to said rock-shaft, and 19 a weight by which it is balanced. 20 20 are spring-buffers which limit the motion of the arm 18 and control the throw of the clack-valve 3. These may be adjusted by suitable nuts to give the valve any desired play.

Referring to Fig. 3, the chamber 11 is there shown in vertical section, the front wall of the chamber 2 having been removed, and the face against which said wall is ordinarily screwed is shown. This figure shows the throat 5 from chamber 2 into chamber 6 and the valve-seat 4, also the rock-shaft 17 upon which the valve 3 is mounted.

Fig. 4 is a plan view of the top of the chamber 11, looking down into it. The top surface of the seat upon which the chamber 11 rests on the top of chamber 2 is shown in dotted lines.

Fig. 5 shows the same structure as that shown in Fig. 1, except that a dome 22 has been added to the top of the chamber 11 and a superelevation pipe 28 is connected to the discharge-pipe 12 of the chamber 11. Experiment demonstrated that the water which was driven through the puppet-valve 9 by the momentum of the rising column in the suc-

tion-pipe 1 was possessed of a latent force sufficient to do additional work, and for the purpose of utilizing this force the dome 22 or cover 23 was placed on the top of the chamber 11 and a superelevation-pipe connected to the discharge-pipe 12. By this means the chamber 11, with its dome and superelevation-pipe, was converted into a portion of the structure known as the "hydraulic ram." By the use of this device water has been raised thirty meters.

Fig. 6 is a diagram showing an application of my invention by which a continual flowing stream of water can be automatically maintained on the surface of ground which is level. This in itself I believe to be a new achievement. I do not know of any apparatus which will accomplish this result, and I do not believe that any apparatus has ever heretofore been devised by which a continuously-flowing stream of water can be maintained in level country by an automatically-operated apparatus. I accomplish this result by a simple application of my invention to natural conditions. In many parts of the world water strata are found at varying levels beneath the surface of the ground. In many places a copious stratum is found at a depth of twenty or thirty feet, and below this an impervious bed of clay or other similar material, and below that, some thirty or forty feet farther down, another water stratum. Wherever these conditions exist, my invention may be applied. A well is sunk into the first water stratum either in the usual way or by driving a pipe into the ground until the stratum is struck and then a second well is drilled until the second water stratum is struck. These two pipes are connected at their upper ends on the surface of the ground so as to form the siphon, and it will be readily seen that when the siphon is started water may be drawn from the shallow stratum into the deep one and will continuously flow.

By mounting my apparatus upon the crown of the siphon about forty per cent. of the water raised from the shallow stratum or well may be delivered at the crown of the siphon above the surface of the ground, the balance of the water flowing down the longer leg of the siphon and into the deep-water stratum.

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

1. In a siphon device for elevating water, the combination of a suction-pipe and a discharge-pipe, with a suction-chamber and a discharge-chamber into which the two pipes enter, said chambers being separated by a valve, the discharge-chamber containing an elastic sack filled with air or other gas.

2. In a water-siphon apparatus, the combination of a suction-pipe and a discharge-pipe with two chambers located between their upper extremities, the suction-pipe emptying into one and the discharging-pipe emptying

the other, said chambers being separated by  
a valve, the discharge-chamber containing an  
elastic sack filled with air or other gas, with  
a third superelevation - chamber which is  
5 closed and connected with the suction-cham-  
ber by means of a valve, said valve adapted  
to be opened by the momentum of water flow-  
ing into the suction-chamber, the superele-

vation-chamber being provided with a super-  
elevation discharge-pipe.

Signed at Paris, France, this 1st day of  
March, A. D. 1895.

JULES LEMICHEL.

Witnesses:

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