

(No Model.)

2 Sheets—Sheet 1.

J. C. TOM.  
PUMP.

No. 483,406.

Patented Sept. 27, 1892.

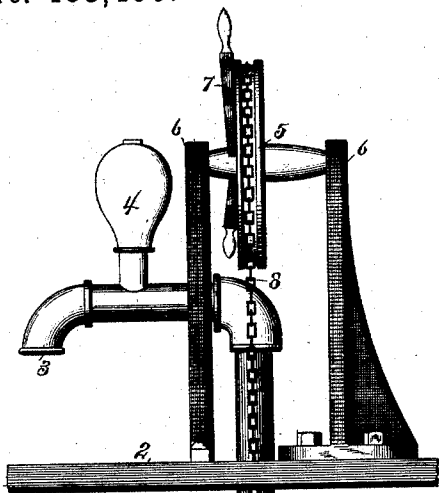


Fig. 1.

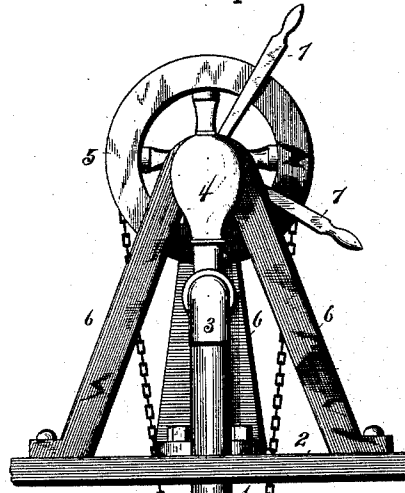


Fig. 2.

Witnesses

Louis F. Julihn  
Eric F. Julihn.

Inventor  
J. C. Tom.

J. H. K. Kins  
Attorneys

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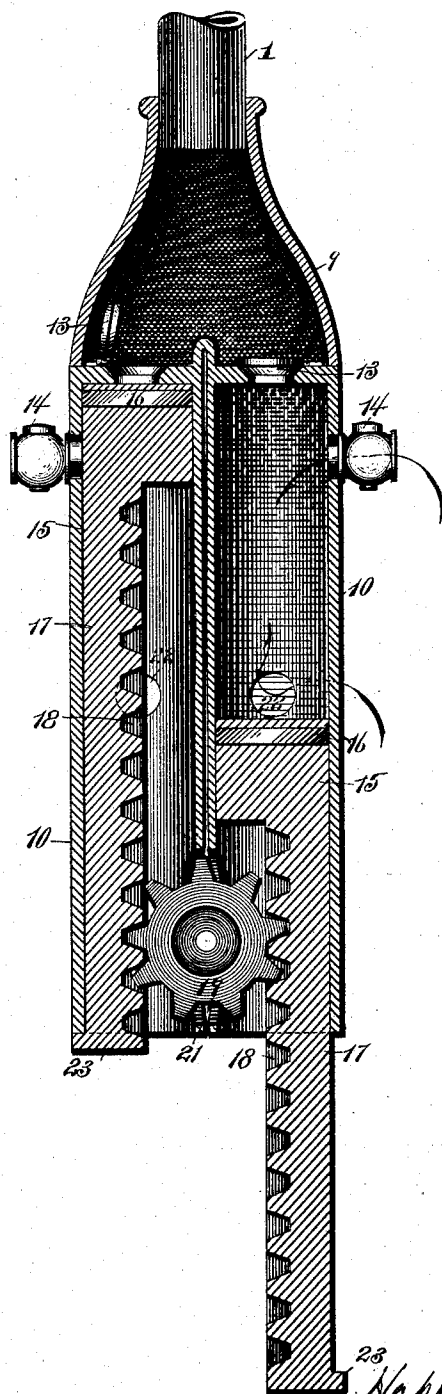
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*Fig. 3.*



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*Louis F. Julihn.*

*Eric G. Julihn.*

Inventor

*J. C. Tom.*

*By*

*Napier & Atkins*

Attorneys

# UNITED STATES PATENT OFFICE.

JOSEPH C. TOM, OF PONTOTOC, TEXAS.

## PUMP.

SPECIFICATION forming part of Letters Patent No. 483,406, dated September 27, 1892.

Application filed October 26, 1891. Serial No. 409,865. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH C. TOM, of Pontotoc, county of Mason, State of Texas, have invented certain new and useful Improvements in Pumps, of which the following is a specification, reference being had to the accompanying drawings.

The object of my invention is to produce a pump that is simple, durable, and efficient, which can be manufactured at a comparatively small cost, and which can be readily cleaned and repaired.

It consists, preferably, in a double-cylinder pump that is adapted to operate by a direct lift without a valve in the plunger. By reason of this peculiar construction it is specially adapted to be used in sandy countries in which the wells generally do not contain great depth of water, and consequently require that a pump-chamber shall be located near the bottom. When the wells contain water of sufficient depth, the ordinary submerged pumps will answer; but in the locations above mentioned the water does not rise sufficiently upon all occasions to fill the pump-cylinders where the ingress-openings are at the top thereof. Therefore I have found it necessary to locate the ingress-openings as near to the bottom of the pump-cylinder as possible, and in order to relieve the vacuum occasioned by the downstroke of the plungers I have found it necessary to provide the upper part of the cylinders with air-inlet openings controlled by inwardly-opening and outwardly-closing check-valves.

In the accompanying drawings, Figure 1 is a side elevation of my pump as in position in a well. Fig. 2 is a similar view taken at right angles to that shown in Fig. 1. Fig. 3 is a view of the lower part of the apparatus, as shown in Fig. 2, detached and in cross section.

Referring to the figures on the drawings, 1 indicates a pipe of ordinary construction, passing through a well-platform 2 and terminating in a nozzle 3, which may be provided with an air-chamber 4. Upon the platform is provided, as usual, suitable pump-actuating mechanism—as, for instance, a wheel and pulley 5, mounted upon a frame 6 and provided with levers 7, by which the pulley may be oscillated to impart, alternately, motion in oppo-

site directions to a chain 8, passing over the pulley. Any suitable actuating mechanism may be substituted for that illustrated in the drawings, adapted to be operated by hand or other power.

To the lower end of the pipe 1, preferably by screw-threads, is secured a chamber, which preferably consists of a shell 9 and a cylinder or cylinders 10, having open lower end or ends. The shell is provided with a flange or flanges 11, to which, by similar flanges thereon, the cylinder or cylinders 10 are fastened by bolts 12. In the bottom of the shell, over a seat provided between it and each of the cylinders, respectively, is fastened a suitable valve 13, opening upwardly. With the upper part of each of the cylinders is connected a suitable valve 14, preferably in the form of an ordinary check-valve set into the wall of the cylinder and opening inwardly into the cylinder.

15 indicates a solid plunger, provided, as is usual, with a packing-ring 16. The stem 17 of the plunger in double-cylinder plungers is preferably provided with a rack 18. The racks of the two plungers in such pumps are located opposite each other to mesh with a pinion 19, carried in suitable bearings 20, secured to the ends of the cylinders.

21 indicates opposite vertical apertures in the lower ends of the cylinders, within which the pinion turns. The pinion is adapted to impart motion from one plunger-stem to the other and to regulate the movement of the two plungers with respect to each other, and is so situated as to limit the motion of each plunger alternately.

22 indicates suitable apertures in the sides of the cylinders, respectively located just above the top of the plungers at the lowest point of their travel. The lower ends of each of the plunger-stems is provided with a projection 23, to which, by rods 24 on opposite sides, it is secured to a yoke 25, that is fastened to one end of the chain 8. The rods preferably pass through suitable guides projecting from the sides of the chamber.

Any ordinary means for connecting the plungers to mechanism for imparting reciprocating motion to them may be substituted for that illustrated.

By avoiding the use of valves in my plungers I am enabled to reduce the size of them so much as to permit of a practically-direct connection between the double cylinders and the main pipe of a pump. It is impracticable to do this where valved plungers are employed, since valves may not be made so delicate as to be liable to excessive wear or too small to allow the ready passage through them of a sufficient volume of water for the proper working of the apparatus.

The chamber being immersed in water, the operation of my pump is as follows: Motion being imparted to the chain 8 in one direction and one of the plungers being elevated against the top of its cylinder, as illustrated in dotted lines in Fig. 2 of the drawings, the other plunger will be depressed to its lowest limit by the operation of the intermediate pinion 19. In this position the top of the last-named plunger will have permitted free access of water to the interior of the cylinder through the apertures 22, so that when the chain is operated in the opposite direction the water in that cylinder will be forced ahead of the plunger up through the valve 13 into the interior of the shell 9, whence its exit will be prevented by the valves in the bottom thereof. The free movement of the plunger in the other cylinder would be prevented, except for the check-valve 14, which opening inwardly communicates with the space in the upper part of that cylinder; but as soon as one plunger begins to descend the check-valve in its cylinder relieves the vacuum therein, allowing the easy movement of the parts. On the other hand the check-valve of the other cylinder closes by the pressure of water on it from within.

By using a solid plunger, in combination with a check-valve, as above described, the life of the packing around the plunger is con-

siderably prolonged, because the wear on the parts is reduced to a minimum.

By the use of the valves and apertures combined and arranged as described the operation of the pump produces little or no current in the water, the water quietly filling the empty space through the apertures after the descent of each plunger in turn. Moreover, by using the apertures located in the lower part of the cylinders the pump will continue to operate for some time after the level of the water has descended below the check-valve, which is a great desideratum in dry seasons, rendering the fullest resources of the well available.

If the check-valve becomes clogged or refuses to operate from any cause, all that is necessary is to unfasten the valve from the cylinder, clean it, and replace it, thereby avoiding the more troublesome and expensive operation of removing the chamber and plunger.

What I claim is—

In a double-cylinder pump, the combination, with the cylinders open at their lower ends, of the plungers arranged to reciprocate therein, the valved openings at the upper ends of the cylinders, leading to the shell connected with the delivery-pipe, the water-ingress openings leading into the cylinders above the lower limit of the movement of said plungers, and the inwardly-opening check-valves whereby water or air may be admitted above the plungers on their downstroke, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOSEPH C. TOM.

Witnesses:

J. J. EDWARDS,  
N. G. SLACK.