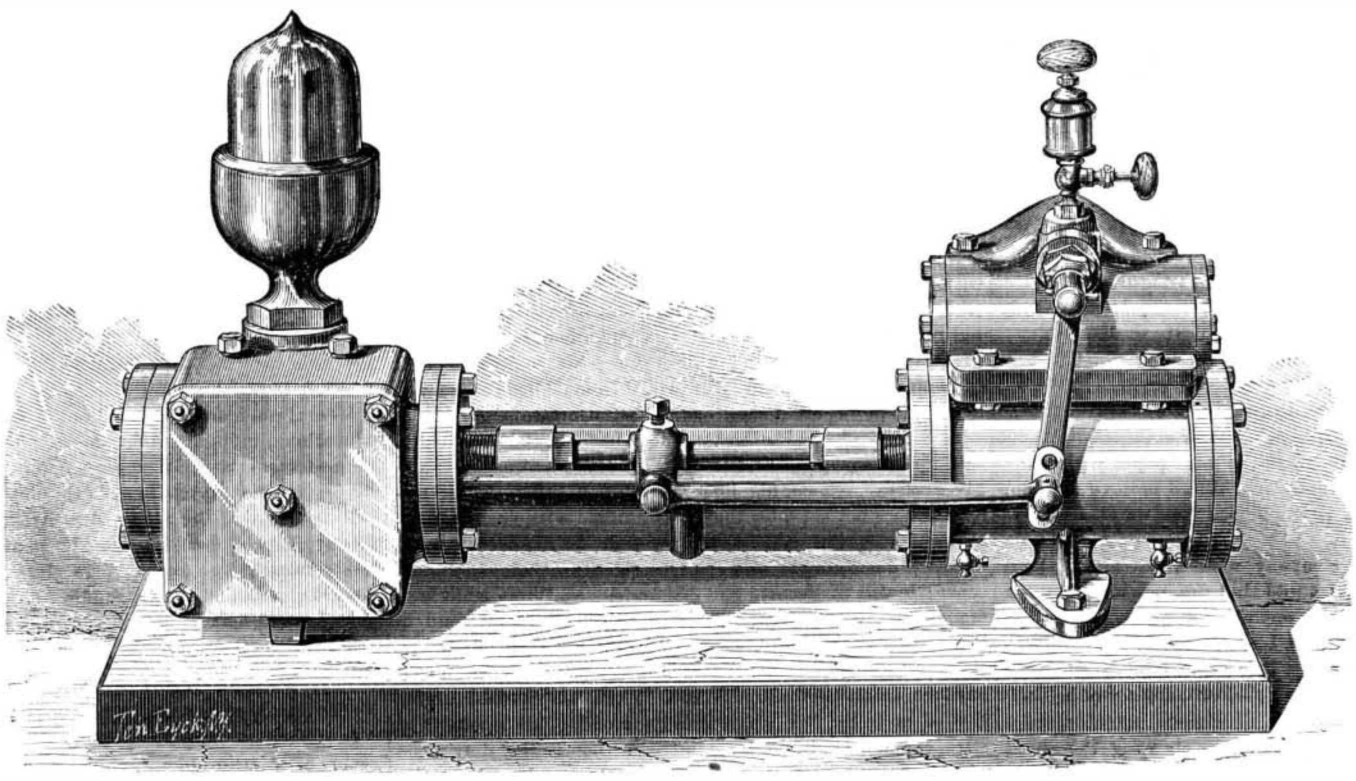
Cameron's Steam Pump.

The independent steam pump—or donkey pump, as European engineers are pleased to term it—although a comparatively recent invention, is now so well known and so extensively used as to be considered an almost indispensable adjunct to a steam boiler. Its relations vary, however. In some cases, the donkey draws its nourishment from the boiler; while in others, the boiler draws its nourishment from the donkey.

The great range of applicability of steam pumps, for moving fluids in almost every possible condition, is increasing daily. For instance, it is now the practice in the oil producing regions to lay pipes (two inch is the size generally employed) from the wells to a point intersecting the nearest railroad, for the conveyance of the crude oil. In some cases oil is conveyed in this way a distance of fourteen miles, forced by a single pump placed at the end of the line, the pipes lying on the surface of the ground and following its undulations. The pressure is, of course, very great, and depends upon the quantity delivered in a given time, but the plan works so successfully that the question is being seriously considered, of connecting the oil districts with the great commercial centers in this way.

The steam pump shown in the annexed engraving is intended chiefly for feeding boilers—a duty that requires a safe and reliable instrument. It is constructed with a view to the fact that we are making steam machinery faster than we are educating men to take care of it properly; and consists, therefore, of the fewest possible parts, and these of the simplest character.



CAMERON'S PATENT STEAM PUMP.

The steam cylinder is shown on the right hand, and the pump cylinder on the left. The piston rod is an unbroken piece, extending from one cylinder into the other, and carrying between the two cylinders an arm, which performs the office of the eccentric in a rotative engine. The steam chest is bored out in the ends, and is fitted with a piston or plunger, which carries the main slide valve back and forth with it. This plunger is operated by a small slide valve seated in the steam chest casting, on the further side, which receives its motion from the arm on the piston rod, through the horizontal and pendant links which vibrate a shaft that extends through the steam chest and carries a toe that engages with the small valve. The horizontal link is connected to the arm on the piston rod, by an eccentric hook than can be lifted when it is desired to stop the machine instantaneously.

The only parts of the steam engine inclosed are the main steam piston, the main slide valve, the plunger, and the auxiliary slide valves. The pump cylinder is equally simple; it is fitted with a piston and four valves. By removing the bonnet shown in the cut, the whole interior of the cylinder is not only exposed, but is rendered accessible for the removal of any foreign substance.

The pump valves, four in number, may be removed by unscrewing the two plugs shown on the top of the cylinder, and lifting out the spindles on which the valves play. The valves and valve seats are made of solid composition.

There is not a screw or little piece of any kind, inside the machine, that can get adrift to disarrange it or give trouble.

These pumps are double acting, and the duty being the same in each direction, their operation is smooth and regular. Their parts are manufactured on the principle of gunwork, each piece being interchangeable.

They are sometimes arranged to feed boilers, in situations where the throttle valve is operated by a float or similar contrivance that varies with the water level, where they are relied upon to stop and start under care of the attachment with the utmost confidence.

This excellent steam pump bears testimony to the restless ingenuity of our American mechanics, which is never satisfied until the whole field is exhausted. It is the latest addition to the already large variety manufactured by the well known firm of A. S. Cameron & Co., whose works are situated at the foot of East Twenty third street, New York, and cover more than an acre of ground. The whole establishment is devoted exclusively to the manufacture of steam pumps, under six distinct patents, granted at different times to Mr. A. S. Cameron; and it is managed on the co-operative plan, each workman being interested in the profits.

COATES AND LASCELL'S WATER ENGINE.

The utilization of the power of small streams with great heads has long been a subject of interest and importance. In many of the mining districts of California, there are streams which fall abruptly from great hights, but the flow of which is so small that, to apply it to work through the medium of overshot wheels or turbines, would involve very great expense, while a large portion of the fall would necessarily be sacrificed. Endless chains, carrying buckets, pressure wheels with buckets worked by cams, and many other devices have been employed with greater or less success, to render the power of such streams available; but there is no doubt that the cylinder and piston is essentially the best thing ever invented for the purpose.

The limited elasticity of water, however introduces difficulties in working cylinder engines not met with in the employment of steam; and it is only in comparatively recent times that these difficulties have been so far surmounted as to give smoothly working water engines.

The engine illustrated herewith works without shock or jar, and can, undoubtedly, be made to economize a very large percentage of the power of any stream, falling from a hight not too great to admit of its being safely conducted to the cylinder in pipes.

The principal merit of the design of the engine is its simplicity and compactness. We need not dwell upon this point, as it is sufficiently shown in the annexed engraving.

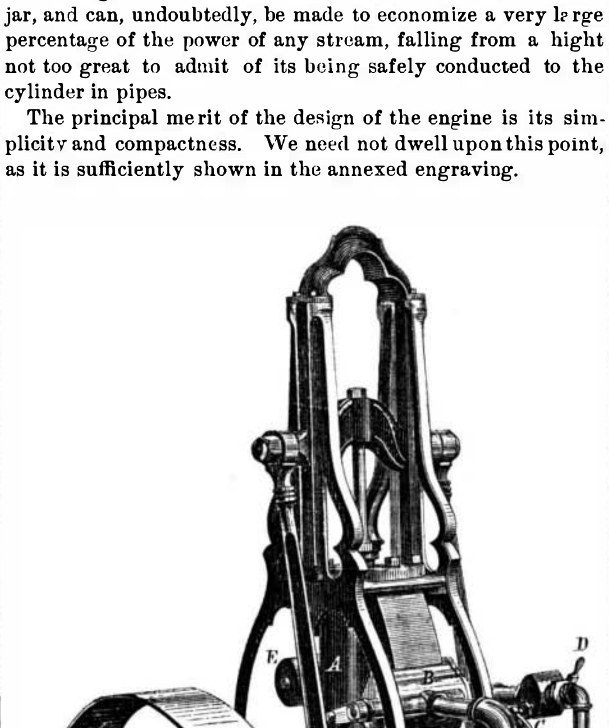


Fig. 2 shows the construction of the valve of the Coates and Lascell engine, which the inventors claim meets all the requirements of the case, claims which, upon personal inspection of the machine, we think, are well sustained.

The valve is balanced and self-packing. It therefore runs lightly and without leakage. The engraving comprises a longitudinal and a cross section, by which the construction is clearly shown.

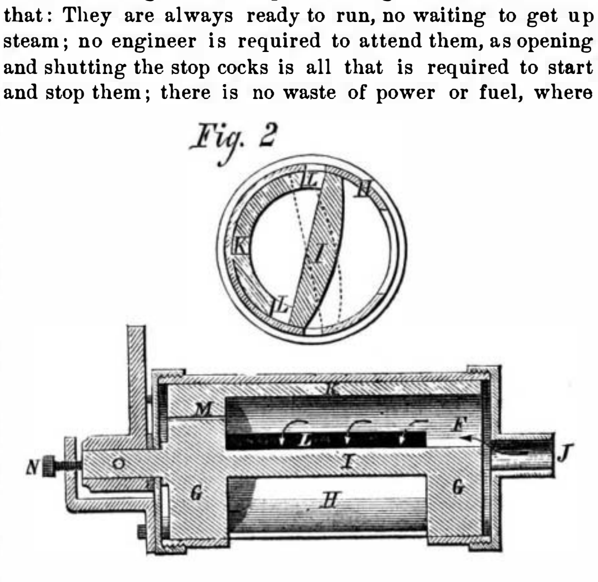
The induction port, F, is located at one end, in one of two transverse disks, G, at the end of the valve, which disks fit closely the interior of valve chest, H. The disks are connected by a flat plate, I. A hollow trunnion, J, admits the water which flows in the direction of the arrows into the valve chest. A plate, K, curved in cross section, as shown, and flush with the perimeters of the disks, G, which it connects, is convex on the outside and concave on the inside, and parallel with the plate, I. In the plate, K, openings, L, are left between the plates, I, and K, and are the eduction ports of the valve.

The plate, K, diffusing the pressure, increases the strength and resisting capacity of the valve. An orifice M, is made through the disk opposite the hollow trunnion, by which water passes through to the back of the disk, and thus balances the end pressure of the valve very nearly, only enough being allowed to act against the washer or packing placed around the stem to keep the joint from leaking. By the aid of the set screw, N, this packing may be relieved of pressure if necessary. Occasion for using this screw, however, occurs rarely, it being found that the packing is regulated by the adjustment of hydrostatic pressure above described.

At the beginning and end of the stroke, the crank travels much faster than the piston, while through the middle of the cylinder the travels of both are nearly equal; and when a governor is used, or the water throttled so as to give the engine any given rate of speed, the crank must necessarily travel much the slowest, as it must wait for the cylinder to fill the otherwise rapidly increasing area, caused by the rapid travel of the piston through the center of the cylinder. Now, to obviate this difficulty, Mr. Lassell has introduced an auxiliary pipe and valve, D, Fig. 1, which is opened by means of a separate eccentric, so adjusted that when the piston has traveled one fourth the distance from the end of the cylinder, this valve gives the additional supply of water necessary to equalize the crank's motion. The defect thus overcome is analogous to that which occurs when what is called wire drawing takes place, the piston traveling faster than the steam.

The advantages of water pressure engines over steam are that: They are always ready to run, no waiting to get up steam; no engineer is required to attend them, as opening and shutting the stop cocks is all that is required to start and stop them; there is no waste of power or fuel, where

Fig. 2



power is used intermittently—when a job is finished, the engine is stopped, and started when another is ready; there is no danger of accidents from explosions, no dirt, dust, or ashes, to annoy; no room required for storage of fuel, etc.; they can be used where steam would be inadmissable; the reduction of the rates of insurance would, in many places, pay the running expenses of a water engine; they are much cheaper than steam engines.

A modification of this engine has been made to adapt it to blowing church organs. The crank has been dispensed with, and the parts are so arranged that the organist can start and stop it from his seat as easily as he can pull a stop of the organ. It has a governor valve also, which is connected with the organ bellows in such a manner that the speed of the engine is governed by the bellows of the organ, resulting in perfect adaptation of supply to demand.

These engines have a counting machine attached, to register the number of revolutions, by which the engine acts as a meter, measuring its own consumption of water.

For further particulars, address the Cold Water Engine Co., Watertown, N. Y.