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New Double Plunger Sewerage Pump.

We illustrate and describe herewith a new double plunger sewerage pump which has just been built by Messrs. Smith, Vaile & Co., of Dayton, Ohio, builders of steam pumps and hydraulic machinery, for the National Soldiers' Home near that place. The machine is an exceptionally fine one, and warrants a full description. The principal points of its construction will be understood from the following:

Diameter of steam cylinder, $16\frac{1}{2}$ inches; diameter of water plungers, 10 inches; length of stroke, 24 inches; capacity, 8.16 gallons per stroke. At a speed of 50 strokes per minute, which is very moderate, the pump will deliver, therefore, 408 gallons per minute. The valve motion is a new patent plain slide valve, operated by a cross-head on piston rod, and through a T lever having a curved face. The motion is perfectly positive, and the pump can be started at any point of the stroke. It can be run at high speed without pounding.

The water cylinder is double plunger in style, having stuffing boxes in the center between the two valve boxes. The suction is 8 inches diameter, and the discharge 6 inches diameter. The water valves are a feature of the pump, and have been constructed on an entirely new plan, designed to give large, free openings that will permit the passage of heavy material and extraneous matter, such as fibrous material, pieces of clothing, scraps of leather, paper, etc., and other materials of a miscellaneous nature such as may be supposed to accumulate in an institution of 4,000 inhabitants. To adapt these valves to their work, the valve openings or seats are 5 inches in diameter, and are free from cross bars or other obstruction. The valves themselves are made of rubber fastened into a cup which slides in a case fastened to or hung to the bonnets directly over the valve seats or openings. Thus, when the valves are open, they hang suspended, as it were, giving a free and unobstructed passage to the sewage.

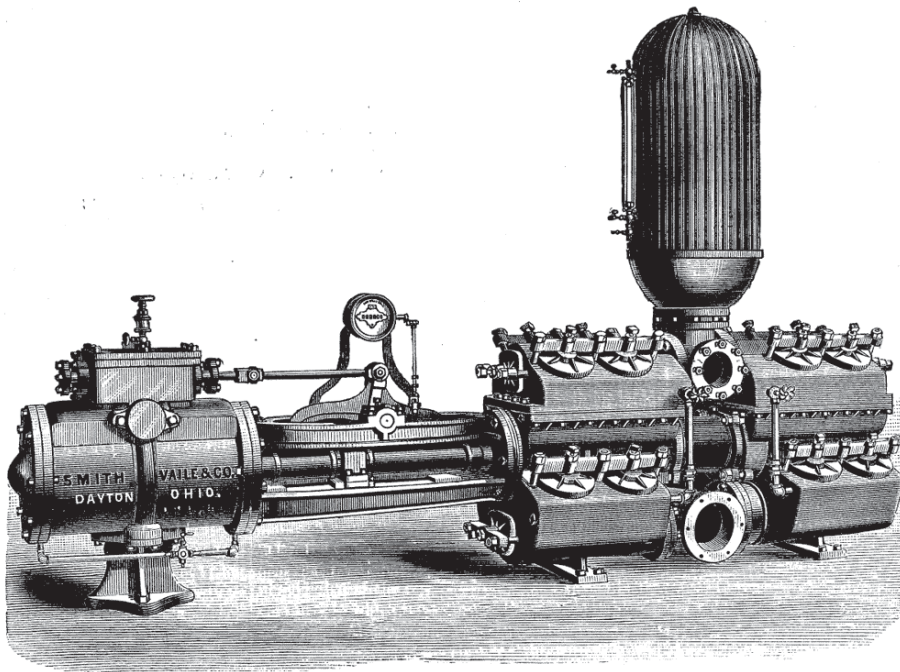
At the National Soldiers' Home, the institution for which this pump was built, the plan in use consists in collecting all of the sewage from the various buildings and flowing it into one large cistern of sufficient capacity to contain the accumulation of several days.

From this cistern it is pumped through some 5,000 feet of pipe, and from this discharged and distributed over the ground, making, as the result has shown, a most excellent fertilizer. As an evidence of this fact, it is stated that many acres of land formerly considered as almost worthless, are now raising large crops of the finest vegetables.

The pump is provided with counter, priming valves, automatic cylinder cocks, glass gauge, an air chamber, etc., and the makers confidently claim that it is beyond question the finest machine for its intended purpose ever designed and constructed. Its weight is 8 tons. Messrs. Smith, Vaile & Co., of Dayton, O., the

makers of the daily papers: 'The space above the water being filled with steam, and the pressure momentarily increasing, the central column of steam becomes inverted, and, pressing upon the surface of the water, acts like a wedge, dividing the water in the center, and pressing it against the sides of the boiler, thereby producing immense pressure at given points instead of that uniformity which the ordinary test effects. Consequently, the wedge of steam divides the water before it until the boiler is rent in pieces.' This theory is startling in its novelty, and well calculated to strike terror into the bravest heart by its terrible efficiency. Something should be done immediately.

Public safety demands it. Somebody should immediately put a contrivance upon the market to nullify the action of the aforesaid 'wedge.' We can only offer a few suggestions. Boilers should be built without 'given points.' Then it is evident the 'wedge' would have nothing to act upon, and would probably get disgusted and leave the boiler after a short time spent in vain endeavors to get a 'grip' by which it could 'rend it in pieces.' This is an important point, and should not be overlooked. If this is not practicable, some law should be at once passed, and rigidly enforced, limiting the acuteness of the 'wedge,' or, perhaps it would be better to insist upon



NEW DOUBLE PLUNGER SEWERAGE PUMP.

makers of this fine machine, are specially engaged in the manufacture of steam pumps and hydraulic machinery. Among their specialties which have attained a wide celebrity, is the so-called "Dayton Cam Pump," designed and built especially for boiler feeding, for pumping hot water, pumping returns from coils and radiators of steam-heating apparatus, without the use of traps or tanks, etc.

New Theory of Steam Boiler Explosions.

The *Locomotive*, published by the Hartford Steam Boiler Inspection and Insurance Company, criticises the absurdities of some mechanical "crank," who has been delivered of a new idea, after the following humorous fashion:

"A Brooklyn (N. Y.) man has just invented, and we presume, has patented, a bran new theory of the explosion of steam boilers, which he thus sets forth in

having it inverted, in which case it would be unable to exert any force upon the sides of the boiler, and would consequently be harmless. Or the upper part of the boiler could be filled with water, thus compelling the steam to confine its operations to the lower part.

"The inventor does not state whether a 'wedge' would be formed in this case or not. Will he please enlighten an anxious community of steam-users on this point? Or, in case we should be unable to get rid of this pestiferous and explosive 'wedge' by any means at our command, we might perhaps make use of it in some way. A boiler fitted with a new and improved system of 'wedges' of great acuteness, and consequent power, might be employed to drive the new motor invented a short time ago and described in the *Locomotive*. A combination of the 'cube of fifty inches dimensions,' with a properly regulated 'Maltese cross,' and 'cut-off bar,' with a 'yoke giving a kind of pen-