T. J. Lovegrove.

Sand Pump.

No. 46,766. Patented Mar. 7, 1865.

Fig. 1.

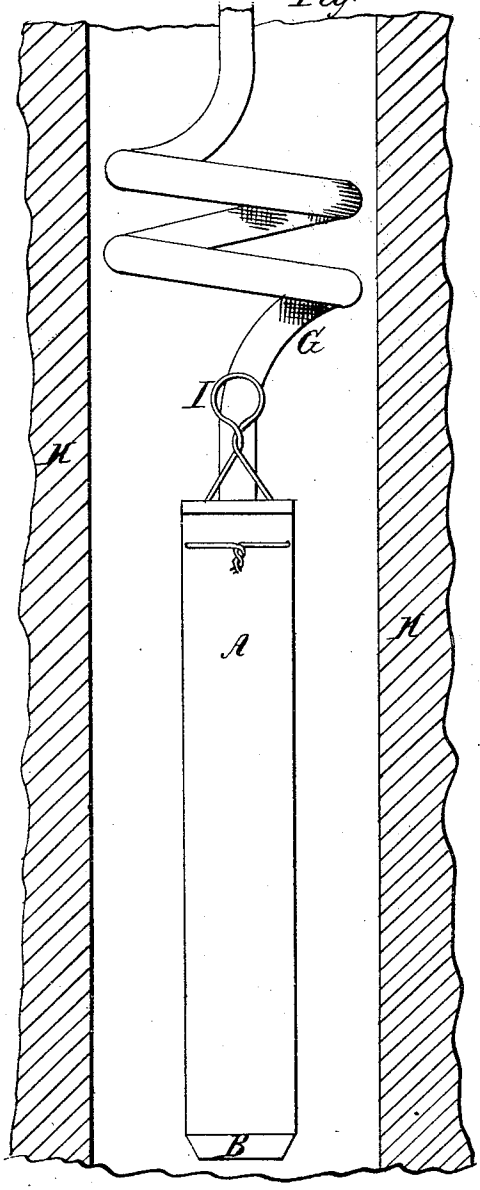
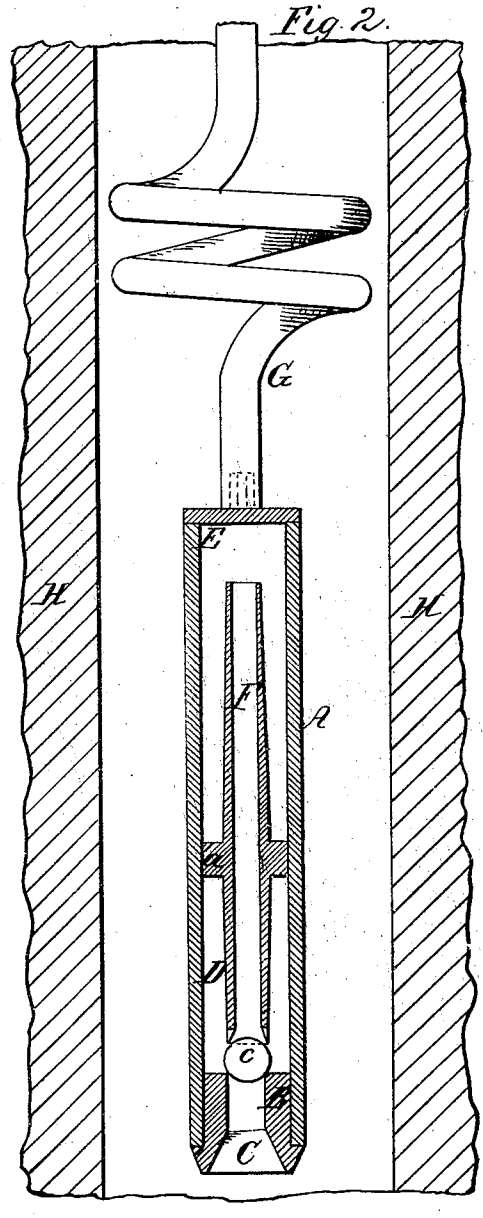


Fig. 2.



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UNITED STATES PATENT OFFICE.

THOMAS J. LOVEGROVE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND HENRY BALDWIN, JR., OF SAME PLACE.

IMPROVEMENT IN SAND-PUMPS FOR ARTESIAN WELLS.

Specification forming part of Letters Patent No. **46,756**, dated March 7, 1865.

To all whom it may concern:

Be it known that I, THOMAS J. LOVEGROVE, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in Sand-Pumps for Artesian Wells, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 represents a view in elevation of my improved sand-pump, and Fig. 2 a vertical central section through the same.

It is the object of my invention to produce a sand-pump which shall exert a constant pressure upon the materials passing through it, which is not liable to choke, and in which the weight to be lifted at every stroke of the pump is less than in those heretofore used; and to these ends my improvement consists, first, in an air-chamber connected with the pump and vibrating with it, so that the elasticity of the compressed air in the chamber assists in discharging the contents of the pump; secondly, in a sand chamber or space connected with the pump and vibrating with it to receive the heavier particles of sand, gravel, or stones which may enter the pump; thirdly, in combining with a sand-pump a flexible and an extensible hose or discharge-pipe, whereby I am enabled to accommodate the movements of the pipe to those of the pump without having to lift the weight of the discharge-pipe at every stroke of the pump; fourthly, in combining in a sand-pump an air-chamber next the valve at the bottom of the pump with a sand-chamber above the air-chamber; fifthly, in combining with a sand-pump a sand-chamber having an induction-pipe projecting above the bottom, so that the heavier particles may fall to the bottom of the chamber without choking the induction-pipe; sixthly, in so combining an air-chamber and a sand-chamber in a sand-pump that the eduction-pipe of the air-chamber forms the induction-pipe of the sand-chamber, while at the same time the contents of the sand-chamber are prevented (without the use of a valve) from returning to the air-chamber, whereby I am enabled to relieve the air-chamber and induction-valve from the pressure of the contents of the sand-chamber; seventhly, in combining in a sand-pump an air-chamber, a sand-chamber, and a valve, with induction and eduction pipes, substantially as hereinafter shown.

In the accompanying drawings, which exemplify one convenient method of carrying out the objects of my invention, my improved sand-pump is shown as constructed with a cylindrical barrel, A, having a bottom, B, tapering somewhat on the outside, and a funnel-shaped opening, C, for the entrance of the sand and water, thus giving a punch-shaped bottom to enter the sand more easily. The barrel of the pump is, in this instance, divided into two portions by a diaphragm, *a*, thus forming an air chamber, D, and a sand-chamber, E, the two being connected by a pipe or tube, F, which passes through the diaphragm *a* and extends nearly to the bottom of the air-chamber and within a short distance of the top of the sand-chamber, being open at each end. The lower end of this pipe is divided into points, and forms a guide for the ball-valve *c*, which controls the communication from the opening C to the air-chamber D.

A flexible hose or discharge-pipe, G, leads from the sand-chamber to the surface of the ground, or wherever the place of discharge may be. This pipe may be made of gutta-percha, leather, canvas, or other suitable material, and should be allowed to hang loosely in the well, in order to conform to the movements of the pump as it plays up or down or sinks deeper below the surface.

The pump is vibrated up and down in the well H (or raised and lowered) by means of a rod, rope, or chain attached to a suitable staple, I. As the pump descends, the ball-valve *c* is lifted and the sand and water rush into the air-chamber D and compress the air therein. When the pump rises on its upward stroke, the ball *c* drops and prevents the contents of the air-chamber from escaping through the opening C. The next downward stroke of the pump forces in more sand and water through the valve at the same time that the pressure of the air compressed in the chamber, in connection with the downward stroke of the pump, forces the sand and water already in the chamber through the pipe F into the sand-chamber E, where the heavier portions settle to the bottom around the outside of pipe F,

while the lighter portions, with the water, pass upward through the flexible hose G to the place of discharge. This hose being flexible and allowed to hang loosely in the well, as shown in the drawings, it is obvious that it will readily accommodate itself to the motions of the pump. Moreover, by this plan I avoid the necessity of lifting the weight of the tubes or pipes, which in deep wells is a matter of great importance.

As the pipe F extends nearly to the top of the sand-chamber, the sand which is too heavy to be carried up by the current will settle below its mouth, and thus be prevented from returning through the pipe or from exerting pressure on the air chamber or induction-valve.

The constant pressure exerted by the compressed air in the chamber D obviates the sudden starting of its contents, and thus avoids the necessity of lifting so much dead-weight at every stroke of the pump.

I am aware that sand-pumps have been made with tubular rods, and with valves in said rods; but in such pumps the entire weight of both the pump and rod must be lifted at every reciprocation, and they have no air or sand chamber in the sense in which I use those terms.

It is obvious that the details of my invention might be modified in various ways without departing from the spirit of my invention.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. An air-chamber connected to and vibrated with a sand-pump, substantially in the manner described, for the purpose set forth.

2. A chamber connected to and vibrated with a sand-pump to receive the heavier portions of the detritus passing through the pump.

3. The combination, with a vibrating sand-pump, of a flexible and extensible hose or discharge-pipe for the purpose of accommodating the movements of the pipe to those of the pump without lifting the weight of the pipe at every stroke of the pump.

4. The combination, in a sand-pump, of an air-chamber next the valve with a sand-chamber above the air-chamber.

5. The combination, with a sand-pump, of a sand-chamber having an induction-pipe projecting above its bottom, substantially as described, to relieve the induction-valve from the weight of the detritus, as set forth.

6. The combination, in a sand-pump, of an air-chamber and conducting-pipe with a sand-chamber, when so arranged that the eduction-pipe of the air-chamber forms the induction-pipe of the sand-chamber.

7. The combination, in a sand-pump, of an air-chamber, a valve, a conducting-pipe, a sand-chamber, and a discharge pipe.

In testimony whereof I have hereunto subscribed my name.

T. J. LOVEGROVE.

Witnesses:

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