V. M. HADDON.

SUCTION PIPE ATTACHMENT.

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Fig. 1.

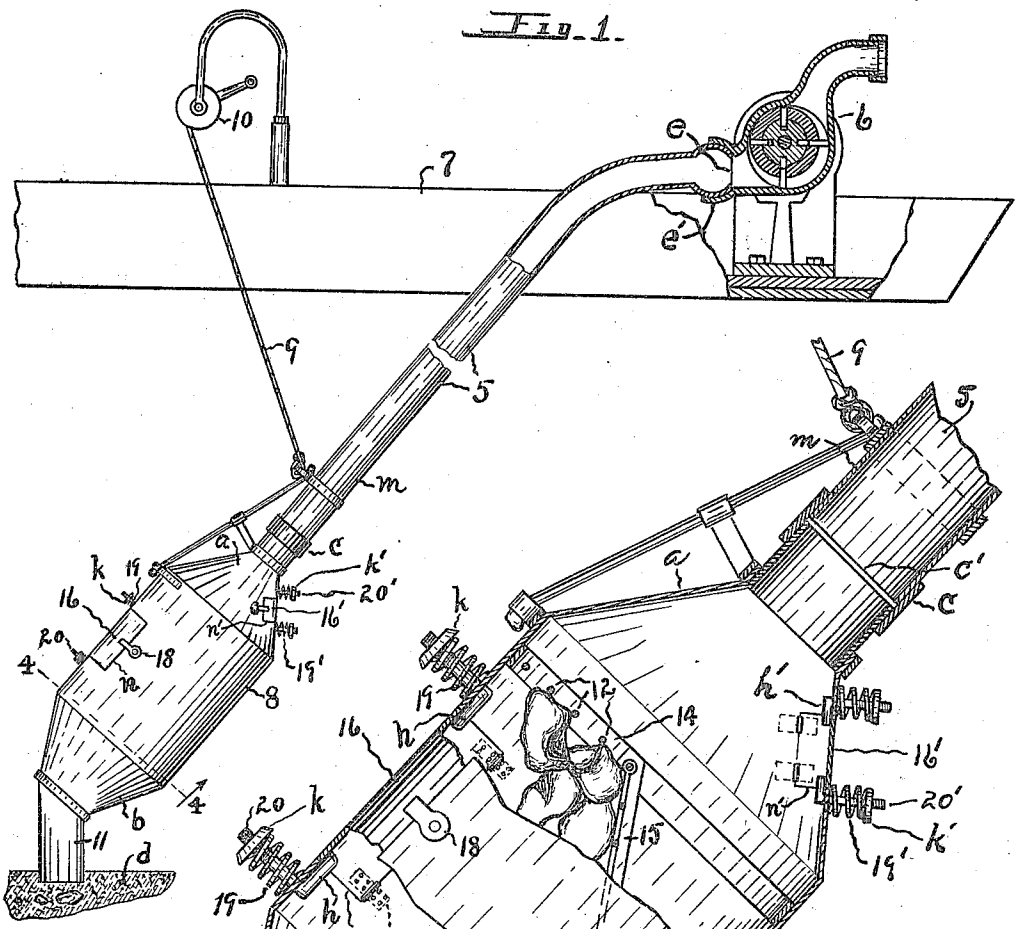


Fig. 2.

Fig. 3.

Fig. 4.

Witnesses

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SUCTION-PIPE ATTACHMENT.

1,169,745. Specification of Letters Patent. Patented Jan. 25, 1916.

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To all whom it may concern:

Be it known that I, VIRGIL M. HADDON, a citizen of the United States, residing at Louisville, in the county of Cass and State of Nebraska, have invented certain new and useful Improvements in Suction-Pipe Attachments, of which the following is a specification.

This invention relates to a suction pipe attachment found to be useful in connection with the operation of sand pumps.

When pumping sand from the bottoms of rivers or lakes, water soaked bark, weeds, debris, and pieces of rock often become wedged in the suction pipe. To avoid clogging it has been the custom to apply a netting or grating at the lower end of the pipe, which however as soon as obstructed prevents the sand and sometimes prevents either sand or water from passing through the pipe and frequently results in collapse of the pipe or breakage of the pump since the operation of pumping when the pipe is obstructed tends to form a vacuum therein. A further objection to the ordinary netting used is that the suction tends to quickly accumulate the pieces of rock, weeds, &c. at the end or intake of the pipe, and this requires shifting the operation of pumping to a different location.

The object of the invention is to provide means which will be convenient in operation whereby sand may be pumped without change of location from the place where the obstructions mentioned are encountered, and means which will operate automatically to prevent breakage of the pump or collapse of the pipe, consisting of a cylindrical casing which may be connected with the lower end of the suction pipe, said casing having an area in cross-section greatly exceeding that of the pipe and which may contain a considerable accumulation of small rock or the like when drawn therein by suction, a grating being provided near the upper end of the casing and so disposed therein that it will have a greater area in cross-section than that of the casing, means being provided for maintaining the casing inclinedly, so that its intake pipe will be normally disposed in an upright position, the intake pipe for said casing having such an area that it will not be liable to become clogged, means being provided so that accumulations may be removed, a secondary intake being employed under control of resilient means to permit an influx of water when the obstruction of the grating is nearly complete, so that injury to the pump or collapse of the suction pipe may be prevented.

With the foregoing objects in view and others to be mentioned, the invention presents a novel construction, combination and arrangement of parts as described herein and claimed, and as illustrated in the drawing, wherein—

Figure 1 is a partly broken view in side elevation of a suction pipe with my attachment applied thereto, a part of the pipe and the pump being in section. Fig. 2 is a view of the pipe attachment in side elevation, the intake pipe and a part of the casing being in longitudinal section, an accumulation of debris or rock being also shown in the casing. Fig. 3 is a plan view of the casing, parts of the convergent ends being removed. Fig. 4 is a transverse section of the casing on line 4 4 of Fig. 1, to show the grating.

Referring now to the drawing for a more particular description, numeral 5 indicates the rigid or inflexible suction pipe of a sand pump 6 mounted upon a horizontal support 7. A cylindrical casing is indicated at 8, preferably having outwardly convergent upper and lower ends indicated, respectively, at *a* and *b*, and connected to the suction pipe by the collar *c* at the intake *c'* thereof, the longitudinal axes of the casing and rectilinear part *m* of the suction pipe being substantially in alinement.

The suction pipe is connected at *e'* with the casing of the sand pump in a manner to permit swinging movements of said pipe, and the pipe and casing 8 may be lowered from or elevated to the support by any suitable means, the cable 9 and windlass 10 being shown for this purpose, so that the accumulation of rubbish may be removed from the casing to be deposited upon the support when elevated, and that the intake pipe 11 of the casing may engage the sand *d* when the casing has been lowered.

While the suction pipe with casing attached may have any suitable length to reach the bottom of a lake, pond or river, the length of these parts should be such that their inclination, during operation, will be approximately forty five degrees with reference to the horizontal support 7, and when

in that position the intake pipe 11 will be disposed vertically, or substantially so, since it is disposed in angular relation to the axis of the casing.

As clearly shown in Fig. 2, a grating is provided for the casing, consisting of the rods 12 and 13 disposed substantially parallel in spaced relation transversely of the casing, rods 12 having their ends mounted on the circular band 14 near the convergent end *a* of the casing, and rods 13 having their ends mounted in the curved strip 15 which extends forwardly from the band 14 approximately to the convergent end *b* and lower side of the casing.

When the pump is operating, the sand and water, normally, will flow freely through the intake pipe, the casing, the grating, and will pass the discharge port *e* of the suction pipe. Pebbles and small stones will also pass with the sand, but pieces of rock, bark or the like sufficiently large to become wedged in the suction pipe will be detained in the casing, and by reason of continued suction from action of the rotary pump generally used, these accumulations, in part, will be pressed against the lower side of the grating, the larger pieces of rock, in part, engaging the casing and inclined portion of the grating and will be supported at the lower convergent end of the casing on account of their weight. The sand and water will pass upward between the larger pieces of rock, and since the grating, by reason of its construction has an adequate area, the sand and water will pass therethrough when partly obstructed. However, on account of the accumulations of weeds and smaller obstructions, the grating may support the formation of a compact mass to prevent a passage of sand or water, and this may cause collapse of the suction pipe unless means are provided to prevent it.

To prevent breakage of the pump or collapse of the pipe from the causes mentioned, the door 16 is mounted on the casing, preferably, by means of hinges 17, and is adapted, normally, to fill an opening *n* in the wall of the casing, the outward swinging movement of the door normally being prevented by the keeper or button 18, its inward swinging movement being subject to the resistance of springs 19 mounted upon the pintles 20 which traverse the casing and which have angular extensions *h* bearing upon the inner side of the door to operate as stops therefor.

The pintles are preferably threaded at their outer ends, and by means of the screw-caps *k* the tension of the springs may be adjusted to suitably resist an inward swinging movement of the door. In operation, when water accompanied by a limited quantity of sand passes through the pump, it will indicate to an operator that the casing or grating is partly obstructed, and when the discharge contains a still less proportion of sand, it may indicate to an operator that the door has been pressed inwardly. By use of the windlass and cable the casing may then be elevated and the accumulations removed, the door being opened outwardly for this purpose.

On account of the automatic action of the door 16, the pump and suction pipe will not become injured if the pumping is terminated when the flow of sand from the pump begins to be limited in its proportion to water, and adjustments of the springs 19 are depended upon so that the door will remain closed at all times except when the obstruction of the grating or casing is nearly complete. The door 16 and its connections therefore operate as a safety valve as well as a means of access to the casing for removal of obstructions.

In order that there may be no injury to the pump or suction pipe should an attendant neglect to terminate operation of the pump when the obstruction of the grating is complete, a door 16′ is provided similar to that already described, except that it is mounted between the grating and the intake of the suction pipe. The door 16′, best shown in Fig. 2, is hingeably mounted on the casing, and, normally, is adapted to fill the aperture *n*′. It will be seen that an adjustment of the springs 19′ may be made by use of screw-caps *k*′ on the threaded ends of the pintles 20′, so that a greater resistance to the inward swinging movement of this door from suction may be provided, than that provided for the door 16, the projections *h*′ operating as stops in the same manner as already described.

The adjustment for springs 19 is such that the suction required for pumping will not cause the door 16 to swing inwardly unless the casing is obstructed in a degree sufficient to prevent a free flow of water with a desired proportion of sand. However, if through the neglect of an operator there should be a complete obstruction of the grating, the adjustment of springs 19′ is such that the door 16′ will swing inwardly to prevent the injury or breakage.

It is considered that the casing would not be practically effective in operation if disposed vertically since the accumulations of rock, &c. would not probably be detained therein when the action of the pump and suction is terminated, and therefore the casing should be disposed inclinedly.

While I have described details of construction, I do not wish to be understood as limiting myself in this respect, nor to size, form or proportion, the scope of the invention being determined by the appended claims.

I claim:

1. In combination with a suction pipe having a rectilinear part, an apertured cylindrical casing provided between its ends with a grating disposed inclined to the longitudinal axis of said casing, its lower end being provided with an angularly disposed intake pipe, a hingeably mounted door normally disposed in the aperture of said casing, pintles traversing the casing and provided at their inner ends with projections for engaging the door, springs mounted on the pintles for resisting an inward swinging movement of the door, means for adjusting the tension of the springs, said casing being mounted at its inner end upon the suction pipe at the intake thereof with its axis disposed approximately in alinement with the axis of the rectilinear part of the suction pipe.

2. In combination with a suction pipe having a rectilinear part, an apertured cylindrical casing provided between its ends with a grating, its outer end being provided with an angularly disposed intake pipe, a door normally disposed in the aperture of said casing, pintles traversing the casing and provided with projections for engaging the door, springs for resisting an inward movement of the door, said casing being mounted at its inner end upon the suction pipe at the intake thereof with its axis disposed substantially in alinement with the axis of the rectilinear part of the suction pipe.

3. In combination with a suction pipe having a rectilinear part, an apertured cylindrical casing provided between its ends with a grating, its outer end being provided with an angularly disposed intake pipe, a door arranged to swing inwardly of the aperture of the casing by the force of suction, resilient means tending to resist an inward movement of the door, said casing being mounted at its inner end upon the suction pipe at the intake thereof with its axis disposed substantially in alinement with the axis of the rectilinear part of the suction pipe.

4. An attachment for the suction pipe of a sand pump, comprising a cylindrical casing provided intermediate its ends with a grating and formed with an outwardly convergent part, said casing being provided with an intake pipe disposed inclinedly to its longitudinal axis to open upon said convergent part, and provided between the grating and intake pipe with an aperture, a door normally disposed in said aperture and mounted hingeably to permit a swinging movement inwardly of the casing by force of suction, and resilient means connected with the door for resisting said swinging movement.

In testimony whereof, I have affixed my signature in presence of two witnesses.

VIRGIL M. HADDON.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."