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SAND SEPARATOR.

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Fig. 1.

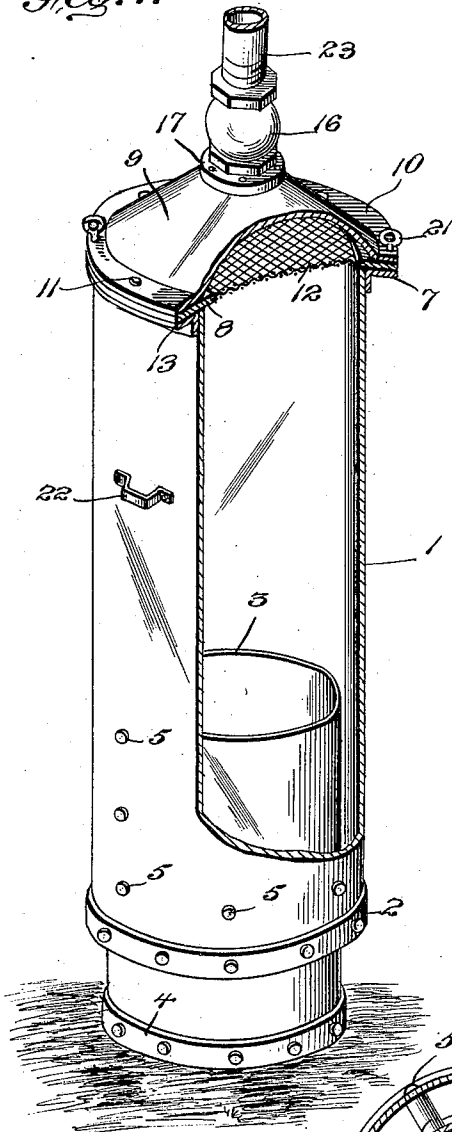


Fig. 2.

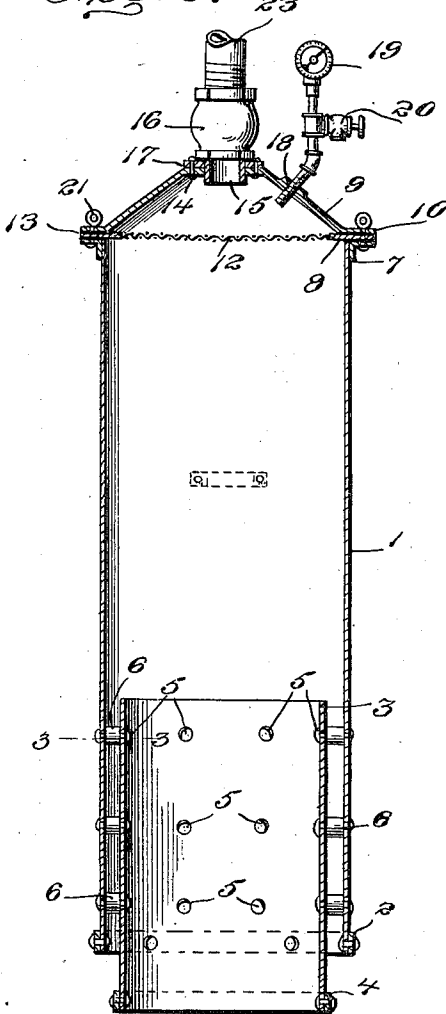
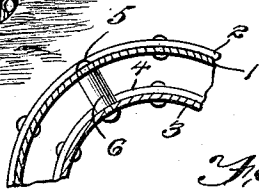


Fig. 3.



Witnesses

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SAND-SEPARATOR.

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To all whom it may concern:

Be it known that we, ARTHUR P. SILLIMAN and JOHN F. LINDBERG, citizens of the United States, residing at Hibbing, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Sand-Separators, of which the following is a specification.

The object of this invention is to provide simple and efficient means whereby water passing to the suction pipe of a pump will be relieved of the sand or other foreign matter therein, so that choking of the pump and abrading of the pump cylinders will be prevented.

The device is intended more specially for use in sinking shafts or other similar work where the water level must be kept low to permit the workmen to operate.

The invention is illustrated in the accompanying drawings and will be hereinafter fully set forth.

In the drawings:—Figure 1 is a perspective view partly broken away of an apparatus embodying our invention; Fig. 2 is a central vertical section of the same; Fig. 3 is an enlarged detail section taken on the line 3—3 of Fig. 2.

In carrying out our invention, we employ a cylindrical body 1 which should be of steel or some similar strong material and is reinforced at its lower end by an annulus 2. Within the lower end of the cylinder 1, we arrange, concentric therewith, a smaller cylinder 3 which is reinforced at its lower end by an annulus 4. The cylinders are secured together and held in their concentric relation by rivets or bolts 5 inserted there-through and equipped with spacing rings 6 between the cylinders, as shown in Figs. 2 and 3. The upper end of the main cylinder 1 is reinforced by a flange 7 formed of angle iron, and upon this flange a flat ring or annulus 8 is placed. The top or cover 9, which is preferably of a conical or tapered form, has a flat edge portion 10 which rests upon the ring 8, and this edge portion 10 is rigidly secured to the said ring 8 and the flange or collar 7 by rivets or bolts 11 inserted through the same, as shown and as will be readily understood. A screen 12 is carried by the ring 8, and suitable packing, indicated at 13, is interposed between the ring 8 and the flange 7 and between the said ring 8 and the flat edge portion 10 of the top, leak-

age at the upper end of the device being thus prevented.

The apex of the top or cover 9 is removed, thereby providing a flat supporting surface 14 and presenting a central opening to receive the nipple or short tube 15 depending from the check valve 16. To prevent the weight of the check valve from buckling the top or cover, a reinforcing collar or washer 17 is rigidly secured upon the flat body portion 14 to fit around the tube or nipple 15 and bear against the lower end of the body of the check valve.

An air vent 18 is provided in the top or cover 9, and this air vent is preferably in the form of a tube equipped with a vacuum gage 19 and with a hand-controlled cut-off valve 20.

The device is equipped with eyes or rings 21 at its upper end in which may be engaged cables or similar lifting devices to permit the device to be lifted when it is to be transported to another point of operation or it is desired to remove the sand collected below the inner cylinder. On the sides of the main body or cylinder 1, handles 22 are provided whereby the device may be manually lifted for the same purpose.

The use of the device will be readily understood. The suction pipe 23 leading from the check valve is connected to the inlet port of a pump, and the device is lowered until the lower end of the main body or outer cylinder 1 is below the level of the water in which the work is to be done. The lower end of the inner cylinder will project below the end of the outer cylinder, and the parts should be so proportioned that the inner cylinder will rest upon or be very close to the deposit of sand forming the water bed. The pumps being then set in motion, will draw the water up through the space between the inner and outer cylinders, and as the water rises above the inner cylinder, it will tend to overflow therein, so that the sand will drop to the bottom of the same.

When the apparatus is filled with water, the sand will settle down into the inner cylinder and thereby shut off any possibility of water entering through the bottom of said cylinder, so that the expansion in the cross area of the rising body of water, as it passes the top of the inner cylinder will carry the sand over into the said cylinder and, consequently, the sand cannot reach

the pump. The sand will eventually fill the inner cylinder and it can then be removed, without arresting the operation of the device, by merely shoveling from under the inner cylinder, so that the sand will gravitate therefrom. Any chips, leaves, or other lighter material which may float in the water will be arrested by the screen 12, so that it cannot reach the pump cylinders and interfere with the operation of the pump.

Should the material arrested by the screen collect therein in such a quantity as to interfere with the operation of the pump, the valve 20 is opened and the pumps temporarily stopped. The water contained within the device will then resume its former level in the main body of water and so flow from the cylinder, and when the cylinder is empty it can be hoisted by the suspending devices attached to the eyes 21, or may be lifted by the handles 22, so that the material collected by the screen will drop out and the apparatus can again be put in operation.

Should the sand be not removed from the inner cylinder after the same has been filled, the screen 12 will prevent sand being drawn into the pumps, and the arrested sand will eventually fill the cylinder 1 and prevent water flowing therethrough, this condition being indicated by the vacuum gage 19 in a well-known manner. The apparatus may then be cleaned and again placed in operation, as before described.

Having thus described our invention, what we claim is:—

1. A device for the purpose stated comprising a pair of concentric cylinders, the inner cylinder projecting below the outer cylinder and being spaced therefrom and adapted to rest upon the bed of a body of

water, the upper end of the inner cylinder and the lower end of the outer cylinder being open, and the upper end of the outer cylinder being in communication with a pump.

2. A device for the purpose set forth comprising an outer cylinder having an open lower end, an inner cylinder having an open upper end below the upper end of the outer cylinder, said inner cylinder being spaced from and projecting below the said outer cylinder, a screen extending across the upper end of the outer cylinder, and a cover fitting over said screen and provided with an outlet.

3. A device for the purpose set forth comprising inner and outer cylinders having open lower ends, the inner cylinder projecting below the outer cylinder and having an open upper end, an outlet from the upper end of the outer cylinder, and lifting devices on the outer cylinder.

4. A device for the purpose set forth comprising an outer cylinder having an open lower end, an inner cylinder having open upper and lower ends and projecting below the outer cylinder, an annular flange at the upper end of the outer cylinder, a ring resting on said flange, a screen carried by said ring, a cover supported on said ring and extending over the said screen, said cover having a flattened apex, a valve casing resting on said flattened apex and having a nipple extending therethrough, and a suction tube leading from said valve casing.

In testimony whereof we affix our signatures in presence of two witnesses.

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Witnesses:

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