Feb. 22, 1927. 1,618,837

S. LEGGETT

STRAINER FOR TUBE WELLS OR THE LIKE

Filed May 16, 1924 2 Sheets-Sheet 1

Fig. 1.

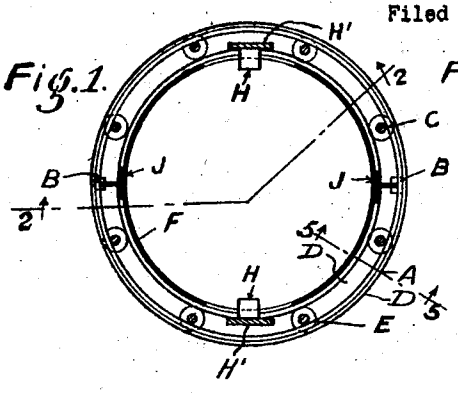


Fig. 4.

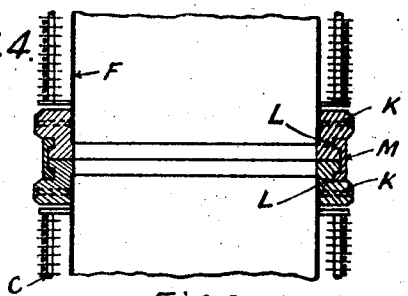


Fig. 3.

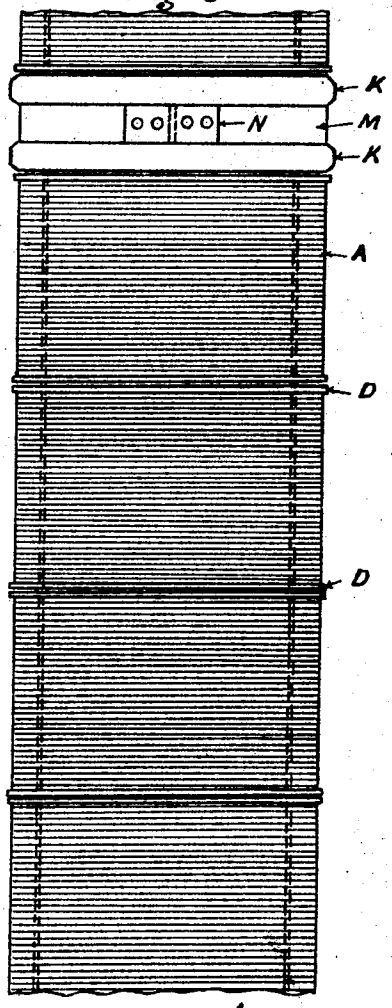
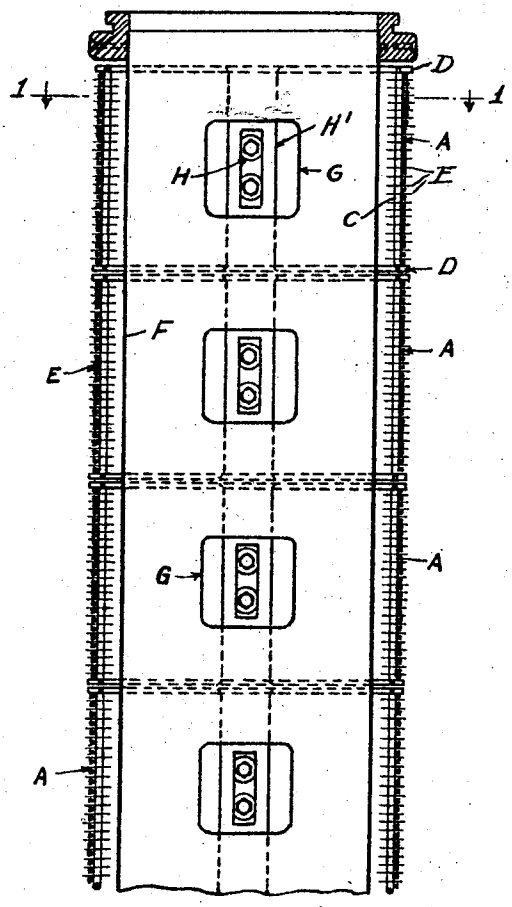


Fig. 2.



Inventor:
Stephen Leggett
By Arthur Kin
Atty.

Feb. 22, 1927. 1,618,837

S. LEGGETT

STRAINER FOR TUBE WELLS OR THE LIKE

Filed May 16, 1924 2 Sheets-Sheet 2

Fig. 5.

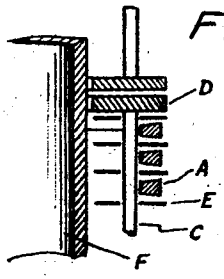


Fig. 6.

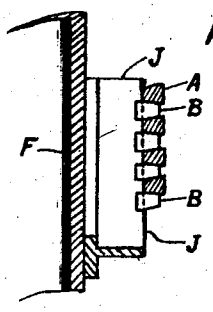
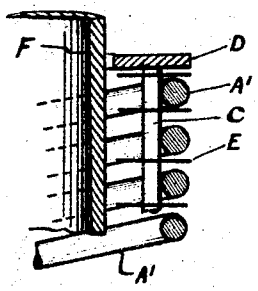


Fig. 7.



Inventor:
Stephen Leggett
By
Atty.

Patented Feb. 22, 1927. 1,618,837

UNITED STATES PATENT OFFICE.

STEPHEN LEGGETT, OF AMRITSAR, BRITISH INDIA.

STRAINER FOR TUBE WELLS OR THE LIKE.

Application filed May 16, 1924, Serial No. 713,706, and in India October 27, 1923.

My invention consists in an improved strainer for tube wells or the like, which are embedded in the soil, and my invention particularly consists in the combination with a strainer of a cleaning device so arranged as to be operated mechanically in suitable time intervals to keep the openings of the strainer from becoming clogged up.

A great difficulty experienced with tube wells embedded in the soil is that the flow of water gradually decreases and in the course of several years becomes materially reduced due to the clogging of the strainer. Experience shows that in many cases the clogging is due to a hard deposit of mineral matter forming on and in the interstices of the strainer. This deposit is in most cases quite thin—perhaps not more than $\frac{1}{16}''$ thick after many years' service—but as it forms upon the strainer itself, it has a material effect on the percolation of the water into the tube well since it tends to close the fine percolation openings.

Various devices have been suggested for cleaning the strainer. In some of these devices, a cleaner is lowered into the tube well and expanded to enter into the percolation slits and then is worked in these slits to clean them. These devices however, labor under the disadvantage that it is difficult to ensure that the cleaning blades will enter the slits, because, owing to the fineness of said slits, it is generally considered advisable to provide several blades to simultaneously enter a number of parallel slits.

Other cleaning devices have been used in which the cleaning blades remain permanently in the slits, being mounted in multiples on suitable frames and adapted to be moved or rotated. However, the frameworks or cages project into the interior of the tube and thus offer a material frictional resistance to the flow of the liquid therethrough. In the case of deep wells, such additional resistance is quite important.

Now, according to my invention, the strainer is built about, or placed around, the central tube of the well which is of relatively large diameter and is equipped with cleaning means which remain permanently in place. The parts whereby the cleaning means may be operated project through openings into the central tube, but only a short distance so as not to interfere with the flow of liquid. The strainer comprises preferably a plurality of superposed individual wire rings separated by spacers and supported by a skeleton frame, but the strainer may also consist of a continuous wire helix supported by a frame. Or, the strainer may be formed of a cylindrical outer tube of large diameter having provided slits therein. In any case, the operating members of the cleaning device extend into the spaces provided between the parts of the strainer, or the slots, so as to clean the same, when the cleaning device is operated.

The cleaning device preferably is equipped with parts engageable through apertures in the central tube whereby the cleaning device may be moved relatively to the strainer.

The strainer is preferably made in sections or units surrounding the central tube, and preferably, each section or unit is separately supported.

In the accompanying drawings, in which like letters of reference indicate like parts, Fig. 1 is a horizontal cross-section through one embodiment of a strainer in accordance with my invention on the line 1—1 of Fig. 2, Fig. 2 a vertical section through the same on the line 2—2 of Fig. 1, Fig. 3 an elevation, Fig. 4 a cross-section through the coupling joining two sections of the strainer together, Fig. 5 is a section on an enlarged scale, along line 5—5 and Fig. 6 a similar section showing the strainer construction, Fig. 7 a similar section showing a different strainer.

In the embodiment shown in Figs. 1 and 2, the strainer consists of a plurality of sections or units, each comprising a number of wire rings A, preferably of trapezoidal cross-section (Figs. 5 and 6), separated by spacing members B arranged at intervals, to provide for the required space, between each two adjacent wire rings. The latter are placed over a strainer body or frame composed of T or angle bars J riveted to the tube F. The cleaning means comprise annular end plates D surrounding, but separate from, the tube F, the main longitudinal bars H′ and rods C connecting said end plates D in pairs forming cages. Mounted on the vertical rods C of each cage are rotatable circular discs E, which protrude between the wire rings A of the strainer projecting outwardly to a small extent.

The bars J support the separate cleaning sections, the plates D resting on the upper ends of the bars.

The various cages are free to turn about

the central tube F, which is the main support of the strainer structure, and forms the well.

The tube F has apertures G, allowing movement of the lugs H, H, carried by the longitudinal bars H′ of each cage, as the latter are turned in either direction by means of said projections. The wire rings A are secured to stops J, J, which are in short lengths and are secured to the central tubes F between the end plates D of each cage, so that the wire rings are held stationary in relation to the tube F.

The discs E are virtually like the teeth of a revolving comb, progressing with a circular motion about the axis of tube F, and also turning on their own axes.

The travel of the cages and comb teeth is limited to ⅛ of a revolution in the example illustrated in Figs. 1 to 3 inclusive.

It will be seen that the causes of diminishing supply are dealt with in one operation. The comb teeth, or discs E on being moved backwards and forwards clean the apertures or slits in the strainer and also cut through the thin crust which forms on the outside, while the bars C and H of the cage remove the muddy matter which clogs the annular space between the strainer and the tube, all in a simple and mechanical manner.

In Figures 3 and 4 a coupling for two strainer sections is illustrated. To the end of each length of the central tube a jointing ring K is bolted or otherwise secured. These jointing rings may be provided with a groove L. A channel shaped jointing strip M is then pressed into two adjacent grooves L, L, holding the sections of the tube firmly together. A fish-plate N may be riveted, or otherwise fixed, to cover the joint in the strip N.

It will be noticed that the rotatable cages occupy a small radial depth, enabling a central tube of large diameter to be used for the flow of the water, and what is of importance, this tube opposes only a low frictional resistance to flow, not much greater than that possessed by a smooth steel pipe.

The strainer is in no way inferior to strainers not equipped with means for cleaning the slits, the supply of water is not less than with the latter, and the construction is strong and robust, not easily damaged during installation.

It is expected that the cleaners will require to be operated once a year to keep the slits free from deposits, two days being sufficient for this process.

In Figures 5 and 6, fragmental sections on an enlarged scale show one form which the combined strainer and cleaner may take. In these figures the straining envelope is formed of a plurality of wire rings A supported on stops J secured to the central tube F.

The cleaner comprises a cage or frame having top and bottom ring members D and a series of vertical rods C on which the rotatable or cleaning discs E are mounted, one disc being placed on each vertical rod C between each two adjacent wire rings A. The latter are separated by spacers B (Fig. 6) secured for example, to the vertical outstanding legs of the stops J. The strainer and the cleaner may be built up of a series of units of convenient lengths as indicated in Fig. 2. Heavy vertical longitudinal members H′, H′ connect the end rings D, D of each cleaner section and have projections H, H which enable the cleaner to be moved backwards and forwards circumferentially in the slots of the strainer.

Figure 7 corresponds to Figure 5, except that the strainer in this embodiment consists of a helix A′ of wire, instead of being made up of separate rings.

It is, of course, understood that I do not confine myself to the embodiments described with reference to the drawings, but claim any reasonable modifications. For instance, the straining envelope may be spirally wound in sections, and if desired, a strainer having inclined percolation slits may be used. In the embodiment shown in Figs. 1–3, the cleaning operation is performed by rotating the cage through an angle of about 45° but if the slots are vertical or inclined, an up and down motion may be given, or a combined rotational and longitudinal motion.

I claim:

1. The combination with a tube well, adapted to be embedded in the soil, of a straining device surrounding, and supported by, a central tube, and cleaning means permanently situated between the said straining device and said tube and having parts extending into the openings of the said straining device, and means for moving the said cleaning means and straining device relatively to each other.

2. The combination with a tube well, of a straining device surrounding a tube of relatively large diameter forming the inner frame of the straining device, cleaning means extending permanently into the percolation openings of the said straining device, and means for moving the said cleaning means relative to the said straining device.

3. The combination with a tube well, of a straining device surrounding, and supported by a tube, cleaning means extending permanently into the percolation openings in the said straining device, and means for moving the said cleaning means relative to the said straining device.

4. The combination with a tube well, of a straining device surrounding, and supported by a tube, movable cleaning means extending permanently into the percolation

openings in the said straining device, and means for moving the said cleaning means relative to the said straining device, the said tube having apertures wherethrough liquid passing through the said straining device may pass from the annular space between said device and tube into the latter.

5. The combination with a tube well, of a straining device surrounding a tube, movable cleaning means extending permanently into the percolation openings in the said straining device, lugs (H) provided on said cleaning means and engageable through apertures in the said tube, whereby the said cleaning means may be moved relative to the said straining device.

6. The combination as specified in claim 1, in which the cleaning means comprises a cage composed of rings and longitudinal members, and carrying cleaning parts extending through the percolation openings in the said straining device.

7. The combination with a tube well, of a straining device surrounding, and supported by, an inner tube, cleaning means extending permanently into the percolation openings in the said straining device, ears on said cleaning means engageable through apertures in the said tube for moving the said cleaning means relative to the said straining device, the said cleaning means comprising a cage composed of individual members having projections adapted to pass through the percolation openings in the said straining device.

8. The combination as specified in claim 1, in which the straining device is formed of a series of sections positioned on tube sections, and means connecting the adjacent tube sections.

9. The combination as specified in claim 1, in which the straining device is formed of a series of sections positioned on said tube, and means for separately supporting each section.

10. The combination as specified in claim 1, in which the said straining device consists of a helix of wire, and spacers extending between the various convolutions.

11. The combination with a tube well, of a straining device and cleaning means therefor, the said straining device and cleaning means being made in sections as units of convenient length, each unit being separately mounted on or about a centrally placed tube, the said units being adapted to be cleaned one at a time.

12. The combination with a tube of relatively large diameter, and having apertures; a frame mounted on said tube, a straining device formed of sections supported on the said frame, cleaning cages formed of rings and longitudinal bars, cleaning cutter discs rotatably mounted on the said longitudinal bars, and extending into the percolation slits between the said rings, ears attached to the said cleaning means and projecting through said apertures into the said tube without interfering with the passage of liquid therethrough, the said ears being adapted to be engaged by a tool for moving the said cleaning means relative to the said straining device in either direction.

In testimony whereof I hereto affix my signature, this eleventh day of April, 1924.

STEPHEN LEGGETT.