July 9, 1935. E. B. SINGLETON 2,007,258

DRAINING DEVICE

Original Filed July 25, 1934

Fig. 1.

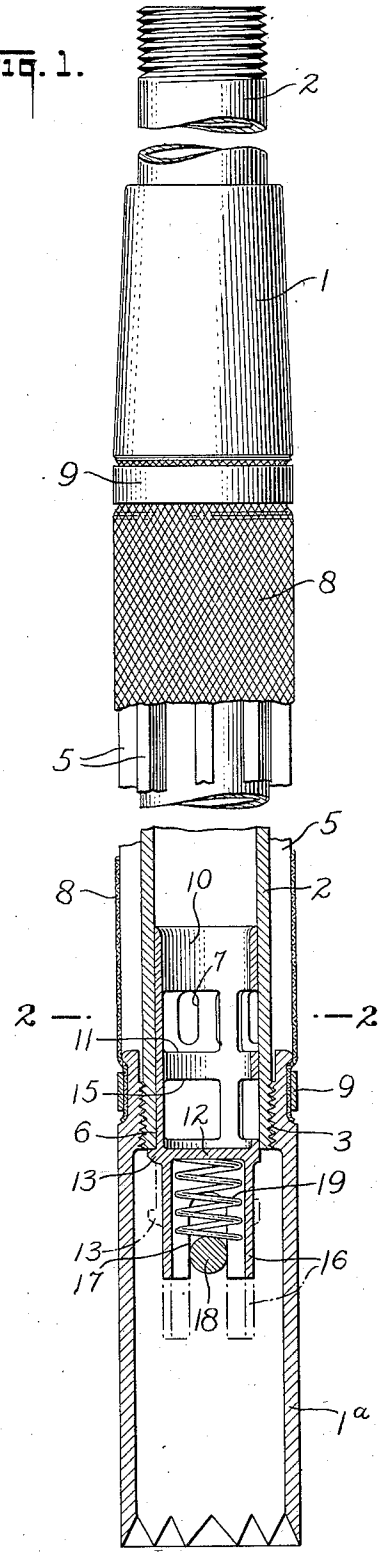


Fig. 2.

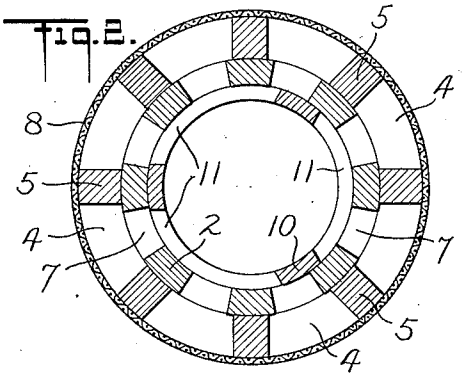


Fig. 3.

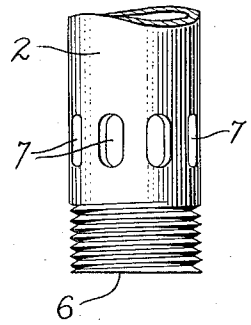
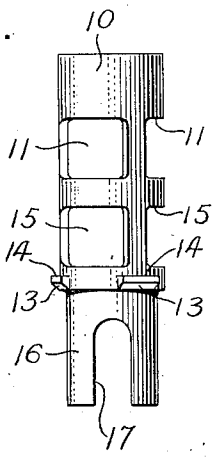


Fig. 4.



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DRAINING DEVICE

Edwin B. Singleton, Rockaway, N. J.

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Renewed December 4, 1934

14 Claims. (Cl. 166—5)

This invention relates to a well point for drainage service or the like. Among the more important objects thereof is to provide a well point of simple and durable construction, which operates safely and efficiently under widely varying conditions, and in which the shift from jetting to draining is automatically controlled by a simple and effective valve mechanism. Other objects and advantages in operation will be in part obvious and in part pointed out hereinafter.

This invention, accordingly, consists in the features of construction, combinations and arrangements of parts as illustratively described herein and as defined in the appended claims.

In the accompanying drawing in which is shown one of the various possible embodiments of the mechanical features of my invention,

Figure 1 is a fragmentary elevation, certain parts thereof being shown in section,

Figure 2, a section along the line 2—2 in Figure 1,

Figure 3, a fragmentary elevation of the lower end of the water supply and drain pipe, and

Figure 4, an elevation of a valve member used in my well point.

As conducive to a clearer exposition of this invention and its purposes, it is noted that, under favorable geological conditions, the sinking of wells for oil or water or the predraining of wet ground or excavations is facilitated by driving or jetting with suitable well points mounted on the ends of water supplying and draining pipes into the ground to be drained. This is effectively done by pumping water at suitable pressure through the pipes to the well point and jetting or expelling it with concentrated force at the nozzle or tip of the point. The jetted water in turn dislodges and carries to the surface sand, silt or like materials, encountered by the point in its passage into the earth to the desired depth. After the point has been so advanced, jetting is discontinued and drainage effected by suction applied through the said well point and pipe. The water to be drained or removed is drawn into the pipe through a filtering screen or the like surrounding the intake portion of the well point; and the parts are preferably so arranged and controlled that sand and gravel in adjacent areas are not drawn up with the drained water.

To provide and maintain efficient pressure and volume of water at the nozzle for jetting, it is necessary to prevent the diversion or escape of said water or pressure through the intake or draining passages and screen elements of the well point. Likewise, to maintain efficient and safe draining; i. e., removing water without dislodging adjacent masses of earth, the valve mechanism in the well point must operate effectively to prevent draining through the unscreened jetting orifice or nozzle.

Well points of known construction have been found to operate unreliably in many instances because of inadequate valve control. Certain types of well points, for example, include an inlet valve intended to open only during draining and an outlet or jet valve intended to open only for jetting. In cases where the outlet valve is of greater cross-sectional area than that of the pipe, and where the moving member of said valve is not properly controlled it frequently fails to seat due to obstruction by sand, pebbles, or the like. Also, when subjected to water under high pressure, valves having separate moving members often chatter or oscillate violently, thus not only disrupting the jetting stream and reducing the effective jetting volume of water, but also often damaging or destroying portions of the valve itself, which if undiscovered permits sand, gravel, etc. to pass directly into the pipe instead of through the screen. Also in the absence of suitable control means related to the jet valve, its moving member tends to move out of closed position when suction is suspended and thereafter frequently fails to close when suction is resumed. A further object of this invention, therefore, is to provide a well point having features of construction whereby the above and other undesirable conditions of operation are remedied or avoided.

Referring now to the drawing, a well point according to my invention comprises a casing 1 secured to a supply and drain pipe 2 in any suitable manner, as by interengaging threads, indicated at 3. The casing 1 is open at its bottom end to provide an orifice or nozzle 1a through which to discharge a jetting stream. Said casing also has drainage openings of relatively extended area, indicated at 4 and lying between longitudinally extending ribs 5.

The discharge or jetting nozzle opening of the casing 1 communicates with the lower end opening 6 of pipe 2; and the lateral or drainage openings 4 communicate with lateral openings 7 in the pipe 2. A screen or other suitable filtering element 8 covers the openings 4, being held in position on the casing 1 by any suitable means, here shown as annular bands 9.

In operation, it is contemplated that water under pressure will be forced through the opening 6 of pipe 2 and thence through the open end of

nozzle 1a in a jetting stream. This dislodges sand, gravel, silt, or the like from the lower end of said casing and permits the well point to rapidly penetrate the ground which it is desired to drain.

In order to provide effective means for operating the above-described apparatus both as a jetting device and as a draining device, a valve sleeve as 10 is mounted in operative relation to said openings 6 and 7 of the pipe 2. In the form shown, it is a cylindrical casting having lateral openings 11 in that portion of its wall which normally engages interior portions of the lower end of pipe 2. A partition 12, Figure 1, extends across and closes the interior of said cylindrical casting. Annularly arranged lugs 13 provide shoulders 14 which limit the extent of upward movement of the sleeve 10, said shoulders bearing against the lower end of pipe 2 when the parts are positioned for draining operation, but taking the dotted line position during jetting operation. The sleeve 10 also has other lateral openings 15 below the openings 11. A lower extension 16 of the sleeve 10 forms a hollow cylinder having opposed longitudinally extending slots 17 positioned to engage a guide and stop pin 18 extending transversely across the interior of the nozzle 1a. A spring 19 positioned in the hollow extension of sleeve 10 has one end bearing against said guide pin 18 and the other end bearing upwardly against the underside of partition 12, thus tending to hold the sleeve 10 normally in position to close the jetting or lower opening 6 of pipe 2 and to open the draining openings 7 of said pipe, the parts then being in the relative positions shown in full lines in Figure 1.

During jetting, the pressure of water supplied through pipe 2 forces sleeve 10 to its lowermost position, indicated by dotted lines, Figure 1. This brings the openings 15 of said sleeve 10 beyond the end of pipe 2, so that the supply of water is released into the jetting nozzle 1a and discharged therefrom in a concentrated stream. It will be understood that the water pressure employed will be enough to displace the sleeve downwardly against the counter pressure of spring 19.

When the well point has penetrated to a sufficient depth as a result of the jetting operation, the water supply is shut off and sleeve 10 immediately and automatically moves back into normal or draining position by operation of spring 19, thus closing the jetting orifices before any suction is applied. Thereafter, when the direction of the pump is reversed or suction is otherwise effected in pipe 2, drainage will take place through the openings and in the manner above described.

It will be apparent from the aforegoing description that during jetting, the openings 7 of pipe 2 are completely closed, thereby preventing any leakage of water or pressure through the drainage openings. The positioning of the discharge or jetting openings is such that a concentrated jetting stream is provided. It will also be apparent that the provision of a valve for automatically closing the jetting orifice before suction begins tends to prevent the admission of sand, pebbles, or other obstructing materials which might otherwise interfere with the closing or seating of the valve during draining. Obviously, this arrangement for reliably closing the jetting and draining openings of pipe 2 produces most effective jetting in relation to the available water pressure and most effective and safe draining with the minimum likelihood of incomplete seating. Furthermore, with a single movable valve member as sleeve 10 controlling both the jetting and the draining ports of pipe 2, my improved well point construction affords material economies in manufacture, as well as real advantages in operation.

What I claim is:—

1. Draining apparatus comprising a supply and drain pipe having an outlet port and an inlet port, a jetting nozzle connected to said pipe to receive water under pressure through said outlet port, a screen positioned to prevent the passage of sand or the like into said inlet port, and a valve sleeve slidably arranged in relation to said pipe to close one of said ports when in one position and the other of said ports when in another position.

2. Apparatus according to claim 1 and wherein means are provided tending normally to maintain said valve sleeve in position to close said outlet port while the inlet port is open.

3. Apparatus according to claim 1 and wherein means are provided to limit the extent of sliding movement of said valve sleeve member.

4. Apparatus according to claim 1 and wherein the inlet port is a lateral opening in the wall of said pipe and the outlet port is an end opening in said pipe, and a portion of said valve sleeve is mounted to slide in said pipe to open and close said ports.

5. Apparatus according to claim 1 and wherein said valve sleeve is arranged to open said outlet port and to close said inlet port when water under pressure is supplied to said pipe.

6. Apparatus according to claim 1 and wherein said sleeve is a hollow body having upper and lower openings respectively, said upper opening being positioned to register with said inlet port during draining and said lower opening being positioned to register with said outlet port during jetting.

7. Draining apparatus comprising a supply and drain pipe having an open end to provide an outlet port and a lateral opening to provide an inlet port, a casing secured to said pipe and having lateral inlet openings communicating with said inlet port of the pipe and a hollow nozzle portion communicating with said outlet port, and a valve sleeve having a portion slidably engaging said pipe in position to open and close said ports, and yielding means for normally retaining said sleeve in position to close said outlet port.

8. Draining apparatus comprising a supply and drain pipe, an outlet port and an inlet port communicating therewith, a jetting nozzle connected to said outlet port, strainer means positioned to prevent the passage of sand or the like into said inlet port, and a movable valve member arranged to close one of said ports when in one position and the other of said ports when in another position.

9. Apparatus according to claim 8 and wherein means are provided tending normally to maintain said valve member in position to close said outlet port while the inlet port is open.

10. Apparatus according to claim 8 and wherein means are provided to limit the extent of movement of said valve member.

11. Apparatus according to claim 8 and wherein the inlet port includes a laterally exposed opening and the outlet port is an end opening, and said valve member is slidably mounted to open and close said ports.

12. Apparatus according to claim 8 and wherein said valve member is arranged to open

said outlet port and to close said inlet port when water under pressure is supplied to said pipe.

13. Apparatus according to claim 8 and wherein said valve member is a hollow body having upper and lower openings respectively, said upper opening being positioned to cooperate with said inlet port during draining and said lower opening being positioned to cooperate with said outlet port during jetting.

14. Draining apparatus comprising a supply and drain conduit, a jetting and draining head including a jetting nozzle, an outlet port from the conduit to the nozzle, and separate inlet ports for draining, valve means operatively arranged to open said outlet port when in position to close the others, a strainer mounted on said head, and spacing means interposed between the strainer and the inlet ports and arranged to provide strainer protected passageways communicating with said inlet ports and presenting an inlet area greater than the area of the inlet ports.

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