

Oct. 17, 1939.

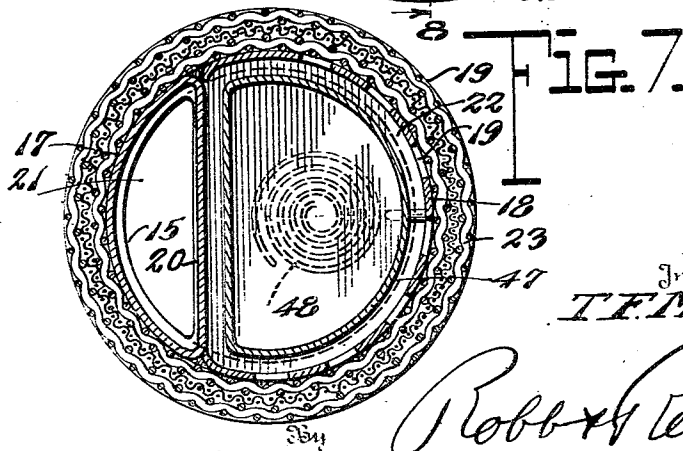
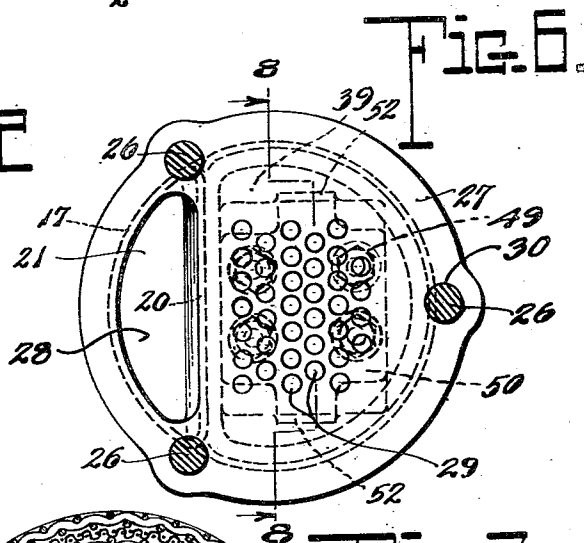
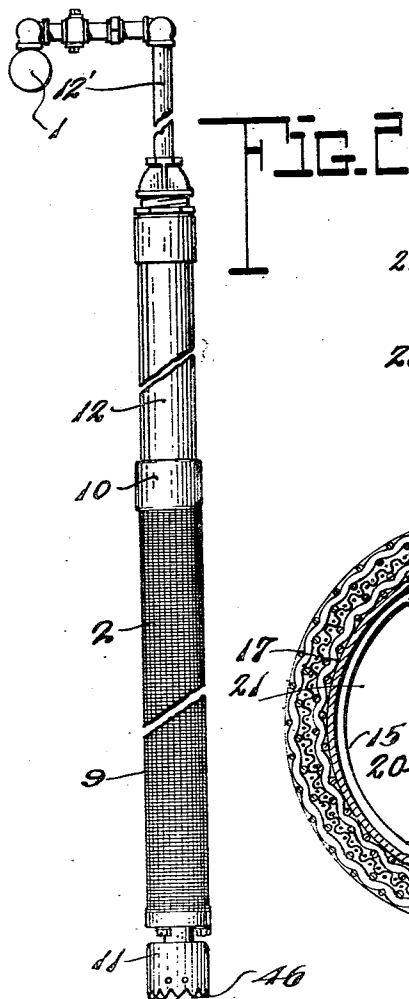
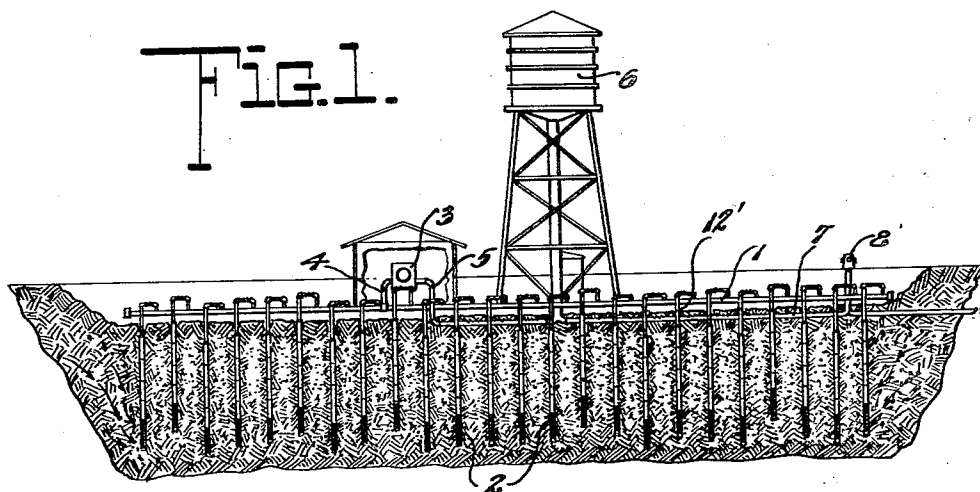
T. F. MOORE

2,176,540

WELL POINT AND SYSTEM THEREFOR

Filed Oct. 11, 1938

3 Sheets-Sheet 1



Inventor
T. F. Moore

Robb & Robb
Attorneys

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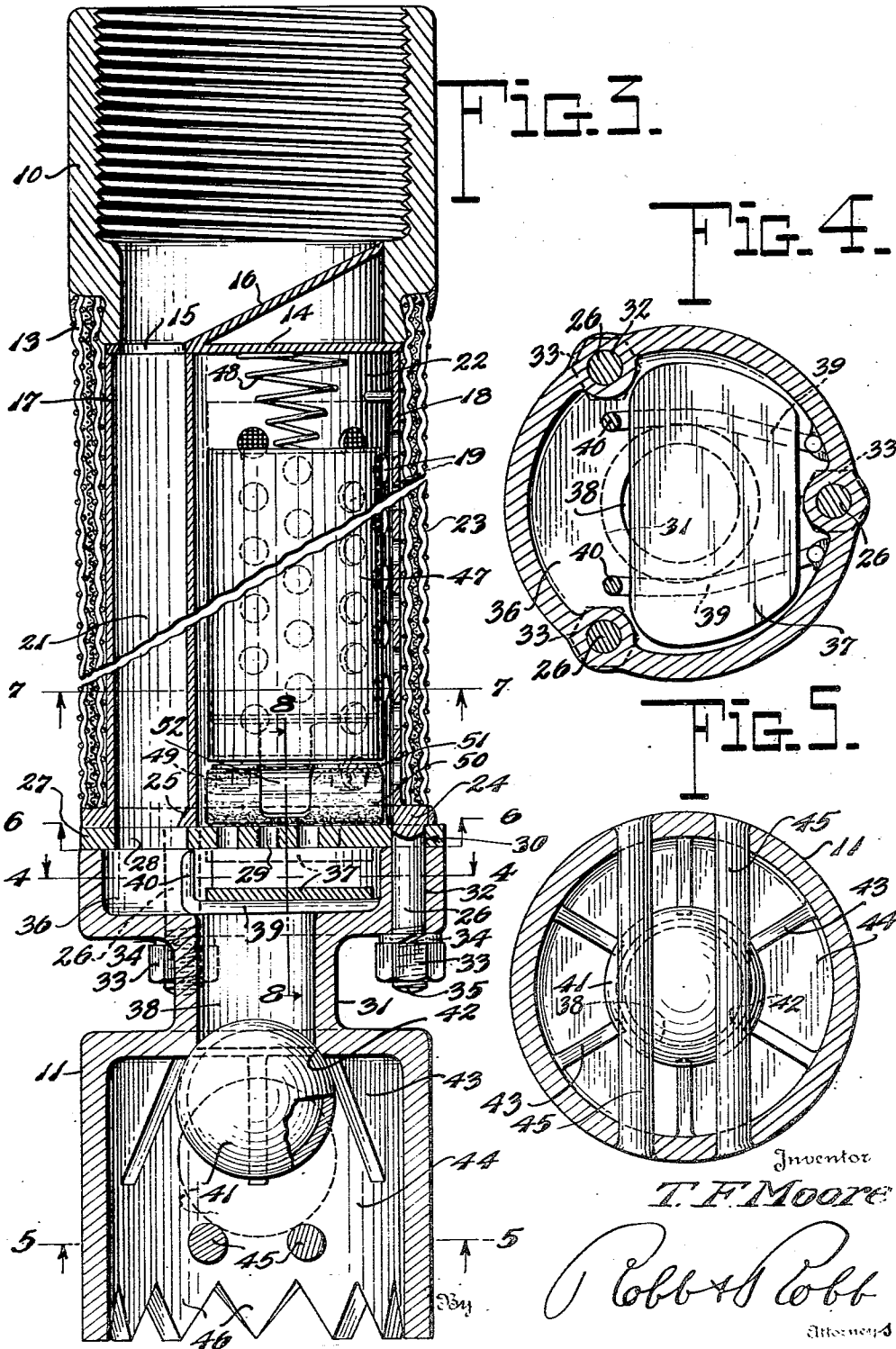
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WELL POINT AND SYSTEM THEREFOR

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3 Sheets-Sheet 2



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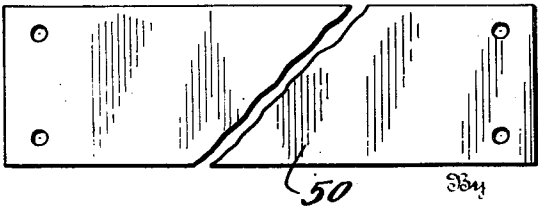
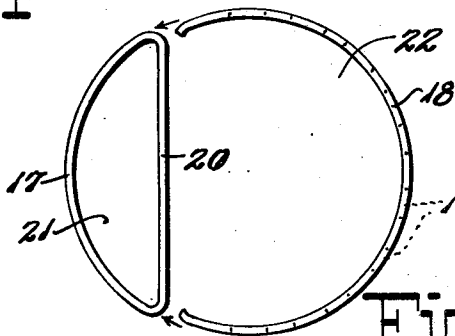
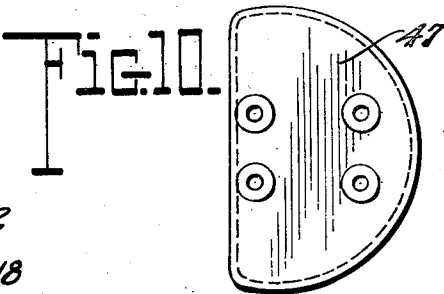
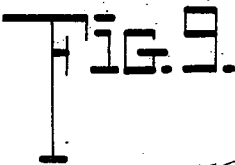
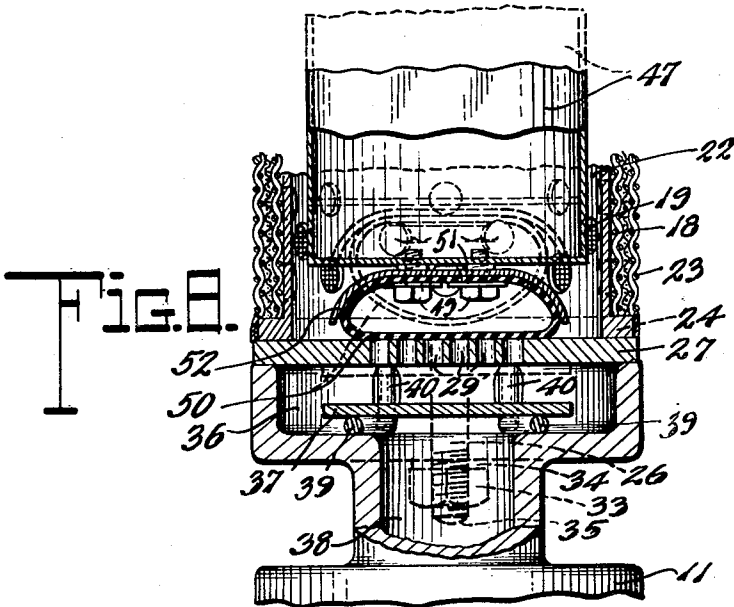
T. F. MOORE

2,176,540

WELL POINT AND SYSTEM THEREFOR

Filed Oct. 11, 1938

3 Sheets-Sheet 3



Inventor
T. F. Moore
Robb & Cobb
Attorneys

UNITED STATES PATENT OFFICE

2,176,540

WELL POINT AND SYSTEM THEREFOR

Thomas F. Moore, Morris Plains, N. J.

Application October 11, 1938, Serial No. 234,433

18 Claims. (Cl. 166—1)

This invention relates to well point systems, and more especially, to a well point having provision for freely passing water or other liquids contained in the soil, while automatically excluding and prohibiting the entrance of air and other aeriform fluids from entering the well point.

In my copending application Serial No. 183,551, filed January 5, 1938, I have disclosed a well point embodying the automatic feature above referred to. The present invention has been designed as an improvement over the construction specifically shown and described in that application.

In the usual well point systems composed of conventional well points, it has been the customary procedure in the past to jet all of the well points to substantially an equal distance below the header or intake line leading to the pump so as to cause the water level in the soil to be brought down evenly within the section of the system which is controlled by a single pump. The uniformity of depth of the well points was essential to a successful operation of the system because if in lowering the water level the level should drop substantially to the lower end of the screened intake of one or more of the well points, air would be drawn into these points and sucked into the lines connecting the various well points to the pump, thereby seriously interfering with the pumping operation, and often times completely rendering the system inoperative. Through provision of an automatic control for each well point, such control freely admitting water to the well points but excluding air, it is now possible and perfectly practical to sink the well points different distances below the header, or in fact to any depth within the range of the vacuum influence of the pump. This is particularly advantageous where the soil characteristics vary at different places within the area which is served by the well point system, and where the water level in the soil is at different elevations below ground level.

The primary object of the present invention is to provide an automatic well point of the type above referred to, which is somewhat simpler in construction and more economical in manufacturing cost than the construction disclosed in my aforementioned copending application.

A still further object of the invention is to provide an improved well point assembly which is sealed to a better degree against the entrance of air into the well point, having particular regard for the fundamental aim of the automatic control to positively exclude air.

Another object of the invention is to provide a

well point construction which can be more readily disassembled and reassembled for purposes of cleaning or repair than has been the case heretofore.

Other and further objects and advantages of the invention will be hereinafter described and the novel features thereof defined by the appended claims.

In the drawings:

Figure 1 is a diagrammatic view of a typical well point system embodying a number of well points, each of which is constructed in accordance with the present invention, and particularly illustrating the manner in which the invention admits of the practical arrangement of the well points at different distances below the header;

Figure 2 is a view in side elevation of my improved well point, showing the connecting pipe and fittings for connecting the upper end of the well point to a header line;

Figure 3 is an enlarged detailed vertical sectional view, taken through the well point;

Figure 4 is a horizontal sectional view, taken approximately on the line 4—4 of Figure 3;

Figure 5 is a horizontal sectional view, taken through the lower head of the well point on approximately the line 5—5 of Figure 3;

Figure 6 is a horizontal sectional view, taken approximately on the line 6—6 of Figure 3;

Figure 7 is a horizontal sectional view, taken approximately on the line 7—7 of Figure 3;

Figure 8 is a fragmentary vertical sectional view, taken approximately on the line 8—8 of Figures 3 and 6;

Figure 9 is a composite top plan view of the flattened conduit and arcuate perforate plate which together form the tubular body of the well point and provide an axially open jetting-and-suction passage through one side of the body and a valve chamber at the other side, when the edges of the arcuate plate are secured to the corners of the flattened conduit as by welding;

Figure 10 is a bottom plan view of the float member;

Figure 11 is a bottom plan view of the resilient pressure member which coacts with the float valve to insure effective cooperation of the float valve with its seat at the bottom of the float valve; and

Figure 12 is a plan view of a blank of flexible material of which the float valve is preferably composed.

Referring to Figure 1, 1 designates a header to which is connected a plurality of well points 2 which have been sunk into the soil to the desired depth or depths so as to enable the liquid (gen-

erally water) contained in the soil to be withdrawn therefrom. A suction pump 3 of any suitable type is connected to the header 1 by means of an intake connection 4, while the discharge side of the pump 3 is connected to a discharge line 5 which may lead to a storage tank 6 or elsewhere, as desired. In the case of the typical well point system illustrated in Figure 1, the water is stored in the storage tank 6 for such use as occasion requires, the tank 6 being connected with a supply line 7 through which the water may be directed to fire hydrants 8 and/or other points where the water is to be availed of. Each of the well points 2 is so constructed, as will hereinafter more fully appear, as to permit the free entrance of water into the same so that it can be withdrawn from the soil by the pump 3, but positively prohibits the entrance of air into the system. Accordingly, the well points may be sunk to different depths, as shown, and need not be all sunk the same distance as heretofore required in such a system to insure uniform lowering of the water level in the soil throughout the whole area served by any given pump of the well point system. The well points of such a system are preferably spaced from three to nine feet apart, depending upon the amount of water contained in the soil and the characteristics of the soil. The principal limitation which is to be taken into consideration is that the well points must not be sunk to a depth greater than the range of vacuum or suction influence of the pump. It is to be understood that my new well point is not limited to use in the particular system illustrated in Figure 1 of the drawings since it is equally adaptable to any of the various uses to which the ordinary well point may be put.

Referring now to the construction of the well point itself, and referring first to Figure 2 of the drawings, it will be seen that the well point is tubular in form and is substantially uniform in size from end to end, so that there are no projections which will interfere with the sinking of the well point into the soil. The central portion of the well point includes a foraminous filter screen 9 of substantial area, which lies between and is coaxial with axially spaced upper and lower heads 10 and 11, respectively. Extending upwardly from the upper head 10 is a riser 12, which is provided at its upper extremity with suitable connections and fittings 12' for connecting the well point to a header such as the header 1 in Figure 1 or to a flexible conduit such as is ordinarily used in connecting the well point to a source of jetting fluid for the purposes of jetting the well point into the soil. While the well point is preferably so constructed as to enable the same to be jetted into the soil, it may be sunk otherwise if preferred.

The upper head 10 is preferably threaded internally to receive the threaded lower end of the riser 12. Around the bottom of the head 10 there is provided an annular recess 13, for a purpose which will hereinafter more fully appear. A floor 14 extends across the lower end of the head 10, said floor being provided with an opening 15 of generally D-shape to permit the free passage of water through the head 10. If desired, the floor 14 may be provided with an inclined baffle 16 disposed within the head 10 to aid in guiding the water towards the opening 15 during its downward movement through the head without creating any material turbulence within the head. As shown in Figure 3, the floor 14 and baffle 16 are constructed separately from the

head 10 and the same are secured to the head in any suitable manner, as by welding. It is to be understood, however, that if preferred, the head, floor and baffle may be formed integrally by casting.

The body portion of the well point below the head 10 is of novel construction, and reference will now be particularly had to Figures 3, 7 and 9. As shown, the body is primarily composed of two separate members, one of which consists of a flattened pipe 17, defining within the same a passage generally D-shape in cross-section, corresponding to the shape of the opening 15 with which the upper end of the pipe 17 is adapted to register. 18 designates a transversely arcuate plate having coarse perforations 19 provided therein. The longitudinal edges of the arcuate plate 18 are connected to the flattened pipe 17 at the corners of the latter in any suitable manner, such as by tack-welding the edges to the pipe at intervals. When so connected, the arcuate plate 18 substantially constitutes a continuation of the arcuate side of the flattened pipe 17 so that the two together form a body which is substantially circular in cross-section. The flattened side 20 of the pipe 17 thus constitutes a partition between the axially open passage 21 within the pipe 17 and the space 22 defined within the wall 18 formed by the plate at the opposite side of the partition, as will be best understood from reference to Figure 9. When the pipe 17 and the plate 18 have been assembled as just described, they are suitably connected to the head 10, as by welding, with the opening 15 in the floor 14 registered with the passage 21, and the imperforate portion of the floor 14 disposed across the upper end of the space 22. The passage 21 within the pipe 17 constitutes and will be hereinafter referred to as a jetting-and-suction passage—this by reason of the fact that the jetting fluid passes downwardly through this passage during the jetting operation, and the water withdrawn from the soil passes upwardly through the same passage during the suction operation. The space 22 within the arcuate wall 18 constitutes a float chamber and also a filtrate chamber, the latter resulting from the fact that the water from the soil passes into this chamber through the perforations 19 after first passing through a filter screen 23 which surrounds the body of the well point intermediate the upper and lower heads 10 and 11. The filter screen 23 is preferably constructed in accordance with the disclosure in my Patent No. 2,090,545, granted August 17, 1937, which is to say that the screen is of laminated construction having inner and outer coarsely foraminate layers and an intermediate relatively finely foraminate layer. The upper end of the tubular screen lies in the annular recess 13 around the lower end of the upper head 10, where it is secured to the head, as by welding, thus preserving the continuity and uniformity of size of the well point from end to end.

The lower ends of the pipe 17 and arcuate wall 18 which form the body of the well point have preferably secured thereto a ring 24 forming a radially outwardly projecting flange, against which the lower extremity of the tubular filter screen 23 abuts, and to which this end may be secured by welding. The lower extremity of the partition 20 is preferably thickened or built up to provide a bead, as at 25, and the lower end of this bead, together with the lower end of the annular flange 24 are faced off to provide perfectly smooth, coplanar surfaces of appreciable

area. Secured to the ring 24 and extending downwardly therefrom is a plurality of studs 26 (preferably three) which serve to detachably secure the lower head 11 to the body of the well point. Intermediate the lower head 11 and the ring 24, there is disposed a plate 27, which is preferably composed of a relatively soft metal, such as lead or the like, to constitute a more or less flexible gasket between the ring 24 and the head 11 and thereby insure the provision of a substantially air-sealed connection between these parts. The plate 27 is provided with an aperture 28 registering with the jetting-and-suction passage 21, and also with a group of perforations 29 registering with the lower end of the float chamber 22. The plate 27 is suitably apertured, as at 30, near its outer edge to receive the studs 26 therethrough.

The lower head 11 is reduced in diameter near its upper end, as at 31, so as to provide an annular groove or channel about the same. Openings 32 in the head 11, and corresponding with the openings 30 in the plate 27, are provided to receive the studs 26. When the head 11 is assembled on the studs 26 and the nuts 33, and lock washers 34 are applied onto the threaded extremities 35 of the studs 26, the nuts and washers will be disposed within the annular groove or channel of the head. Assembly of the lower head 11 and removal thereof can thus be accomplished by a very simple operation, as will be obvious from Figure 3 of the drawings. When the assembly is complete, the nuts 33, being located within the annular groove or channel in the lower head 11, cannot interfere with the sinking of the well point into the soil, and when the nuts are tightened up, the plate 27 will be tightly clamped between the upper end of the lower head 11 and the lower end of the well point body and maintain the parts sealed against the entrance of air at this connection.

In the upper end of the lower head 11 there is provided a chamber 36, normally establishing communication between the lower end of the jetting-and-suction passage 21 and the float valve chamber 22 through the opening 28 and perforations 29, respectively registering with this passage and chamber. Within the chamber 36 is located a rigid disc valve 37 (preferably composed of brass) which is of a size sufficient to cover the entire group of perforations 29 in the plate 27 when seated against the lower side of the plate over the perforations. Fixed within the valve chamber 36 and lying horizontally on the bottom of the chamber at opposite sides of the upper end of the central passage 38 through the reduced portion of the lower head 11 is a pair of small spacer rods or bars 39, upon which the disc valve 37 is normally adapted to rest, as shown in full lines in Figures 3 and 4. Rods or bars 39 are bent vertically upwardly at their ends, as at 40, so as to aid in guiding the disc valve 37 towards and away from the perforations 29, and prevent the disc valve from becoming laterally displaced in the valve chamber 36, as will hereinafter more fully appear.

Mounted within the lower end of the lower head 11 is a floating ball-check valve 41 which is normally in floating engagement with a beveled seat 42 at the lower end of the passage 38. Guide ribs 43 within the lower chamber 44 in the head 11 serve to guide the valve 41 into engagement with the seat 42. A pair of rivets 45, extending transversely through the head 11 at opposite sides of the axis thereof serves to normally retain the

ball-check valve in the chamber 44 and to limit the axial movement of the valve 41 away from its seat 42. These rivets also prevent stones and other relatively large material from crowding up inside of the chamber 44 where they might interfere with the seating of the valve 41 or ultimately become sucked up into the well point body. The lower extremity of the head 11 is preferably serrated to provide teeth 46 to aid in displacing the soil below the well point as the well point is sunk into the soil.

Reverting to the float valve chamber 22, there is provided in this chamber a float body 47 of a size somewhat smaller than the chamber so as to permit the float body to freely move axially therein. The float body may be of any suitable construction, and fixed to its upper end is a relatively light compression spring 48 arranged so that its free end is adapted to abut against the floor 14 which lies across the upper end of the chamber 22. Fixed to the lower end of the float body 47 by one or more fastenings 49 is a flexible valve 50. This valve is preferably composed of sheet rubber, leather, or the like. A generally rectangular blank of such suitable material is cut, as shown in Figure 12, and the ends of the blank are folded upwardly and inwardly towards each other and are then attached by the fastening or fastenings 49, hereinbefore referred to, to the bottom of the float body 47, leaving the portion of the blank intermediate the ends loosely suspended below the float body and freely movable towards and away from the same. When the level of the water which collects in the chamber 22 is high enough to raise the float body 47 in this chamber to the position shown in broken lines in Figures 3 and 8, the loosely suspended portion of the flexible valve 50 will assume a position spaced above the perforations 29 in the plate 27 below the chamber 22, as shown best in dotted lines in Figure 8. As the water level falls in the chamber 22, the float body 47 will automatically descend until the flexible valve 50 rests upon the plate 27, thus flattening out the loosely suspended portion of the flexible valve 50 so as to cause the same to cover and close off the entire group of perforations 29, as best shown in full lines in Figure 8. A pressure plate 51, having downwardly curved arms or fingers 52, 52 extending therefrom at opposite sides and formed of resilient material such as spring metal, is interposed between the bottom of the float body 47 and the flexible valve 50 to aid in pressing the valve 50 evenly against the plate 27, thereby assuring substantially even contact of the valve over the perforations 29 so that air cannot pass by the valve through the perforations 29. The pressure member 51 further contributes to the preservation of the shape of the valve body 50, which, in its suspended condition, is transversely arcuate. As the float body 47 rises in the chamber 22, the flexible valve 50 is yieldingly and gradually lifted off the plate 27, commencing at the opposite ends of the valve, resulting in a substantial "peeling" of the valve from its seat and thereby progressively uncovering the perforations 29 from the opposite ends of the group of perforations towards the center of the group. Because of this peeling action, so-called, the valve 50 will operate freely responsive to the buoyancy of the float body 47, and without requiring too large a float body to produce the required buoyancy. The action of the float body 47 and flexible valve 50 is substantially the same as disclosed in my co-pending application hereinbefore referred to.

Operation

Having described the structural details of my improved well point, the operation thereof will be briefly summarized as follows:

The well point, in its assembled condition as shown in Figure 2, is preferably jetted into the soil by connecting the connections and fittings 12' to a suitable source of jetting water through means of a flexible hose leading from the supply. Thereupon, the jetting water is forced downwardly through the well point while the well point is held in a substantially vertical position over the spot where the well point is to be sunk, so that the force of the jetting water discharged downwardly through the bottom of the lower head 11 will act upon the soil below the well point to erode and displace the soil and allow the well point to progressively sink downwardly. The jetting operation may be aided by rotating or oscillating the well point so that the teeth 46 on the lower extremity of the lower head 11 will loosen the soil in the well known manner.

As the jetting water passes downwardly through the riser 12, it enters the upper head 10 and is directed through the opening 15 in the floor 14 into the jetting-and-suction passage 21 through which the water passes downwardly. From this passage 21, the water passes through the opening 28 in the plate 27 into the valve chamber 36 in the upper end of the lower head 11, where it acts upon the lower side of the disc valve 37 to automatically elevate this valve to the position shown in dotted lines in Figures 3 and 8, thereby closing off the perforations 29 in the plate 27 and preventing the jetting water from entering the float chamber 22 from which it would otherwise escape outwardly through the perforations 19 and filter screen 23. Since the jetting water cannot enter the chamber 22, as a result of the closing of the perforations 29 by the valve 37, it must pass downwardly through the passage 38 in the lower head 11, forcing the floating ball-check 41 downwardly away from its seat 42 to the dotted line position shown in Figure 3, which allows the jetting water to enter the lower chamber 44, from which it is discharged at the bottom of the head 11. Thus substantially the full pressure of the jetting water is effective at the bottom of the well point for causing erosion and displacement of the soil.

When the well point has been sunk to the desired depth, the connections and fittings 12' are disconnected from the source of jetting water and are then connected to a suitable pump or suction apparatus for causing the water in the soil to be drawn into the well point and upwardly therethrough where it can be conveyed to and discharged at any convenient point. Where it is desired to drain a large area of soil, or to provide a supply of water which is greater than can be conveniently handled by a single well point, a proportionate number of well points may be sunk at different places as illustrated in Figure 1, and the well points connected to one or more header lines 1, which in turn are connected to one or more pumps 3, according to the capacity of the pump.

During the suction or drainage operation, the water from the soil passes inwardly through the filter screen 23 of each well point, and thence through the perforations 19 in the wall 18 of the float chamber 22 which also constitutes a filtrate chamber. If the water level in the soil, and consequently in the float chamber, is high enough,

the float body 47 will rise in the chamber, lifting the valve 50 off the perforations 29 in plate 27, thereby allowing the water to be sucked downwardly from the chamber 22 through the perforations 29 into the upper chamber 36 in the lower head 11. During the suction operation, the floating ball-check 41 will assume its full line position shown in Figure 3 against the seat 42, thereby closing off the lower end of the well point and preventing mud, sand, stones and other foreign matter from being sucked up into the well point. The disc valve 37 also automatically assumes its full line position in Figure 3 during the suction operation, resting upon the rods or bars 39 in spaced relation to the perforations 29. From the chamber 36, the water is sucked up through the opening 28 into the jetting-and-suction passage 21 from which it passes upwardly through the opening 15 in the floor 14, into the upper head 10 and riser 12, which conducts the water to the surface of the ground, and from the upper end of which it is conveyed to the desired point of storage, use or discharged as waste.

If the level of the water in the soil should be drawn down substantially to the bottom of the well point, or if for any reason the flow of water into the well point should diminish to such an extent as to tend to cause air to be sucked into the well point during the suction action, the float valve 50 will automatically function to exclude air by closing the perforations 29 and interrupting communication between the float chamber 22 and the jetting-and-suction passage 21. In other words, when the water level in the float chamber 22 falls, the float body 47 descends in the float chamber, bringing the valve 50 into seating engagement on the upper side of the plate 27, thereby closing the perforations 29. The valve 50 is held tightly against its seat by the weight of the float body 47, which is evenly distributed on the valve by the resilient pressure member 51, thereby assuring substantially even contact of the valve over the perforations 29 so that no air can pass by the valve. There is sufficient space between the top of the float body 47 and the plate 14 to enable the float body to rise far enough to lift the valve 50 completely off its seat and uncover the perforations 29. Upon resumption of a condition under which the water in the soil is present in sufficient quantities to justify further withdrawal of the water from the soil, the water will rise in the float chamber 22 and automatically cause the valve 50 to be stretched and peeled off the perforations 29. When this occurs, the float body 47 jumps to the top of the float chamber, and the spring 48 acts as a buffer to prevent the float body from striking the plate 14 so hard as to damage the float body. As soon as the valve has been elevated sufficiently far to uncover the perforations 29, the water in the float chamber 22 is permitted to flow downwardly through the perforations 29 into the chamber 36 from which it is withdrawn upwardly through the opening 28, passage 21 and opening 15 into the head 10, and thence upwardly through the riser 12, finally emerging into the header line 1 of the system. It will be understood from the foregoing that the well point will admit water up to the limit of its capacity, but will automatically exclude air and prevent the same from being drawn into the well point so that air cannot interfere with the operation of the well point system. The size of the jetting and suction passage 21 formed by the flattened pipe 17 is determined according to the

desired capacity of the well point. The perforations 19 are preferably of sufficient size and number to pass many times as much water as the passage 21 is capable of handling at the same velocity. The reason for this relationship is that it is very desirable to have the entrant water pass through the filter screen 23 with a very low velocity in order to minimize any movement of fine material which would tend to clog the screen. A slow entrant velocity of the water through the screen 23, which has a large surface area, results in a very low carrying capacity respecting fine material, and thus tends to keep the screen clear at all times. After the water passes through the screen into the well point, it can be drawn through the well point and to the discharge point with as great velocity as can be created or as desired.

Since the perforated wall 18 has a substantial surface area, for the reasons given above, the cross-sectional area of the chamber 22 may be greater than the cross-sectional area of the passage 21. As shown in the drawings, the area of the chamber 22 is greater than half the cross-sectional area of the tubular body of the well point as a whole.

Through reason of the disposition of the lugs 26 and nuts 33, which serve to removably secure the lower head 11 to the body of the well point, in the manner shown in the drawings and hereinbefore described, the head 11 can be quickly removed by a very simple operation for purposes of giving access to the interior of the well point for cleaning or repairing. Moreover, the recessing of the nuts 33 in the lower head 11 enables the preservation of a uniform dimension of the well point from end to end so that there is a minimum resistance offered to the sinking of the well point into the soil, or withdrawal of the well point from the soil.

It is to be understood that the terms "water" and "air" have been used herein in a general or broad sense. Obviously, the well point is not limited to the handling of water, as it is equally adaptable to use where other liquids may be present. Likewise, instead of air, the automatic control of the well point is equally adapted for excluding gases and other aeriform fluids.

While the specific details have been herein shown and described, the invention is not confined thereto, as changes and alterations may be made without departing from the spirit thereof as defined by the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is—

1. In a well point system, a header, a suction pump connected to said header, a plurality of well points connected to said header and extending into liquid-containing soil with their intakes disposed at different elevations but all within the vacuum influence range of the suction pump, and means within and forming a part of each well point for admitting liquid into the well point, but automatically excluding aeriform fluids therefrom.

2. In a well point system, a header, a suction pump connected to said header, a plurality of well points connected to said header and extending into liquid-containing soil with their intakes disposed at different elevations but all within the vacuum influence range of the suction pump, and means within and forming a part of each well point and independently operable responsive to the liquid level at the respective well points for

admitting liquid into the well point, but automatically excluding aeriform fluids therefrom.

3. In a well point, a body having a jetting-and-suction passage extending axially therethrough at one side thereof, and also having a float chamber at the other side of said body in open communication with the exterior of said body and normally with the lower end of said jetting-and-suction passage, means responsive to the passage of the jetting fluid through the well point for interrupting communication between the float chamber and lower end of the jetting-and-suction conduit whereby to prevent a jetting fluid from entering the float chamber during jetting action, and float valve means disposed in said float chamber and operable responsive to the liquid level therein for controlling communication between the jetting-and-suction passage and the exterior of the well point during suction action.

4. In a well point, an axially open tubular conduit flattened on one side and defining a jetting-and-suction passage of generally D-shape cross-section within the same, an arcuate perforate wall member having its longitudinal edges secured to the conduit at the respective corners of its flattened side and forming a continuation of the arcuate side of the conduit, whereby to provide therewith a body of substantially circular cross-section, the perforate wall member aforesaid defining a float chamber within the same which is in open communication with the exterior of the body through its perforations, and having its lower end normally in open communication with the lower end of the jetting-and-suction passage, means for closing the upper end of the float chamber, means responsive to the passage of a jetting fluid through the well point for interrupting communication between the float chamber and the lower end of the jetting-and-suction passage whereby to prevent the jetting fluid from entering the float chamber during jetting action, and float valve means disposed in said float chamber and operable responsive to the liquid level therein for controlling communication between the jetting-and-suction passage and the exterior of the well point through the float chamber during suction action.

5. In a well point, an axially open tubular conduit flattened on one side and defining a jetting-and-suction passage of generally D-shape cross-section within the same, an arcuate perforate wall member having its longitudinal edges secured to the conduit at the respective corners of its flattened side and forming a continuation of the arcuate side of the conduit, whereby to provide therewith a body of substantially circular cross-section, the perforate wall member aforesaid defining a filtrate chamber within the same of substantially greater cross-sectional area than half the area of the circular well point body and which is in open communication with the exterior of the body through its perforations, and having its lower end normally in open communication with the lower end of the jetting-and-suction passage, means for closing the upper end of the float chamber, and means responsive to the passage of a jetting fluid through the well point for interrupting communication between the float chamber and the lower end of the jetting-and-suction passage whereby to prevent the jetting fluid from entering the float chamber.

6. In a well point, a tubular body of generally circular form having a partition extending thereacross dividing the same into a pair of axially

parallel sections, one of which constitutes a jetting-and-suction passage, and the other constituting a float chamber, the exterior wall of the float chamber having perforations therein establishing communication with the exterior of the well point, and the lower end of the float chamber being normally in open communication with the lower end of the jetting-and-suction passage, means for closing the upper end of the float chamber, means responsive to the passage of a jetting fluid through the well point for interrupting communication between the float chamber and the lower end of the jetting-and-suction passage whereby to prevent the jetting fluid from entering the float chamber during jetting action, and float valve means in said float chamber and operable responsive to the liquid level therein for controlling communication between the jetting-and-suction passage and the exterior of the well point through the float chamber during suction action.

7. In a well point, a tubular body of generally circular form having a partition extending thereacross dividing the same into a pair of axially parallel sections, one of which constitutes a jetting-and-suction passage, and the other constituting a float chamber, the exterior wall of the float chamber having perforations therein establishing communication with the exterior of the well point, and the lower end of the float chamber being normally in open communication with the lower end of the jetting-and-suction passage, a foraminous screen encircling the tubular body so as to lie against the perforate wall of the float chamber, means for closing the upper end of the float chamber, means responsive to the passage of a jetting fluid through the well point for interrupting communication between the float chamber and the lower end of the jetting-and-suction passage whereby to prevent the jetting fluid from entering the float chamber during jetting action, and float valve means in said float chamber and operable responsive to the liquid level therein for controlling communication between the jetting-and-suction passage and the exterior of the well point through the float chamber during suction action.

8. In a well point, a tubular body having a jetting-and-suction passage extending axially therethrough, and also having an axially open float chamber in open communication laterally with the exterior of said body, means for closing the upper end of said float chamber, a plate positioned across the lower end of said tubular body and having an opening therethrough registering with the lower end of the jetting-and-suction passage, said plate also having a plurality of perforations therein registering with the lower end of the float chamber, a float valve disposed in said float chamber and cooperative with perforations in the plate aforesaid responsive to the liquid level in the float chamber, a tubular head secured to the lower end of the tubular body and having a chamber in its upper end for establishing communication between the jetting-and-suction passage and float chamber through the perforated plate, and a rigid disc valve disposed in said valve chamber and normally spaced from the plate but movable against the plate to close the perforations registering with the float chamber responsive to the passage of a jetting fluid through the well point during jetting action.

9. In a well point, a tubular body having a jetting-and-suction passage extending axially therethrough, and also having an axially open

float chamber in open communication laterally with the exterior of said body, means for closing the upper end of said float chamber, a plate of relatively soft material positioned across the lower end of said tubular body and having an opening therethrough registering with the lower end of the jetting-and-suction passage, said plate also having a plurality of perforations therein registering with the lower end of the float chamber, a float valve disposed in said float chamber and cooperative with the perforations in the plate aforesaid responsive to the liquid level in the float chamber, a tubular head secured to the lower end of the tubular body so as to clamp the perforated plate aforesaid therebetween in sealed relation thereto, and having a chamber in its upper end for establishing communication between the jetting-and-suction passage and float chamber through the perforated plate, and a rigid disc valve disposed in said valve chamber and normally spaced from the plate but movable against the plate to close the perforations registering with the float chamber responsive to the passage of a jetting fluid through the well point during jetting action.

10. In a well point, a tubular body having a jetting-and-suction passage extending axially therethrough and also having an intake chamber therein in open communication with the exterior of said body, a tubular head detachably mounted on the lower end of said tubular body and coaxial therewith, said head having a valve chamber in the upper end thereof normally in open communication with the jetting-and-suction passage and also with the chamber in the body aforesaid, valve means in the valve chamber of the head operable responsive to the passage of a jetting fluid through the well point to interrupt communication between the chamber in the tubular body and the valve chamber, and removable fastening means recessed laterally in the head and serving to detachably connect the head with the tubular body.

11. In a well point, a tubular body having a jetting-and-suction passage extending axially therethrough and also having an intake chamber therein in open communication with the exterior of said body, a tubular head detachably mounted on the lower end of said tubular body and coaxial therewith, said head having a valve chamber in the upper end thereof normally in open communication with the jetting and suction passage and also with the chamber in the body aforesaid, valve means in the valve chamber of the head operable responsive to the passage of a jetting fluid through the well point to interrupt communication between the chamber in the tubular body and the valve chamber, said head having an annular recess formed in the exterior wall thereof adjacent to its upper end, a plurality of studs carried by the tubular body and extending axially through the head in spaced relation to each other at its margin, said studs having threaded extremities projecting into the annular recess aforesaid, and nuts threadedly received on the respective studs and disposed within the recess, said nuts cooperating with the studs to secure the head to the tubular body.

12. In a well point, a tubular body having a jetting-and-suction passage extending axially therethrough and also having an intake chamber therein in open communication with the exterior of said body, a plate mounted across the lower extremity of said tubular body, said plate having an opening therethrough registering with the

jetting-and-suction passage and also having a plurality of perforations registering with the chamber aforesaid, a tubular head detachably mounted on the lower end of said tubular body and coaxial therewith, said head having a valve chamber in the upper end thereof normally in open communication with the jetting-and-suction passage and also with the chamber in the body aforesaid through the opening and perforations respectively in the plate, a rigid disc valve mounted in the valve chamber of the head and axially movable towards and away from the perforations in the plate, and means disposed in said valve chamber for normally supporting the disc valve in spaced relation to the bottom of the chamber in the head and also normally spaced from the perforations in the plate, and for guiding said disc valve in its axial movement aforesaid, said valve disc being adapted to be automatically elevated in said valve chamber against the plate to close the perforations therein responsive to the passage of a jetting fluid through the well point, whereby to interrupt communication between the intake chamber in the tubular body and the valve chamber in the head.

13. Apparatus as defined in claim 12, wherein the spacing and guide means for the disc valve comprises laterally spaced bars disposed across the bottom of said valve chamber and turned upwardly at their ends so as to extend axially towards the bottom of the plate intermediate the opening which communicates with the jetting-and-suction passage and the perforations which communicate with the intake chamber.

14. Apparatus as claimed in claim 10, in combination with a tubular head mounted on the upper end of said tubular body, and means at the bottom of said upper head for closing the upper end of said intake chamber in the tubular body.

15. Apparatus as claimed in claim 10, in combination with a tubular head mounted on the upper end of said tubular body, and means at the bottom of said upper head for closing the upper end of said intake chamber in the tubular body, said last named means comprising a plate

extending across the upper end of the tubular body intermediate the same and the upper head, said plate having an opening therethrough registering with the jetting-and-suction passage, and means disposed within the upper head for guiding a fluid towards the opening in the plate as the fluid passes downwardly through the upper head to the tubular body.

16. Apparatus as claimed in claim 10, in combination with a tubular head mounted on the upper end of said tubular body, means at the bottom of said upper head for closing the upper end of said intake chamber in the tubular body, and a tubular foraminous filter member encircling the tubular body intermediate the upper and lower heads.

17. Apparatus as claimed in claim 10, wherein the tubular head is provided with a second valve chamber in its lower extremity communicating with the upper valve chamber through an axial passage extending therebetween, a valve seat at the lower end of said axial passage, a floating ball-check valve mounted in the lower valve chamber and having a limited axial movement towards and away from the last mentioned valve seat, and means disposed within the second valve chamber for guiding said floating ball-check valve towards its seat.

18. An automatic well point of the class described, comprising a hollow body, an entrance and exit head mounted thereon and adapted to be connected to an entrance and exit conduit, said hollow body having a float chamber therein communicating with the exterior thereof in such manner that a liquid may enter therein with a relatively low velocity, filter means mounted on the body to filter the liquid as it enters the float chamber, said body also having a passage connecting the float chamber with the entrance and exit head, a float disposed in said float chamber, and valve means operable by said float for controlling communication between the entrance and exit head and the float chamber through the connecting passage aforesaid.

THOMAS F. MOORE