

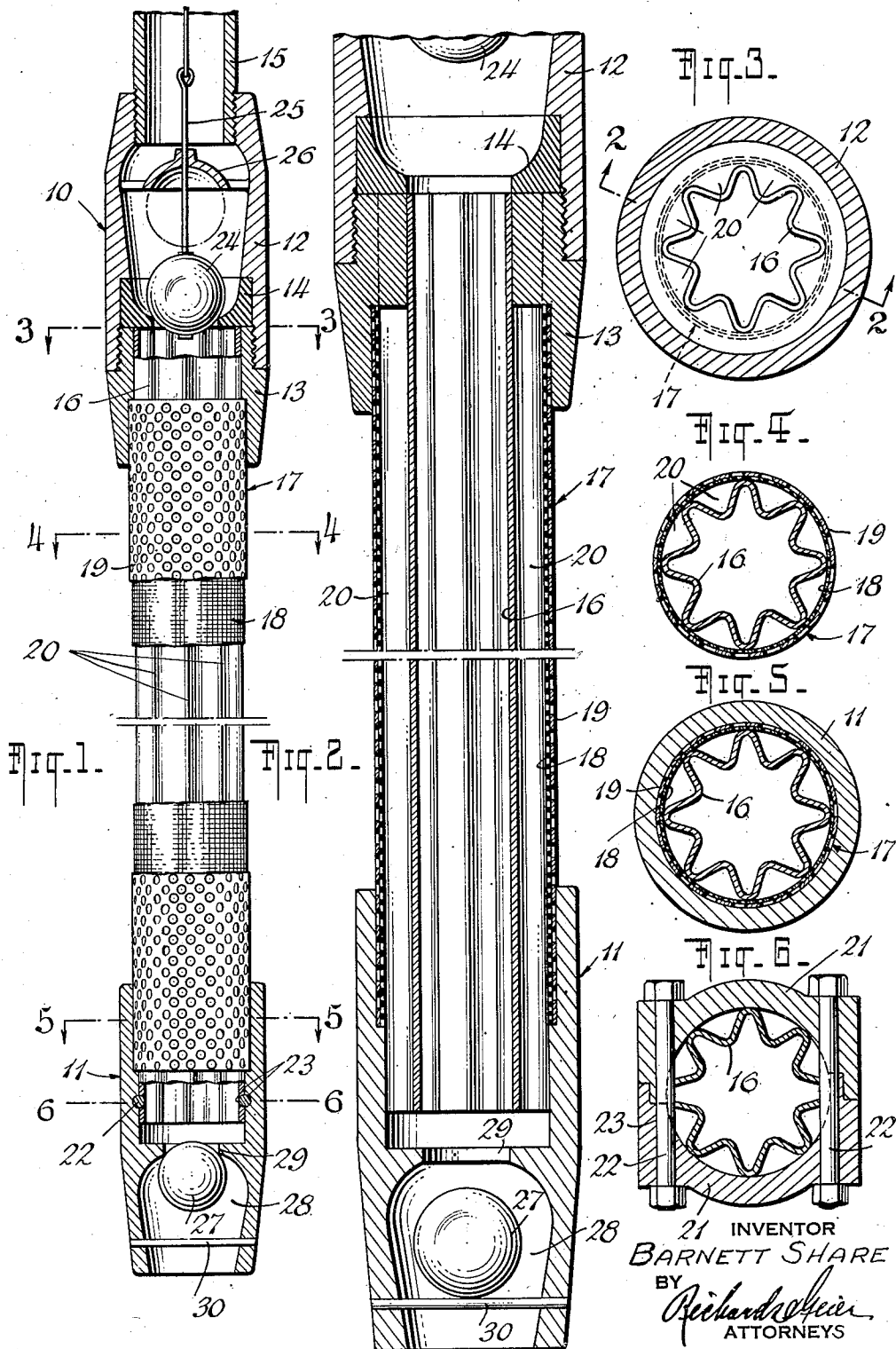
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B. SHARE

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WELL POINT

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UNITED STATES PATENT OFFICE

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WELL POINT

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This invention relates to improvements in apparatus for draining water from soil and has particular reference to a device commonly known as a well point.

Devices of this character are sometimes used in excavation work where it is necessary to drain water-containing soil before proceeding with the excavating operations. It has heretofore been proposed to utilize a well point for the dual functions of jetting the soil by water pressure to prepare a hole of the proper depth for receiving the point, and of draining the water, by suction, from the soil preparatory to excavating. In order to secure the most efficient drainage and, coincident therewith, reduce the possibility of air entering the suction line from the well point during the pumping operation, it has been proposed to form drainage chambers about the suction pipe of the well point by mounting longitudinally and exteriorly thereof one or more spacing elements, portions of which extend laterally to the pipe, and winding a water-pervious screen around said pipe and elements. Said screen then combines with the pipe and the laterally projecting edges of the spacing elements to form drainage channels extending along the pipe and through which water from the soil passes into the jetting head of the well point as long as the water level is above said head. A device of this nature has a certain degree of efficiency in operation, but it is expensive to manufacture, owing to the material used for the spacing elements, and must be frequently replaced because of the wear and tear upon said elements and the surrounding screen during jetting operations when the well point is being driven into the ground.

In accordance with the present invention, the above objections are obviated to a large extent by providing an improved and practical form of well point in which the use of separate spacing elements is eliminated, thereby materially reducing the cost of manufacture, and wherein damage to the screen and dislodgement of parts of the well point, principally during jetting operations, is minimized.

The inventive idea involved is capable of

receiving a variety of mechanical expressions, one of which, for purposes of illustration, is shown in the accompanying drawing, wherein:

Figure 1 is an elevation, partly broken away and partly in section, of a well point constructed in accordance with the invention;

Figure 2 is a fragmentary enlarged longitudinal section taken substantially on the line 2—2 of Figure 3, illustrating the position of the controlling valves of the device when the same is being employed in a jetting operation; and

Figures 3 to 6 inclusive are transverse sections taken substantially on the lines 3—3, 4—4, 5—5 and 6—6 of Figure 1.

When devices of the kind embodied herein are employed in excavation work for the purpose of draining water from the soil preparatory to the actual excavating operations, a series of said devices are sunk into the ground to the desired depth and at suitably spaced intervals, and are then connected by a header pipe or the like to a common source of power, such as a pump. The well points are sunk by what is known as a jetting operation, wherein water under pressure is fed by the pump to the jetting heads of the points so as to bore holes in the ground into which the points advance as the operation proceeds. When the points have been sunk to the proper level, they are connected to a common header pipe and the same or a different pump may be utilized to pump, by suction, the water in the soil surrounding each well point and thereby drain the soil.

The well point is illustrated in its preferred form as comprising suction and jetting heads generally indicated by the numerals 10 and 11, respectively, the former consisting of the upper and lower detachable sections 12 and 13 having a valve seat 14 held therebetween, the purpose of which will appear in the course of the description. As the well point is sunk during the jetting operation, the upper section 12 has joined thereto one or more pipes 15, depending upon the depth to which the point is to be lowered, the upper end of the conduit formed by said

pipe or pipes being connected to the header previously mentioned.

Into the lower end of the section 13 of the suction head 10 there is inserted and suitably secured, as by welding or otherwise, the upper end of a pressure and suction pipe 16 which, in accordance with the present invention, is open-ended and longitudinally fluted throughout its entire length to provide a series of substantially uniform convolutions extending about the entire circumference of the pipe. The inner surface of the section 13 is likewise convoluted so as to form a close fit with the upper end of the pipe 16 in order to prevent water under pressure from passing exteriorly of said pipe during the jetting operation and also to prevent air from the drained soil above the water level from being drawn into the head 10 during the pumping operation, thereby minimizing the possibility of breaking the vacuum in the conduit leading upwardly to the header.

When the elements thus far described have been assembled, a water-pervious member, generally indicated by the numeral 17, of cylindrical formation is mounted upon the pipe 16 in concentric relation thereto and has its upper end inserted in the lower section 13 of the head 10, forming a snug fit therewith so that said member may be easily removed and replaced. The member 17 comprises the inner and outer screens 18 and 19, respectively, the former having a fine mesh and being made of relatively light material, whereas the outer screen is of comparatively heavy material and of considerably larger mesh, said outer screen forming a covering for the inner screen and protecting the same against undue pressure and possible damage which might be occasioned when forcing the well point into position during the jetting operation. The screens constituting the member are also further supported by contact of the outer portions of the series of convolutions of the pipe 16 with the inner wall of the screen 18 at more or less regularly spaced intervals. By reason of the convolute form of the pipe 16, the same combines with the member 17 to constitute a series of longitudinally extending and spaced drainage channels 20 adapted to receive the water which seeps through the screens 18 and 19 during the pumping operation.

After the upper end of the member 17 has been positioned in the section 13, the lower or jetting head 11 is mounted in position. This head comprises two complementary sections 21 which combine to encircle the lower end of the pipe 16 and member 17, and bolts 22 are extended laterally through said sections and engaged in opposed grooves 23 formed in the inner surfaces of said sections and in two of the convolutions of the pipe 16 at the lower end of the latter, thus anchoring the head 11 to said pipe.

In the upper section 12 of the head 10 there is mounted a spherical valve 24 to which are connected a series of links 25 extending upwardly through a spider 26 in said head and into the conduit 15. Before starting a jetting operation, the valve 24 is lifted by the links 25 to the dotted line position shown in Figure 1 and is secured against the spider 26 by fastening the upper end of the links 15 by any suitable means so as to prevent the pressure of the water, during the jetting operation, from forcing the valve 24 down against its seat 14 and thus allow the water under pressure to have a free passage from the conduit 15 into the pipe 16. In the lower or jetting head 11 there is also provided a ball-valve 27 disposed within a chamber 28 and movable between a valve seat 29 and stop pin 30 in said chamber, said valve engaging the pin while the jetting operation is proceeding so as to allow the water from the pipe 16 to pass through the valve seat 29 and outwardly through the lower open end of the head 11. When pumping, the valve 27 is drawn upwardly by suction to close the seat 29 and thus prevent the soil or sand from being drawn upwardly into the pipe 16.

In practice, after a hole has been started into which the lower end of the well point may be inserted, the valve 24 is lifted against the spider 26 as previously described, and the water pressure then turned on. The water flows downwardly through the pipe 16 and out of the lower end of the head 11, forcing the valve 27 downwardly against the stop pin 30, and, by reason of its pressure, disperses the soil around the lower end of the point to thereby permit the latter to advance into the hole thus made. When the point has been lowered to the desired level, the water pressure is shut off and the links 25 disconnected so as to permit the valve 24 to drop upon its seat 14 where it remains until the pumping action commences. During the jetting operation, some of the water passing downwardly through the pipe 16 also enters and passes upwardly into the channels 20 and outwardly through the screens 18 and 19, thereby clearing the mesh of said screens of any obstructions which may have lodged therein during a previous pumping operation. The pump is now started to create a suction in the conduit 15 and pipe 16 and as the water from the soil seeps through the screens of the member 17, it flows downwardly in the channels 20 as long as the water level remains above the upper end of the jetting head 11. From the channels 20 the water passes into the space formed in the head 11 between the lower end of the pipe 16 and the valve seat 29, and the latter being now closed by its valve due to the suction created, said water will then pass upwardly through the pipe 16 and into the head 10. This upward flow of the water combined with

the suction action maintains the valve 24 in an elevated position so that the water may continue to flow from the head 10 upwardly into the conduit 15, but, should there be
 5 a break in the vacuum in the suction line with a consequent momentary stoppage of the upward flow of water, the valve 24 will drop upon its seat 14 and thus prevent a backward or downward flow of the water in the
 10 conduit 15 into the pipe 16.

What is claimed is:

1. In a well point, spaced heads, a water-pervious member extending between said heads and having sliding engagement with
 15 one of them and being embraced by the other, a pipe connecting said heads within said member and combining with the latter to provide drainage space, and removable locking elements extending transversely through said
 20 other head and portions of said pipe to anchor one to the other.

2. In a well point, suction and jetting heads, the latter being formed of separable sections, a water-pervious member extending
 25 between said heads, said member being insertable into said suction head and embraced by the sections of said jetting head, a pipe connecting said heads within said member and combining therewith to form drainage space
 30 communicating with the interior of said pipe through said jetting head, and means extending through the sections of said jetting head and portions of said pipe to lock said elements together and clamp the sections of the
 35 head in embracing relation about said water-pervious member.

3. A well point comprising an imperforate longitudinally fluted pipe, a water-pervious member encircling said pipe, spaced heads
 40 into which said pipe and member extend, one of said heads being formed of separable sections, and removable means extending through said sections and certain of the flutes of said pipe to secure the last named head to
 45 said pipe.

4. A well point comprising suction and jetting heads, a water-pervious member connecting said heads, a fluted imperforate pipe within said member and having its flutes extending into said jetting head to combine
 50 therewith and with said water-pervious member to form a series of drainage channels which are in permanent communication with the interior of said pipe only through said
 55 jetting head, and means to connect said pipe and jetting head together to prevent relative movements therebetween.

5. A well point comprising suction and jetting heads, the latter having a valve seat, a water-pervious member connecting said
 60 heads, a fluted pipe within said member and combining therewith to form drainage space, said pipe being imperforate throughout its length and the lower end thereof projecting
 65 into said jetting head in permanently spaced

relation to said valve seat so as to combine therewith to form a space communicating with the first named space and through which water flows during both the suction and jetting operations of the well point.

In testimony whereof, I have affixed my signature.

BARNETT SHARE.

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