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Chiaves

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[54] **CONCERNING THE WELL HEADS SUITABLE TO SUPPORT SUBMERSED PUMPS FOR WATER EXTRACTION**

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[51] **Int. Cl.** **E21b 33/03**

[58] **Field of Search** 166/75, 95, 85, 224; 137/533.17, 516.17

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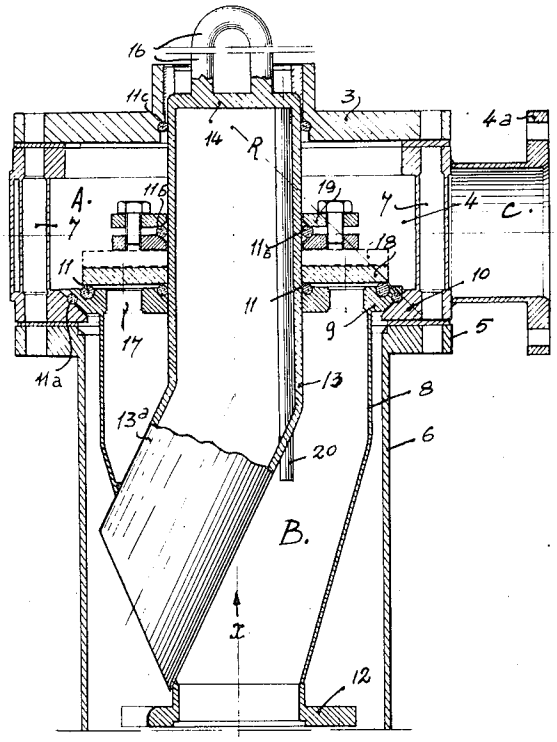
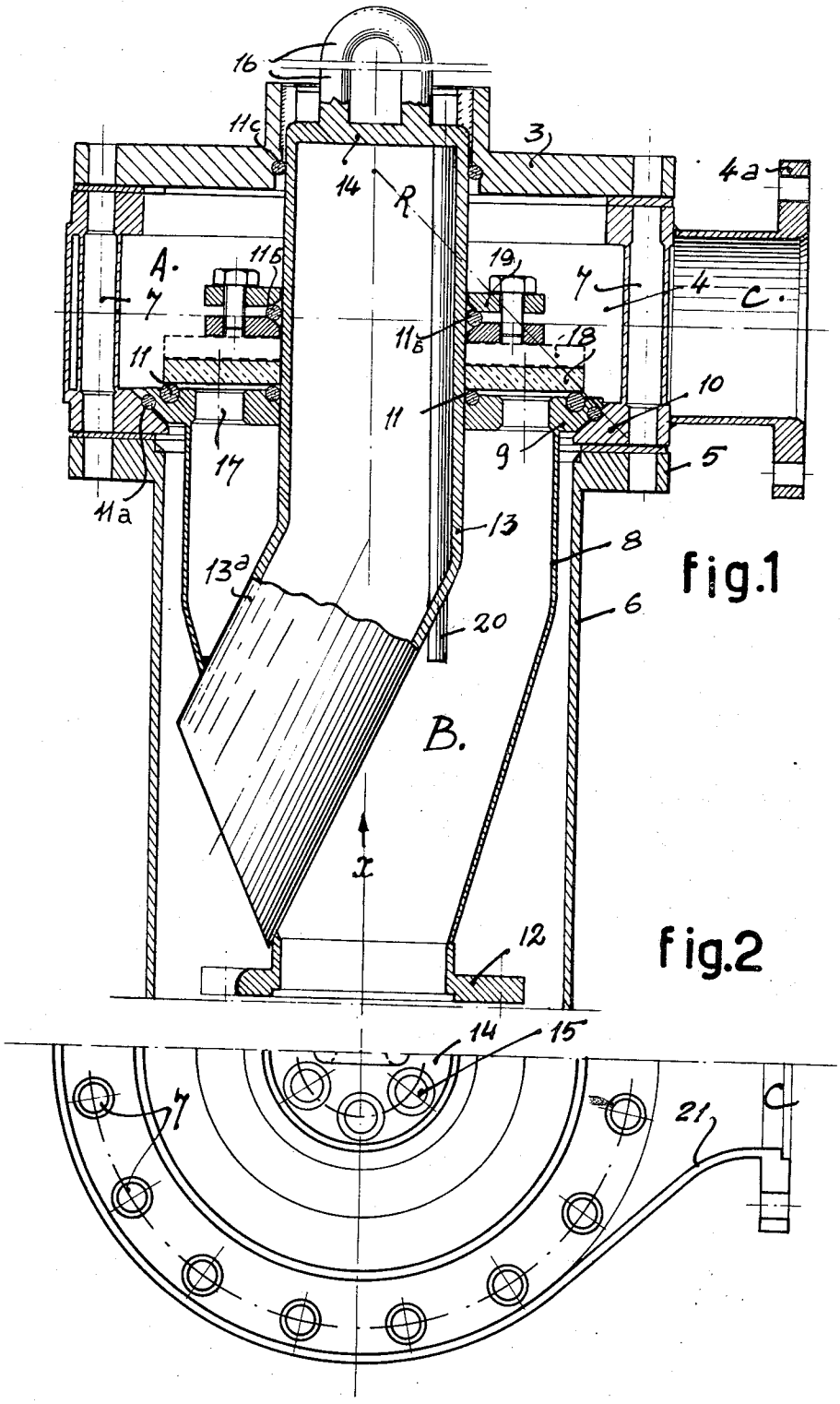
[57] **ABSTRACT**

A well head is provided with a centrally disposed tubular body that permits the water tight passage of cables connected to a submersed pump. A disc valve that is slidably movable to an open, upper position by means of water pressure and which is also movable to a closed, lower position by the force of gravity, is mounted on the tubular body. Annular seal means are provided between the convex outer edge of a transverse, perforated base that is secured to the body and the concave opposing surface of an annular seat.

7 Claims, 2 Drawing Figures




16
11c
14
R
3
4a
A.
11b
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4
C.
7
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11b
18
10
11
9
5
17
11a
13
8
13a
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20
B.
X
12
14
15
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21
C

fig.1

fig.2

CONCERNING THE WELL HEADS SUITABLE TO SUPPORT SUBMERSED PUMPS FOR WATER EXTRACTION

The use of well heads,provided with a projection forming a vertical support for a submersed pump, and also provided with an automatic valve designed to close the water outlet port when the pump motor is stopped,is known.

The most common type of automatic valves used in the well heads is the flap valve type. Said type of valve is opened by the pressure of the flowing water fed by the pump and is automatically closed by the return of water when the pumping action stops. But it occurs that before the closing of the valve, the returning stream acquires a remarkable speed ; speed and pressure of the returning water mass cause the snap closing of said valve and therefore,at the junction point upstream of the same,inevitable and violent water hammers are generated which cause the well known troubles within the conduits,particularly if frequently repeated.

In order to avoid the above said phenomenon, the present invention subject matter is a well head mainly characterized in that it comprises a disc valve with a vertical axis controlled in the direction of opening by the pressure of the water fed by the pump and providing an automatic, instantaneous closing of the outlet ports,due to gravity ; said valve being mounted axially movable on the skirt of a central bar of the well head which controls the water outlet in a manifold provided with suitable means for the connection to the utilization conduit.

Another particular feature of said well head derives from the fact that the central bar,on whose skirt is movably mounted the disc valve,takes preferably the shape of a tubular body passing through the well head in a longitudinal direction,in order to serve as a tube for the passage of electrical cables to feed the pump motor,-while the upper end of same tubular body has a blind bottom,takes the shape of a gripping element in order to permit the lifting of the whole upper part of the tubular body.

A further feature of the well head,according to said improvement,derives from the fact that the disc valve controls an outlet port crown formed at the base of a funnel which with the opposed base forms a flange for the connection to the delivery duct section of the submersed pump.

Wider and clearer features of the well head according to the invention will result from the following specification with reference to the accompanying drawings as a demonstrative example only,wherein:

FIG. 1 shows the complete head in a longitudinal section; and

FIG. 2 is a plan partial view from top of same head.

Referring to the drawing,3 indicates a cover connected to manifold 4 and flange 5 of the tubular jacket 6 by means of suitable bolts engaging the tubular seats 7. The tubular jacket 6 delimits the well diameter and is intended to contain funnel 8 which bears with its base 9 upon the annular edge 10 of manifold 4. The shape of annular edge 10 pre-sents a concavity with a radius R,while the shape of base 9 presents an analogous convexity designed to bear upon base 10. Between the two shapes is provided the insertion of a circumferential packing 11*a*. The lower end of funnel 8 terminates with a flange 12 designed to be connected to a correspondent flange of the duct section from the submersed pump. Base 9 of funnel 8 is centrally traversed by the tubular body 13 which is welded to it and closed at its upper end by base 14 provided with holes 15 (FIG. 2) for the passage of cables to said base 14 is firmly attached the hook 16 suitable to permit the lifting of the head when the same is detached from flange 5 of jacket 6 or to lift only the internal body when, having removed the cover 3,said body is detached from flange 10 of manifold 4. The tube 13 for the passage of cables protrudes from funnel 8 with its sloping section 13*a* and contains the electrical cables to feed the motor actuating the submersed pump,leaving the cables out of the water mass passing through the funnel 8 and entering in the direction of arrow *x*. That base 9 of funnel 8 is further provided with a plurality of delivery ports 17,normally closed by the disc valve 18 located in the cavity A of manifold 4 and longitudinally and slidingly mounted upon tube 13. Above valve there is provided a stop 19 , which is height adjustable and designed to limit the axial movement of valve disc 18. The adjustment of the height of stop 19 is obtained by utilizing the friction of packing 11*b*. Seal packings indicated by 11 are provided for the sealing of disc valve 18. Another annular packing 11*c* is provided for the sealing between body 13 and cover 3.

It is important that the center of said annular packing 11*c* coincides with the curvature of the radius R for the concave and convex surfaces of flange 9 and annular edge 10,in order to tolerate possible verticality errors of the well.

Manifold 4 is provided with flange 4a,for the connection of head to analogous flange carried by the utilization duct branch for the water extracted from the well.

Operation of the well head according to present invention is the following:

the water fed by the sumersed pump and pumped within the cavity B of funnel 8,determines with its pressure the lifting of valve disc 18 and discharges through ports 17 in cavity A of manifold 4 and hence through the outlet mouth C of same,feeds the utilization conduit. At the moment the electric motor actuating the submersed pump is stopped,the pressure of the water fed by the pump within cavity B drops instantaneously down and completely ceases ; the valve disc 18 lifted by pressure of water from pump,being no longer sustained by the same,falls contemporaneously due to cavity and closes also instantaneously ports 17 preventing any return of the water present in A or in any way returning from the utilization conduit connected to the feeding mouth C. In these conditions, due to the rapid closing of the valve formed by the passage ports 17 and the valve disc 18,the return of water is prevented and therefore any possibility of water hammers in the interested conduits is also prevented.

From what has been stated hereinbefore the simple and reliable operation of the valve present within the well head according to the invention appears clear and is assured by the weight of disc 18 which ,due to gravity,closes ports 17 as soon as the pressure of water fed by the pump ceases and opens them again only when said pressure reaches a predetermined value.

More specifically,the annular port for the passage of water which forms between valve disc 18 and flange 9 reduces as the water flow speed decays and closes completely when said speed becomes zero, that is, before the formation of even a minimum value of the reflux water speed. When the conditions that would permit

the water return to occur, the valve is already completely closed whereby the happening of a water hammer is impossible.

A longitudinal vent tube 20 passing through tube 13 completes the head described.

As clearly represented on FIG.2,the outlet mouth C,provided with flange 4*a*,is connected to manifold body 4 by a neck 21 whose tubular outline is curved,-has been particularly studied in order to avoid any vortex of the water discharging from the manifold through the same mouth C.

From the preceding specification,the features and structure of the well head according to the improvement of the invention appear clear.

It is obvious that the well head according to the invention is in no way limited to the arrangements described and represented but that,without departing from its scope, it may be submitted to possible improvements and some variants dictated by requirements of the practical application of the same.

I claim:

1. An improved well head for use with a submersed pump comprising:

a. a manifold having an annular seat;

b. a tubular body positioned within said manifold;

c. a transverse, perforated base rigidly secured to said tubular body intermediate the ends thereof, said base having a peripheral edge positioned in sealing relationship to said seat; and

d. a disc valve slidably mounted on said tubular body above said base whereby the pressure of the water delivered by the pump raises and opens said valve, the force of gravity returning said valve to a lower closed position in covering relationship with the apertures in said base when the pump is not operating.

2. The well head in accordance with claim 1, wherein said base further includes a funnel-like member extending downwardly about said tubular body, the lower end of said tubular body being sealed and passing through the side wall of said funnel-like member, the upper end of said tubular body including a transverse perforated wall through which the cables of the submersed pump are adapted to pass.

3. The well head in accordance with claim 1, wherein the said seat is formed with a concave recess extending thereabout and said peripheral edge is formed with a mating concave surface.

4. The well head in accordance with claim 3, wherein the opposed concave and convex surfaces are formed on a common radius having its center on the axis of said tubular body proximate the upper end thereof.

5. The well head in accordance with claim 4, wherein there is further included a cover for said manifold and an annular seal means between said cover and said tubular body, the center of said seal means being common with the center of the radius.

6. The well head in accordance with claim 5, wherein said tubular body extends through said cover and is provided with a gripping member.

7. The well head in accordance with claim 1, further including stop means for limiting the axial displacement of said disc valve by the pressure of the water.

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