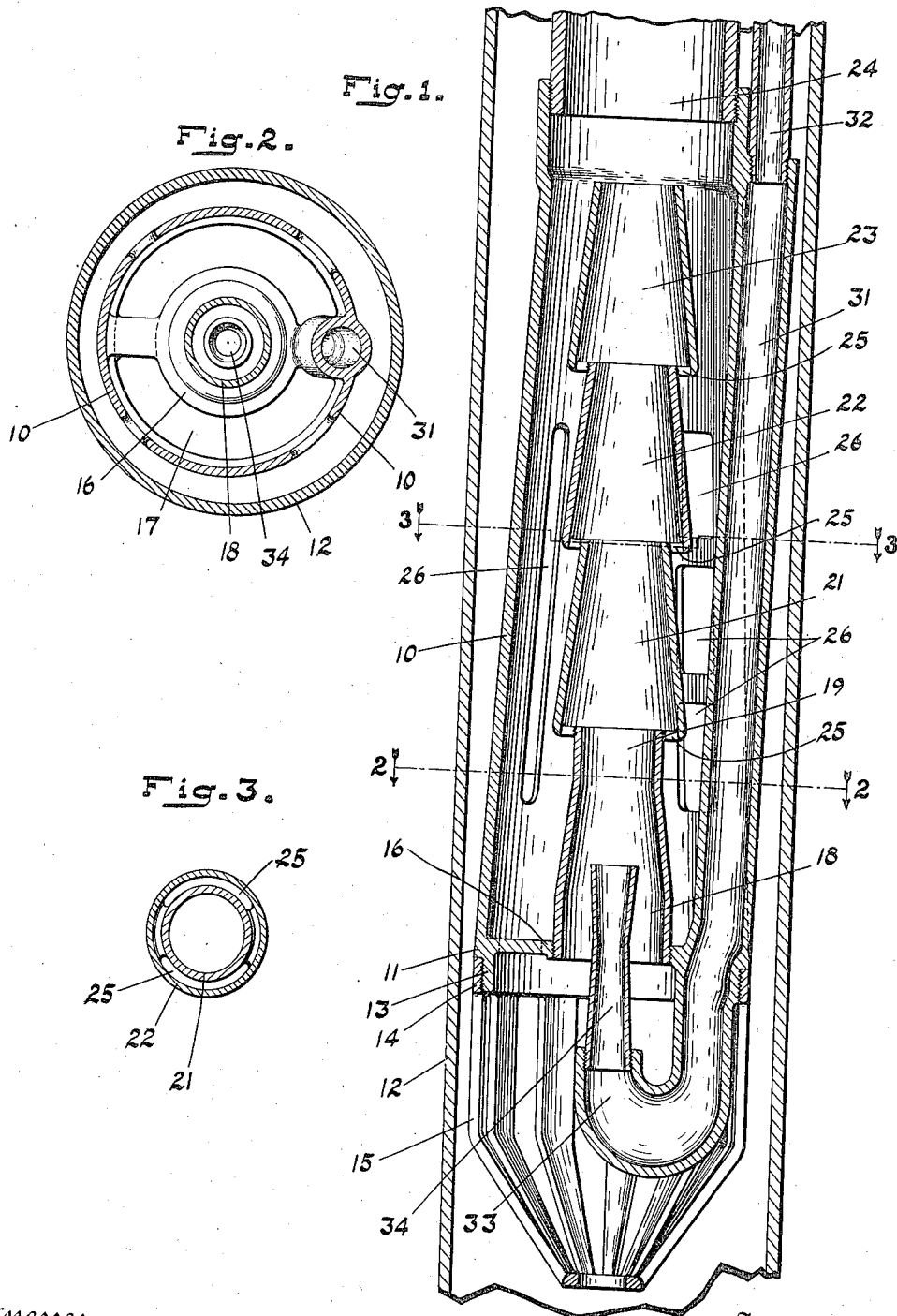


O. E. HARRIS.
AIR LIFT PUMP.

APPLICATION FILED JUNE 20, 1910. RENEWED APR. 15, 1912.

1,028,209.

Patented June 4, 1912.



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UNITED STATES PATENT OFFICE.

OTTO E. HARRIS, OF INDIANAPOLIS, INDIANA.

AIR-LIFT PUMP.

1,028,209.

Specification of Letters Patent.

Patented June 4, 1912.

Application filed June 20, 1910, Serial No. 568,038. Renewed April 15, 1912. Serial No. 691,003.

To all whom it may concern:

Be it known that I, OTTO E. HARRIS, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Air-Lift Pump, of which the following is a specification.

The object of my invention is to produce an air lift pump nozzle of high efficiency.

The accompanying drawings illustrate my invention.

Figure 1 is an axial section of my improved nozzle in position within a well casing; Fig. 2 a horizontal section on line 2—2 of Fig. 1; Fig. 3 a horizontal section on line 3—3 of Fig. 1.

In the drawings, 10 indicates the main tubular body of my improved nozzle, the lower end 11 thereof being of a diameter which is but very little less than the internal diameter of the well casing 12. The portion 11 is provided with a depending threaded flange 13 adapted to receive the threaded ring 14 of a perforated guard 15 which permits free inflow from the lower portion of the well casing. Arranged in the lower end 11 of the main body 10 is a ring 16 surrounded by water inlet passages 17 and threaded into ring 16 is the lower end of a tube 18 having a threaded upper end 19 of considerably less diameter than the lower end. Threaded upon the upper end 19 of tube 18 is a conical tube 21 and this tube carries a conical tube 22 which, in turn, carries a conical tube 23, the upper end of the last tube 23 coming quite close to the lower end 24 of the water outlet pipe which is threaded into the upper end of main body 10. Leading into the bottoms of each of the inspirator tubes 21, 22 and 23 are water passages 25. The main tubular body 10 is tapered upwardly and inwardly and is perforated at 26 for a distance beginning below the bottom of tube 21 and ending at a point at or below the bottom of tube 23.

In many wells, the water supply comes both from above and below the point at which the pump is most economically located but in structures which have been commonly used heretofore the flow from the upper regions of the well has been seriously obstructed because of the formation of main body of the pump. In my present forma-

tion, the portion 11 of the pump fills the casing 12 to such an extent as to materially obstruct the flow from the upper portions of the well to the cage 15 but, by tapering the main body and then perforating the walls at 26 above the portion 11, and providing the inspirator tubes 21, 22 and 23, I am able to operate upon the water supply coming from the upper regions of the well, as well as to operate upon the water supply from the lower regions of the well.

Formed integral with body 10 is an air tube 31, the upper end of which opens outside of the main body 10 in position to receive the air pipe 32. The lower end of the air tube 31 projects downwardly into cage 15 and is turned upwardly at 33, in a well known manner, in order to receive the air nozzle 34 which is projected upwardly into the lower opened end of tube 18.

In operation, the air under the pressure emerging from the nozzle 34 passes upwardly through the several tubes 18, 21, 22, and 23 and, in its upward passage, causes the water to flow upwardly through cage 15 and thence through tube 18, and passages 17, and also to flow inwardly through perforations 26 and thence through passages 25 into the several tubes 21, 22, and 24 and from thence up through the discharge pipe 24.

I claim as my invention:

1. An air lift pump nozzle comprising a main tubular body having open ends, an air passage leading downwardly to the lower end of said tubular body and carrying an upwardly projected air nozzle, a tube of less diameter than the interior of the main body mounted in the lower end thereof and surrounding the air nozzle, and a plurality of tapered inspirator tubes arranged in succession above the first tube and each having water inlets leading into its lower end, the wall of said main tubular body being perforated, from a point below the upper end of the tube surrounding the air nozzle, upwardly.

2. An air lift pump nozzle comprising a main tubular body having open ends, an air passage leading downwardly to the lower end of said tubular body and carrying an upwardly projected air nozzle, a tube of less diameter than the interior of the main

body mounted in the lower end thereof and
surrounding the air nozzle, the wall of said
main tubular body being perforated, from a
point below the upper end of the tube sur-
5 rounding the air nozzle, upwardly.

In witness whereof, I have hereunto set
my hand and seal at Indianapolis, Indiana,

this 13th day of June, A. D. one thousand
nine hundred and ten.

OTTO E. HARRIS. [L. s.]

Witnesses:

ARTHUR M. HOOD,
FRANK A. FAHLE.
