March 9, 1954 W. L. STOORS 2,671,405

CYCLONE PUMP

Filed Aug. 25, 1952

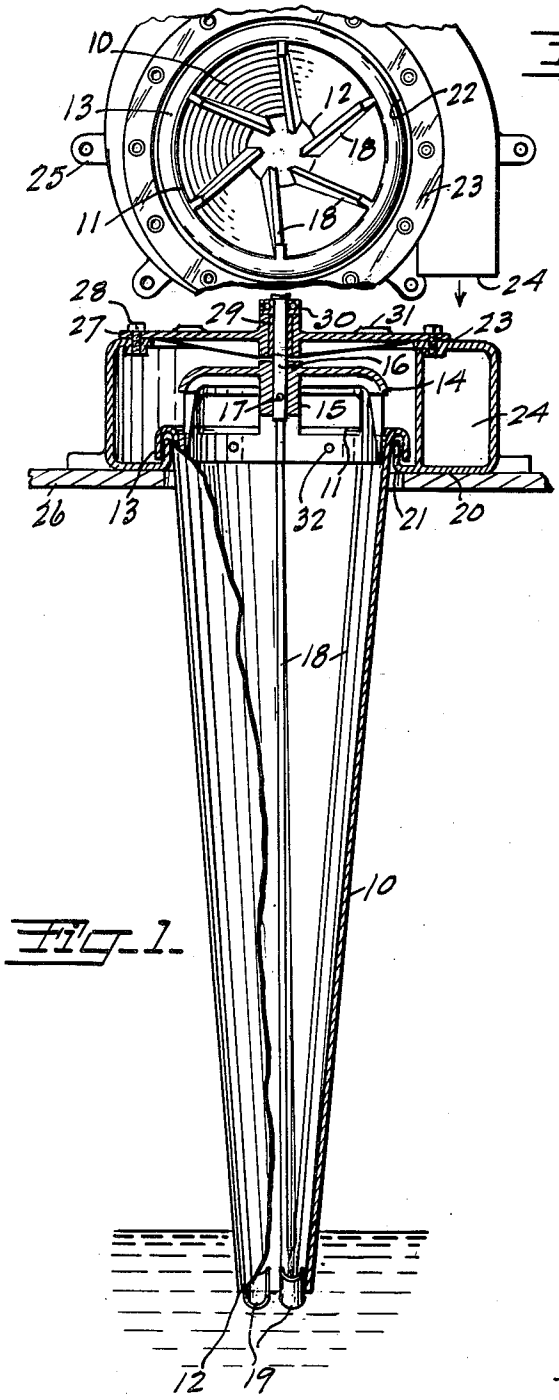


Fig. 1.

Fig. 2.

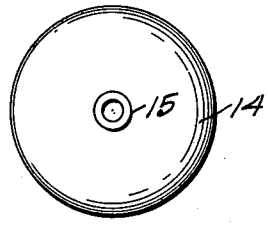


Fig. 3.

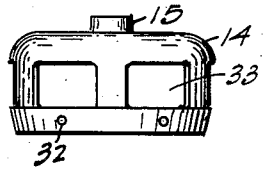


Fig. 4.

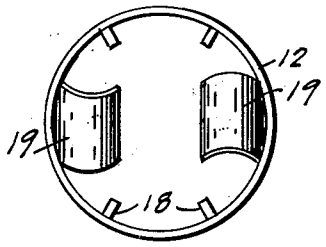


Fig. 5.

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Patented Mar. 9, 1954

2,671,405

UNITED STATES PATENT OFFICE

2,671,405

CYCLONE PUMP

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Application August 25, 1952, Serial No. 306,215

1 Claim. (Cl. 103—99)

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This invention relates to improvements in pumps, and particularly to a shallow well pump of the cyclone type, in which water is lifted through centrifugal action within an inverted cone or tapered sleeve, and provides a highly efficient pump for shallow wells and for water lift from irrigation ditches, canals, creeks, rivers, ponds, and lakes for diversion to fields at elevations above the level of the water supply, providing volume of delivery in conformity with the speed of rotation of the sleeve and the angularity of the walls of the sleeve, the pressure coincidently increasing with increased angularity.

This pump is intended to deliver large volume at low pressure with a minimum of power, and is therefore particularly suited for irrigation purposes, the water delivery efficiency being higher than that delivered by centrifugal and reciprocating pumps, since the water resistance and friction present in the latter types of pumps is practically absent in my new pump.

The objects and advantages of the invention are as follows:

First, to provide a water lift pump which is particularly suited to shallow well and irrigation pumping.

Second, to provide a pump as outlined which is relatively simple in construction and light in weight.

Third, to provide a pump as outlined in which the pumping element consists of a frustum of a cone with the base forming the top and discharge end.

Fourth, to provide a pump as outlined in which the sleeve is provided with spiral ribs to decrease frictional resistance between the walls of the cone and the water being lifted.

Fifth, to provide a pump as outlined with terminal cupping vanes for initiating lift from shallow water supply sources such as irrigation ditches.

Sixth, to provide a pump as outlined in which the pump is rotatably suspended from a suitable support, and free of supports and bearings at the lower end.

Seventh, to provide a pump as outlined which is simple in construction, easy to install, capable of installation on a vehicle for transportation and use as needed at different locations on a farm, ranch or the like, and economical to manufacture.

In describing the invention reference will be had to the accompanying drawings, in which:

Fig. 1 is a vertical elevation through the invention shown partly in section.

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Fig. 2 is a top plan view of the invention with parts of the discharge chamber broken away and the suspension spider and head being removed.

Fig. 3 is a top plan view of the suspension spider.

Fig. 4 is a front elevation of Fig. 3.

Fig. 5 is a bottom plan view of the cone showing the cupping vanes for lift from very shallow water supplies.

The invention consists essentially of an inverted cone with the apex removed, and with the cone being rotatably supported and driven to cause the water to be lifted through centrifugal action and discharged from the base or upper end of the cone.

The pump barrel or sleeve 10 is frusto-conical in form and is inverted with the base 11 constituting the discharge end, and the apex 12 the intake, the discharge end being curled out and down as indicated at 13 to an inverted U-shape in cross-section.

Mounted in the discharge end is a suspension spider 14 and which is immovably secured in the upper end of the sleeve, and this spider has a hub 15 in which the suspension and drive shaft 16 is fixed as indicated at 17, this shaft being driven by any suitable source of power, depending on the conditions under which it is to be operated and the available source of power. A series of equi-angularly spaced flutes 18 extend from the discharge end to the bottom interiorly of the sleeve with the lower ends offset angularly relative to the upper ends to provide a spiral which recedes from bottom to top relative to the direction of rotation of the sleeve, and which functions to decrease resistance and increase the upward flow of water by decreasing peripheral slippage with consequent frictional resistance of the water. Cupping vanes 19 are provided at the bottom of the barrel for operation in shallow ditches, creeks and the like, for providing initial lift of the water into the end of the sleeve. These vanes can be eliminated if the water is of sufficient depth to allow suitable submersion of the intake end of the barrel.

The combined discharge chamber and supporting frame consists of a housing having a passage in the bottom wall 20 for the sleeve, with an upturned wall 21 clearing the outside wall of the sleeve and inside wall of the curl and extending upwardly therein almost to the return bend, and also has a passage 22 provided in the top wall 23 to pass the barrel including the curl, so that the barrel can be inserted through the top, and this housing has a discharge 24 and is also provided with a flange or ears 25 for securing to a

rigid base 26, the housing being of volute form as indicated.

A cover member 27 forms a closure for the top of the housing and is removably secured as indicated at 28, and this cover has an axial bearing 29 for the drive shaft and a thrust hearing 30 for support of the pump through the shoulder provided on the drive shaft, motor mounting pads 31 being provided on this cover.

For assembly, the housing is mounted on a rigid base, the drive shaft is passed through the thrust bearing and thence through the axial bearing in the cover, then into the hub on the suspension spider and fixed therein. The spider is next secured in the top of the barrel as indicated at 32 access being had through the discharge passages 33 in the side walls of this spider.

As will be noted, when the pump is rotated, the water climbs the walls through centrifugal action with the flutes preventing peripheral lag with consequent induced friction and transferring this lag to actual lift, providing highest efficiency in water lift in relation to the power consumed. Obviously, the greater the degree of divergence from bottom to top, and the greater the speed, the greater the volume of water that will be delivered.

I claim:

A pump comprising a frusto-conical sleeve invertedly mounted and having a curl formed outwardly and downwardly to inverted U-shape at its upper end, a discharge housing for receiving water discharged from said sleeve and having an inner upturned flange from the bottom thereof to fit about the upper end of the sleeve within said curl, said discharge housing surrounding the upper end of said sleeve and having a spirally formed exterior wall terminating in a discharge opening and having an inturned flange at the top with the opening within the flange having a diameter greater than the maximum diameter of said sleeve for passage of the sleeve therethrough for assembly, a cover removably secured over said opening to said inturned flange and having an axial bearing, a spider having side walls having a plurality of extensive openings formed therethrough for discharge of water from said sleeve, and having a top wall having an axial hub having a bore, with the lower end of the side walls frictionally fitting within the upper end of said sleeve and being affixed thereto, a shaft rotatable in said bearing and having a thrust member for axial support on the top of said bearing and having its lower end fixed in said bore for support and for rotational driving of said sleeve.

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