

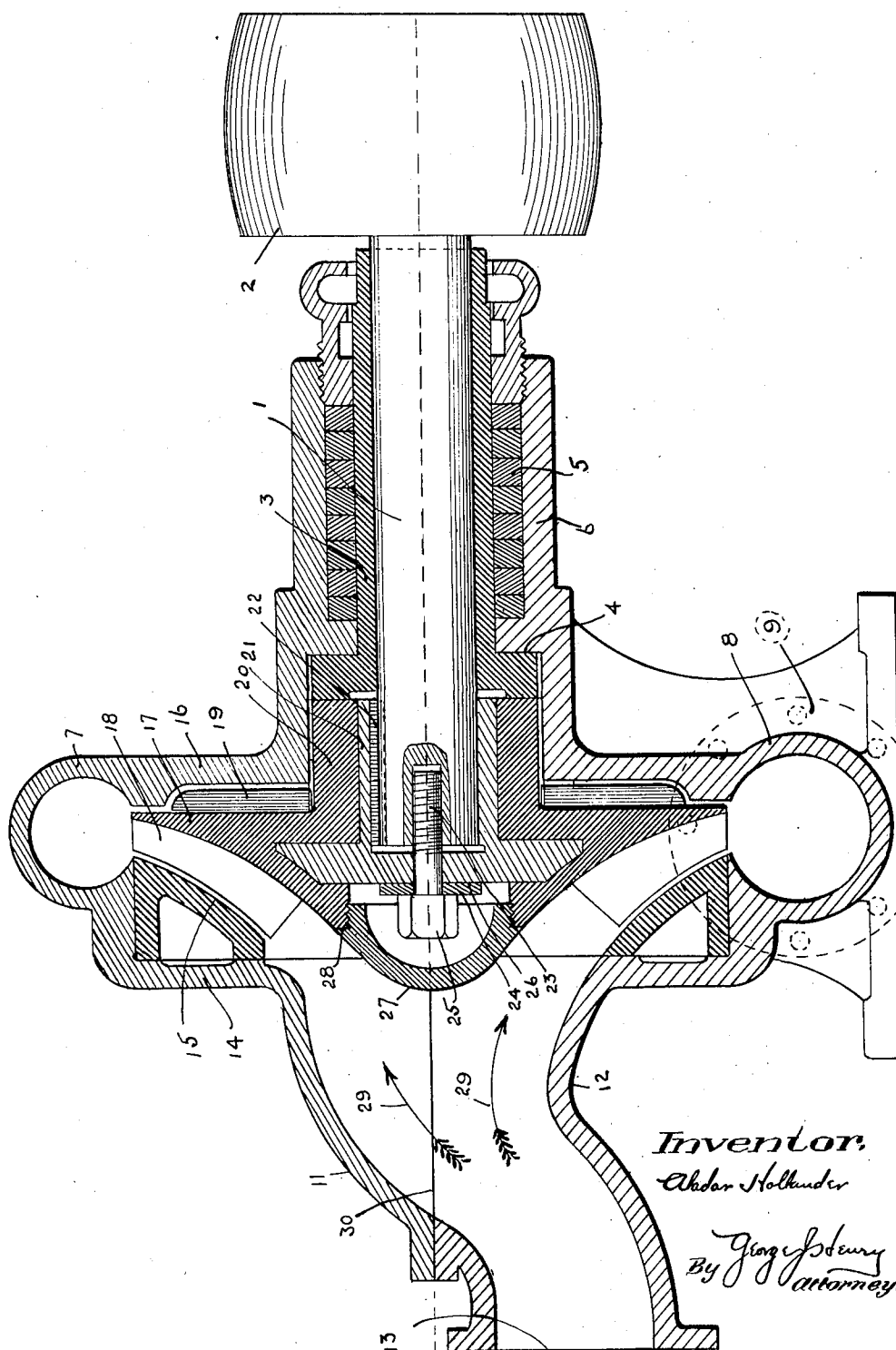
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ACID PUMP

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ACID PUMP.

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My invention has for its object a pump made up of assembled parts each of acid resisting material and I have found lead to be well adapted to this use. The parts are constructed and arranged with the special object of simplicity of construction, facility of making repairs and replacements and the securing of efficient operation, combined in a construction of the greatest mechanical strength.

Other objects will appear from the drawing and specifications.

These objects I attain by constructing all of the parts which are exposed to the action of the acid fluid on which the pump is operating, of lead, hard rubber, or other acid resisting material while transmitting the driving strains to which the impeller is subjected, through a metal of higher tensile strength as steel or cast iron.

The impeller is preferably mounted upon the shaft with a conventional key and set screw within a special compartment and the exposed parts entirely closed from acid action by acid resisting material.

By referring to the drawing my invention will be made clear.

In the figure the numeral 1 represents the main driving shaft actuated by the pulley 2, the shaft being protected by the lead sleeve 3 having a shoulder at 4 and which sleeve rotates with the shaft in the conventional packing material 5 carried in the bracket 6 of the main pump casing.

The volute or pump spiral shown at 7, 8 is made in two sections the upper section 7 having a portion of the suction elbow 11 cast therewith and the lower section 8 having the lower portion 12 of the suction elbow and also the suction nozzle 13 and the discharge nozzle 9 cast integral therewith. Within the volute at 14 is fitted the casing ring 15 which, with the opposite side 16 of the volute 7, 8 forms the space within which the impeller 17 having the blades 18 is adapted to rotate.

Centrifugal vanes or wings are preferably provided at 18 extending from the inner face of the impeller 17 to establish a negative or suction pressure between the packing 5 and shaft sleeve 3, so that fluid acid is thrown outward into the volute establishing a negative or vacuum pressure between the packing 5 and impeller boss 20.

This boss 20 sets against the collar or

shoulder 4 on the sleeve 3 thus preventing any acid from reaching the shaft from the impeller compartment or volute.

At 21 is a hub member of cast iron or steel or other metal of high tensile strength fitted with a key 22 to the shaft 1 and held in place by the screw 23, washer 24 and hexagon head 25, the said washer bearing against the flanged end at 26 of the cast iron hub.

The impeller 17 with blades 18, wings 19 and boss 20 are integrally cast or formed of lead or other acid resisting material on the hub member 21 which latter with the shaft 1 are of metal of high tensile strength as cast iron or steel. The sleeve 3 and collar 4 are also of lead, hard rubber or the like.

After the parts described have assembled as shown in Fig. 1 the lead cap 27 is screwed, pressed or soldered into place at the joint 28, thus closing the aforesaid hub connections form the acid fluid which normally flows in the direction of the arrows 29, 29 when the pump is in operation.

The entire casing is split in a horizontal plane on the line 30 and bolted together or otherwise clamped in any conventional manner.

It will now be seen that the runner may be removed, adjusted or replaced by disassembling the parts on the joint plane 30 and a new ring 15 may be readily replaced in the pump when it becomes worn or corroded by acid action, without replacing the entire casing, this ring being exposed to greater acid action because of the relatively high velocity adjacent the impeller; also that all of the cast iron or steel parts are completely enclosed in an acid resisting envelope comprised of the sleeve 3, boss 20, filler piece 27 and the impeller 17; that the parts may be readily examined by removing the member 11, by disconnecting it along the line 30.

Although I have shown and described my invention as particularly applicable to a specific form of centrifugal pump it will now be understood that it may be employed with other structures wherein the operating parts are exposed to the corrosive action of acid, gases, or liquids.

I claim:

In an acid pump, a casing parted on an axial plane into an upper and a lower section, a suction nozzle and a discharge nozzle integral with said lower section, a hub member of relatively high tensile strength and

means fixing said hub to said shaft, an impeller of acid resisting material formed over and integral with said hub member, an opening through the impeller to enable said fixing means to be introduced, a closure of acid resisting material for said opening sealing the shaft and the hub member and the fixing means from the impeller compartment, an acid resisting ring fixed inside said casing and adjacent the suction side of said 10 impeller, an acid resisting sleeve surrounding said shaft and having an end collar effecting closure against said impeller and forming a running joint against said casing, packing carried in said casing and within 15 which the sleeve and shaft are adapted to rotate.

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