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NOZZLE FOR HYDRAULIC MOTORS.
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1,076,962.

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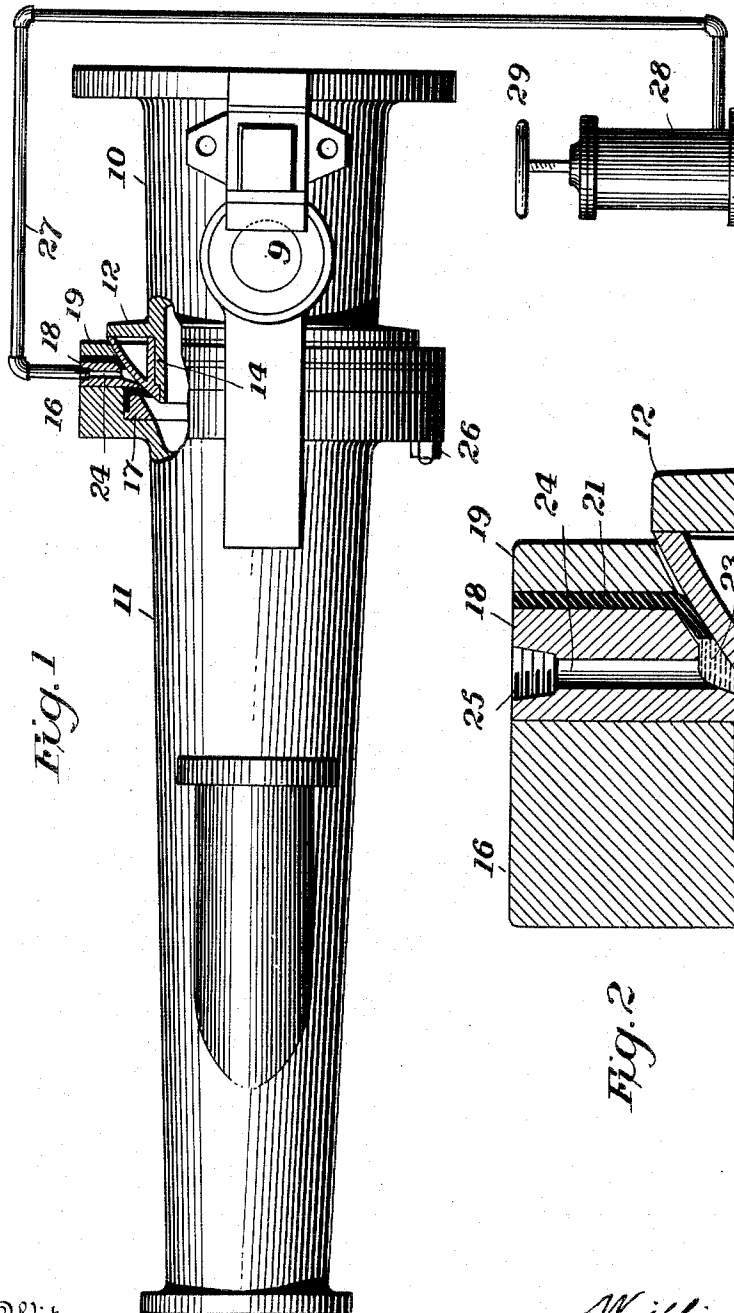


Fig. 1

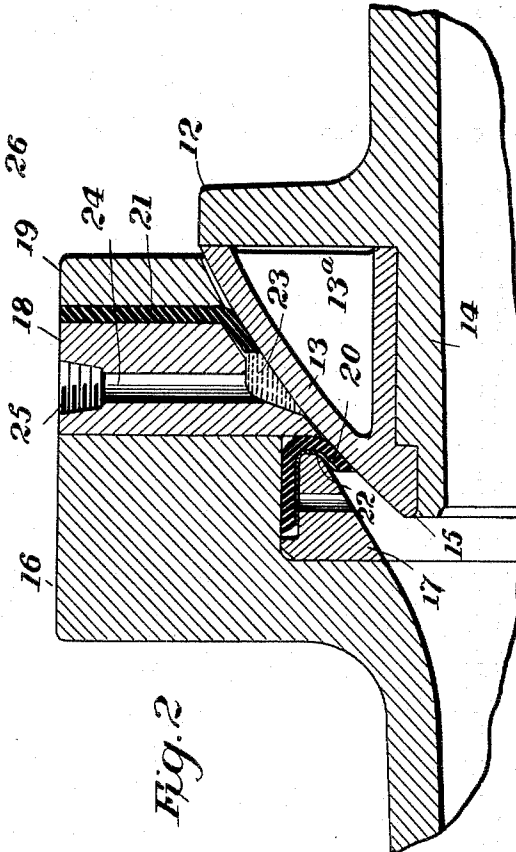


Fig. 2

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NOZZLE FOR HYDRAULIC MOTORS.

1,076,962.

Specification of Letters Patent.

Patented Oct. 28, 1913.

Application filed January 18, 1910. Serial No. 538,643.

To all whom it may concern:

Be it known that I, WILLIAM A. DOBLE, a citizen of the United States, and resident of San Francisco, county of San Francisco, State of California, have invented certain new and useful Improvements in Nozzles for Hydraulic Motors, of which the following is a specification.

This invention relates to hydraulic nozzles of the type described in my prior Patent 12,460, reissued February 27, 1906.

In hydraulic apparatus of the class referred to, which is particularly applicable to be used in connection with water wheels, the nozzle has a pivotal relation with respect to the supply pipe to permit it to be moved about an axis so as to direct the stream against and away from the buckets on the wheel. The joint between the nozzle and supply pipe is generally a ball and socket joint, and it is found in practice that the joint is rapidly cut out and corroded due to the grit and acid in the water. Where the head is high, as is the case where impact water wheels are used, there is no feasible way to lubricate the joint, and the water itself is generally depended upon for lubrication. Where such a ball and socket joint is used, the supply pipe must necessarily be provided with an enlarged head so as to furnish the spherical head of the joint. Due to the very heavy mass of metal, it is extremely difficult to produce solid and sound castings, in view of the fact that a very large section joins a comparatively thin section. The casting will often have blow holes and other defects which must be plugged up in order to obtain a smooth bearing face. The joint is subject to great wear, due to the sand and grit in the water, and thus where the head forms an integral part of the supply pipe section, the entire supply pipe section must be replaced, or must be removed and machined down, when the head wears down.

One of the objects of this invention, therefore, is to construct the joint in such a manner that it may be properly lubricated, and another object is to provide a renewable head for the spherical part of the joint which may be readily replaced when it is worn out.

The invention will be described in connec-

tion with the accompanying drawings, in which—

Figure 1 is an elevation, partly in section, of a part of a supply pipe and the nozzle connected thereto; Fig. 2 is a detail sectional view showing the joint.

Referring to the drawings, 10 designates a section of a supply pipe, and 11 a nozzle pivotally connected to the supply pipe at 9. The supply pipe is provided with an enlarged head 12 having a removable section 13, which forms one of the faces of the joint between the supply pipe and the nozzle. The supply pipe and the portion of the head integral therewith are generally composed of cast iron, while the section 13 may be composed of a metal which will withstand corrosion better than the iron, and in practice it is found that brass or gun metal will accomplish this purpose very well. The section 13 is mounted upon a reduced portion 14 of the supply pipe, and is secured in place by being shrunk on, the end of the reduced portion 14 being slightly peened over, as shown at 15.

The nozzle 11 is provided with an enlarged head 16, to which are secured a number of clamping rings 17, 18 and 19. A pair of spaced packing rings 20 and 21 are clamped between the clamping rings, the portions of the packing rings engaging the face of a section 13 being deflected in the direction of the interior of the nozzle for a purpose hereinafter to be described. The packing rings are preferably of leather, and the forward packing ring has a guard ring 22 of copper in order to strengthen it and render it more stiff. The clamping ring 18 has formed therein an annular groove 23 which forms a channel between the packing rings 20 and 21. The ring 18 is also provided with a hole 24, which terminates in a tapped portion 25. The clamping rings firmly secure the packing rings to the head 16 by means of a circle of bolts 26 passing through the rings and head.

The hole 24 and channel 23 are arranged to be connected with a pipe 27, which is connected to a suitable pressure lubricator 28, which is arranged to supply the lubricant to the channel 23 under pressure. The cylinder of the pressure lubricator receives the lubricant and pressure is applied to the

lubricant by a piston which works in the cylinder and is operated by a handle 29. The pressure lubricator may be of any suitable construction, for instance, such as shown in my copending application, Serial No. 538,641, filed January 18, 1910.

In practice a heavy lubricant is supplied by the pressure lubricator 28 under pressure to the channel 23, and this lubricant will thoroughly lubricate the joint. Preferably the pressure of the lubricant is greater than the pressure of the water, and thus the lubricant will be forced under the packing ring 20. This lubricant will keep the packing 20 in prime condition, and will clean off any grit or sand that may accumulate there. In view of the fact that the deflected portions of the packing rings face in the direction of the interior of the nozzle, the pressure of the water against the ring 20 will operate to force it more tightly down on the face of the section 13, and, therefore, will close the joint tight, at the same time the oil will be allowed to be forced underneath the packing. The rear packing ring 21 will also prevent the oil from escaping backward to the outside of the joint.

By providing the renewable section 13, the section may be replaced for renewal or repairs by simply removing it. The section is shrunk on by being heated to the temperature of boiling water and then placed in position, so that it can be readily removed by lightly heating it. The pressure of the water will of course aid to keep it in position. In this way the expense due to renewals is very much reduced and the labor required for making repairs is also reduced. In view of the fact that the section 13 is a separate part, defects due to blow holes and the like in the main casting will not do any harm, since the finished face is on the section 13. The section 13 is preferably strengthened by radial webs 13* located at intervals, so that the amount of material is a minimum, which is desirable where brass or gun metal are used.

It is obvious that various changes may be made in the details of construction without departing from this invention, and it is, therefore, to be understood that this invention is not to be limited to the specific construction shown and described.

What I claim is:—

1. In a hydraulic apparatus, the combination with a supply pipe, of a nozzle having a pivotal relation thereto, a joint between said members including spaced packing members, and means for forcing a lubricant under pressure between said packing members, for the purpose set forth.

2. In a hydraulic apparatus, the combination with a supply pipe, of a nozzle having a pivotal relation thereto, a joint between said members including a packing

member, means for forcing a lubricant on said joint against one side of said packing member at a greater pressure than the water pressure on the other side of said packing member, for the purpose set forth, and means for preventing the escape of lubricant to the outside of the joint.

3. In a hydraulic apparatus, the combination with a supply pipe, of a nozzle having a pivotal relation thereto, a joint between said members including a packing member, means for forcing a lubricant on said joint at a greater pressure than the water pressure, and means for preventing escape of lubricant to the outside of the joint, for the purposes set forth.

4. In a hydraulic apparatus, the combination with a supply pipe, of a nozzle having a pivotal relation thereto, a joint between said members including a packing ring deflected in the direction of the interior of the nozzle, means for forcing a lubricant under pressure on said joint against the side of said ring away from the interior of said nozzle, for the purpose set forth, and means for preventing the escape of lubricant except under said packing ring.

5. In a hydraulic apparatus, the combination with a supply pipe, of a nozzle having a pivotal relation thereto, a joint between said members including spaced packing rings deflected in the direction of the interior of the nozzle, and means whereby a lubricant may be supplied between said members.

6. In a hydraulic apparatus, the combination with a supply pipe, of a nozzle having a pivotal relation thereto, and a joint between said members including spaced packing rings on one of said members bearing on the other of said members and deflected in the same direction, a lubricant receiving channel being formed between said members and packing rings.

7. In a hydraulic apparatus, the combination with a supply pipe, of a nozzle having a pivotal relation thereto, and a joint between said members including spaced packing rings on the nozzle bearing on the supply pipe and deflected in the same direction, said nozzle being provided with an annular groove, located in its face between the packing rings, for the reception of a lubricant.

8. In a hydraulic apparatus, the combination with a supply pipe, of a nozzle having a pivotal relation thereto, and a joint between said members including a plurality of clamping rings on said nozzle, a plurality of spaced packing rings clamped between said clamping rings, bearing on said supply pipe, and deflected in the same direction, a lubricant receiving channel being formed between said packing rings.

9. In a hydraulic apparatus, the combination with a supply pipe, of a nozzle hav-

ing a pivotal relation thereto, an enlarged
outwardly facing spherical head on said
supply pipe coöperating with said nozzle
to form a ball joint, said head having a re-
movable bearing section shrunk thereon, for
the purpose set forth.

In testimony whereof I affix my signature
in presence of two witnesses.

WILLIAM A. DOBLE.

Witnesses:

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LEOPOLD M. KARNASCH.