No. 749,417. PATENTED JAN. 12, 1904.

J. A. YEATMAN.

HYDRAULIC NOZZLE AND JOINT.

APPLICATION FILED MAY 20, 1903.

NO MODEL.

Fig. 1.

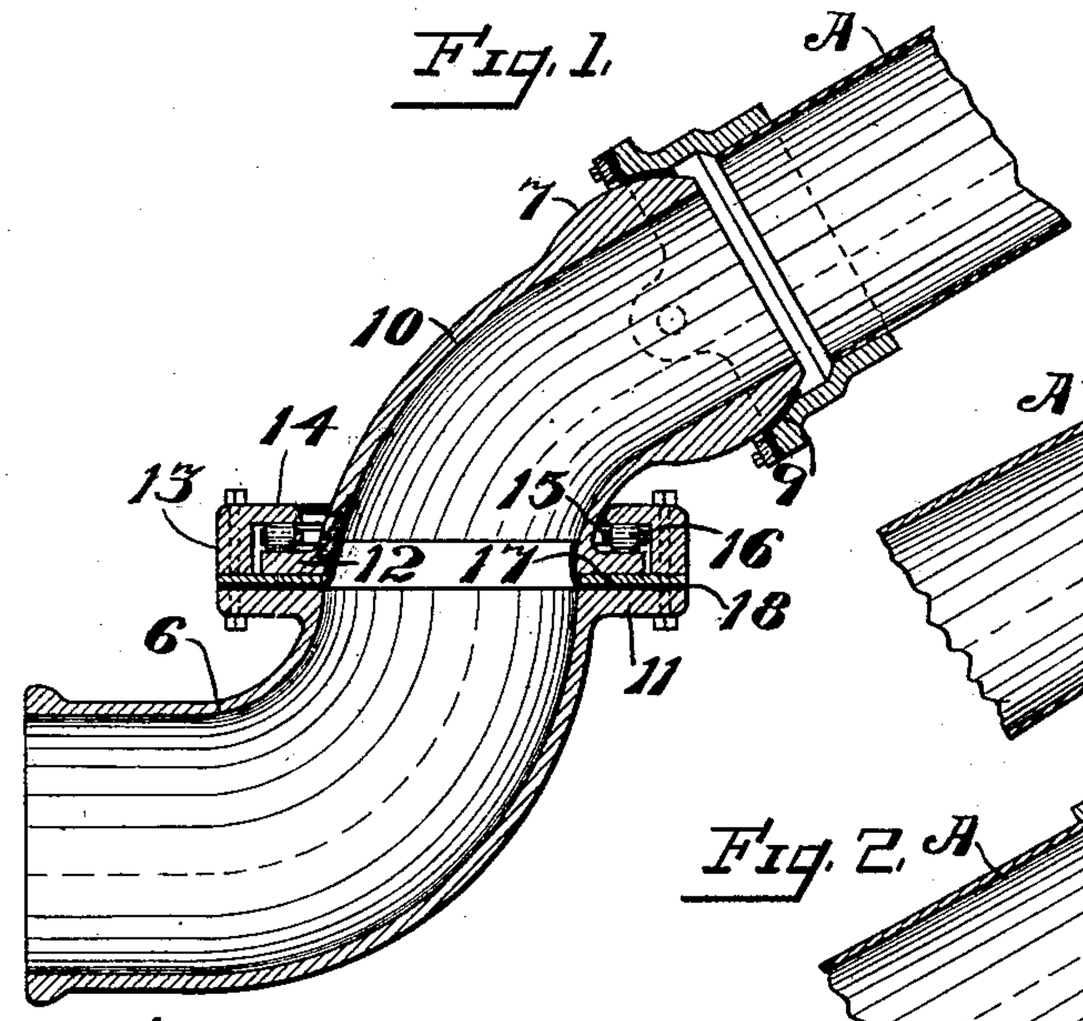


Fig. 1ª.

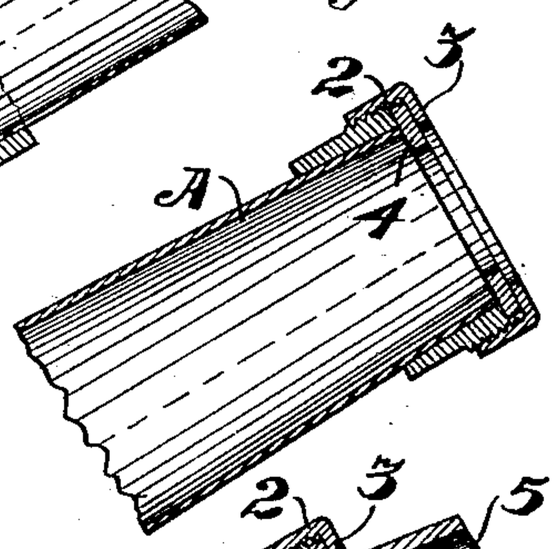


Fig. 2.

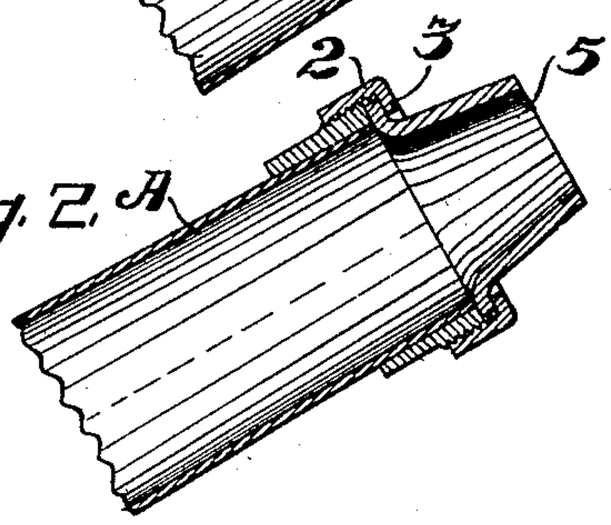


Fig. 3.

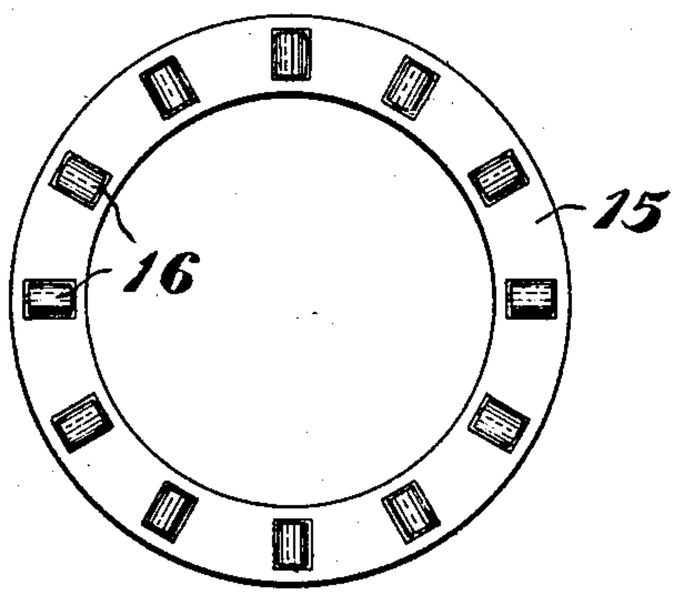
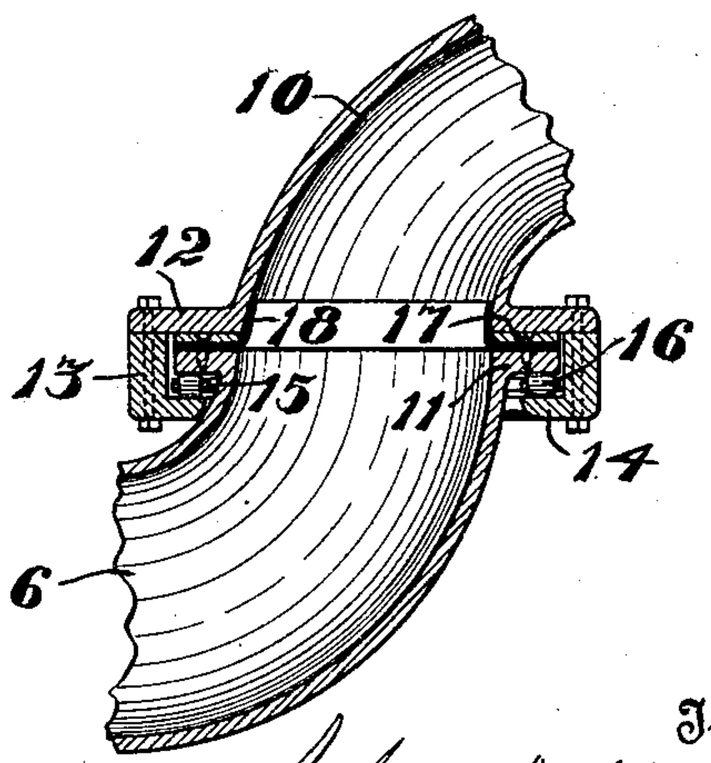


Fig. 4.



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No. 749,417. Patented January 12, 1904.

UNITED STATES PATENT OFFICE.

JOHN A. YEATMAN, OF SAN FRANCISCO, CALIFORNIA.

HYDRAULIC NOZZLE AND JOINT.

SPECIFICATION forming part of Letters Patent No. 749,417, dated January 12, 1904.

Application filed May 20, 1903. Serial No. 157,899. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. YEATMAN, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Hydraulic Nozzles and Joints; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a hydraulic nozzle and antifrictional joint for the conducting-pipes thereof, which pipes are turnable in order to change the direction of water flowing through them; and it is especially applicable to that class of joints which are used in conjunction with pipes and nozzles conveying water to be used for washing down banks of earth, as in placer-mining.

My invention consists of the parts and the constructions and combinations of parts, which I will hereinafter describe and claim.

Figure 1 is a longitudinal vertical central section of my invention. Fig. 1ª is a sectional view of the discharge end of the pipe, showing the cap and disk in place. Fig. 2 is a central section of nozzle end, showing modification. Fig. 3 is a plan view of the rollers and guide. Fig. 4 is a longitudinal vertical central section of swivel-joint, showing modification.

As illustrated in the present case, A is the discharge-pipe of a hydraulic mining apparatus. These pipes have been usually provided with nozzles of various diameter, depending upon the supply of water, its pressure, and the work to be done, and these nozzles are bolted to the end of the pipe.

In my invention I use a cap 2, which is screw-threaded and adapted to screw upon corresponding threads formed upon the outside of a collar which is secured to the outer end of the sheet-metal pipe A. The outer end of the cap 2 has an inwardly-turned flange, as at 3, forming a circular opening interior to the flange of a diameter as great as will be required for any discharge to take place through it.

4 represents disks or nozzles having an exterior circumference sufficient to fit within the cap 2, and when the cap is screwed into place these disks are held between the end of the pipe and the interior of the flange 3 of the cap. There may be any number of these disks thus fitted within the cap having different diameters to suit the required discharge, and one or more of them may be fixed within the cap at the same time, the smaller one serving as the actual discharge-nozzle.

It will be understood that a short nozzle 5, having an outwardly-turned flange at the bottom, may be introduced into the cap 2 and locked in position by screwing the cap upon the end of the pipe, as before described, the length of the interior of the nozzle in this case being slightly greater than that produced by the thickness of the disks where the latter are entirely inclosed within the cap. This construction provides a light and efficient nozzle capable of rapid adjustment and change for any-sized discharge required.

The pipe A is connected with the stationary supply-pipe 6, so as to enable it to be turned in any direction. This connection is variously made; but I have here shown a spherical joint at 7 with trunnions, by which the base of the pipe A is connected, so that it is turnable about the spherical portion 7, and it is packed by the usual flexible leathers 9, extending from the flange of the pipe and movable over the spherical surface 7.

The particular novel features of my joint are shown in the connection between the swiveling section 10 and the fixed section 6 of the conducting-pipe. As shown in this construction, each of the sections 6 and 10 has flanges 11 and 12, respectively, and these flanges register with each other when the pipes are united in the proper position.

13 is a thrust-collar, which is firmly bolted around the periphery to either of the flanges 11 or 12 of the pipe-sections 6 and 10, as shown in Figs. 1 and 4. This thrust-collar has an inwardly-turned flange, as at 14, and between this flange and the flange of the pipe-section, to which it is contiguous, is fitted an annular cage-ring 15, having openings formed therethrough, within which are fitted the antifrictional rollers or balls 16, which serve to relieve the joint of the friction which would otherwise occur from the great pressure of water passing through the joint under a high

head. By the use of this cage the antifrictional rollers or balls are kept apart and prevented from rubbing against each other, the cage turning freely in unison with the rolling of the rollers or balls between the surfaces of the pipe-flanges and the flange 14 of the collar. As shown in Fig. 1, the thrust-collar 13 is secured by bolts passing through it and the flange 11 of the fixed pipe-section 6. In Fig. 4 I have shown the thrust-collar inverted and bolted to the flange 12 of the pipe-section 10. In this case the inwardly-turned flange of the collar projects below the flange 11 of the fixed pipe-section 6, and the roller or ball cage 15 is inserted between the collar-flange and the pipe-flange. In either construction the pressure of the water passing through the pipes acts to force the movable section 10 away from the fixed section 6; but the antifrictonal rollers introduced between the pipe-flange and the thrust-collar flange receive this pressure, whatever it may be, and whenever the pipes are turned with relation to each other the friction will be thus relieved, while any leakage which might otherwise occur from the opening of the joint between the pipe-section flanges will be prevented by the peculiar arrangement of the rigid and flexible interposed disks or rings 17 and 18. The ring 18 is of leather or equivalent flexible and pressure-resisting material. The ring 17 is of steel or other rigid material, and both rings are secured to the flange 11 of the pipe-section 6 either by bolts or screws 20, so as to prevent water from escaping between the rings and the flange. By thus fastening these rings to the flange 11 there is no movement between them, and the actual movable joint falls between the steel ring 17 and the flange 12 of the movable pipe-section, and there will be no rubbing friction at this point to wear the flexible packing-ring 18. In order to prevent leakage through this joint between 12 and 17, the packing-ring 18 is turned up over the inner edge of the ring 17, so that the interior water-pressure will press this upturned portion against the inside of the movable pipe-section 10, and as the two rings are secured to the flange 11 there will be no rubbing friction except between the upturned edge of the ring 18 and the smooth interior of the turnable pipe-section 10 during its comparatively slight and infrequent movements. By this construction I insure a water-tight joint, and the guided and separated rollers relieve the joint of excessive friction under high pressure.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An improved hydraulic discharge-pipe comprising fixed and movable pipe-sections, with flanges upon their contiguous ends; an annular thrust-collar bolted to one of the flanges and having a flange projecting inwardly over the uppermost of the pipe-flanges; an antifriction-bearing between the last-named flanges; a flexible disk secured between the pipe-flanges said disk having its inner edge projecting and turned over the joint between the flanges whereby said projecting portion will be forced against the inner wall of the pipe-sections and the joint to prevent leakage at the latter; a discharge-pipe jointed to the movable pipe-section; a cap fitting over the end of the discharge-pipe and having an inwardly-extending flange; and a removable annulus fitting the cap from the inside and clamped between the flange thereof and the end of the discharge-pipe.

2. A hydraulic discharge-pipe having fixed and movable pipe-sections, with flanges upon their contiguous ends, an annular thrust-collar bolted to one of the flanges having an inwardly-projecting flange projecting over the other pipe-flange, guided rollers or the like located between the collar-flange and pipe-flange, annular rigid and flexible disks secured to the stationary pipe-flange said flexible disk projecting and bent inwardly over the edge of the rigid disk and covering the movable joint between the sections.

3. A hydraulic discharge-pipe having fixed and movable pipe-sections, with flanges upon their contiguous ends, antifrictional thrust-bearings against which interior water-pressure acts, a flexible packing-ring and a metal ring overlying, and bolted through said flexible ring to the lower flange, to provide metallic movable surfaces of contact, said packing-ring being extended and its inner edge turned up to cover the moving joint.

In witness whereof I have hereunto set my hand.

JOHN A. YEATMAN.

Witnesses:
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