

Sept. 30, 1952

J. A. MISCOVICH  
HYDRAULIC GIANT NOZZLE

2,612,402

Filed Nov. 8, 1948

2 SHEETS—SHEET 1

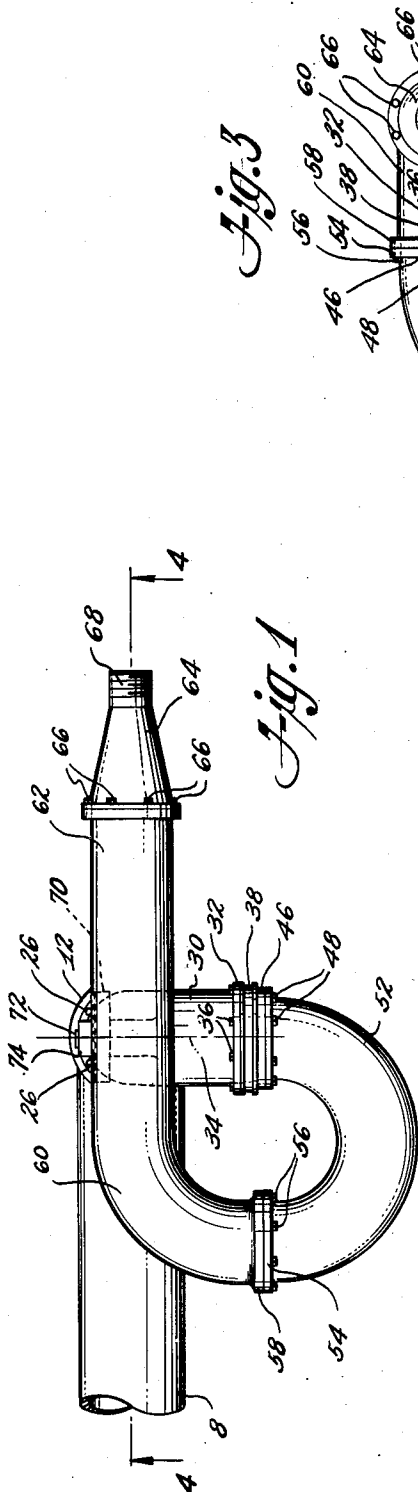


Fig. 1

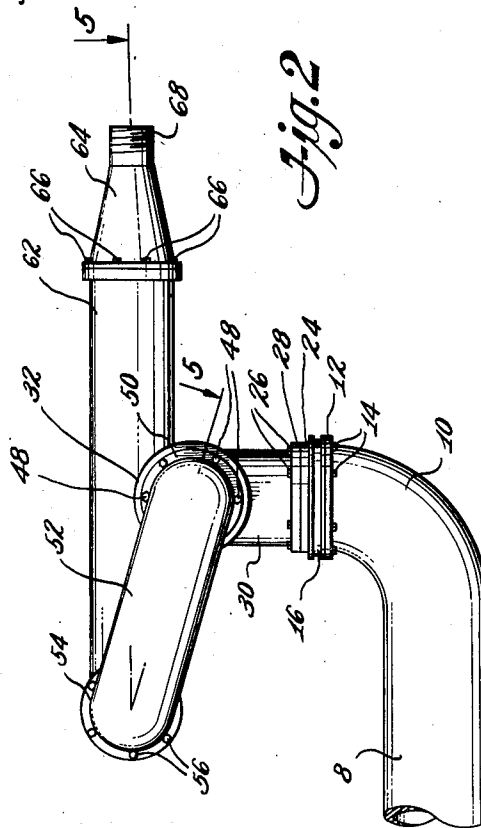
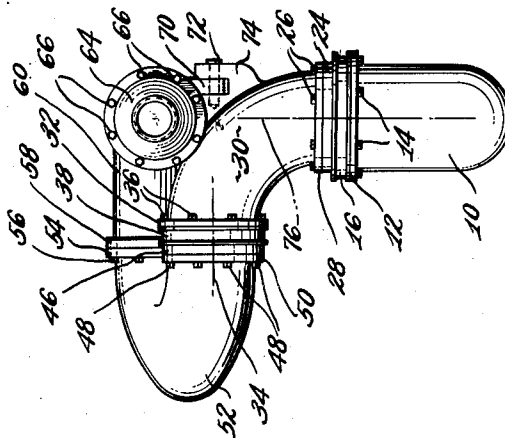


Fig. 2

Fig. 3



INVENTOR.  
JOHN A. MISCOVICH  
BY  
Wm. Edward Hann  
Attorney



## UNITED STATES PATENT OFFICE

2,612,402

## HYDRAULIC GIANT NOZZLE

John A. Miscovich, Fairbanks, Territory of Alaska,  
 assignor of one-half to George S. Allin, Seattle,  
 Wash.

Application November 8, 1948, Serial No. 58,897

3 Claims. (Cl. 299—73)

1

This invention relates to hydraulic giants of the type used for the moving of earth by directing a stream of water under pressure thereon, as in hydraulic placer mining and the like.

The main objects of this invention are to provide an improved form of hydraulic giant; to provide a hydraulic giant in which the water stream therethrough is unimpeded by structural braces such as spiders and the like which cause turbulence in the water flow; to provide a hydraulic giant in which the nozzle may be freely and readily moved in both vertical and horizontal planes; to provide a hydraulic giant in which there will be no reaction whatever in a horizontal plane regardless of the horizontal direction in which the nozzle is pointed; to provide a hydraulic giant in which there will be a minimum of reaction in a vertical plane and in which such vertical reaction is counterbalanced by extending the nozzle forwardly of the axis of pivotal movement so as to take advantage of the weight of the forwardly extending portion of the nozzle and the water therein, and to provide a hydraulic giant in which the stream of water discharged therefrom will be more solid and compact and less dispersed than in existing giants whereby the effectiveness of the water is greatly increased.

An illustrative embodiment of this invention is shown in the accompanying drawings, in which

Fig. 1 is a top plan view of the improved giant mounted on the end of a penstock;

Fig. 2 is a view in side elevation of the giant shown in Fig. 1;

Fig. 3 is a view in front elevation of the same;

Fig. 4 is an enlarged vertical sectional view taken on the line 4—4 of Fig. 1 looking in the direction indicated by the arrows, but with the nozzle tip shown in elevation; and

Fig. 5 is an enlarged sectional view taken on the line 5—5 of Fig. 2, looking in the direction indicated by the arrows, but with the threaded end of the nozzle tip shown in elevation; and

Fig. 6 is a further enlarged fragmentary sectional view showing the detail of the anti-friction sealed joint enclosed in the broken circle 6 of Fig. 5.

In the construction shown in the drawings, a penstock or water supply pipe 8 for hydraulic fluid under pressure and generally disposed in a horizontal position is shown terminating in a 90° elbow end 10 so as to provide an upwardly presenting, horizontally disposed annular end face in the form of a radially disposed, out-

2

wardly extending flange 12. The flange 12 is provided with a plurality of stud holes therethrough for receiving a plurality of studs 14 which extend therethrough and are threaded into an annular ring swivel joint portion 16. The ring 16 is provided with an annular groove on its face near the axial face thereof which is bolted to the flange 12 for receiving an O-ring seal 18.

The upper axial end face of the ring 16 is also provided with an annular upwardly presenting groove for receiving another O-ring seal 20 therein. The inner face of the ring 16, above the seal 18, is also provided with an annular groove or race of generally semi-cylindrical cross section for receiving a plurality of anti-friction members in the form of balls 22. A complementary swivel joint member or ring 24, of L-shaped cross section, is provided on its outer face with the other portion of the ball race for receiving the balls 22. The two flanges of the ring 24 extend downwardly and outwardly, respectively, a distance sufficient to cover over and bear against the O-rings 18 and 20 so as to form a liquid-tight seal at each side of the ball-bearing 22 whereby lubricant is retained around the balls within the bearing and water and dirt is excluded therefrom.

The horizontally extending flange of the ring 24 is drilled and tapped to receive a plurality of threaded studs 26 which pass through registering holes in a radially disposed, outwardly extending flange 28 on one end of a 90° elbow 30. The elbow 30 normally extends upwardly and thence horizontally at right angles to the axis of the penstock 8 but of course may be rotated with respect thereto so as to extend in any direction in a horizontal plane.

The upper end of the elbow 30 terminates in a radially disposed, outwardly extending flange 32 forming an annular end face having a horizontal axis as shown by the axis line 34 and is provided with a plurality of openings therethrough for receiving studs 36 which pass therethrough and are threaded into one portion of a swivel joint in the form of an annular ring 38 identical in construction with the ring 16. Ring 38 is provided with an annular groove on its inner face for receiving an O-ring seal 40 and on the end face opposite to its attaching face for receiving an O-ring seal 42. The inner surface of the ring 38 is also provided with an annular ball race for receiving a plurality of anti-friction balls 44.

A cooperating swivel joint member 46 has an

axially disposed flange fitting within the ring 38 and provided on its outer surface with a ball race for receiving the balls 44 and is extended sufficiently to bear against the O-ring 40 for sealing the joint at that side of the ball race. The ring 46 is also provided with a radially disposed, outwardly extending flange portion which covers over and bears against the O-ring 42 to effect a seal at that side of the ball race whereby lubricant is retained around the anti-friction bearings and water and dirt excluded therefrom.

The ring 46 is drilled and tapped in an axial direction to receive a plurality of threaded studs 48 which pass through registering holes in a radially disposed, outwardly extending flange 50 integrally formed on one end of a 180° elbow 52. The opposite end of the elbow 52 is provided with an integrally formed, radially disposed, outwardly extending flange 54 which is apertured to receive a plurality of threaded studs 56 which pass therethrough and into an integrally formed, radially disposed, outwardly extending flange 58 of a 90° elbow end 60 of a nozzle section 62.

The other end of the nozzle section 62 is similarly flanged to receive a tapered nozzle tip 64 secured thereto by threaded studs 66 and the discharge end of the tip 64 is exteriorly threaded at 68 for the attachment of a control valve when desired.

As shown most clearly in Figs. 1 and 3, the nozzle section 62 is provided with a depending lug 70 which is horizontally apertured to receive a pivot pin 72 carried by an upwardly extending bifurcated bracket 74 integrally formed on the top curved surface of the elbow 30.

All of the parts are so formed and disposed so that the center line 76 of the discharge nozzle is the axis line of the swivel joint formed by the parts 16 and 22 and the axis of the pin 72 is in alignment with the axis line 34 of the swivel joint formed by the parts 38 and 46.

As shown in the drawings, the penstock 8 terminates in a 90° upwardly curved elbow and upon which is mounted one operating portion of an anti-friction sealed swivel joint, the axis of this joint being vertical and the end face being in a horizontal plane. The 90° elbow 30 has its lower end mounted on the other portion of this swivel joint and terminates in an end face disposed in a vertical plane with a horizontal axis.

The upper end of this elbow is secured to one portion of a second anti-friction sealed swivel joint and the other portion of the joint is secured to a nozzle section which, as a matter of convenience in manufacture, is made in two parts and joined at the flanges 54 and 58 but which together constitute a 270° elbow when viewed in plan, i. e., in a horizontal plane.

The 180° portion of the elbow extends slightly upwardly as shown in Fig. 2 of the drawings so that the nozzle portion 62 barely clears the top surface of the elbow 30 as shown most clearly in Fig. 3, it being desirable to have the axis of the nozzle as close as possible to the axis line 34 so as to create a minimum of reaction in a vertical plane when the nozzle is in operation.

The curvature of the 270° elbow when viewed in plan is such as to have the axis of the nozzle section and discharge tip intersect the vertical axis 76 of the penstock swivel joint so that there will be a zero reaction in a horizontal plane when the nozzle is in use.

A feature of this nozzle is in having the interior of the entire structure completely clear of spiders or other parts which tend to create a turbulence

in the flow of water therethrough and this unimpeded flow of water through the nozzle results in the stream of water issuing from the nozzle being in a more compact and dense form and less dispersed than in the present forms of hydraulic giants. This results in a stream of water that does more effective and better work and thereby secures an increase in efficiency. This increase in efficiency is particularly important where water supply is limited, and the time of operation is also limited, such as in working the frozen lands in placer mining in Alaska and other northern areas where the season is short.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that details of the construction shown may be altered or omitted without departing from the spirit of this invention, as defined by the following claims.

I claim:

1. In a hydraulic giant a substantially horizontal penstock section for supplying fluid under pressure, the discharge end of said section being curved upwardly and terminating in a substantially horizontal end face, a swivel joint on said end face having a substantially vertical axis, a 90° elbow having one end swiveled on said joint and its other end disposed at right angles to the axis of said penstock end, a second swivel joint on the second mentioned end of said elbow and having a substantially horizontal axis and a nozzle section having one end swiveled on said second joint, said nozzle section being curved substantially 270° in a horizontal plane with the discharge end thereof in the same vertical plane as the axis of said first joint whereby fluid discharged from said nozzle under pressure will cause no reaction in a horizontal plane, said nozzle section extending forwardly from said second joint a distance sufficient to cause the weight thereof to act as a counterbalance for discharge reaction in a vertical plane.

2. In a hydraulic giant a substantially horizontal penstock section for supplying fluid under pressure, the discharge end of said section being curved upwardly and terminating in a substantially horizontal end face, a swivel joint on said end face having a substantially vertical axis, a 90° elbow having one end swiveled on said joint and its other end disposed at right angles to the axis of said penstock end, a second swivel joint on the second mentioned end of said elbow and having a substantially horizontal axis and a nozzle section having one end swiveled on said second joint, said nozzle section being curved substantially 270° in a horizontal plane with the discharge end thereof in the same vertical plane as the axis of said first joint whereby fluid discharged from said nozzle under pressure will cause no reaction in a horizontal plane, and said curved nozzle section being disposed closely adjacent to said elbow whereby discharge reaction in a vertical plane will be minimized, said nozzle section extending forwardly from the discharge end of said second joint a distance sufficient to cause the weight thereof to act as a counterbalance for discharge reaction in a vertical plane.

3. In a hydraulic giant a substantially horizontal penstock section for supplying fluid under pressure, the discharge end of said section being curved upwardly and terminating in a substantially horizontal end face, a swivel joint on said end face having a substantially vertical axis, a 90° elbow having one end swiveled on said joint

and its other end disposed at right angles to the axis of said penstock end, a second swivel joint on the second mentioned end of said elbow and having a substantially horizontal axis and a nozzle section having one end swiveled on said second joint, said nozzle section being curved substantially 270° in a horizontal plane with the discharge end thereof in the same vertical plane as the axis of said first joint whereby fluid discharged from said nozzle under pressure will cause no reaction in a horizontal plane.

JOHN A. MISCOVICH.

#### REFERENCES CITED

The following references are of record in the file of this patent:

| Number    | Name         | Date          |
|-----------|--------------|---------------|
| 112,969   | Shaw         | Mar. 21, 1871 |
| 273,397   | Russell      | Mar. 6, 1883  |
| 860,445   | Cheney       | July 16, 1907 |
| 2,006,833 | Jensen       | July 2, 1935  |
| 2,269,431 | Allen et al. | Jan. 13, 1942 |
| 2,501,639 | Warren       | Mar. 21, 1950 |

#### FOREIGN PATENTS

| Number  | Country       | Date          |
|---------|---------------|---------------|
| 350,704 | Great Britain | June 18, 1931 |

#### UNITED STATES PATENTS