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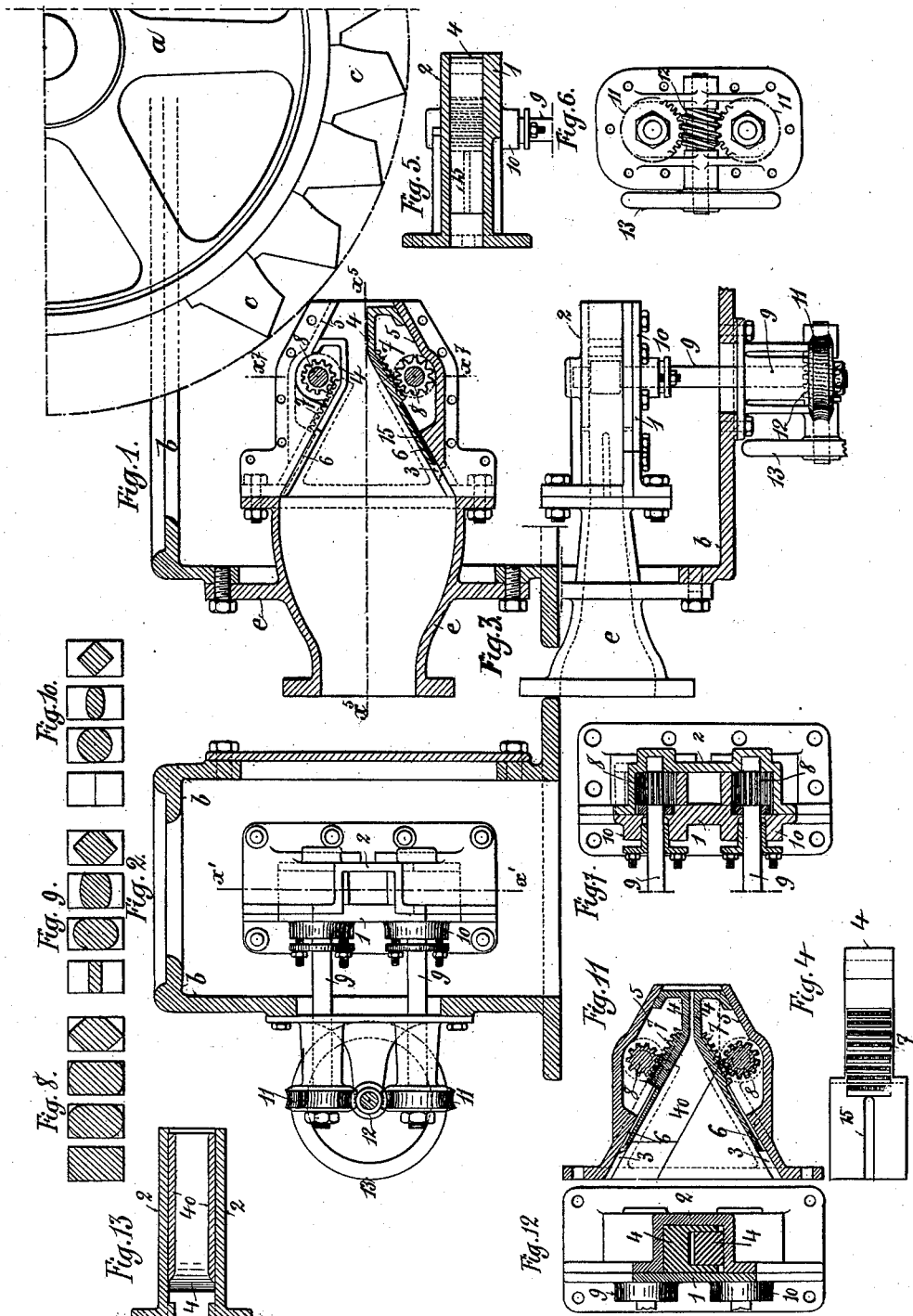
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REGULABLE AJUTAGE FOR HYDRAULIC MOTORS.

(Application filed Nov. 11, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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REGULABLE AJUTAGE FOR HYDRAULIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 647,283, dated April 10, 1900.

Application filed November 11, 1899. Serial No. 736,711. (No model.)

To all whom it may concern:

Be it known that we, FRANÇOIS JOSEPH SINGRÜN and HENRI ALBERT SINGRÜN, citizens of the French Republic, and residents of Paris, France, have invented certain new and useful Improvements in Regulable Ajutages for Hydraulic and other Motors, of which the following is a specification.

This invention relates to ajutages such as are used for hydraulic motors—as water-wheels, for example; and the object of the invention is to provide a regulable sectional ajutage for motors under high pressures, impacts, or heads, such as the Pelton wheel or similar motors, and for turbines and similar apparatuses operated either by water, steam, gas, or other fluids or liquids.

In the accompanying drawings, which illustrate an embodiment of the invention, the ajutage is represented as applied to supplying water to a Pelton wheel; but this application is merely for illustration. It may as well be applied to other wheels or motors.

In the drawings, Figure 1 is a sectional elevation substantially at line x' in Fig. 2. This view shows, merely for illustration, the upper movable section of the ajutage full open and the lower movable section nearly closed. Fig. 2 is a face view of the ajutage as seen from the right in Fig. 1, but with both sections of the ajutage open. Fig. 3 is a plan. Fig. 4 is a plan view of one of the movable sections of the ajutage detached. Fig. 5 is a horizontal longitudinal mid-section of the ajutage at line x^5 in Fig. 1. Fig. 6 is a side view of the operating mechanism seen at the left in Fig. 2. Fig. 7 is a transverse section at x^7 in Fig. 1. Figs. 8, 9, and 10 show several forms of the distributing-orifice of the ajutage. Fig. 8 shows the ajutages full open. Fig. 9 shows them partly closed, and Fig. 10 shows them closed as nearly as may be. Figs. 11, 12, and 13 are views illustrating a slightly-different construction from that illustrated in the principal views.

In Fig. 1, a represents a Pelton wheel. b is the frame which supports the ajutage. c are the buckets of the wheel a , and e is the mouth-piece in the frame b , to which the ajutage is secured.

The ajutage is formed of two side plates,

1 and 2, Fig. 2, which are secured to the mouthpiece e and serve to limit the width of the jet-orifice. The plate 2, which is mounted removably, forms also a fixed top and bottom boxing for the ajutage, and within the space thus inclosed are mounted two movable plates or sections 4 4, one above and one below, which move over inclined surfaces 5 5 on the part 2, so that when driven forward they converge, so as to restrict the vertical height of the outlet. At their edges the sections 4 engage and play in grooved guideways in the plates 1 and 2. On the respective outer faces of the sections 4 are formed racks 7, with which gear pinions 8, fixed to or integral with their respective arbors 9. These arbors pass through and have bearings in stuffing-boxes 10 in the side plates. On their exterior ends the respective arbors 9 have fixed on them worm-wheels 11, with which gears a worm or screw 12, which may be turned by hand through the medium of a crank or hand wheel 13. The worm 12 may, however, be controlled by any known form of governor or automatic speed-regulator, if desired.

It will be readily understood that by rotating the screw or worm 12 the sections 4 4 may be advanced convergently and thus brought more or less nearly together for reducing the ajutage, or by turning said worm in the opposite direction they may be drawn back for enlarging the area of the outlet. At the same time the faces of the movable sections 4, which form the ajutage proper, will always remain parallel with each other and with the longitudinal axis of the inlet and ajutage. In the wider inner portions of the respective sections 4, Fig. 4, are formed slots or apertures 15, which permit the liquid, under some tension, flowing through the ajutage to pass through the section to the back thereof, and thus balance the pressure thereon, so as to reduce the friction and resistance to movement to a minimum.

The parallel faces of the two sections 4 may have any desired shape or form in cross-section, so as to produce a jet having a cross-section of the form required. Figs. 8, 9, and 10 illustrate four forms. The first is the plain rectangular form seen in the principal views,

as Fig. 2, for example. The second will produce when the sections are closed, Fig. 10, a cylindrical jet. The third will produce when closed a jet with a flat elliptical cross-section, Fig. 10, and the fourth will produce a jet of rectangular form with oblique sides or one of lozenge shape. These are only illustrations of many forms. In some of them the movements of the sections only contract but cannot wholly close the outlet for the jet. They modify its shape and dimensions only.

The construction of the ajutage as above described has the following advantages:

First. The jet can have any form desired and remains always compact and full, with all its threads parallel, whatever may be its cross-sectional area.

Second. The angle of injection and the center of pressure remain invariable, whatever may be the variation in the section of the outlet-orifice.

Third. The form of the conduit brings the fluid into the final section or ajutage proper in a manner to avoid all throttling and reduces to a minimum the contraction of the fluid. The friction and loss are diminished, and consequently the effective pressure at the mouth or outlet of the ajutage is augmented, while the cross-section of the same is reduced.

Fourth. The utilization of the fluid is more complete, and the fluid is thus economized when the motor is not moving up to the full speed due to admission, since only that much liquid is dispensed which is required by the variable demand to preserve or maintain the velocity required.

Fifth. The section of the orifice of distribution may be changed while the ajutage is in full operation and instantaneously by hand or automatically and without stopping the motor.

Having thus described our invention, we claim—

1. An ajutage for hydraulic motors and the like of which the outlet-orifice is regulable, said ajutage having fixed side walls, two slidable sections within said walls and mounted to operate convergently, said sections having parallel faces which form the jet, and means for operating said slidable sections.

2. An ajutage for hydraulic motors and the like of which the outlet-orifice is regulable, said ajutage having fixed lateral or side walls,

two obliquely-slidable sections between said side walls, said sections having parallel faces which form the jet, and means for simultaneously operating said sections to an equal extent, whereby the axis of the jet and its angle of injection are maintained while its cross-section is varied.

3. A regulable ajutage for hydraulic motors and the like, having fixed lateral or side walls, a pair of slidable sections between said walls and provided each with a rack, pinions gearing with said racks, and exterior means for operating said pinions simultaneously, substantially as set forth.

4. A regulable ajutage for hydraulic motors and the like, having fixed lateral or side walls, a pair of slidable sections between said walls and provided each with a rack, pinions gearing with said racks, the shafts of said pinions having worm-wheels fixed on their outer ends, a screw or worm gearing with both of said worm-wheels, and means for rotating said screw, substantially as set forth.

5. A regulable ajutage having displaceable sections with parallel faces and slidably mounted so as to converge, the faces always remaining parallel at all distances apart.

6. A regulable ajutage having obliquely-slidable, convergent sections with always parallel faces, said faces being adapted to close the outlet entirely, and means for operating said sections.

7. A regulable ajutage having slidably-mounted sections which are adapted to move together convergently in the direction of the longitudinal axis of the ajutage, and to totally close the outlet, whereby the aid of other cut-off devices is avoided.

8. An ajutage having an outlet of fixed walls and within said walls a pair of slidably-mounted sections for varying the dimensions of the ajutage-outlet, said sections having apertures in them for the passage of the fluid to the backs thereof to balance the pressures on the two faces of the sections.

In witness whereof we have hereunto signed our names, this 25th day of October, 1899, in the presence of two subscribing witnesses.

FRANÇOIS JOSEPH SINGRÜN.
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Witnesses:

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