(No Model.)

A. DELATTRE & F. BRÜCKERT.

ROTARY MOTOR.

No. 530,220. Patented Dec. 4, 1894.

Fig. 1

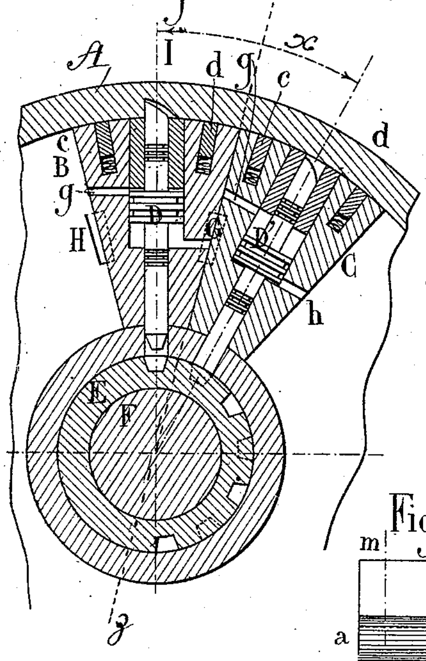


Fig. 3

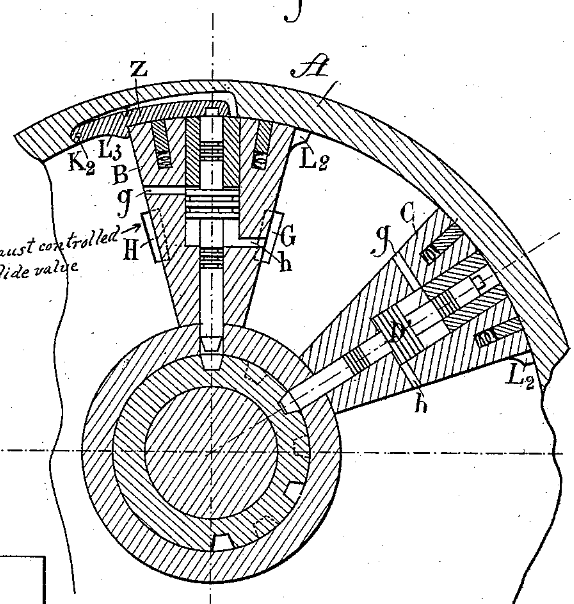


Fig. 2

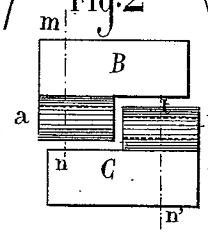
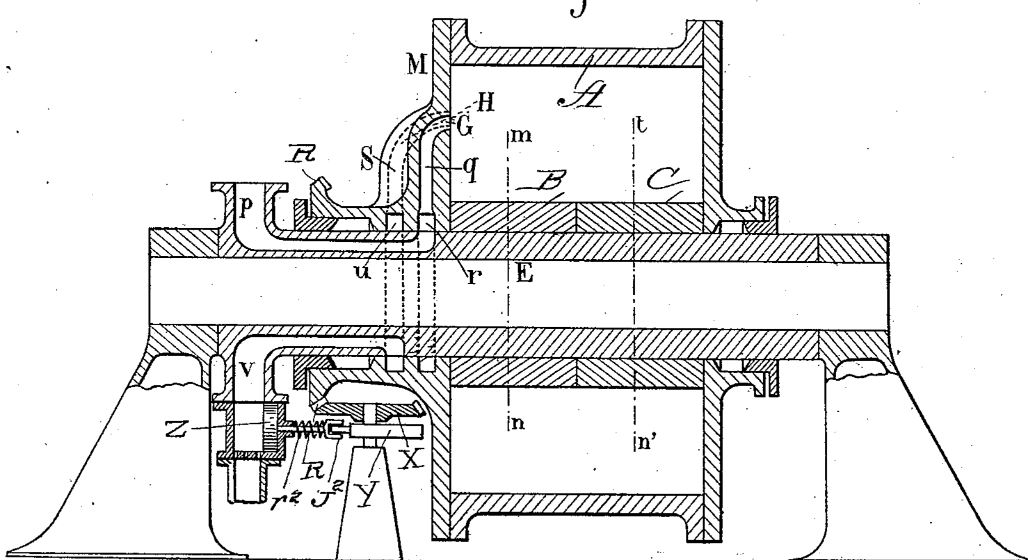


Fig. 4



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AUGUSTE DELATTRE AND FIRMIN BRÜCKERT, OF FERRIERE-LE-GRANDE, FRANCE.

ROTARY MOTOR.

SPECIFICATION forming part of Letters Patent No. 530,220, dated December 4, 1894.

Application filed July 7, 1893. Serial No. 479,814. (No model.)

To all whom it may concern:

Be it known that we, AUGUSTE DELATTRE and FIRMIN BRÜCKERT, citizens of France, and residents of Ferriere-le-Grande, France, have invented certain new and useful Improvements in Rotary Motors, of which the following is a specification.

It is the object of our invention to provide a turbine for use with steam or like motive fluid, in which two paddles will be employed carrying radially movable pistons arranged to be controlled by the pressure of the fluid to lock the paddles alternately to a central nave or hub while the other paddle is released and pressed around by the motive fluid carrying the casing or pulley with it.

Figure 1, is a transverse sectional view through the rotary paddles and part of the casing of the engine, said section being taken on line *m*—*n* of paddle B of Figs. 2 and 4 and on line *t*—*n'* of the paddle C of said figures. Fig. 2, shows the relative arrangement of the two paddles. Fig. 3, is a view similar to Fig. 1 showing a slightly modified form of engine, the paddles in this figure being in a different position from that of Fig. 1. Fig. 4, is a longitudinal section through the engine casing on line *y*—*z* of Fig. 1.

A is a bored out cylinder into which the two paddles B and C are arranged of which one is free to move while the other is fixed. The paddles have eyes or hubs as shown in Fig. 2 through which the shaft passes on which the paddles turn. In the body of each of the paddles a cylindrical opening is bored in which a piston D or D' can reciprocate. Said piston is provided with a rod or stem on each of its faces. Each of these pistons and its two rods are provided with grooves for securing the necessary water tight joint whereby one port of the piston chamber is divided from the other.

The conduits *g* and *h* put the piston chambers in communication either with the inlet orifice, or with the exhaust so that the piston with its rod will be pressed toward the center or toward the circumference according to the flow of the liquid and according to which face it acts upon. The rod, when pressed toward the center engages in one of the indents made in a sleeve or shaft E while if pressed toward the circumference it engages in an indent I made in the interior surface of the cylinder A. The pistons D and D' are so disposed that the one D is in the plane of the line *m*, *n* of the paddle B Fig. 2 and the other D' in the plane of the line *t*, *n'* of paddle C. One series of indents of the sleeve E are disposed in the plane of the line *m*, *n* and the other series in the plane of the line *t n'*.

In order to secure the water tightness of the chambers formed by the paddles each of the latter is provided with movable pieces pressed by springs. These are shown at *c d* pressing against the inner surface of the cylinder. One of the heads of the cylinder A is provided with two openings of which one, G serves for admitting the motive fluid and the other H for its escape.

The fixed sleeve E, Fig. 4, is provided with a channel through which the fluid comes in. The head M (Fig. 4) is provided with a channel *q* which extends to one side into the cylinder A and connects at its other end with a circular groove *r* formed in a projection or enlargement of the head M at the point to which the channel *p* extends; so that whatsoever may be the radial position of the channel *q*, the motive fluid that enters through the conduit *p* flows into the groove *r* and passes then into the cylinder A between the paddles B and C through the channel *q*. For effecting the exhaust, the conduit H is prolonged by a channel S shown in dotted lines, Fig. 4, which connects with a circular groove *u* which in turn connects with the channel *v* extending lengthwise of the fixed sleeve E so that in exhausting the fluid passes through the orifice H, through the channel S and from there into the circular groove *u* from where it escapes through the channel *v*.

The working of our paddles in a rotary engine, where the cylinder A is imparted a rotary motion by the alternating motive action of the paddles B and C, occurs as follows: The two paddles B and C being in the position shown in Fig. 1 the motive fluid enters by the orifice G, pushes the paddle B that

carries along the cylinder A through the intermediary of the exterior extremity of the rod of the piston D, which engages the indent I in the cylinder A. During the rotary motion of the paddle B the fluid contained in the other chamber or in other words the part of the chamber in front of the paddle escapes through the opening H. A little time before the paddle B comes into contact with the paddle C that is stationary the escape opening is shut by any suitable means (a slide or a valve.) The paddle B that continues to rotate after the closing of the escape opening compresses the gas or the steam that remains between the two paddles B and C. (The closing of the escape opening must be made so that said compression may reach a superior degree to the initial pressure at G.) The thus compressed fluid between the two paddles enters through the openings *g* and *h* of the paddles B C respectively upon the pistons D and D′ and tends to lower the piston D toward the sleeve E and to move outwardly the piston D′ toward the cylinder A. As soon as the extremity of the rod of the piston D arrives opposite the indent of the nave E it engages therein and thus holds the paddle and said paddle B is no longer in engagement with the cylinder A which by its acquired speed, continues its rotary motion. The indent I comes opposite the rod of the piston D′ which immediately engages in the same as it is pressed by the pressure of the compressed fluid entering through port *h*. At this moment the openings G and H instead of being at each side of the paddle B are located at each side of the paddle C which has become movable while the paddle B that was movable a moment ago has become stationary. The paddle C will thus undergo the action of the motive fluid that comes in through G and the same action above described will take place.

It will thus be seen that the paddles B and C which are alternatingly one movable and the other stationary will each make a revolution of three hundred and sixty degrees minus the angle *x* which angle *x* is equal to the angle formed by the radial axes of the two paddles when the latter touch each other. The changes of action of the two paddles occur therefore always at different points, the difference of those changes amounting to the angle *x* at each turn of the cylinder A. The cylinder that thus has a rotary motion can transmit the motion directly through the intermediary of the strap or whatsoever other device.

The exterior extremities of the pistons D D′ instead of engaging into the indent I of the pulley cylinder A can engage with a click pivoted at the point K^2. This modification works as follows: The paddles B and C being in the positions shown in Fig. 3, the motive fluid that comes in at G will push the paddle B as the exterior extremity of the rod of the piston D, is engaged with the click Z. When the paddle B arrives near the paddle C the inclined plane L^3 with which the click Z is provided will hit against the finger L^2 which is carried by the paddle C. (The paddle B is also provided with the same finger L^2.) The click will thus be raised and consequently will be disengaged from the paddle B which stops by hitting against the paddle C. The pulley cylinder A continues its course by its acquired speed and the openings G and H will be located the one H at the left of the paddle C and the other G at the right of the paddle C. The openings *g* and *h* are thus, the one *g* in communication with the escape opening and the other *h* in communication with the motive fluid and of the paddle B. *g* is in communication with the motive fluid and *h* in communication with the escape opening. The two pistons D and D′ are thus worked in different directions, that is, D will be pushed toward the sleeve E in an indent of which the inner rod of the piston D will engage, and the piston D′ will be pressed toward the pulley cylinder and the exterior end of its rod will engage with the click Z. The same action will occur again by each turn of A.

When the exterior extremities of the rods of the pistons D D′ of the paddles B and C engage alternately with the click Z instead of engaging the indent I, it will not be necessary to establish such a high degree of compression as in the case first described when the paddles engage in an indent I, as the compression that is established either by a motive gas or by steam in this modification has no other object than to deaden the speed acquired by the paddle that must become stationary. This difference in action is due to the fact that in this modification the release of the pistons from the click is effected mechanically while in the first instance the pistons are released from the indent only by the greater degree of compression.

We do not wish to limit ourselves to the use of the invention as a motor or engine as it may be adapted for use as a pump.

The means for closing periodically the port H for producing the necessary compression for actuating the pistons D D′ at the required moment is as follows, (see Fig. 4:) A cog wheel R gearing with the wheel X is fixed upon the extremity of the case of the stuffing box. Upon the axle of the wheel X a cam Y is mounted that transmits its action to the slide valve Z by the slide J^2. A spring r^2 carries back the slide valve to the position shown in the drawings.

We claim—

1. A rotary engine comprising the rotary cylinder, the sleeve or shaft E having indentations, the inlet and exhaust ports G H, the paddles B C arranged to turn about the central shaft said paddles containing piston chambers and the pistons therein having

stems or rods projecting inwardly and outwardly to engage alternately the indented shaft and the cylinder respectively said paddles having ports leading to the piston chambers, substantially as described.

2. In combination, the central shaft E, the rotary cylinder having inlet and exhaust ports G H, the paddles B C, each having a piston chamber with a piston therein having inwardly and outwardly extending rods, to engage the shaft and cylinder respectively the ports leading through the paddles to said piston chambers, the pivoted click Z carried by the cylinder to engage the outer piston rods and the fingers carried by the paddles for lifting the click, substantially as described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

AUG. DELATTRE.
FIRMIN BRÜCKERT.

Witnesses:
WITTEMBERG,
A. ERNOTTE.