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ROTARY ENGINE.

APPLICATION FILED MAY 8, 1912.

1,068,963.

Patented July 29, 1913.

2 SHEETS—SHEET 1.

Fig. 1

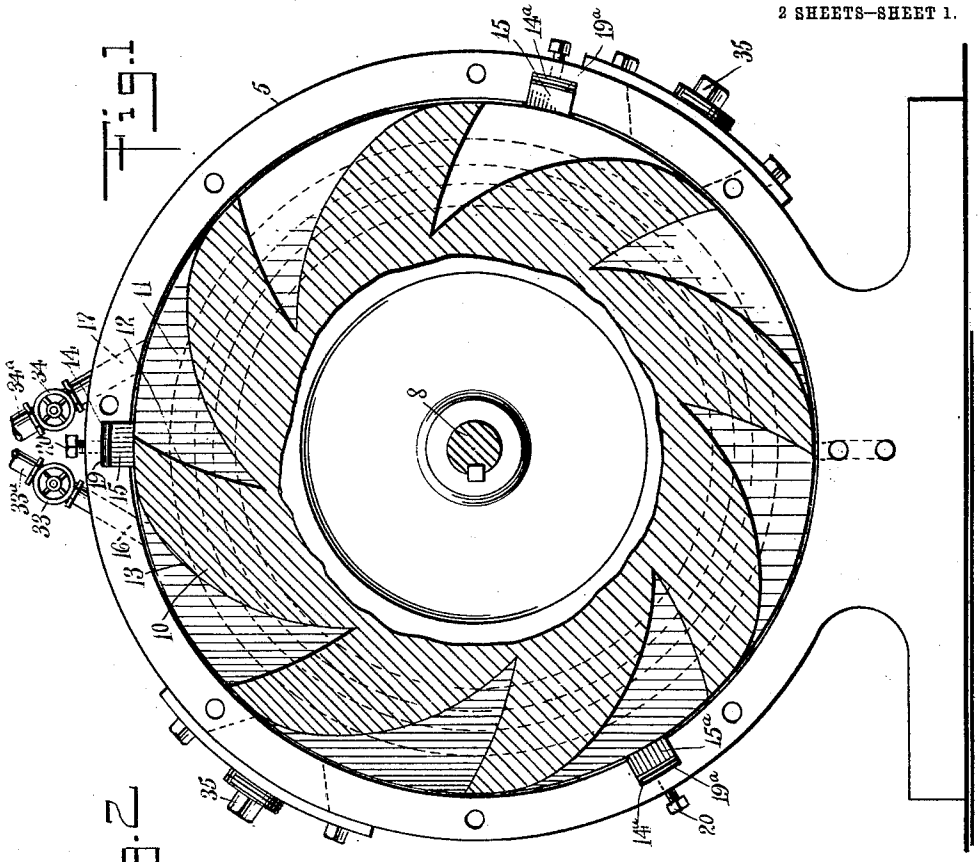
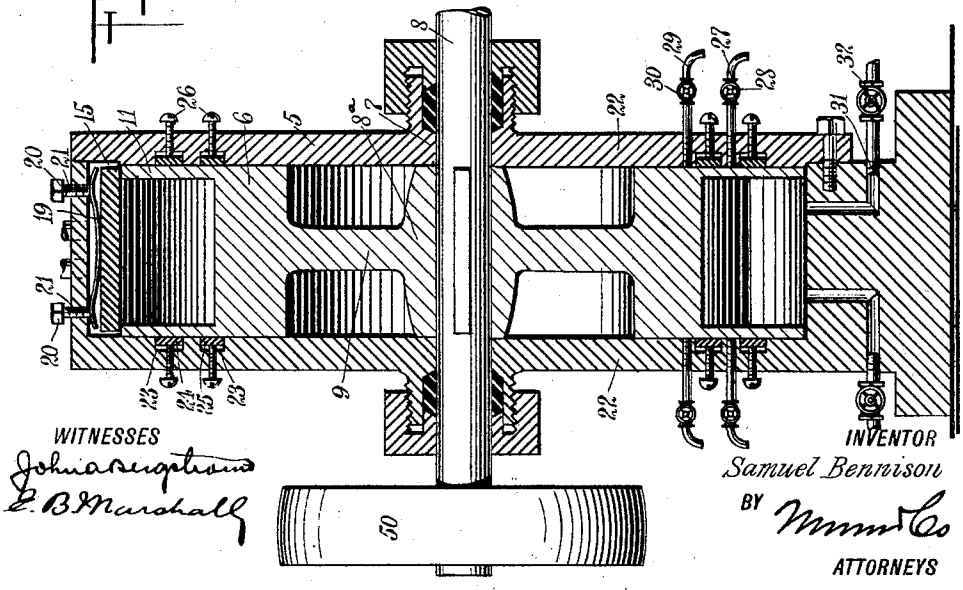


Fig. 2



WITNESSES

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Fig. 3

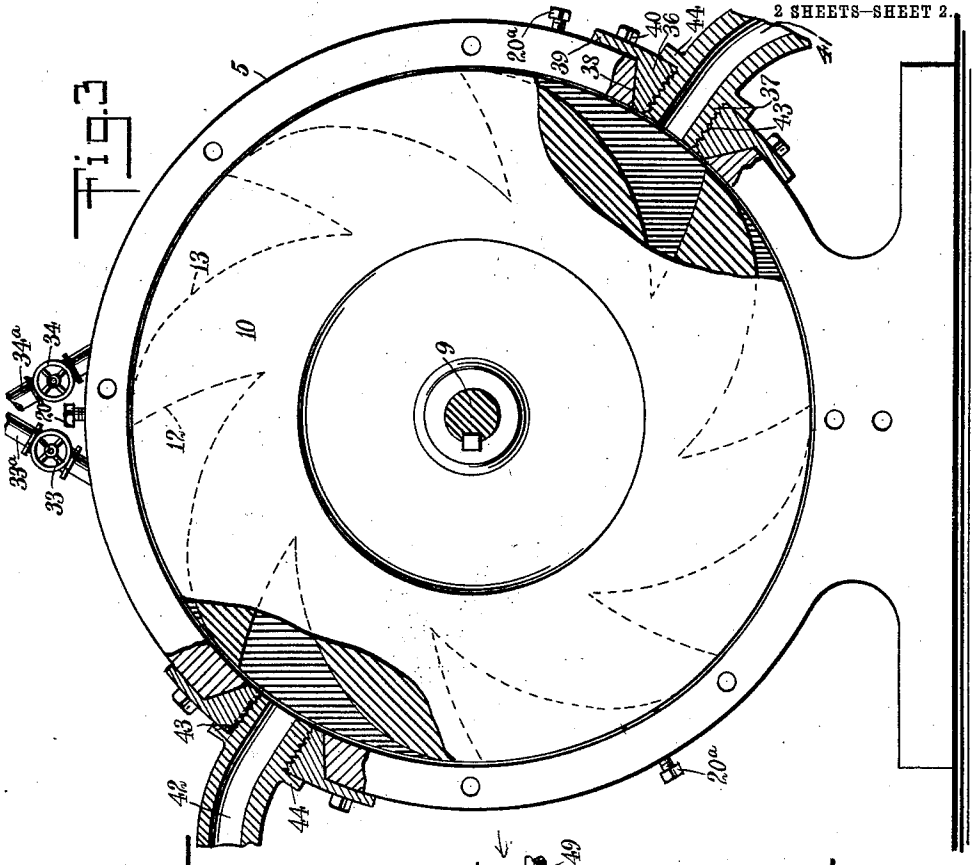
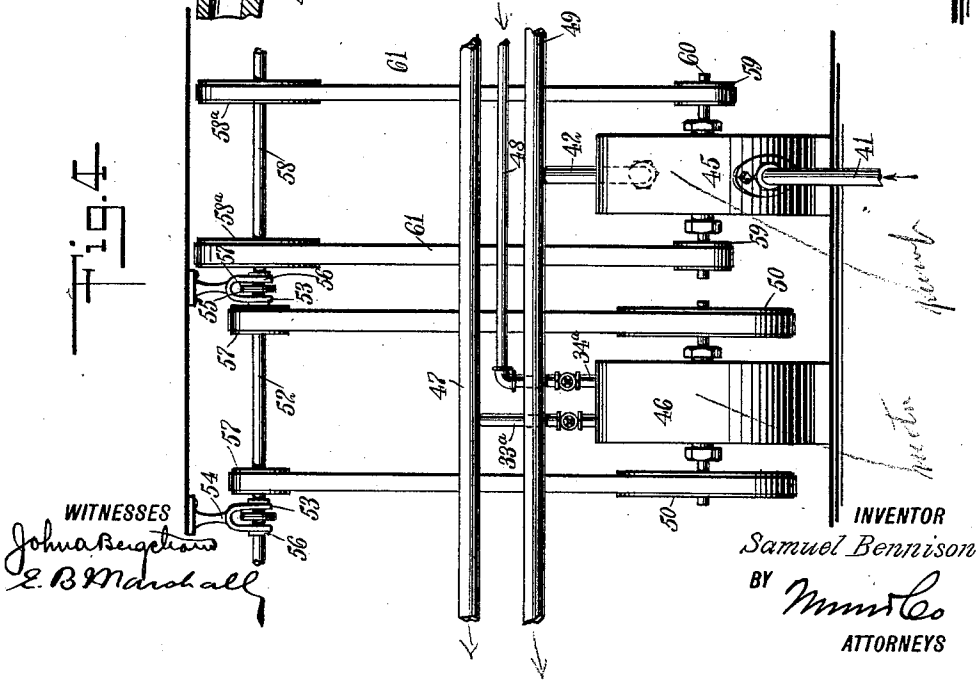


Fig. 4



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ROTARY ENGINE.

1,068,963. Specification of Letters Patent. Patented July 29, 1913.

Application filed May 8, 1912. Serial No. 695,858.

To all whom it may concern:

Be it known that I, SAMUEL BENNISON, a citizen of the United States, and a resident of Galveston, in the county of Galveston and State of Texas, have invented a new and Improved Rotary Engine or Pump, of which the following is a full, clear, and exact description.

My invention relates to rotary engines or pumps and it has for its object to provide one having packing rings for engaging the sides of the wheel near its periphery, to prevent the fluid under pressure from escaping toward the axis of the wheel, so that its full power may be exerted on the impact faces of the buckets, which are spaced apart on the piston wheel between the sides which are engaged by the packing rings. The casing of the engine is provided with cocks for indicating any escape of the fluid in the direction of the axis of the wheels, so that, when necessary, the packing rings may be adjusted to prevent the further escape of the fluid.

Another object of the invention is to provide a twin pillar hanger, having bearings spaced apart in which are journaled sections of a main shaft, the shaft sections having flanges, which are normally bolted together, and which may be readily freed from each other to cut out a shaft section which is connected with one of the rotary engines, or, when desired, to reverse the said shaft section to operate the rotary engine connected therewith as a pump.

Still other objects of the invention will appear in the following complete specification, in which the preferred form of the invention is disclosed.

In the drawings similar characters of reference indicate corresponding parts in all the views, in which—

Figure 1 is a side sectional elevation of my rotary engine or pump; Fig. 2 is a transverse sectional view of Fig. 1; Fig. 3 is an elevation of the rotary pump with parts broken away, to show how the suction inlet and outlet pipes are connected when the device is used as a rotary pump; and Fig. 4 is an elevation showing how the shaft sections with which the several rotary engines or pumps are coupled, are connected together at the twin pillar hangers.

By referring to the drawings it will be seen that each rotary engine or pump has a casing 5, each casing having bearings 7, in which the shaft 8 is journaled, a wheel 6 being disposed in each of the casings 5, and being keyed to the said shaft 8. The wheels 6 have hubs 8^a, and web portions 9, there being buckets 10, which are spaced apart around the wheel, these buckets 10 being disposed between the extending sides 11 of the wheel.

As best shown in Figs. 1 and 3 of the drawings, these buckets 10 have impact faces 12, and rear faces 13, the said faces being curved and converging outwardly. The inlet port 16 is so disposed in the casing 5 that the full force of the steam or fluid under pressure will strike against the impact face of the bucket 10 until the periphery of the next bucket is about to pass the inlet port 16. In the casing 5 there is an opening 14, between the inlet port 16 and the outlet port 17, a separator 15 being disposed in this opening, and, as best shown in Fig. 2 of the drawings, pressing against the peripheries of the sides 11 of the wheel, and also against the outer ends 18 of the buckets 10. This separator 13 is engaged by a spring 19, the tension of which is regulated by the set screws 20, which mesh in the threaded orifices 21 in the casing, and press against the spring 19. In the sides 22 of the casing there are two circular grooves 23, which have the same axis as the shaft 8, and in these grooves 23 there are disposed packing rings 24 and 25, which press against the sides 11 of the wheel 6. The packing rings 24 and 25 have plates which are engaged by set screws 26, by which means the pressure of the packing rings 24 and 25 against the sides 11 of the wheel may be regulated. In the sides of the casing 22 there are disposed pipes 27, commanded by valves 28, the pipes 27 being disposed between the packing rings 24 and 25. There are also pipes 29 disposed between the packing rings 25 and the axis of the shaft 8, these pipes 29 being commanded by the valves 30. These pipes 27 and 29, with their valves 28 and 30 are provided so that the engineer may readily determine whether the steam or other fluid under pressure is escaping past the packing rings 24 and 25, and in the direction of the shaft 8.

Should it be found that the steam or other fluid under pressure is escaping past the packing rings 24 and 25, the packing rings may be pressed with greater force against

the sides 11 of the wheels 6, by means of the set screw 26. In the bottom of the casing 5 there are drain outlets 31, commanded by valves 32, for draining any fluid from the engine in the casing which may be contained therein, when the engine is at rest.

As shown in Fig. 4 of the drawings, two of these engines or pumps may be coupled together, one to act as an engine for driving the other, which operates as a pump. When one of the engines is to be operated as a pump, one of the sides 22 of the casing is removed, and the wheel 6 is reversed so that the buckets 10 will extend and will be disposed in the position shown in Fig. 3 of the drawings. This having been done, additional separators 15^a, which are disposed in the openings 14^a, in the casing, are pressed against the periphery of the wheel by means of the set screws 20^a, and the springs 19^a, these additional separators being provided to assist in producing the necessary suction to obtain the best results. When the device is used as a pump, the valve 33 in the pipe 33^a leading to the inlet port 16, and the valve 34 in the pipe 34^a leading to the exhaust port 17, are closed, and the plugs 35 are removed, these plugs being normally disposed in the conical blocks 36, these conical blocks 36 having threaded openings 37, with which the screws or plugs 35 normally mesh. The conical blocks 36 fit conical openings 38 in the periphery of the casing 5. The conical surfaces are provided to prevent the blocks 36 from extending inwardly, beyond the inner face at the periphery of the casing. The flanges 39 on the conical blocks 36 are secured to the casing 5 by the set screws 40. When the blocks 35 have been removed the suction pipe 41 and the outlet pipe 42 are disposed in the conical blocks 36, the said suction pipe 41 and the outlet pipe 42 having threads 43 which mesh with the threads 37 in the conical blocks 36. There are flanges 44 on the suction pipe 41, and the outlet pipe 42, to limit the inward movement of the said pipes.

When the wheel 6 in one of the rotary engines or pumps has been reversed, and the additional separators 15^a and the suction and outlet pipes 41 and 42 have been adjusted in position, as has been described, this rotary pump, which, in Fig. 4 of the drawings, is indicated by the reference character 45, is driven by the rotary engine disclosed in Figs. 1 and 2 of the drawings, and indicated by the reference numeral 46 in Fig. 4 of the drawings. The rotary engine 46 receives the supply of steam from the pipe 33^a, which is in communication with the steam supply pipe 47, the exhaust pipe 34^a leading to the pipe 48 which may communicate with another engine or with the atmosphere as may be desired.

The outlet pipe 42 of the rotary engine 45, which is being used as a pump communicates with the pipe 49 into which the fluid may be driven by other similar pumps 45.

I preferably supply the shafts 8 with two pulleys 50, one disposed at each side of the casing, these pulleys 50 being connected with the pulleys 51, keyed to the shaft section 52. The terminals of this shaft section 52 are journaled in the bearings 53, in the twin pillar hangers 54, so that the flange 55 on the shaft section 52 will be disposed between the bearing 53 and the bearing 56 on the said twin pillar hanger. In the arrangement shown in Fig. 4 of the drawings one of these flanges 55 is bolted to a flange 57 on the shaft section 58, one end of this shaft section 58 being journaled in one of the bearings 56. The shaft section 58 is provided with pulleys 58^a, these pulleys 58^a being connected with the pulleys 59 on the shaft 60 by the belts 61. It will of course be understood that my twin pillar hangers on one of the shaft sections 58 may be readily disconnected from the shaft 52, by removing the bolts which secure the flanges 55 and 57 together. By this means the shaft section 58, which connects with the rotary pump, may be readily disconnected from the shaft section 52, which communicates with the rotary engine 46. In the same way the shaft section 58 may be disconnected from the shaft section 52, so that the shaft sections 52 and 58 may be driven at different speeds or in opposite directions.

Having thus described my invention I claim as new and desire to secure by Letters Patent:

1. A rotary engine having an inlet and an exhaust, a wheel having sides spaced apart, and buckets spaced apart around the wheel, and between the sides, the impact and the rear faces of the buckets converging outwardly and being curved in the same general direction, and a separator disposed against the periphery of the wheel, between the inlet and the exhaust.

2. A rotary engine having an inlet and an exhaust, a wheel having sides spaced apart, and buckets spaced apart around the wheel, and between the sides, the impact and the rear faces of the buckets converging outwardly and being curved in the same general direction, a separator disposed against the periphery of the wheel, between the inlet and the exhaust, and packing rings engaging the sides of the wheel to prevent the escape of the fluid under pressure toward the axis of the wheel.

3. In a rotary engine a casing having sides with circular grooves and inlet and exhaust ports, a wheel mounted for rotating in the casing and having sides spaced apart and buckets spaced apart around the wheel and between the sides, the impact and the rear faces of the buckets converging out-

wardly and being curved in the same general direction, packing rings disposed in the circular grooves, means for pressing the packing rings against the sides of the wheel to prevent the escape of the fluid under pressure between the casing and the wheel, and toward the axis of the wheel, an outlet in the casing between the packing rings and the axis of the wheel, and a valve for controlling the outlet.

4. In a rotary engine a casing having sides with circular grooves, and inlet and exhaust ports, a wheel mounted for rotating in the casing and having buckets, packing rings disposed in the circular grooves, means for pressing the packing rings against the wheel to prevent the escape of the fluid under pressure between the casing and the wheel, and toward the axis of the wheel, the casing being provided with an outlet and a valve commanding the outlet.

5. In a rotary engine a casing having sides with inlet and exhaust ports, a wheel mounted for rotating in the casing and having buckets spaced apart around the wheel, packing rings mounted on the inner sides of the casing, means for pressing the packing rings against the sides of the wheel to prevent the escape of the fluid under pressure between the casing and the wheel, and toward the axis of the wheel, an outlet in the casing between the packing rings and the axis of the wheel, and a valve for controlling the outlet.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL BENNISON.

Witnesses:
J. H. SMITH,
M. E. VERKIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."