A. F. W. PARTZ.
Rotary-Engine.

No. 196,038. Patented Oct. 9, 1877.

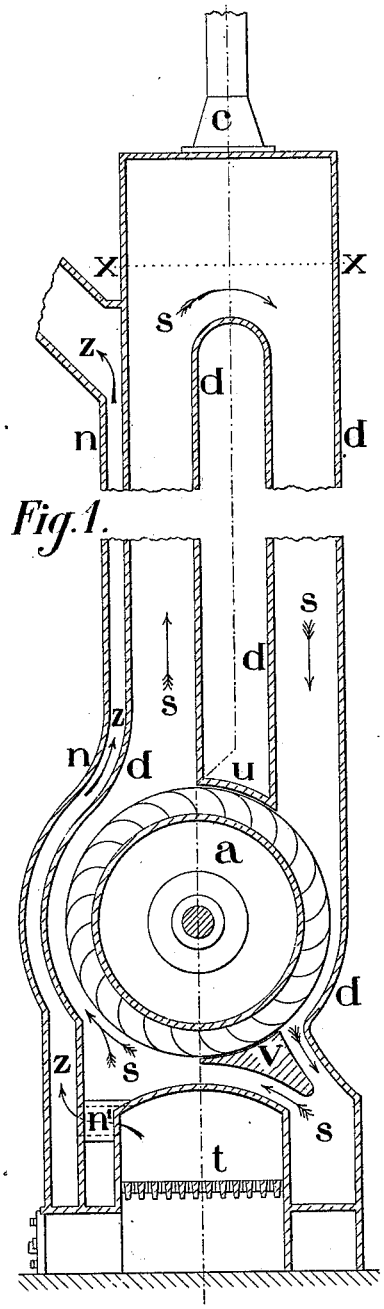

Fig. 1.

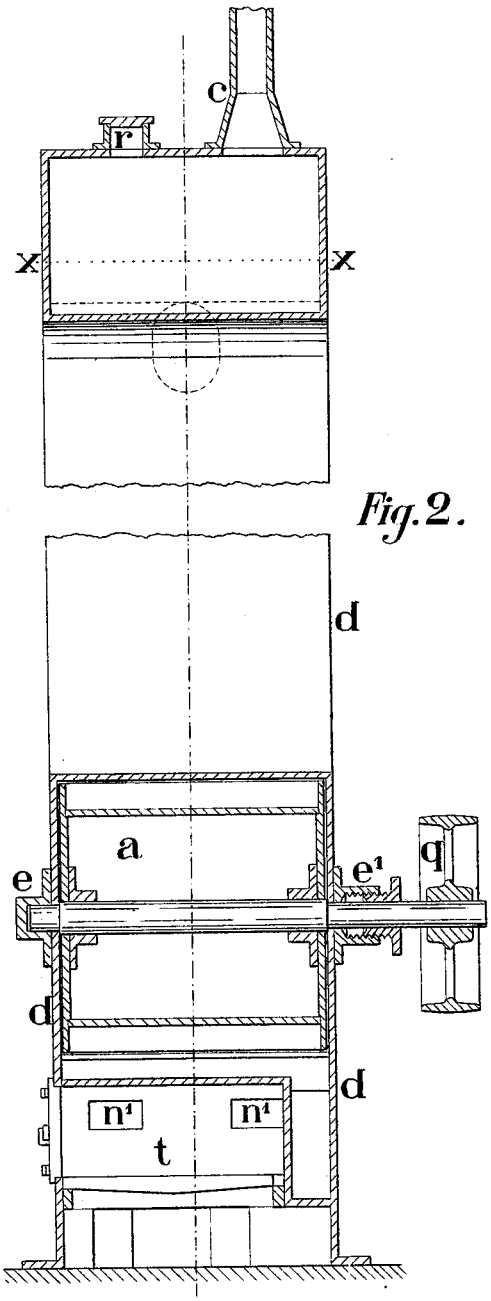

Fig. 2.

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AUGUST F. W. PARTZ, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **196,038**, dated October 9, 1877; application filed June 6, 1876.

To all whom it may concern:

Be it known that I, AUGUST F. W. PARTZ, of Philadelphia, in the State of Pennsylvania, have invented a new Thermo-Hydraulic Motor, of which the following is a specification:

In this motor the force exerted by steam in ascending through a body of heated water or other liquid is made to serve as a dynamic agent. The contrivance by means of which this is accomplished consists in a stationary vessel inclosing a water-wheel, both so constructed and arranged that when the vessel is filled with liquid the bulk of the latter is separated in two columns, and when steam is made to rise from the bottom of the vessel, the liquid, after having attained the requisite temperature to leave the steam uncondensed, is caused to circulate in a continuous current, and to impart motion to the wheel.

In the following full and exact description of my invention, reference is had to the accompanying drawing, in which—

Figures 1 and 2 represent vertical sections of an engine embodying my invention, the plane of either section being shown by a broken line in the other.

a is an overshot water-wheel, inclosed in a high trunk-like vessel, *d*, at the base of which is a furnace, *t*, and the greater part of which above the wheel is divided vertically into two compartments, with an open space between them. The curved casing-plate *u* at the lower end of this space is in close proximity to the periphery of the wheel, as is also one of the three curved sides of a bar, *v*, fixed across the vessel parallel with the axis of the wheel. *n* is a flue, communicating, by a pair of short tubes, *n' n'*, with the furnace *t*, from which the passage of the gases of combustion is indicated by the arrows *z*. Upon the shaft of the wheel *a*, which lies in bearings *e* and *e'*, (the latter being a stuffing-box,) attached to the vessel *d*, is fastened a driving wheel or pulley, *q*.

In describing the manner in which the engine operates, I will assume that the vessel *d* has been filled with water, through the opening *r*, up to the dotted line *x x*, that combustion is going on in the furnace *t*, and that the water has been brought to a boiling state. All the steam generated is obliged to ascend on that side of the wheel *a* which is, in Fig. 1, to the left, since all that portion of it which is evolved upon the surface of the right half of the furnace is guided thither by the bar *v*. The rising steam has the effect of lessening the weight of the left-hand column of water; and as this causes the heavier right-hand column to sink, a circulatory motion ensues in the direction of the arrows *s*, which continues so long as sufficient heat is supplied by the furnace to maintain ebullition. Under these conditions the wheel *a* is made to revolve by the ascensional force of steam on the one side, and the weight and impulse of descending water on the other, the motive power imparted to it being determined by the difference between the counteracting weights of the two columns of water. Referred to its source, this power represents the latent heat of the steam, so far as the same is converted into motion, the temperature of the water remaining nearly unchanged, and a large percentage of that heat can be thus converted and utilized if the generation of steam be kept within proper bounds.

The pipe *c* is for the escape of surplus steam, which, instead of being allowed to pass into the air, may be condensed in some suitable manner. When it is intended to work the engine with steam of a higher than common atmospheric tension, which is preferable as regards economy, a safety-valve is to be attached to the pipe *c*. It is not necessary that the steam be generated below the wheel *a*, as it may also be led there from a separate boiler, when it should be admitted to the left of the broken section-line in Fig. 1, so that the bar *v* can be dispensed with.

Although the employment of water will generally be found most convenient, that of some saline solution or other liquid of a higher specific gravity and boiling-point may under circumstances prove more advantageous.

Engines of small dimensions are supplied with lamps or gas-burners instead of furnaces, unless the liquid used in them be mercury, in which case steam from an outer source must be introduced below the wheel.

In the above I have confined myself to the description of one mechanical device, in which the rising of steam in one of two columns of

liquid, communicating so as to admit of a circulatory motion, is made to effect the turning of an overshot water-wheel; but it is evident that motive power may be procured in essentially the same manner if, for the overshot wheel, a turbine or some other suitable rotary mechanism be substituted, and the stationary portion of the engine be shaped accordingly.

I claim as my invention—

In combination with the wheel *a*, the vessel *d*, when extended above the wheel, in two vertical compartments or tubes, united at their upper ends, substantially as and for the purpose herein specified.

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