

J. F. M. PATITZ.
STEAM TURBINE.
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915,212.

Patented Mar. 16, 1909.

Fig 1.

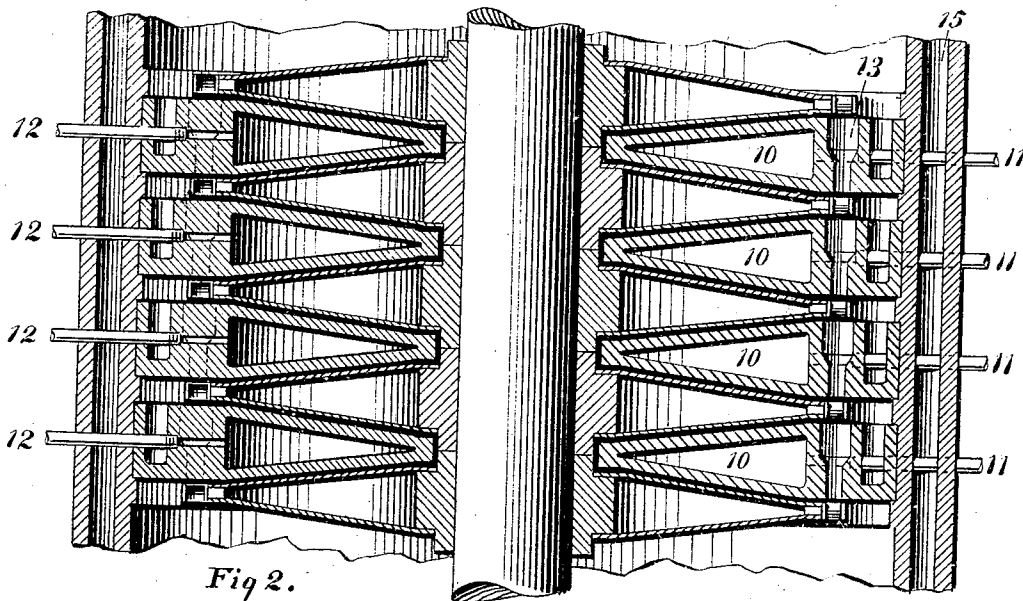
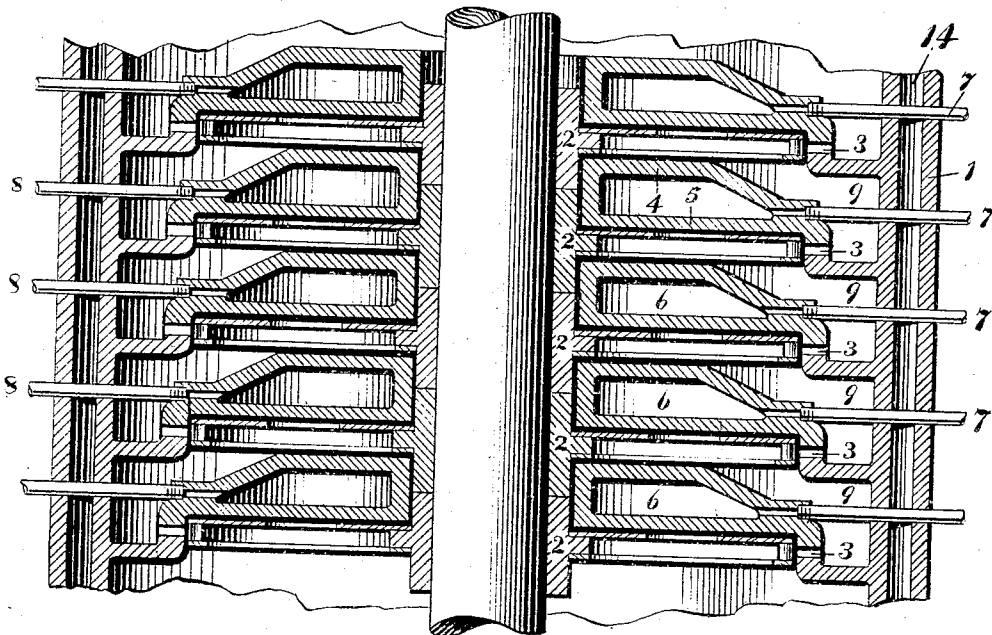


Fig 2.

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STEAM-TURBINE.

No. 915,212.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHANN FRIEDRICH MAX PATITZ, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Steam-Turbine, of which the following is a specification.

My invention relates to steam turbines and its object is to provide means for re-heating or super-heating steam within the turbine itself.

Figure 1 shows the invention applied to one form of turbine. Fig. 2 shows the invention applied to a different form of turbine.

The economy attained by the use of super-heated steam, especially in steam turbines, has long been recognized. If the super-heating is done in a separate superheater, there will be loss of heat by radiation in transmitting the same to the turbine. Besides, more space is needed and the cost of the superheater is added to that of the plant. To avoid these disadvantages, I have devised a form of turbine wherein the super-heating is done within the turbine itself, thus avoiding all external losses.

Referring to Fig. 1, 1 denotes the casing of a steam turbine provided with the necessary steam passages and wheel chambers. The turbine wheels 2, are mounted to rotate in said casing, steam being admitted through the orifices 3, and passing successively from one turbine wheel to the next one. The wheels are separated from each other by partitions in the casing projecting inwardly, as shown, a slight clearance being allowed between the turbine wheels and the side walls 4 and 5, of these partitions. These walls 4 and 5, form between them closed chambers 6, in the partitions. Pipes 7 and 8, communicate from the outside of the casing with these chambers on opposite sides. The steam to operate the turbine passes through the orifices 3, through the first turbine into the first steam chamber 9, formed in the casing, through the next turbine wheel, and so on. The steam chambers 9, and the open interiors of the turbine wheels are therefore always filled with steam while the turbine is in operation. In order to superheat or re-heat this steam in the successive stages, live steam, or hot gases, such as products of combustion from the boiler furnace, are conducted into the chambers 6 by the pipes 7,

thereby heating the walls of said chamber, which latter transmit their heat to the operating steam. The condensed steam or the gases, after the heat has been abstracted, escape through the pipes 8. If the temperature of the heating vapor is too low to super-heat the steam, no super-heating will take place. The steam will, however, be reheated in the turbine, thus reducing condensation.

In Fig. 2 an axial flow turbine is shown with the invention applied thereto. The side plates of the wheels are flaring in order to resist side pressure, consequently the form of the casing is somewhat changed, and the heating chambers 10, are triangular in cross-section, as shown. The inlet pipes 11, and outlet pipes 12, pass into the chambers at points located between the nozzle openings 13, through which the steam is guided into the turbine wheels. Steam jackets 14, 15 may or may not be employed in conjunction with the heating.

It will be observed that in either axial or radial flow turbines, the heating chambers are entirely within the path of flow of steam through the turbine; that is, in the axial flow turbine the path of flow is of hollow cylindrical shape, and in the radial flow turbine the path of flow is of transversely corrugated hollow cylindrical shape, and in both types the heating chambers are within the bounds of the hollow cylindrically shaped path. This construction prevents radiation from the heating chambers to the atmosphere, the heat of the medium within the chambers passing into the working steam within whose path they are located. The locus of nozzles in each type is as shown, a cylinder and the heating chambers are located within this locus.

My invention may be applied to any form of compound turbine, it being only necessary to provide heating chambers in the partitions separating the turbine wheels.

Having thus described my invention, what I claim is:—

1. In a steam turbine, chambers located within the path of steam flow through the turbine, and means coacting with the chambers for admission and exhaust of a heating medium.

2. In a steam turbine, a wheel, nozzles directed thereon, chambers located within the

locus of the nozzles, and means coacting with the chambers for admission and exhaust of a heating medium.

3. In a steam turbine, means for carrying
5 vanes, means on the stator projecting between the vane-carrying means, chambers located in the projecting means and entirely within the steam flow, and means coacting with the chambers for admission and exhaust
10 of a heating medium.

4. In a steam turbine, means for carrying
15 vanes, chambers located between the vane-carrying means and entirely within the steam flow, and means coacting with the chambers for admission and exhaust of a heating medium.

5. In a turbine, a casing, a wheel therein, a hollow wall supported by the casing and having an entire side face directly adjacent the wheel, and inlet and outlet means for the
20 hollow wall.

6. In a parallel flow turbine, superheating chambers located entirely within the path of steam flow.

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

JOHANN FRIEDRICH MAX PATITZ.

Witnesses:

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