PUBLISHED

MAY 11, 1943.

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PROCESS AND DEVICE FOR THE UTILISATION OF THE WIND ENERGY BY MEANS OF DIRECT HEAT TRANSFORMATION

Filed March 29, 1940

Serial No. 326,790

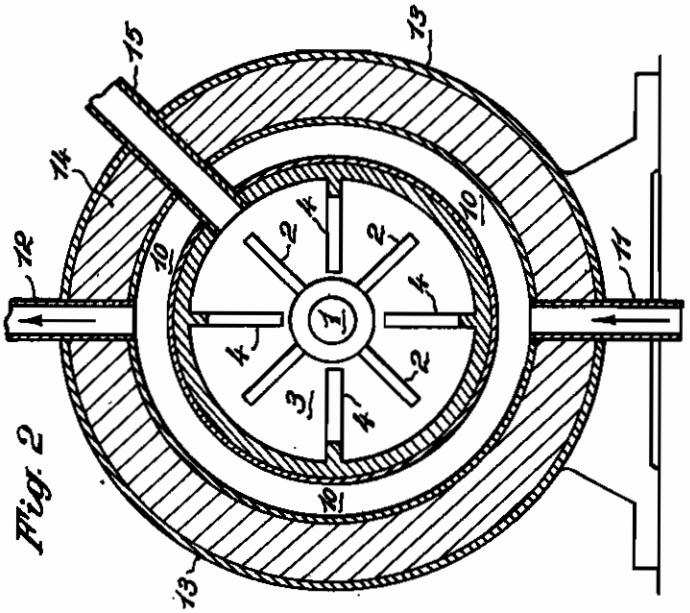

Fig. 2

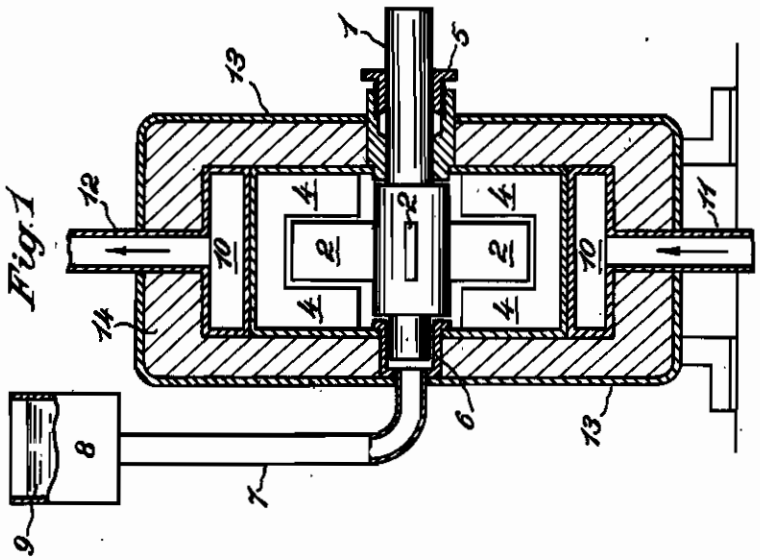

Fig. 1

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Published May 11, 1943 Serial No. 326,790

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PROCESS AND DEVICE FOR THE UTILISATION OF THE WIND ENERGY BY MEANS OF DIRECT HEAT TRANSFORMATION

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Application filed March 29, 1940

The present invention relates to a process and device for the utilisation of the wind energy by means of direct heat transformation.

It is well known that any energy whatever and particularly mechanical energy may be directly transformed into heat with a very high efficiency, theoretically reaching the 100%. In order to obtain heat from mechanical energy, generally, as known, the phenomenon has to be resorted to the friction between solid bodies or between solid and fluid bodies.

Heat being the least valuable form of energy generally the transformation is avoided of the mechanical into thermic energy and the direct utilisation of the motion is preferred or its transformation, for instance, into electric energy.

On the contrary in the case of wind, directly providing mechanical energy, the transformation has been found convenient, according to the present invention, of said energy into heat, then to accumulate the same in order to furnish it for heating purposes or the transformation into pressure potential energy or into mechanical or electric energy and the like by using convenient means already known or to be devised, capable of transforming heat into a higher form of energy.

According to the present invention the transformation is furthermore suggested of the mechanical into thermic energy by means of a brake of the type comprising a rotor cooperating with a fixed friction body radially and/or axially pressed against the same rotor, or of the type comprising a blade or bowl wheel operating within a fluid (liquid or gaseous) contained in a convenient envelope. To this object an hydraulic brake of the known Froude type may be very well adapted.

Always according to the present invention the fluid heated by the brake mentioned and thus brought to a high temperature is circulated through a thermic accumulator, wherefrom the heat is subtracted at right time and in the quantity wanted by means, for instance, of a second auxiliary fluid. The action of the brake on said rotor may be made automatically proportional to the wind speed.

Peculiarly advantageous is the present invention when employed in those installations where the wind energy is collected by means of a certain number of helical flaps or wheels placed more or less distant one from the other and in which the energy of the single flaps is wanted to be collected. The invention allows the transformation of the mechanical energy of each flap in the immediate proximity of the flap, into thermic energy, this requiring extremely simple means of construction, heat being then conveyed from the single generators to a central point of accumulation.

The invention is illustrated in the accompanying drawing showing a preferred form of realisation. In the drawing:

Fig. 1 shows a longitudinal section through the hydraulic brake of the type mentioned;

Fig. 2 shows the same brake in a cross section. Reference number 1 is the axle of the brake kept in motion by means of one or several blade wheels (said wheels might also have helical blades). On said axle two or more blades 2 are fixed turning with the axle in the direction of the arrow or on the contrary. This rotation takes place in a drum-like chamber 3 filled with oil or other liquid. To prevent the liquid from rotating there are provided within said drum two or more fixed walls 4 possessing openings a little larger than the turning blades 2. When the axle 1 turns, the passage of the blades 2 produces through the openings in the walls 4 a severe shaking mixing of the oil.

Practical trials have led to the result that with a relatively small machine remarkable quantities of mechanical energy may be transformed into heat. The axle 1 is made to pass, on only one side, through a stuffing box 5 and turns on the other side within a usual bearing 6 without packing. As the oil within the drum 3 is expanded, when heated, the bearing 6 communicates through the tube 7 with the expansion receptacle 8. According to the heat reached the level of the liquid 9 reaches a greater or smaller height in the receptacle 8. The drum 3 is surrounded by a water chamber 10, where the water is admitted in 11 and discharged in 12 according to the direction of the arrow. This water, eventually also another liquid, exclusively serves for withdrawing the heat produced and conveying it to the place of utilisation. Of course the water chamber 10 may surround also on the sides the oil chamber 3. The water chamber 10 might also be abandoned, the liquid flowing then directly through the drum 3, to be directly utilised by heat carriers for withdrawing the same heat.

In the example of realisation illustrated the whole brake is furthermore surrounded by an envelope 13 allowing to lodge in the interval 14 an insulating means, to thus reduce the losses of heat to a minimum. The tube 15 still serves for pouring oil or another liquid into the drum 3.

The quantity of heat generated depends on the

wind speed and on the consequent speed of rotation of the blade wheels. The quantity of heat generated increases, thus, approximately, with the third power of the speed of the blades' rotation. In this fact there resides a peculiar advantage of the present invention, being it possible, consequently even with a great intensity of wind to obtain with the help of simple devices of small size, the transformation of the wind energy into heat energy.

The hydraulic brake may have any known conformation whatever. In general a rotor is provided operating in the liquid together with fixed surfaces, or moveable, disturbing the movement of the oil accelerated by the motor and generating consequently the greatest possible quantity of liquid friction.

It may be advisable to guide the heat transmitting liquid successively through several hydraulic brakes, in order to collect the heat of these devices and gradually reach the most elevated possible temperatures.

Of course other devices may logically be used together with the object of the present invention for instance joints or couplings between the blade wheels and the conduit of the shaft 1 preventing the heat from being conveyed from the interior chamber 3 of the hydraulic brakes towards the outside through the conduit of the shaft.

The present invention has been illustrated and described in a preferred form of realisation but it is clear that constructive changes may be practically introduced therein without surpassing the limits of protection of the present industrial patent.

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