

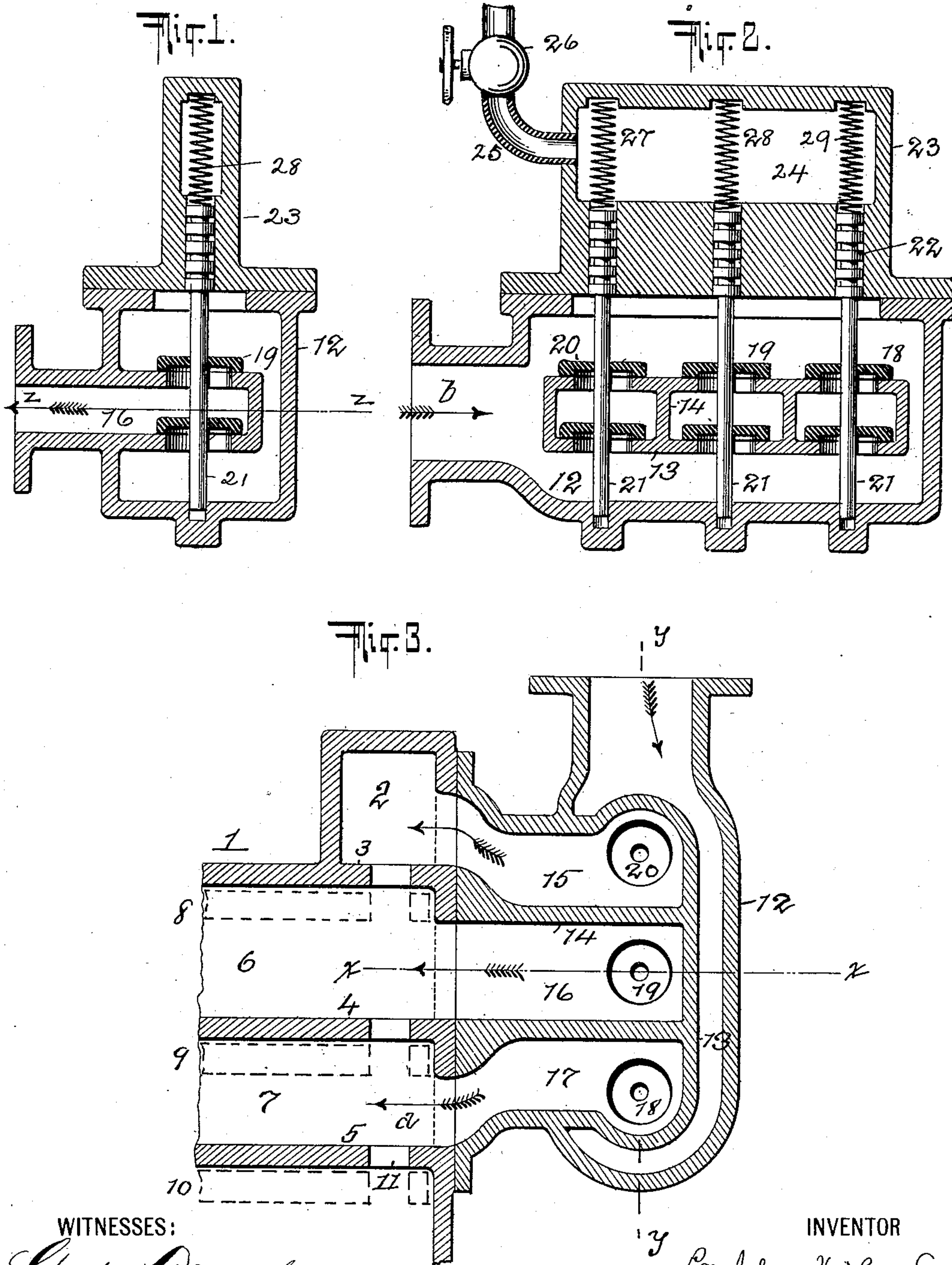
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P. J. HEDLUND.
REGULATOR FOR STEAM TURBINES.

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NO MODEL.



WITNESSES:

Gustave Dietrich
Edwin H. Dietrich

INVENTOR

Per Johan Hedlund
BY *David Benjamin*
his ATTORNEY

UNITED STATES PATENT OFFICE.

PER JOHAN HEDLUND, OF STOCKHOLM, SWEDEN.

REGULATOR FOR STEAM-TURBINES.

SPECIFICATION forming part of Letters Patent No. 742,422, dated October 27, 1903.

Application filed March 30, 1903. Serial No. 150,250. (No model.)

To all whom it may concern:

Be it known that I, PER JOHAN HEDLUND, of Stockholm, Sweden, have invented a new and useful Improvement in Regulators for Steam-Turbines, of which the following is a specification.

The invention relates to a device for regulating the admission of steam to a series of successive communicating chambers.

The invention consists more particularly in the construction of the operating parts of the device, whereby the same are simplified and rendered more compact.

In the accompanying drawings, Figure 1 is a vertical section through the valve-chest and escape-pipe on the line *xx* of Fig. 3. Fig. 2 is a similar section on the line *yy* of Fig. 3. Fig. 3 is a horizontal section on the line *zz* of Fig. 1.

Similar numbers of reference indicate like parts.

At 1, Fig. 3, is shown a portion of a casing, a steam-inlet chamber 2 containing partitions 3 4 5. Between said partitions are chambers 6 7. The casing 1 may be the inclosing casing of a compound elastic-fluid turbine, in which case the wheels 8 9 10 (dotted lines) would be located in the chambers 6 7 and also in the chamber beyond the partition 5. In the partitions are openings 11, through which the steam passes to the wheel-buckets.

The valve-chest 12 incloses a box 13, divided by partitions 14 into as many conduits as there are chambers in the casing 1, so that when said chest is secured to the casing, as shown in Fig. 3, (arrows *a*,) conduit 15 communicates with chamber 2, conduit 16 with chamber 6, and conduit 17 with chamber 7. In the upper and lower sides of each conduit and within the valve-chest 12 are seated pairs of puppet-valves 18 19 20. Each pair of valves is supported upon a stem 21, and each stem is on its upper portion enlarged to form a piston 22, which enters a bore in the valve-chest cover 23. Also in said cover and above said bores is a chamber 24, with which communicates the pipe 25, in which is a valve 26. Between the top of chamber 24 and the upper ends of the valve-stems 21 are interposed helical springs 27 28 29.

The operation of the device is as follows: Steam flows into the valve-chest 12, as indi-

cated by the arrow *b*. The pistons 24 fit loosely in their bores, so that steam may leak into the cover-chamber 24, and hence to the pipe 25. If the valve 26 in pipe 25 is completely opened, the fluid-pressure below pistons 22 will overbalance and the valves 18 19 20 will be lifted. If, on the contrary, the valve 26 be closed, then the pressure in chamber 24 and the pressure of the springs will be sufficient to overbalance the pressure in the valve-chest 12 and the valves will be shut.

In practice the springs 27 28 29 are made of different strengths, so that the valves will be operated as described at different times and under different pressures. Thus if spring 29 be the weakest, spring 28 next, and spring 27 next then with a certain extent of opening of the valve 26 only the valve 18 may operate, followed by valves 19 and 20, as the valve 26 is more widely opened.

I have shown at 26 a simple hand-valve; but in practice the valve there located will be controlled by any suitable device, such as a governor, which will vary the amount of opening or closing of said valve proportionate to speed-pressure or any other desired function, with the result, as already stated, that steam will be admitted to one or more of the chambers in the casing to produce whatever effect may result from entering said chambers in the manner stated.

If the casing contains turbine-wheels, as indicated in dotted lines, (and as fully explained in the aforesaid application to Lindmark,) then steam entering simultaneously into all of said chambers will operate only the wheel 10, the wheels 8 and 9 having equal pressures on each side. If the valve 19 now be opened and valve 18 closed, then the steam will pass first to wheel 9, and, finally, if the valve 20 be opened and the valves 19 and 18 closed steam will pass to wheel 8.

I claim—

1. A valve-chest having an inlet for working fluid and a plurality of outlets, valves in said outlets, pistons controlling said valves and operating in chambers communicating at one end with the interior of said valve-chest and at the other end with a compartment communicating with a source of working fluid and means for controlling the pressure in said compartment.

2. A valve-chest having an inlet for working fluid and a plurality of outlets, valves in said outlets, pistons controlling said valves and operating in chambers communicating at one end with the interior of said valve-chest and at the other end with a compartment communicating with a source of working fluid, means for controlling the pressure in said compartment, and means for independently and mechanically regulating said valves.

3. A valve-chest having an inlet for working fluid and a plurality of outlets, valves in said outlets, pistons controlling said valves and operating in chambers communicating at one end with the interior of said valve-chest and at the other end with a separate compartment in said chest; the said pistons fitting loosely in said chambers to allow passage of working fluid and a valve disposed in an escape-outlet from said compartment.

4. A valve-chest having an inlet for working fluid and a plurality of outlets, valves in said outlets, springs of different elastic strengths controlling said valves, pistons also controlling said valves and operating in chambers communicating at one end with the interior of said valve-chest and at the other

end with a separate compartment in said chest; the said pistons fitting loosely in said chambers to allow of passage of the working fluid, and a valve disposed in an escape-outlet from said compartment.

5. A valve-chest 12 having an inlet for working fluid and a plurality of outlet-openings, valves, 18, 19, 20 in said outlets and provided with stems 21, pistons 22 on said stems operating in cylinders communicating at one end with the interior of said chest, a cover 23 for said chest having compartment 24 provided with outlet 25 and communicating with the other end of said piston-cylinders, springs 27, 28, 29 in said compartment 24 of different elastic strengths and bearing on said pistons and a valve 26 in outlet 25; the said pistons 22 fitting loosely in their cylinders to allow of flow of working fluid from said valve-chest 12 to said compartment 24.

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

PER JOHAN HEDLUND.

Witnesses:

I. A. VAN WART,
WM. H. SIEGMAN.