

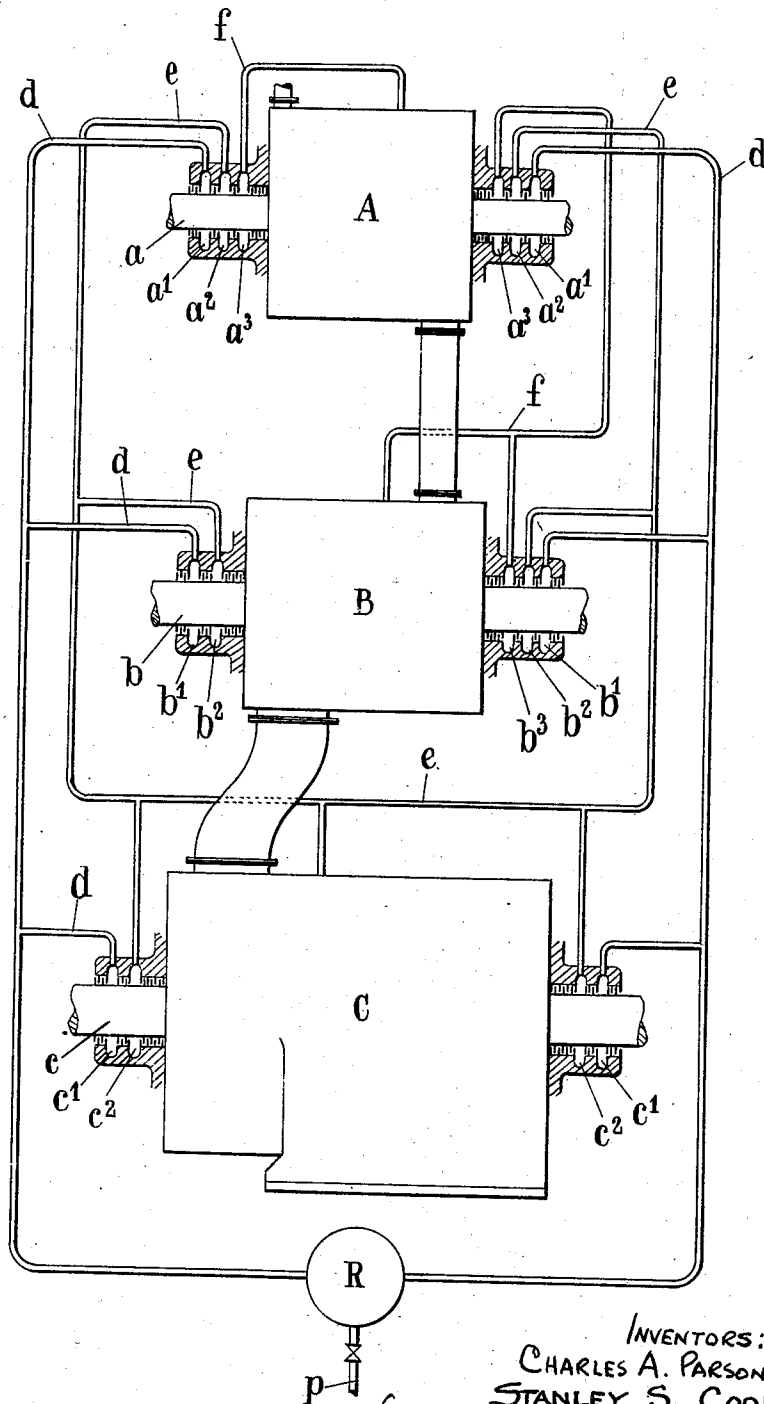
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SHAFT PACKING SUITABLE FOR STEAM TURBINES

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SHAFT PACKING SUITABLE FOR STEAM TURBINES

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The invention relates to shaft packings suitable for steam turbines and particularly to those of the kind in which a so-called "reservoir" is connected to pockets provided in the glands of stuffing boxes.

In a certain constructional form of such packings proposed for steam turbines, the "reservoir" constitutes a pipe connection between the gland pockets respectively of the high-pressure and low-pressure turbine stages, so that leakage steam from the high-pressure turbine into the high-pressure gland pocket passes by way of the reservoir to the low-pressure gland pocket. If the pressure in the reservoir in such a case is adjusted correctly for the low-pressure gland pocket, the resulting pressure in the high-pressure gland pocket, owing to the resistance of pipes of practicable dimensions, may be so high as to cause considerable leakage of steam into the engine room.

The main object of the present invention is to provide improvements designed to overcome such difficulties.

With such an object the invention consists in the combination of parts hereinafter described and particularly pointed out in the claims.

The accompanying drawing shows diagrammatically one form of the invention.

In carrying the invention into effect according to this form as applied to a multi-unit steam turbine having high-pressure, intermediate-pressure and low pressure units, A, B, C, respectively on separate shafts, a , b , c , each gland of labyrinth or other suitable packing on the shafts of the three units is provided with two gland pockets a^1 , a^2 for unit A, b^1 , b^2 for unit B and c^1 , c^2 for unit C, which may be of annular form, an inner pocket (a^2 , b^2 , c^2) at a certain distance from the turbine and an outer pocket (a^1 , b^1 , c^1) more remote therefrom, these pockets being axially spaced with packing on both sides thereof as shown. All the outer pockets, a^1 , b^1 , c^1 , are connected by suitable piping, d to a reservoir, R, (or the piping may itself form the reservoir) supplied with steam from any suitable source by way of the valve-controlled pipe p , while all the inner pockets, a^2 , b^2 , c^2 ,

are also connected together and to a point of the low-pressure turbine, C, at a pressure slightly below atmosphere by means of the piping, e .

The arrangement as above described is preferred in order to stage the pressure drop across each gland but as the flow in the low-pressure turbine is necessarily inwards from the outer gland it is not necessary that its inner gland pockets, c^2 , should in all cases be connected to the sub-atmospheric point.

With like glands as shown, it will be seen that the resistance to flow in the glands of the different stages can be made identical, the pressure in the reservoir being maintained at a point only very slightly above the atmosphere so that leakage from the outer glands to the engine room is reduced to a negligible quantity for each stage and the flow is inwards for the outer gland pocket of each unit. As a consequence, in addition to adding to the comfort of the engine-room staff, the heat in the steam is saved and also the heat necessarily expended in the evaporator to replace lost feed water.

The supply of steam to the reservoir may be drawn from the low-pressure steam for the auxiliaries, auxiliary exhaust steam, steam tapped from the main turbines, or other convenient source.

The use of wet steam for the glands is preferred inasmuch as if the turbines are working with superheated steam, any leakage becomes very highly superheated by passage through the glands and is practically invisible so that it cannot be seen whether the gland is working correctly; the present invention enables all the outer pockets to be supplied with saturated steam.

If desired, the usual connections, f , f , may be provided from other gland pockets, a^3 , b^3 , at pressures above atmosphere to lower pressure stages for the purpose of staging the gland to reduce leakage.

We wish it to be understood that the terms "super-atmospheric glands" and "sub-atmospheric glands" as used in the above specification and in the claims appendant thereto mean that the relative glands pack against

internal pressures which are respectively above and below atmospheric pressure.

The details of the invention may take other forms than those specifically described above.

5 Having now described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. A rotary engine comprising in combination a plurality of pressure stages; engine shafting; glands for said shafting in connection with each of said plurality of stages, each gland having at least two axially-disposed gland pockets, an outer pocket and an inner pocket; a reservoir system at a pressure slightly above atmosphere to which all said outer gland pockets are connected; and a second reservoir system at a pressure below atmosphere to which all said inner gland pockets are connected.

2. A rotary engine comprising in combination a plurality of pressure stages including a sub-atmospheric stage; engine shafting; glands for said shafting in connection with each of said plurality of stages, each gland having at least two axially-disposed gland pockets, an outer pocket and an inner pocket; a reservoir system at a pressure slightly above atmosphere to which all said outer gland pockets are connected; and a second reservoir system to which all said inner gland pockets are connected, said second reservoir system being connected to a point of said sub-atmospheric stage.

In testimony whereof we have signed our names to this specification.

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