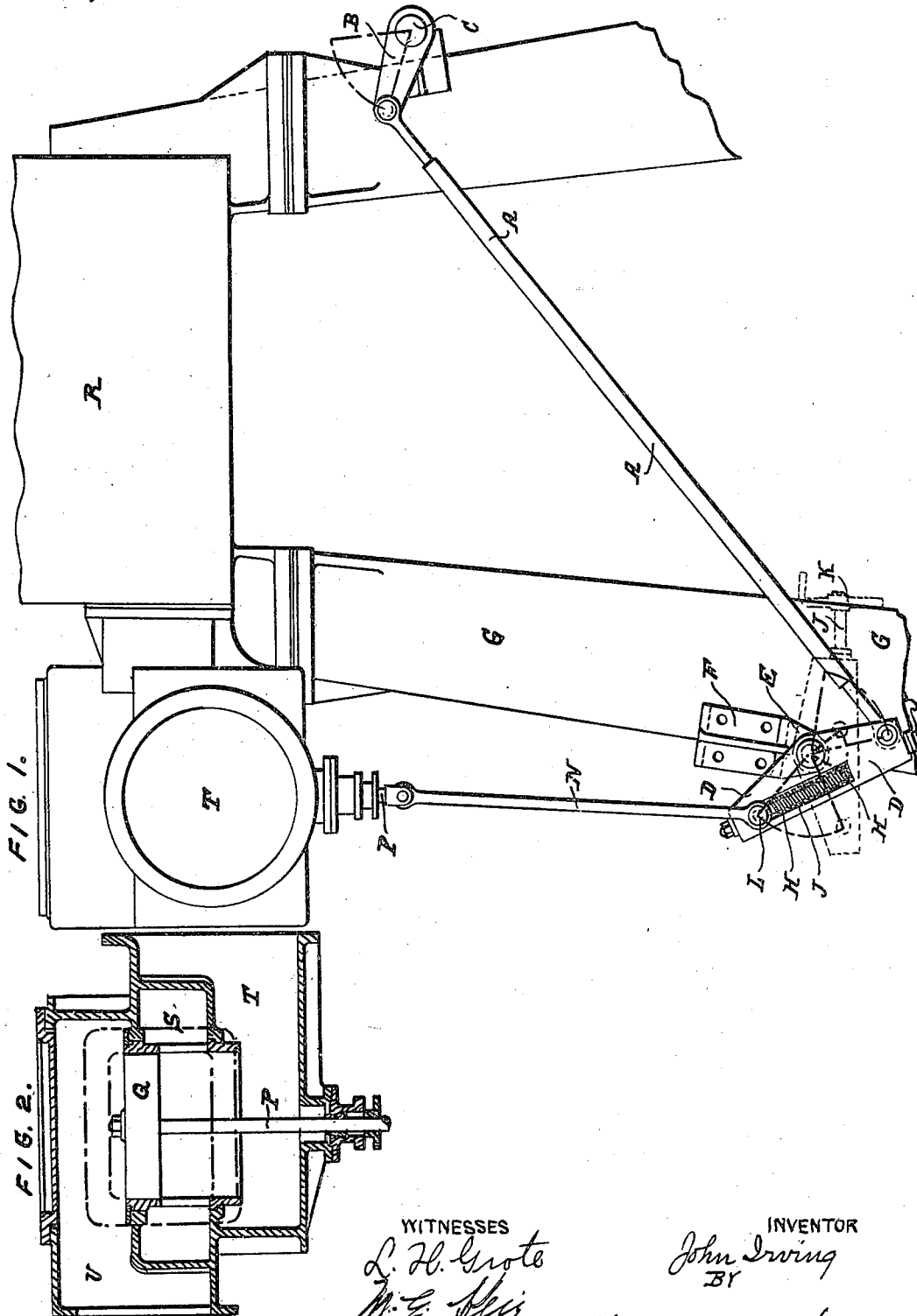


J. IRVING.
VALVE GEAR.
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WITNESSES

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JOHN IRVING, OF CARDROSS, SCOTLAND.

VALVE-GEAR.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN IRVING, a subject of the King of Great Britain and Ireland, and a resident of Cardross, in the county of Dumbarton, Scotland, have invented certain new and useful Improvements in Connection with Valve-Gear for Combined Reciprocating and Turbine Engines, and of which the following is the specification.

This invention has for its object to provide an improved arrangement of valve gear for combined reciprocating and turbine engines, so that not only may the turbine be cut out altogether when the reciprocating engine is going astern, as is possible in hitherto known arrangements of such engines, but also so that the turbine engine may be cut out altogether, if desired, when the reciprocating engine is going ahead as well as astern, thus leaving the reciprocating engine to be operated alone for maneuvering purposes in harbors or docks for example. The improved arrangement of valve gear is also such that the supply of the steam to the turbine may be regulated without its being necessary to also adjust the valve gear for the reciprocating engine.

In carrying out the invention, a rod is connected, as usual to a lever on the reversing gear shaft of the reciprocating engine, but instead of this rod directly operating the valve controlling admission of steam to the turbine, so that this steam is admitted to the turbine when the reciprocating engine is running ahead and cut off entirely when going astern, as in existing arrangements of such valve gear, this rod is connected, according to the present invention, to one end of a plate rocking on a pin carried by a bracket secured to any convenient part of the framing, and having an adjustable connection with the valve controlling admission of steam to the turbine. This adjustable connection is obtained by forming a slot in the rocking plate, in which slot there works the screwed part of a handled rod capable of turning in bearings in the plate. On the screwed part of the handled rod there is a nut, or it might be a sleeve, connected to one end of a rod, the opposite end of which is connected to and operates the valve controlling the passage of steam to either the turbine or a condenser.

In order that the invention and the manner of performing the same may be properly

understood there is hereunto appended a sheet of explanatory drawings in which—

Figure 1 is an elevation of part of the valve gear sufficient to show the application of the present improvements, Fig. 2 being a vertical section of the valve and passages controlling the passage of the steam to the turbine engine or the condenser.

As shown in the drawings, a rod A is connected as usual to a lever B on the reversing gear shaft C. This rod A, according to the present invention, is connected to one end of a plate D rocking on a pin E carried by a bracket F secured to the framing G. The plate D has formed in it a slot H in which works the screwed part of a rod J turning in bearings in the plate. One end of this rod is fitted with a handle K, and on the screwed part there is a nut L having on one side a pin to receive an eye on the lower end of a rod N, the opposite end of which is jointed to the lower end of a rod P connected to and operating the steam controlling valve Q.

With the parts in the position shown in the accompanying drawings, the nut L is at its outermost position in the slot H and the reversing gear shaft C has been operated to place the valves controlling the admission of steam to the reciprocating engine in position for the engine going ahead. The movement of the reversing gear shaft into this position has through the rod A so rocked the plate D into the position shown by full lines in the drawing that that plate through the rods N, P connecting it with the valve Q has also placed that valve in the position shown, and the steam from the reciprocating engines R passes through the port S and passage T to the turbine engine, as usual, before passing to the condenser. On the reversal of the reversing gear shaft C, the opposite movement of the slotted plate D takes place, it being then rocked into the position shown by dotted lines, so that the valve Q controlling admission of the steam to the turbine engine is moved sufficiently to close the port S to the passage T leading to the turbine and open that port to the passage U leading to the condenser, and the steam is therefore directed to the condenser without passing through the turbine.

If it be desired to shut off the turbine engine irrespective of whether the reciprocating engines are going ahead or astern, the handled screwed rod J is rotated so as to

draw the nut L inward and near to the pin E and through the rods N, P to bring the valve Q into its position in which the port S is open to the condenser passage U. With
 5 the nut L in this position it will be seen that on the slotted plate D being thrown over when reversing the valve gear of the main reciprocating engines as hereinbefore described, the rod N then only oscillates
 10 on its connection with the rod P as a center and does not travel endwise, thus the valve Q remains practically stationary irrespective of whether the reversing gear shaft C is thrown to make the reciprocating engines
 15 go ahead or astern, and the steam from the reciprocating engines then goes directly to the condenser without passing through the turbine engine, the latter may thus be cut out during maneuvering operations.
 20 If it should be found that more steam is passing through the main reciprocating engines R than can be conveniently used at the low absolute pressure desired in the turbine, the handled screwed rod J working in
 25 the slotted plate D may be turned so as to operate the valve Q controlling the admission of the steam to the turbine in such manner that the travel of the turbine steam admission valve Q is restricted and only a
 30 portion of the steam from the main reciprocating engines passes through the turbine, the remainder being directed to the condenser.

What I claim is:—

35 1. In valve gear for combined reciprocating and turbine engines, a reversing gear rocking shaft for the reciprocating engine, a rocking plate, an operative connection between shaft and plate, a valve controlling
 40 the passage of steam from the reciprocating engine to the turbine engine or to a condenser, and an adjustable connection between the rocking plate and this valve.

2. In valve gear for combined reciprocating and turbine engines, a reversing gear 45 rocking shaft for the reciprocating engine, a rocking plate, a lever on the shaft, a rod connected at one end to the lever and at the other to one end of the rocking plate, a valve controlling the passage of steam from 50 the reciprocating engine to the turbine engine or to a condenser, and an adjustable connection between the rocking plate and this valve.

3. In valve gear for combined reciprocating and turbine engines, a reversing gear 55 rocking shaft for the reciprocating engine, a rocking plate, an operative connection between shaft and plate, a valve controlling the passage of steam from the reciprocating 60 engine to the turbine engine or to a condenser, a slot in the rocking plate, a handled screwed rod working in the slot, a nut on the screwed rod, a rod connecting the nut with the steam controlling valve for the 65 turbine engine.

4. In valve gear for combined reciprocating and turbine engines, a reversing gear rocking shaft for the reciprocating engine, a rocking plate, a lever on the shaft, a rod 70 connected at one end to the lever and at the other to one end of the rocking plate, a valve controlling the passage of steam from the reciprocating engine to the turbine engine or to a condenser, a slot in the rocking 75 plate, a handled screwed rod working in the slot, a nut on the screwed rod, a rod connecting the nut with the steam controlling valve for the turbine engine.

In testimony whereof I have signed my 80 name to this specification, in the presence of two subscribing witnesses.

JOHN IRVING.

Witnesses:

WILFRED HUNT,
BARBARA MILLER.