

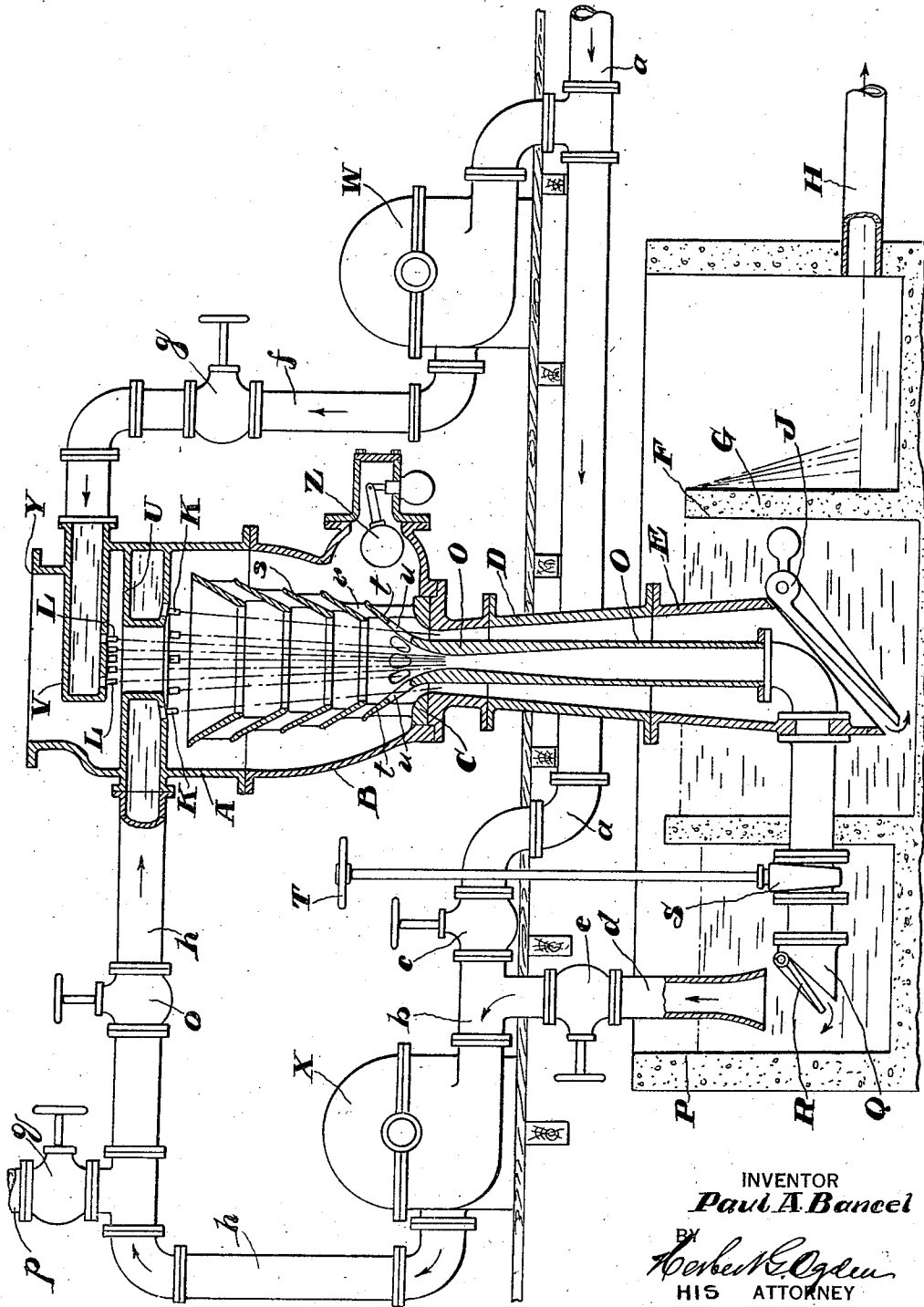
May 20, 1924.

P. A. BANCEL

1,494,944

DOUBLE MULTIJET CONDENSER

Filed March 21, 1923



UNITED STATES PATENT OFFICE.

PAUL A. BANCEL, OF NUTLEY, NEW JERSEY, ASSIGNOR TO INGERSOLL-RAND COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

DOUBLE MULTIJET CONDENSER.

Application filed March 21, 1923. Serial No. 626,689.

To all whom it may concern:

Be it known that I, PAUL A. BANCEL, a citizen of the United States, a resident of Nutley, county of Essex, and State of New Jersey, have invented a certain Double Multijet Condenser, of which the following is a specification, accompanied by drawing.

This invention relates to multi-jet condensers, but more particularly to a double condenser of that type, comprising one condenser within another.

One object of the invention is to enable a multi-jet condenser to be served by two water supply pumps, so that at light loads, or in winter time with cold water, one pump can be shut down.

Another object of the invention, is to enable the water discharged from one set of nozzles to be re-circulated by a second pump and supplied to the other set of nozzles, which is advantageous for instance in case water has to be pumped a long distance, so that a large supply is not available.

Further objects of the invention will hereinafter appear, and the invention is shown in one of its preferred forms in the accompanying drawing, which is a side elevation partly in longitudinal section of a condenser.

Referring to the drawing, the condenser casing comprises the upper section or inlet head A, the lower section or body B having the contracted outlet C, and the outer diffuser tube D, which may be formed as desired, and as shown is provided with the tail pipe E partially submerged in the tank F having the weir G and discharge outlet H. The tail pipe E may be provided with the counter weighted flap valve J.

In accordance with this invention, two concentric sets of nozzles K and L are arranged within the upper section or inlet head A, of the condenser, and in addition to the outer diffuser tube D, there is an inner concentric diffuser tube O preferably discharging into a separate tank P. The outer and inner sets of nozzles K and L direct convergent streams of water into the outer and inner diffuser tubes D and O respectively. The tail pipe Q of the inner diffuser O is provided with the flap valve R and the gate valve S, which latter valve is adapted to be operated by the hand wheel T.

The sets or rings of nozzles K and L are preferably carried by separate water heads U and V, so that the sets of nozzles may be

served by separate water supply pumps W and X respectively. Steam enters at the steam inlet Y and the condenser casing is preferably provided with any suitable form of vacuum breaker Z.

The water supply pump W pumps water from the supply main *a* which main is also connected to the intake *b* of the supply pump X and a valve *c* is preferably inserted in the main *a*. As shown in the drawings, the intake of the supply pump X is connected by the pipe *d* to the tank P and a valve *e* is inserted in this connection. The pump W is connected by the pipe *f* to the water head V of the inner ring of nozzles L and a valve *g* is inserted in said pipe. The pump X is connected by the pipe *h* to the water head U of the outer ring of nozzles K and a valve *o* is inserted in said pipe. A discharge connection *p* having the valve *q* is also connected to the pipe *h*.

In the operation of the apparatus, let it be assumed that the valve *c* in the water main *a* is closed, and that the water is being supplied by the pump W to the inner concentric ring of nozzles L which discharge convergent streams of water to the throat of the inner diffuser tube O. The jets of water may be surrounded by the combining tube *r* having the guide vanes *s* and in such case, the lower guide vanes *t* of the combining tube, are provided with the apertures *u*. The water supply pump X withdraws partially heated discharge water from the tank P and supplies it to the outer concentric ring of nozzles K which discharge convergent streams through the apertures *u* in the combining tube to the outer diffuser tube D which discharges into the tank F. The flap valve R on the tail pipe Q of the inner diffuser will close when water is not being discharged. In winter with cold water, the pump W may be shut down and then by closing the valve *e* on the pipe *d* leading to the tank P, and opening the valve *c* in the main supply pipe *a*, the outer ring of nozzles K only will be served by the supply pump X.

In case, as stated, water has to be pumped a long distance and a large supply is not available, the water discharged from the inner ring of nozzles L may be re-circulated by the second pump X which then takes its water from the discharge well P, as described and delivers it to the outer ring of nozzles K which discharge to a separate

tank or well F and thence to waste, through the over-flow pipe.

As an example, let it be assumed that a given condenser when supplied with 3,300 gallons at 70 degrees temperature will carry a load of 23,600 pounds of steam at 28 inches vacuum. Half of this water, or 1650 gallons in the inner ring of the nozzles L carry half the load, or 11,800 pounds of steam, heating the water from 70 degrees to 83½ degrees. If then this 1650 gallons at 83½ degrees temperature is delivered by another pump X through the outer ring of nozzles L, 6500 pounds of steam will be condensed at 28 inches vacuum, heating the water to 91½ degrees temperature. The total load that would be carried by the condenser would therefore be 18,300 pounds of steam for a water consumption of 1650 gallons circulated twice.

I claim:

1. In a multi-jet condenser, the combination with a casing, of two concentric sets of nozzles, and two concentric diffuser tubes, into which convergent streams of water are directed respectively by the sets of nozzles.

2. In a multi-jet condenser, the combination with a casing, of inner and outer rings of nozzles in the upper portion of the casing, and inner and outer diffuser tubes at the outlet of the casing.

3. In a multi-jet condenser, the combination with a casing having a contracted out-

let, of an outer diffuser tube connected to said outlet, an inner diffuser tube, an outer ring of nozzles in the upper portion of the casing, directing convergent streams of water to the throat of the outer diffuser tube, and an inner ring of nozzles directing convergent streams of water within the outer streams to the throat of the inner diffuser.

4. In a multi-jet condenser, the combination with a casing having a contracted outlet, of an outer diffuser tube connected to said outlet, an inner diffuser tube, an outer ring of nozzles in the upper portion of the casing, directing convergent streams of water to the throat of the outer diffuser tube, an inner ring of nozzles directing convergent streams of water within the outer streams to the throat of the inner diffuser and separate water supply pumps delivering water to said sets of nozzles.

5. In a multi-jet condenser, the combination with a casing, of inner and outer rings of nozzles in the upper portion of the casing, and inner and outer diffuser tubes at the outlet of the casing, separate discharge tanks for each of said diffusers, a supply pump for the inner ring of nozzles, and a separate supply pump for delivering water from the discharge tank of the inner diffuser to the outer ring of nozzles.

In testimony whereof I have signed this specification.

PAUL A. BANCEL.