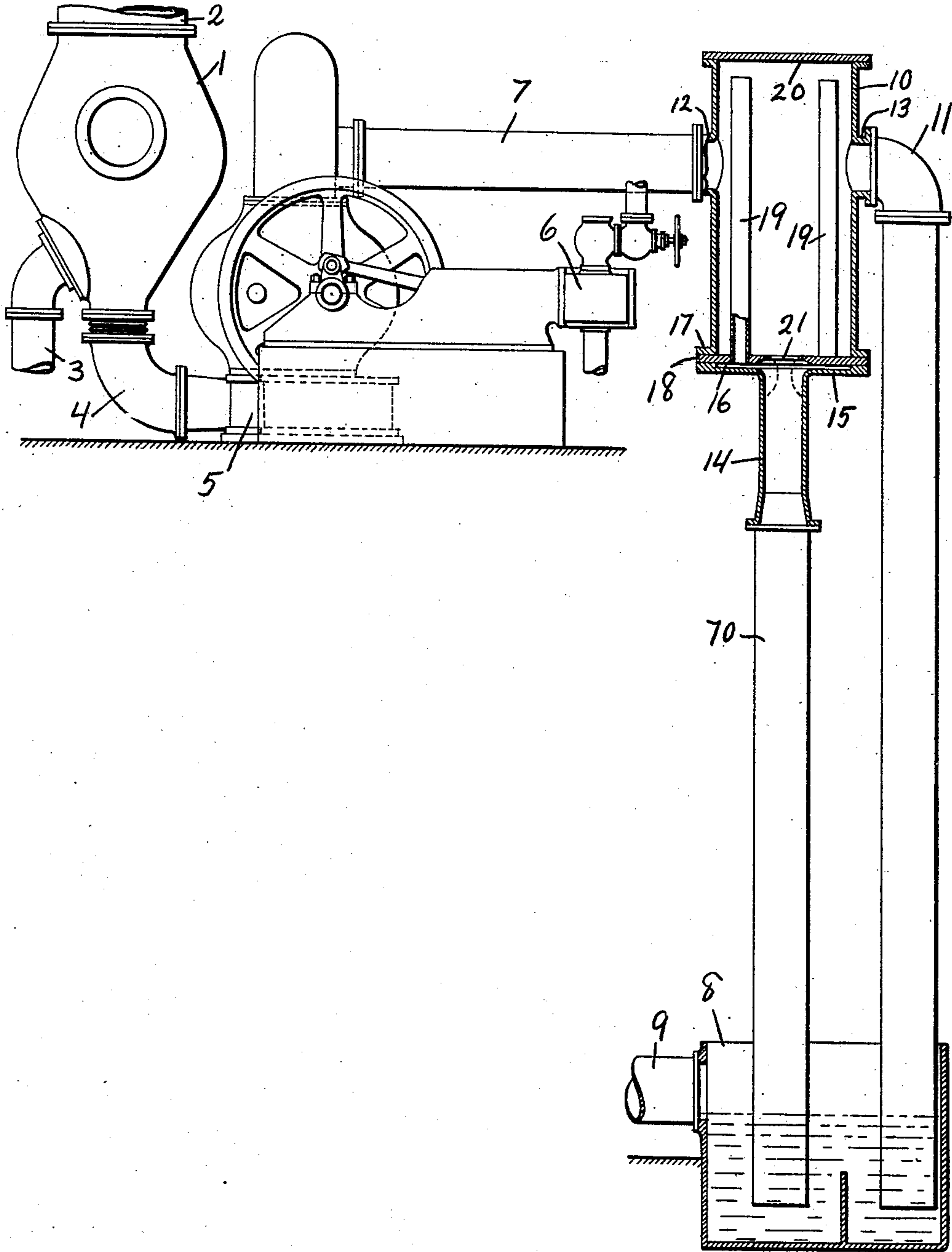


R. D. TOMLINSON.  
CONDENSER PLANT.  
APPLICATION FILED JULY 26, 1907.

915,318.

Patented Mar. 16, 1909.



WITNESSES -  
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# UNITED STATES PATENT OFFICE.

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## CONDENSER PLANT.

No. 915,318.

Specification of Letters Patent.

Patented March 16, 1909.

Application filed July 25, 1907. Serial No. 385,424.

*To all whom it may concern:*

Be it known that I, ROYAL D. TOMLINSON, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Condenser Plant, of which the following is a specification.

This invention relates to condenser plants, and the object of the invention is to provide an arrangement of apparatus by which a difference in height between the level of the pump which discharges water from the condenser and the level at which it is possible to locate the hot well, may be taken advantage of to reduce the back pressure upon the pump, thereby relieving the pump from unnecessary strain and economizing in the power necessary to operate the pump. The discharge from a pump doing this work varies with the load and the temperature of the injection water. The discharge pipe from the pump must therefore be large enough for the maximum discharge. Should this pipe be of the maximum size throughout from the pump to the hot-well, air would separate from the water during the minimum discharge. This air would collect in the pipe and destroy the vacuum effect of the column of water above the hot-well by reducing the height of the column. This is caused by the increasing pressure of the air collecting in the pipe. When this pressure becomes equal to atmospheric pressure, the column of water above the hot-well becomes *nil* and the air pump would have to discharge against full atmospheric pressure. In order to maintain this column of water so as to utilize the effect thereof under all conditions, this air must be removed in some way from the discharge pipe as soon as it separates from the water. This is done in the present instance by utilizing the flow of the water itself as discharged from the pump. In order to do this, a nozzle on the *vena contracta* principle is arranged in the discharge pipe. In the present case the nozzle is designed to operate with the minimum discharge of water so that the air will be abstracted at all times. In order to provide for any discharge greater than this, an auxiliary or overflow pipe is connected to the discharge pipe from the pump above the nozzle.

The drawings show an elevation, partly in section, of a condenser plant.

Referring to the drawings, the numeral 1

designates the condenser body of a condenser of the jet or barometric type to which is connected the steam exhaust pipe 2, and with which communicates the injection water supply pipe 3.

The numeral 4 designates the outlet pipe from the condenser body which communicates with the pump 5, illustrated as a positive displacement rotary pump driven by the steam engine 6, said pump being provided with the discharge pipe 7 through which the water from the condenser is discharged into the hot well 8, which is provided with the overflow pipe 9.

Interposed in the pipe 7 is the casing 10 provided with the overflow pipe 11, which also extends into the hot well 8. This casing 10 is preferably formed as a cylinder with flanged ends and flanged bosses 12 and 13, to which the pipes 7 and 11 may be readily attached.

To the top of the lower section 70 of pipe 7 is secured a section of pipe 14, provided with an enlarged flange 15 at its upper end, said flange being of substantially the same diameter as the flanged lower end of casing 10 to which it is secured by bolts or in any suitable or preferred way. The upper part of this flange 15 is recessed as at 16, and between flange 15 and flange 17 on the bottom of the casing is secured the plate 18. Secured to the plate 18 are pipes 19 which extend up close to the top 20 of the casing 10, said top 20 being disposed at a higher level than bosses 12 and 13. Plate 18 is provided with an aperture 21 concentric with the thoroughfare through pipe section 14, and the periphery of this aperture is preferably perpendicular for a short distance downward and then beveled downwardly and outwardly, the purpose of this construction being to cause the water as it flows from said casing to assume a decided bend, as indicated by dotted lines in the drawing, thereby insuring a good *vena contracta* being maintained.

The operation of the apparatus is as follows: Steam and injection water being admitted to the body 1 of the condenser, the steam will be condensed as usual, and the pump 5 being operated by the engine 6, will discharge the water through pipe 7 into casing 10 and through section 70 of pipe 7 into the hot well. Air and gases which separate from the water in pipe 7 will collect in the top of casing 10, and, owing to the high vacuum



existing in the space about the *vena contracta*, the air and gases will flow through pipes 19 into the space surrounding said *vena contracta*, and whatever air or gas passes into  
5 said space will be removed therefrom by the aspirating effect of the flowing column of water.

What I claim is,—

10 1. The combination of a condenser, a pump for removing water therefrom, a hot well placed at a lower level than said pump, a discharge pipe from said pump extending into said hot well and adapted to be sealed by the water therein, and means interposed  
15 in the said discharge pipe for utilizing the flow of water to abstract air from the said pipe.

20 2. The combination with a condenser, of a pump for removing water therefrom, a hot well placed at a lower elevation than said pump, a discharge pipe from said pump ex-

tending into said hot well and adapted to be sealed by the water therein, a casing interposed in said discharge pipe, and means for removing air which may collect in said casing. 25

3. The combination with a condenser, of a pump for discharging water therefrom, a hot well placed at a lower elevation than said pump, a discharge pipe for said pump extended into said hot well and adapted to be  
30 sealed by the water therein, a casing provided with an overflow pipe interposed in said discharge pipe, and a pipe in communication with the upper part of said casing through which air may be withdrawn from said casing. 35

In testimony whereof, I affix my signature in the presence of two witnesses.

ROYAL D. TOMLINSON.

Witnesses:

G. F. DE WEIN,

FRANK E. DENNETT.