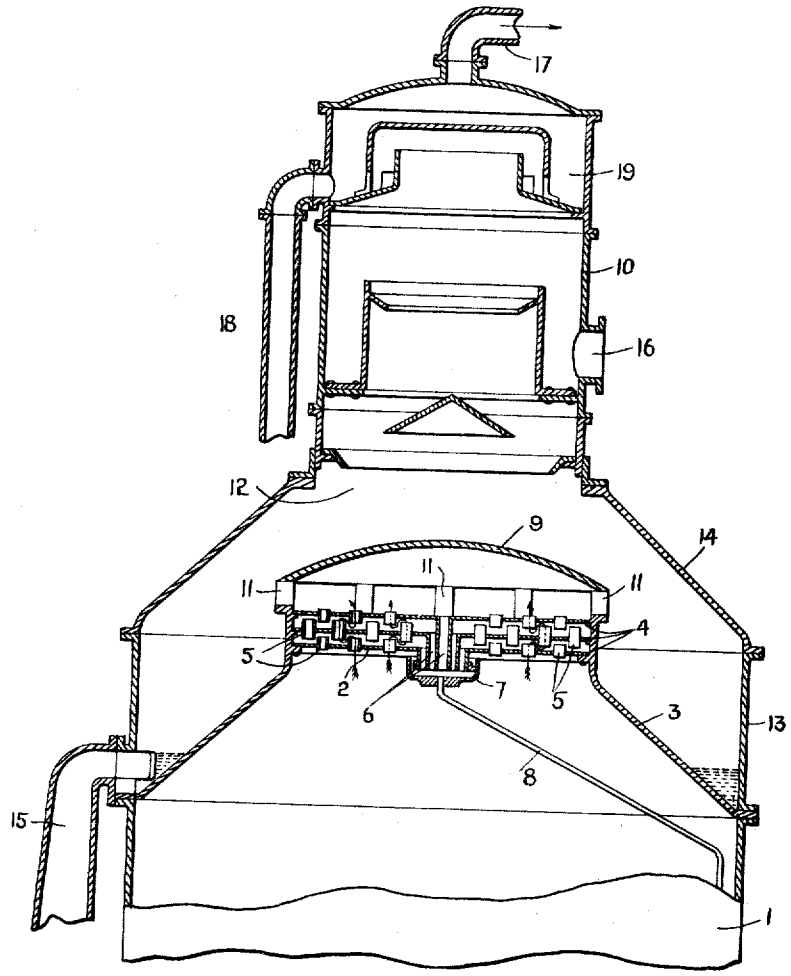
H. E. BEYER AND W. G. HALL.

RECTIFIER AND CONDENSER.

APPLICATION FILED JAN. 25, 1919.

1,352,648.

Patented Sept. 14, 1920



WITNESS

E. M. Hitchcock

INVENTOR

H. E. Beyer & W. G. Hall

BY

Joseph V. Schofield

ATTORNEY

UNITED STATES PATENT OFFICE.

HERMAN E. BEYER, OF NEW YORK, N. Y., AND WILLIAM G. HALL, OF HONOLULU, TERRITORY OF HAWAII, ASSIGNORS TO INGERSOLL-RAND COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

RECTIFIER AND CONDENSER.

1,352,648. Specification of Letters Patent. **Patented Sept. 14, 1920.**

Application filed January 25, 1919. Serial No. 273,200.

To all whom it may concern:

Be it known that we, HERMAN E. BEYER and WILLIAM G. HALL, both citizens of the United States, residing, respectively, at New York, in the county of New York and State of New York, and at Honolulu, in the county of Oahu, in the Territory of Hawaii, have invented a certain new and useful Improvement in Rectifiers and Condensers, of which the following is a specification.

This invention relates to a combination rectifier and condenser adapted particularly for vacuum drying pans and evaporators used in the process of manufacture of sugar and other chemical processes.

The object of the present invention is to provide a rectifier and condenser in combination with a vacuum pan in which the condenser is mounted directly above the vacuum pan and the rectifier is located between the vacuum pan and condenser, or just below the condenser, so that the large amount of piping required for carrying off the vapors in the apparatus now used is dispensed with and a more efficient installation is provided.

With the above and other objects in view our invention consists in the features of construction and operation set forth in the following specification and illustrated on the accompanying drawing, forming a part hereof, in which the figure shows a vertical sectional view of the complete installation of vacuum pan rectifier and condenser.

Referring more particularly to the figure, the reference character 1 refers to the vacuum pan or evaporator cell which may be of any usual construction, directly above which is located the rectifier 2 held securely in relation to the vacuum pan by the cone sheet 3. The rectifier 2 comprises a plurality of plates 4 having short lengths of piping 5 inserted in each, the pipes 5 in each plate 4 being staggered in relation to those in the adjoining plates. This is for the purpose of providing a tortuous passage for the vapors arising from the vacuum pan and for the purpose of entrapping particles of the commercial fluid to prevent them from being carried off into the condenser with the vapor. Each of the plates 4 of the rectifier 2 is provided with a central orifice or hole 6 terminating below the edge of a liquid sealing cup 7 and from the central portion of the liquid sealing cup 7 extends a small pipe 8 to drain the commercial liquid back into the bottom of the vacuum pan. Directly above the rectifier 2 is a crown sheet 9 which acts as a baffle for the falling cascade of water from the condenser 10 presently to be more definitely described. This is spaced from the rectifier 2 by means of short struts 11 so that there is a large area of opening for the vapors to pass from the rectifier 2 into the lower portion 12 of the condenser. Preferably the condenser is mounted upon an annulus 13 and cone 14 extending from the walls of the vacuum pan 1 so that the cone sheet and rectifier 2 and crown sheet 9 are all incased within the base of the condenser 10. This is for the purpose of providing an insulating cavity for the top portions of the vacuum pans or evaporators and to also provide a portion from which the cooling water may be drained into a drain pipe or eduction or barometric pipe 15. The condenser 10 is itself mounted upon the upper surface of the cone 14 and comprises a counter current condenser of the form described and claimed in the patent granted to Herman E. Beyer, #1,162,969, so that a further description of the parts of this condenser is not deemed to be necessary. The circulating water is admitted through orifice 16 and the air pump is in communication with the pipe 17 extending from the top of the condenser to remove any air that may be contained in the solutions. A pipe 18 communicates with the baffle chamber 19 to drain any water which may be carried over into this chamber.

From the above description it will be seen that a new arrangement of rectifier and condenser has been provided for an evaporating or vacuum pan in which the vapors arising from the evaporating or vacuum pan pass directly through a rectifier of large area and consequently the velocity of the vapors arising from the evaporating pan is not increased to any perceptible degree and is therefore very low. From the rectifier 2 the vapors come directly in contact with the circulating or cooling waters of the condenser without passing through any additional piping or having their velocity increased by passage through piping of reduced diameter, so that there is no heat or commercial fluid lost in the piping. The counter current condenser which as above

stated is the type best adapted for the present installation, is arranged so that there is a very slight terminal difference between the temperature of the vapors and the final temperature of the cooling water; that is, there is but little if any difference in temperature between the vapors as they rise from the pan and the circulating water as it passes from the condenser. This has the effect of preventing chilling of the cone sheet 3 and consequently condensation of the vapors within the evaporating pan, which is one cause of loss due to the heat required to reëvaporate the vapors condensed.

It is to be understood that the present showing and description disclose only one specific embodiment of our present invention, and that other forms and modifications are included within the spirit and scope of the invention, as expressed in the appended claims.

What we claim is:

1. A combined rectifier and condenser, comprising a vacuum pan, a cone sheet above the same, a rectifier supported by said cone sheet over the vacuum pan, means for draining the rectifier back to the vacuum pan, a crown sheet spaced above the vacuum pan and acting as a baffle to intercept cooling liquid, a casing extending above the rectifier, a condenser supported by said casing above the rectifier, means for draining the said condenser casing, baffles in the condenser forming chambers, means for admitting circulating cooling liquid to the condenser and means for draining the upper baffle chamber of the condenser.

2. A combined rectifier and condenser comprising a vacuum pan, a cone sheet above the same, a rectifier supported by said cone sheet over the vacuum pan, means for draining the rectifier back to the vacuum pan, a crown sheet spaced above the vacuum pan by struts and acting as a baffle to intercept a falling cascade of cooling liquid from a counter current condenser mounted upon a cone shaped casing extending from the walls of the vacuum pan above the rectifier thereby incasing the rectifier within the base of the supporting casing, means for draining the cooling liquid from the bottom of the cone shaped condenser supporting casing, means for admitting circulating cooling liquid to the condenser, means for exhausting the condenser, baffles in the condenser and means for draining the upper baffle chamber of the condenser.

In testimony whereof, we have hereunto set our hands.

HERMAN E. BEYER.
WILLIAM G. HALL.