

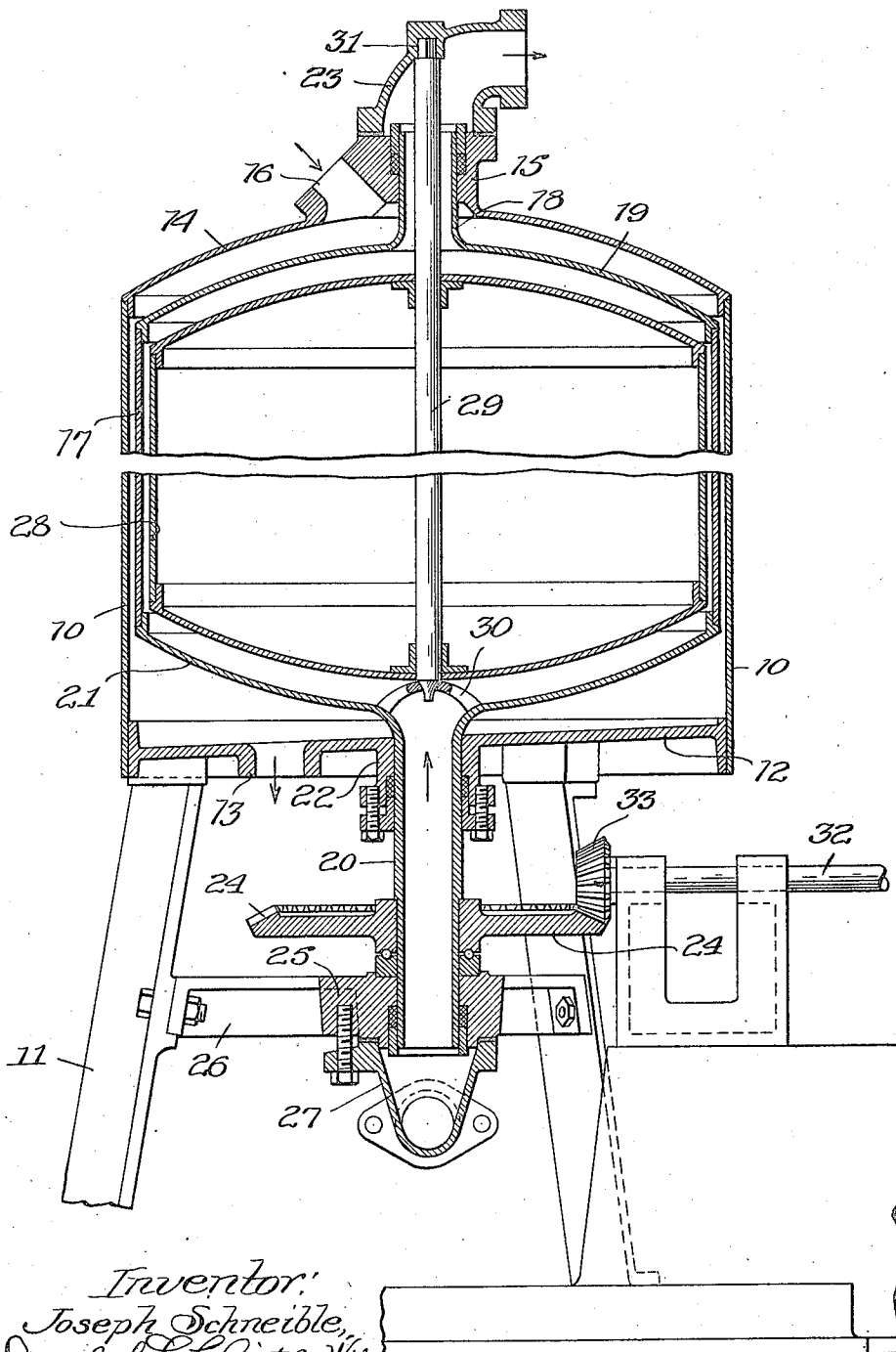
Jan. 1, 1924

1,479,088

J. SCHNEIBLE

HEAT EXCHANGER

Filed April 16, 1921



Inventor:
Joseph Schneible,
By *Byrd, Green, Smith, Lee, Crittton & Niles,*
Attys.

Patented Jan. 1, 1924.

1,479,088

UNITED STATES PATENT OFFICE.

JOSEPH SCHNEIBLE, OF CHICAGO, ILLINOIS.

HEAT EXCHANGER.

Application filed April 16, 1921. Serial No. 461,393.

To all whom it may concern:

Be it known that I, JOSEPH SCHNEIBLE, a citizen of the United States, residing at 130 North Wells Street, Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Heat Exchangers, of which the following is a specification.

The present invention relates to improvements in heat exchangers or heating devices and will be fully understood from the following description thereof, illustrated by the accompanying drawing, in which a device embodying the invention in a specific form is shown.

Referring more particularly to the drawing, the numeral 10 indicates a cylindrical casing or drum, preferably vertically mounted upon a suitable standard 11. The drum or casing 10 may suitably be provided with an inclined bottom 12 provided with an outlet 13 and at its top is provided with a closure 14, which, at the axis of the casing, is provided with a stuffing box, for the purpose hereinafter set forth. It is likewise provided with an inlet opening 16 located near the axis of the drum.

Within the drum or cylinder 10 is a second drum or cylinder 17, its external diameter being such that its external wall is spaced but a short distance from the inner wall of the cylindrical casing 10. The drum 17 is rotatably mounted coaxial with the cylindrical drum or casing 10, preferably by means of an upper hollow trunnion 18 formed as part of, or secured to the top 19 of the drum 17 and journaled in the stuffing box 15, and a lower trunnion 20 formed as part of the bottom 21 of the casing 17 and journaled in the stuffing box 22 formed in the inclined bottom 12 of the drum 10. The upper trunnion 18 opens into an elbow 23 or other suitable connecting member. The lower trunnion 20 is prolonged to pass through a gear 24, which is splined to it, and through a journal 25 mounted in the spider 26 secured to the support or standard 11, and opens into an elbow or conduit member 27.

Within the drum 17 is mounted a third cylindrical body or drum 28, closed at top and bottom, this drum being secured to a central rod or shaft 29, journaled at its lower end in a spider 30 mounted in the drum 17, and at its upper end in a suitable squared end 31, formed, for example, in the

elbow 23. In the form shown the rod or shaft 29 passes through the trunnion 18. The external diameter of the drum 28 is such as to leave a narrow annular space between it and the interior of the drum 17.

In using the device of the present invention, the fluids, either vapors or liquids between which the heat exchange is desired, may be caused to travel through the device in the same direction or in opposite directions, the latter being preferred as a higher efficiency of heat exchange is thereby obtained. Thus, for example, the warmer liquid or vapor may be introduced through the inlet 16, distributed between the drums 10 and 17 and passed out through the outlet opening 13. At the same time, the cooler liquid or fluid may be introduced through the inlet 27 and the trunnion 20, distributing itself between the drums 17 and 28 and making its exit through trunnion 18 and outlet 23. During the passage of the liquids or fluids the central drum 21 is rotated, for example, by means of the drive shaft 32 and gear 33 meshing with the gear 24 keyed to the trunnion 20. The rotation of this central drum, the drums 10 and 28 being substantially stationary, results in a movement of each current of liquid transversely of its main direction of travel and hence results in an increased efficiency of heat transference or exchange through the wall of the drum 17. By the spaced drum construction the liquids are formed into relatively thin layers or sheets upon the surfaces of the central drum 17. The thickness of these sheets or layers may be varied in accordance with the dimensions of the drums and the quantities of liquids to be treated. For example, when the quantities of liquids to be treated are in the order of 40 barrels per hour, I have found a satisfactory size for the central drum 17 to be six feet in length, and two feet in diameter, the drums 10 and 28 being respectively one half inch greater and one half inch less in diameter than the central drum 17. The relative movement between the heat exchange surface or the wall of the intermediate drum and the fluids on its respective sides greatly increases the efficiency of heat transmission therethrough. The speed of rotation of the intermediate drum may vary widely, a suitable speed of a drum of the dimensions above set forth with liquid of approximately the viscosity of water being about 150 R. P. M. Under

these conditions the heat exchange secured is so efficient that the temperature differences between the liquid entering and leaving the apparatus at each end of the device are less than two degrees C.

When the liquids are caused to travel through the device in the same direction, they issue at the same end of the device; and in this case likewise the temperatures may be brought to within two degrees centigrade of each other.

The apparatus of the present invention may be employed as a heating device, for example, by using steam, preferably superheated, hot oil or other heating medium as one of the fluids.

Although the present invention has been described in connection with the specific details of a device embodying it, it is not intended that these details shall be regarded as limitations upon the scope of the invention, except in so far as included in the accompanying claims.

I claim:—

1. In combination, an annular chamber, a cylindrical wall partitioning said chamber, means for rotating said wall, and means for passing fluids through the chamber in direc-

tions substantially transverse to the movement of the wall on each side of the latter.

2. In combination, a cylindrical drum, means for rotating it, a cylindrical body surrounding the drum and spaced therefrom to form an annular chamber, a cylindrical body within the drum and spaced therefrom to form a second annular chamber, means for introducing liquid into and withdrawing it from the annular chamber between the drum and the casing and means for introducing liquid into and withdrawing it from the annular chamber between the drum and the internal cylindrical body.

3. In combination, a vertical cylindrical casing, provided with inlet and outlet means at opposite ends, a cylindrical drum mounted within the casing and spaced therefrom to form a narrow annular chamber, the drum being provided with hollow axial trunnions serving to introduce fluid into and withdraw it from the interior thereof, a substantially cylindrical body within the drum and spaced from its interior walls to form a narrow annular chamber and means for rotating the cylindrical drum.

JOSEPH SCHNEIBLE.