

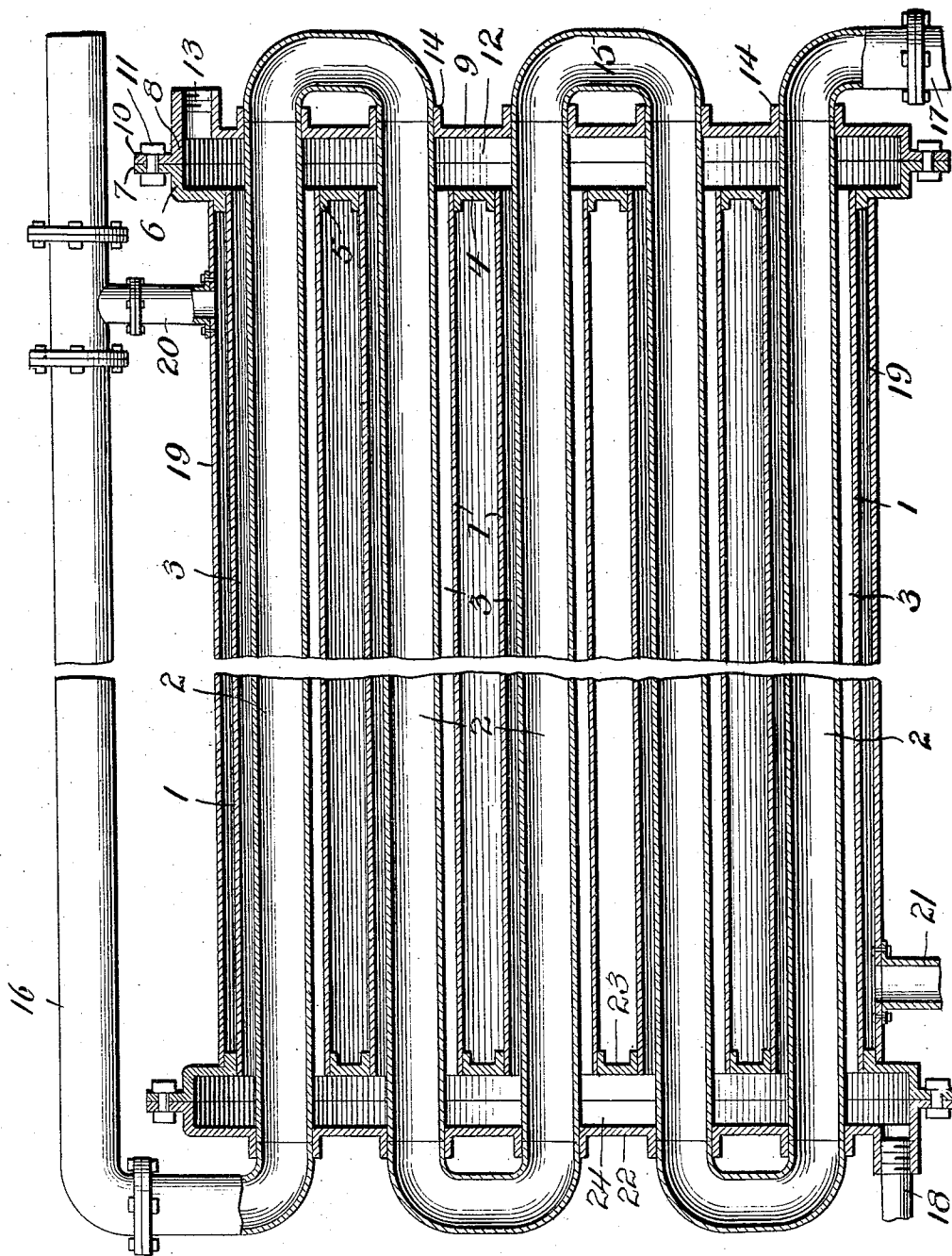
No. 894,141.

R. HERMAN.
CONDENSER.

PATENTED JULY 21, 1908.

APPLICATION FILED AUG. 12, 1907.

2 SHEETS—SHEET 1.



WITNESSES:
W. F. Koyle
T. D. Bryant
Fig. 1.

INVENTOR
R. Herman
By *H. C. Evert & Co.*
Attorney.

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2 SHEETS—SHEET 2.

Fig. 3.

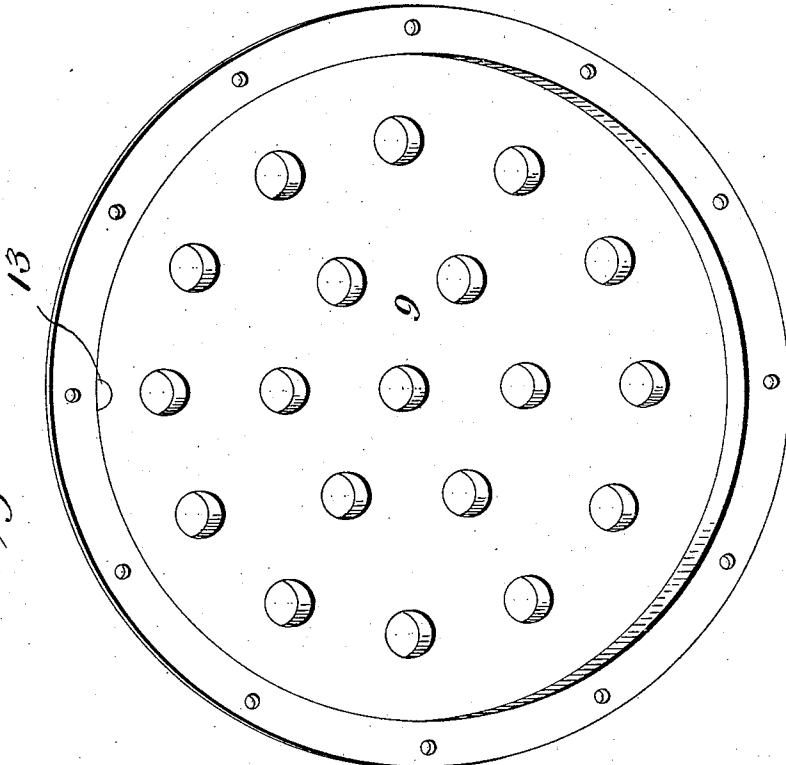
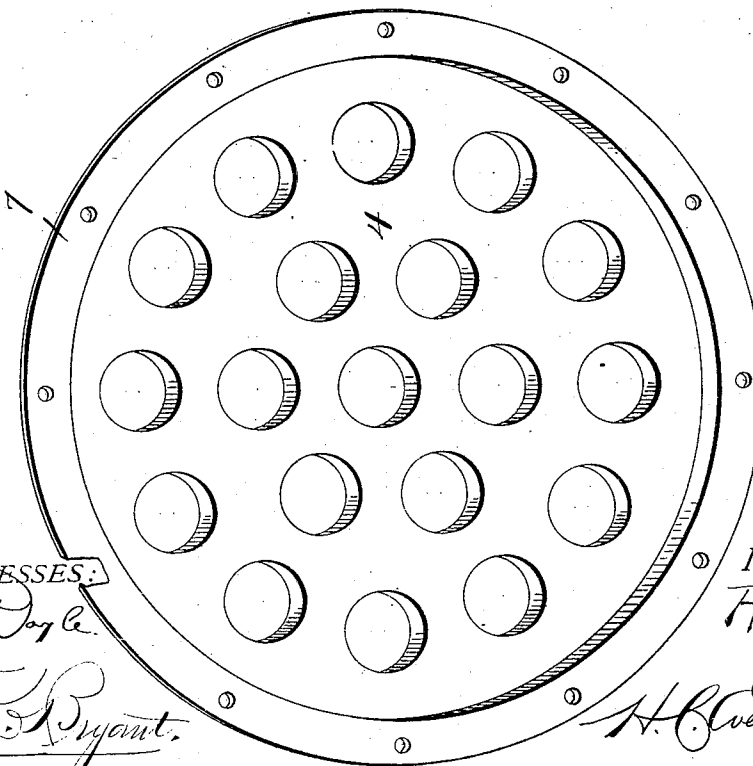


Fig. 2.



WITNESSES:

H. F. Roy & Co.

T. R. Bryant.

INVENTOR

R. Herman
by

H. C. Veit & Co.
Attorneys

UNITED STATES PATENT OFFICE.

REINHOLD HERMAN, OF CRAFTON, PENNSYLVANIA.

CONDENSER.

No. 894,141.

Specification of Letters Patent.

Patented July 21, 1908.

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To all whom it may concern:

Be it known that I, REINHOLD HERMAN, a citizen of the United States of America, residing at Crafton, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Condensers, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to condensers for steam or other fluids and the object thereof is to provide a condenser in the manner as hereinafter set forth whereby the volume of fluid to be condensed will be reduced to a
15 minimum, while at the same time increasing the area of the cooling surface thereby quickly performing the condensing operation.

Although the invention is designed primarily for the condensing of steam or other fluids, yet it is so set up that it can be readily adapted as a cooling apparatus for hot liquids of any character for which the apparatus may be found applicable.

Further objects of the invention are to
25 provide a condenser in the manner as hereinafter set forth and which shall be simple in its construction, strong, durable, efficient in its operation, readily set up for use, and comparatively inexpensive to manufacture.

30 With the foregoing and other objects in view the invention consists of the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawing, wherein is shown the preferred embodiment
35 of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

40 In describing the invention in detail, reference is had to the accompanying drawings wherein like reference characters denote corresponding parts through the several views and in which;

45 Figure 1 is a vertical sectional view of a condenser in accordance with this invention. Fig. 2 is a perspective view of one of the sections of the steam head, and Fig. 3 is a like view of the other section of the steam head.

50 A condenser in accordance with this invention comprises a series of steam conducting tubes and a series of water conducting tubes surrounded by a water jacket.

The steam conducting tubes are indicated by the reference character 1 and the water
conducting tubes by the reference character 2. The latter extend through the former
and said water tubes are of such diameter with respect to the steam tubes as to form
contractive passages 3 thereby reducing the
60 volume of steam to a very small minimum, while at the same time providing a cooling surface of large area. The tubes 1 at one end are secured in a plate or sheet 4, openings being provided in the plate 4 to receive
65 tubes 1, plate 4 being furthermore provided with bosses 5 constituting bearings for the tubes. The plate 4 is also formed with a laterally-extending flange 6, having off-sets
7, the flange 6, abutting against the flange
70 8, formed upon an outer sheet or plate 9. The flange 8 is formed with off-sets 10, which abut against the off-sets 7. The off-sets of the plates are secured together by the hold-
75 fast device 11 and when the plates 4—9 abut and are secured together the steam space 12 is formed, which has an inlet 13 communicating with a steam supply. The plate 9
80 has secured therein on end of tubes 2, these latter extend across the steam space 12. Openings are provided in the plate 9 to receive the tubes 2. The plate 9 is furthermore provided with bosses 14 to constitute bearings for the tubes 2. The tubes 2 have
85 their ends alternately connected together by the unions 15 and by such arrangement the water is caused to circulate in a sinuous manner.

Communicating with one of the upper tubes 2 is a water supply pipe 16, while one
90 of the lower tubes 2 has connected thereto a discharge pipe 17. A discharge pipe for the condensates is indicated by the reference character 18.

Inclosing the tubes is a jacket 19 having
95 an inlet 20 which communicates with the pipe 16 and further provided with an outlet 21. A sheet or plate 22 is provided for supporting the ends of the tubes 2 opposite to the ends which are supported by the plate 9
100 and a sheet or plate 23 is provided for supporting the ends of the tube 1 opposite those ends which are supported in the plate 4. The plates 22 and 23 are of a construction similar to the plates 4—9, and the like reference characters are applied thereto. The
105

plates 22 and 23 form a steam space 24. As the pipes 2 extend through the steam spaces 12 and 24 it is evident that the cooling medium circulating through the pipes 2 will
5 condense the steam within said spaces.

From the foregoing construction, it is evident that a condenser is set up in which is provided an unusually large cooling surface for the fluid to be condensed, and that
10 furthermore the volume of the fluid to be condensed is reduced to a very small minimum and by such an arrangement, it is evident that the condensing operation is vastly facilitated. Furthermore the steam con-
15 ducting pipes are not only cooled exteriorly owing to the arrangement of the water jacket surrounding the tubes, but are also cooled internally owing to the circulation of water through the pipes 2. The manner
20 of operating the device can be reversed in this particular, that the water space may be used for steam and the steam space may be used for the water, which in either case will give the same result.

25 Although the condenser is designed primarily for use for condensing steam, yet it is evident that it can be employed as a cooling apparatus for hot liquids.

What I claim is:—

30 1. A condenser comprising two pairs of flanged plates, the flanges of the plates of each pair abutting against each other and thereby providing a fluid receiving space, means for securing the plates of each pair
35 together, fluid receiving pipes having their ends connected to the inner plates of each pair of plates and opening at their ends into said fluid receiving spaces, cooling medium conducting pipes extending through said
40 fluid receiving pipes, across said fluid receiving spaces and having their ends connected in the outer plates of said pairs of plates, and means exteriorly of the outer plates of said
45 pairs of plates for alternately connecting the fluid conducting pipes together, one of said fluid receiving spaces provided with an inlet and the other of said fluid receiving spaces with an outlet.

2. A condenser comprising two pairs of
50 flanged plates, the flanges of the plates of each pair abutting against each other and thereby providing a fluid receiving space, means for securing the plates of each pair together, fluid receiving pipes having their
55 ends connected to the inner plates of each pair of plates and opening at their ends into said fluid receiving spaces, cooling medium conducting pipes extending through said fluid receiving pipes, across said fluid receiving
60 spaces and having their ends connected in the outer plates of said pairs of plates, means exteriorly of the outer plates of said pairs of plates for alternately connecting the fluid conducting pipes together, one of said

fluid receiving spaces provided with an inlet 65 and the other of said fluid receiving spaces with an outlet, a jacket surrounding said fluid receiving pipes and interposed between the inner plates of said pair of plates, said jacket forming a cooling medium receiving 70 chamber, means for establishing communication between one of said cooling medium conducting pipes and said chamber, and an outlet for said chamber.

3. A condenser comprising two pairs of 75 flanged plates, the flanges of the plates of each pair abutting against each other and thereby providing a fluid receiving space, means for securing the plates of each pair together, fluid receiving pipes having their ends 80 connected to the inner plates of each pair of plates and opening at their ends into said fluid receiving spaces, cooling medium conducting pipes extending through said fluid receiving pipes, across said fluid receiving 85 spaces and having their ends connected in the outer plates of said pairs of plates, means exteriorly of the outer plates of said pairs of plates for alternately connecting the fluid conducting pipes together, one of said fluid 90 receiving spaces provided with an inlet and the other of said fluid receiving spaces with an outlet, a jacket surrounding said fluid receiving pipes and forming a cooling medium receiving chamber, means for establishing 95 communication between one of said cooling medium conducting pipes and said chamber and an outlet for said chamber.

4. A condenser comprising means for constituting a pair of fluid receiving spaces, fluid 100 receiving pipes having their ends opening into said fluid-receiving spaces, cooling medium conducting pipes extending through said fluid-receiving pipes, across said fluid receiving spaces and having their ends con- 105 nected to the outer walls of said fluid-receiving spaces, and means exteriorly of the outer walls of said fluid-receiving spaces for alternately connecting said fluid conducting pipes together, one of said fluid-receiving spaces 110 provided with an inlet and the other of said fluid-receiving spaces provided with an outlet.

5. A condenser comprising means for constituting a pair of fluid-receiving spaces, 115 fluid-receiving pipes having their ends opening into said fluid-receiving spaces, cooling medium conducting pipes extending through said fluid receiving pipes across said fluid-receiving spaces and having their ends con- 120 nected to the outer walls of said fluid-receiving spaces, and means exteriorly of the outer walls of said fluid-receiving spaces for alternately connecting said fluid conducting pipes together, one of said fluid-receiving spaces 125 provided with an inlet and the other of said fluid-receiving spaces with an outlet, a jacket surrounding said fluid receiving pipes

and forming a cooling medium receiving chamber, a cooling medium supply pipe arranged exteriorly of said jacket and communicating with said cooling medium conducting pipes, and means for establishing communication between said supply pipe and said chamber formed by the jacket.

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

REINHOLD HERMAN.

Witnesses:

GILMORE HERMAN,
JAMES W. WATSON.