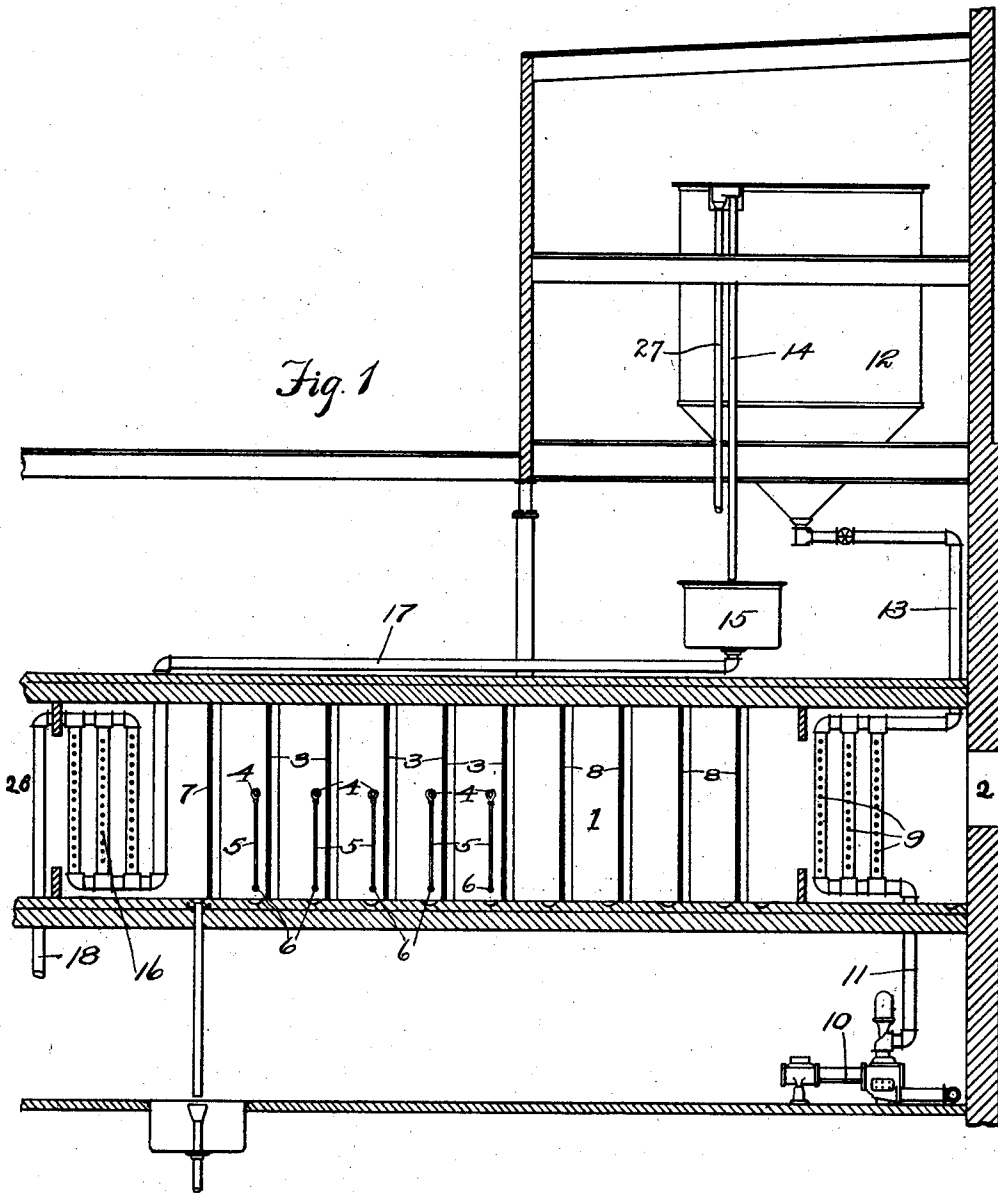


W. H. PRINZ.  
 APPARATUS FOR COOLING AND DRYING AIR FOR USE IN MALT HOUSES.  
 APPLICATION FILED JULY 18, 1903.

997,581.

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2 SHEETS—SHEET 1.



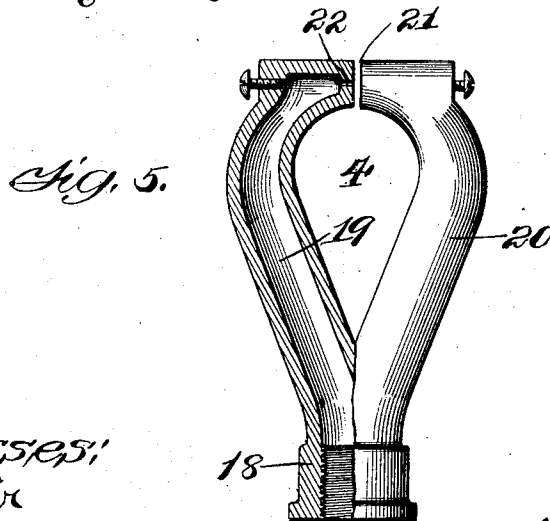
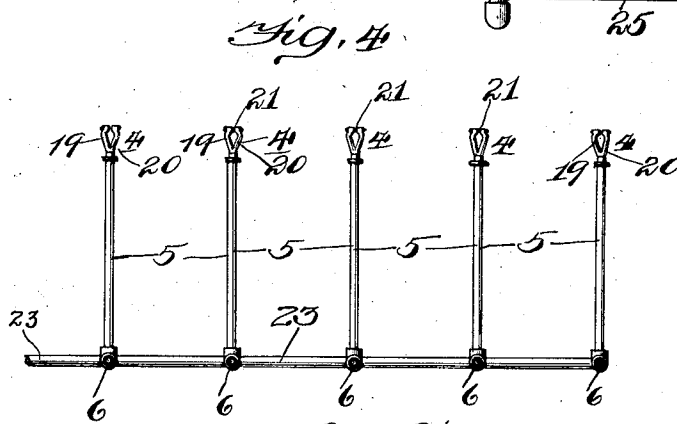
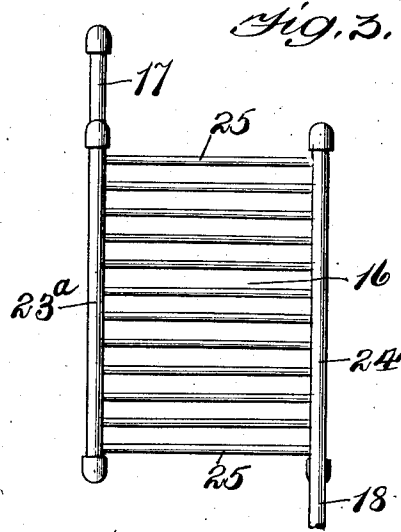
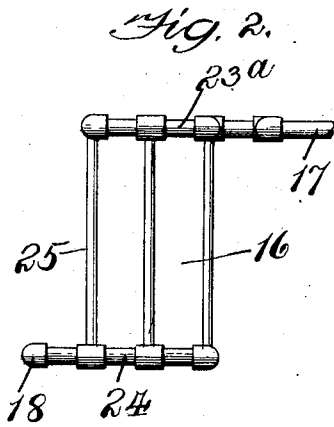
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*Witnesses:*  
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# UNITED STATES PATENT OFFICE.

WILLIAM H. PRINZ, OF CHICAGO, ILLINOIS.

APPARATUS FOR COOLING AND DRYING AIR FOR USE IN MALT-HOUSES.

997,581.

Specification of Letters Patent. Patented July 11, 1911.

Application filed July 18, 1903. Serial No. 166,295.

*To all whom it may concern:*

Be it known that I, WILLIAM H. PRINZ, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Cooling and Drying Air for Use in Malt-Houses, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to malt houses, and has for its object to provide new and improved apparatus for attemperating and drying air for use in malt houses.

The apparatus illustrated in the drawing and hereinafter described is designed with special reference to carrying out my improved process described in my application for Letters Patent for method of making malt of even date herewith, but it is not restricted in its use solely to carrying out such process. It consists in improved means by which the air may be properly cleansed, cooled and dried; also in improved means by which the cooling and purifying of the air may be more economically effected than by the use of the various forms of apparatus heretofore employed for the purpose.

In the accompanying drawings Figure 1 is a partial vertical section of a malt house, illustrating the compartment in which the steep-tanks are placed and the attemperator-room, together with suitable pumping-apparatus for securing the necessary circulation of the water. Fig. 2 is a plan view of one of the water coils or systems of piping; Fig. 3 is an end view thereof; Fig. 4 is a view, illustrating the arrangement and connections of the spraying devices; and Fig. 5 is an enlarged detail, partly in section of one of the spray-nozzles or heads.

Referring to the drawings,—1 indicates the attemperator-floor or room of the malt house, which is preferably at one side of the floor containing the malting compartments and communicates therewith through a passage 2.

3 indicates a series of perforated metal plates or sheets, arranged transversely in the attemperator-room and provided with spraying-devices 4 adapted to distribute water in finely-divided condition over the surfaces of said plates or sheets. Said spraying-devices are preferably of the construction shown in Fig. 5, being composed of bifurcated heads 18 and branches 19—20, which are tubular

and together form a substantially kite-shaped figure. The upper ends of said branches are turned toward each other and lie almost in contact, as shown at 21 in Fig. 5. They are perforated, as shown at 22 in Fig. 5. The arrangement is such that the jets of water discharged by each of said branches come together and form a fine spray of water lying in the plane of the opening between said branches. The heads are adjusted so that the spray is substantially parallel with the sheets 3 over which the water is to be distributed. The spraying-devices 4 receive the water through pipes 5 which communicate with supply-pipes 6 connected to a suitable main 23, to which water is supplied in any suitable manner.

7 indicates a perforated sheet, preferably of metal, which is arranged in advance of the first of the sheets 3,—that is to say, nearer the inlet-end of the attemperator-room,—which said sheet 7 is not provided with spraying-apparatus and serves to divide the air entering the attemperator-room into fine streams or jets.

8 indicates a series of perforated metal sheets arranged between the last sheet 3 and the outlet-end of the attemperator-room, which plates serve to relieve the air of part of its contained moisture,—meanwhile maintaining it in the form of jets or finely-divided streams.

9 indicates a coil or series of connected pipes, arranged at the outlet end of the attemperator-room between the last of the sheets 8 and the outlet 2, so that the air passing from said sheets 8 comes in contact with the pipes 9, and as such pipes are kept at a low temperature by the circulation of water therethrough, as hereinafter described, the air coming into contact therewith is relieved of all the moisture therein that may readily be deposited by condensation.

10 indicates a pump, which communicates by pipe 11 with the pipes 9 and serves to pump cold water through said pipes.

12 indicates one of the steep-tanks, which, as shown, are placed above the attemperator-room and receive water from the pipes 9 through a pipe 13.

14 indicates an overflow-pipe, communicating with the upper portions of the steep-tanks 12 and discharging into a reservoir 15. 27 indicates another overflow pipe which communicates with the steep-tank 12 at a lower level than the pipe 14. The pipe 27

is intended to carry off water alone, while the pipe 14 carries off water mixed with grain. A strainer (not shown) is provided to prevent the grain flowing into the pipe

5 27. The pipe 27 also discharges into the reservoir 15, which is also provided with a strainer to retain therein the grain passing to it through pipe 14.

16 indicates a second coil or series of  
10 pipes, placed at the inner end of the at-  
temperator-room and receiving water from  
the reservoir 15 through a pipe 17, as shown.

18 indicates an outlet from the pipes 16,  
which may discharge into the sewer.

15 The construction of the coil or series of  
pipes 16 is preferably as shown in Figs. 2  
and 3, there being two headers 23<sup>a</sup>—24  
connected by a series of cross or branch pipes  
25. Any other suitable construction may,  
20 however, be employed. The series of pipes  
9 is preferably of the same construction.

By the construction described the cold  
water pumped through the pipes 9 passes  
25 into steep-tanks 12 where it serves the pur-  
pose of steeping the grain therein,—after  
which it overflows through pipe 14 and  
finally reaches the pipes 16, being then at  
a somewhat higher temperature. The tem-  
perature of the water in the pipes 9 is  
30 usually from forty-eight to fifty degrees  
Fahrenheit,—while that in the pipes 16  
ranges from sixty to sixty-five degrees. I  
thus make use of the same water for three  
purposes,—first, in the pipes 9 it serves as  
35 a final means of condensing moisture from  
the air under treatment; second, it serves as  
a means of steeping the grain in the steep-  
tanks; and, third, it serves as a preliminary  
means of condensing the surplus moisture  
40 from the air as it passes into the attemper-  
ator-room. Atmospheric air from the out-  
side entering the attemperator-room through  
a passage 26 first comes into contact with the  
pipes 16, where the moisture carried by it,  
45 together with a large proportion of its im-  
purities, is condensed and deposited. The  
air then passes through the sheet 7, being  
divided into fine streams,—in which condi-  
tion it passes through sheets 3, where it is  
50 washed by the water from the sprays 4 and  
is maintained in a finely-divided condition  
during the washing operation. From the

last sheet 3 the air passes through sheets 8  
which are not supplied with spraying mech-  
anism and which act to intercept and sepa- 55  
rate therefrom the small globules of water  
entrained with the air passing through such  
plates. The air then passes over pipes 9,  
which, being maintained at a low tempera-  
ture by the cold water therein, cool it before 60  
it passes through the outlet 2.

It will be understood that the air is  
caused to flow through the attemperator  
room by a suction fan located in some other  
part of the building, or it may be caused 65  
to flow in the proper direction by any other  
suitable mechanism.

I wish it to be understood that while I  
have described specifically the form of ap-  
paratus illustrated, my invention is not re- 70  
stricted to the details of the construction  
shown and described, except in so far as  
they are particularly claimed.

That which I claim as my invention and  
desire to secure by Letters Patent is,— 75

1. In a malting apparatus, the combina-  
tion of an attemperator room having an out-  
let leading to a malting compartment room,  
a series of perforated plates in said attem-  
perator room through which the air passes, 80  
spraying devices arranged adjacent to said  
plates, and means comprising a perforated  
plate through which the air passes after the  
spraying operation and prior to its discharge  
through said outlet for intercepting the 85  
small globules of water entrained with the  
air.

2. In a malting apparatus, the combina-  
tion of an attemperator room having an  
outlet leading to a malting compartment 90  
room, a condensing coil over which the air  
passes initially, a series of perforated plates  
in said attemperator room through which  
the air passes, spraying devices arranged  
adjacent to said plates, and means compris- 95  
ing a perforated plate through which the  
air passes after the spraying operation and  
prior to its discharge through said outlet  
for intercepting the small globules of water  
entrained with the air.

WILLIAM H. PRINZ.

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