Dec. 4, 1923.

1,476,637

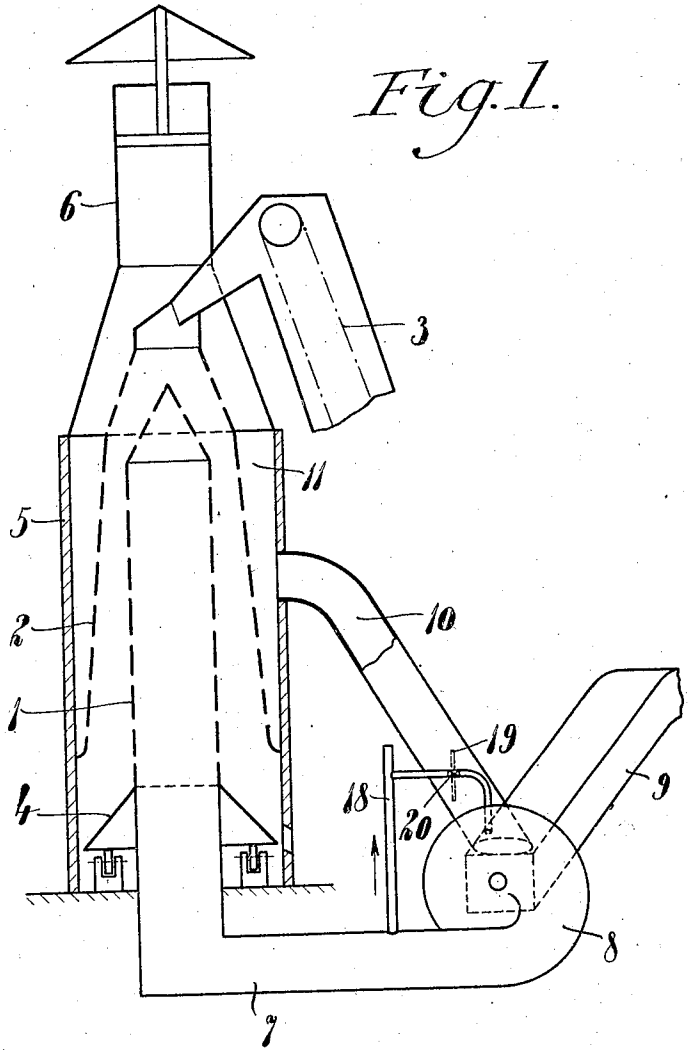
O. NORDSTRÖM

DRYING PLANT

Filed July 7, 1922

2 Sheets-Sheet 1

Fig. 1.



Inventor

Otto Nordström

by James J. Shelley & Co., attys

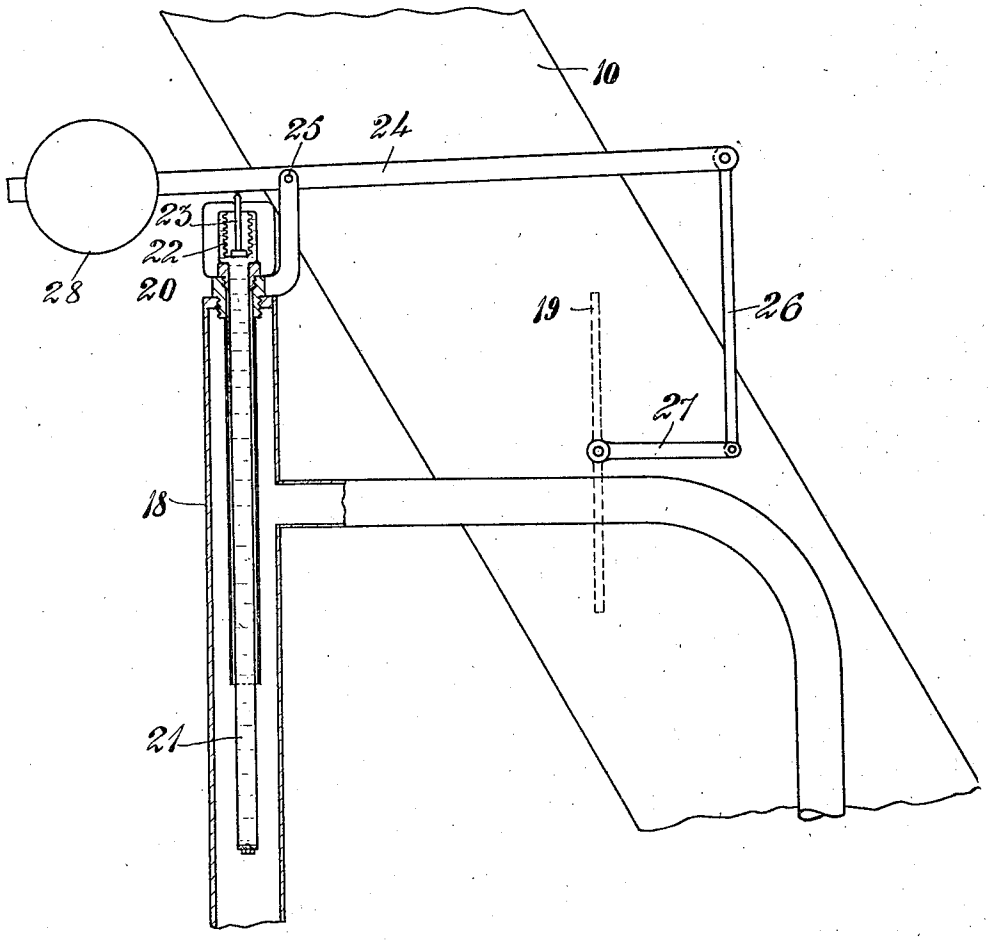
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Fig. 2.



Inventor,
Otto Nordström
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UNITED STATES PATENT OFFICE.

OTTO NORDSTRÖM, OF SUNDSVALL, SWEDEN.

DRYING PLANT.

Application filed July 7, 1922. Serial No. 573,448.

To all whom it may concern:

Be it known that I, OTTO NORDSTRÖM, a citizen of the Kingdom of Sweden, residing at Sundsvall, Sweden, have invented new and useful Improvements in Drying Plants, of which the following is a specification.

This invention relates to drying plants comprising one or more drying towers each including an annular drying chamber having perforated walls, and in which the material to be dried descends through said annular chamber, hot gases or hot air being at the same time passed through said chamber, preferably by means of a fan-blower pressing the gases into the central space within the wall of said chamber from which space the gases will then pass through the apertures of the said inner wall and into the annular drying chamber and will thereupon escape through the apertures formed in the outer wall of the drying chamber.

The object of this invention is to provide means to automatically maintain the temperature of the gases entering the drying chamber at a constant height or to adjust same according to the degree of moisture of the material to be dried. The apparatus used for obtaining this purpose will appear from the following specification when taken in consideration with the accompanying drawing in which:

Figure 1 is a diagrammatic vertical section of a drying plant constructed according to this invention.

Figure 2 is a view on an enlarged scale illustrating the preferred form of thermo-responsive device employed with the invention.

In the drawing, the numeral 1 indicates the perforated cylindrical inner wall of a drying tower of well-known design. 2 is the outer likewise perforated wall of said drying tower. The annular space formed between said two walls is adapted to serve as a drying chamber. To this end an elevator 3 is provided serving to feed the material to be dried into the said chamber at the top thereof. Provided at the bottom of the drying chamber is a feed out or emptying device 4. The whole structure is surrounded by a casing 5, preferably consisting of brickwork, surrounded by a chimney 6. In the interior of the inner cylindrical wall 1 the hot drying gases are introduced through a conduit 7 from a fan-blower 8 to the inlet end of which a pipe 9 is connected. The devices described above are well-known per se.

According to this invention I have now provided a pipe-line 18 of a restricted cross section area between the conduits 7 and 9 as a shunt to the fan-blower 8. Inserted in said pipe-line 18 is an adjusting device responsive to a definite temperature, to control a damper 19 mounted in a conduit 10 extending from the inlet pipe 9 of the fan-blower 8 to the space 11 formed between the outer wall 2 of the drying tower and the casing 5. Said thermoresponsive device is only indicated at 20 but is not shown in details as it is well-known per se.

It is well understood that a gas current having the same temperature as that of the gases entering the drying tower, will always circulate in the direction of the arrow through the pipe line 18. As the temperature rises above that for which the thermo-responsive device 20 is adjusted, said device will open the damper 19 to permit comparatively cool gases to pass from the space 11 and to the fan-blower 8 to dilute the hot gases entering through the conduit 9 until the temperature of the gases when leaving the fan-blower has sunken in the desired degree.

The diluting gases are taken from the space 11 in order that no amount of heat may be consumed in heating a quantity of fresh air that would otherwise be required, and to maintain the amount of carbonic acid contained in the drying gases as high as possible.

Many types of thermo-responsive devices are known, which may be used for the purpose of this invention. The thermo-responsive device selected as an example comprises as pipe 21 containing a liquid having a large coefficient of expansion due to heat. Said pipe 21 is closed at its one end by a bellows 22, the bottom of which carries a pin 23 on which one arm of a double armed lever 24 pivoted at 25 freely rests. The one end of said lever 24 is connected by a link 26 to a crank arm 27 on the shaft of the damper 19, the other end of the lever 24 carrying a counter weight 28. The pipe 21 is inserted in the pipe-line 18 so that the expansion and contraction of the liquid within the pipe 21 will be controlled by the heat of the gas flowing through pipe-line 18. As the said liquid expands or contracts it will

cause the bellows to operate the lever 24, which will in turn control the damper 19.

What I claim is:—

1. In a drying plant, the combination with a drying tower, comprising a drying chamber to be passed through by the material to be dried as well as by hot drying gases, and further comprising a space to be passed by the drying gases after their passage through the drying chamber, of means for causing the hot gases to enter the drying chamber, a connection extending between said last-mentioned space and the inlet of said means, a throttling member inserted in said connection, and an adjusting device to control said throttling member according to the temperature of the gases when leaving the said means.

2. In a drying plant, the combination with a drying tower, comprising a drying chamber to be passed through by the material to be dried as well as by hot drying gases, and further comprising a space to be passed by the drying gases after their passage through the drying chamber, of means for causing the hot gases to enter the drying chamber, a connection extending between said last-mentioned space and the inlet of said means, a throttling member inserted in said connection, a pipe-line arranged as a shunt to the said means between the inlet and the outlet thereof, and an adjusting device inserted in said pipe-line to control said throttling member according to the temperature of the gases when leaving the said means.

In testimony whereof I have signed my name.

OTTO NORDSTRÖM.