

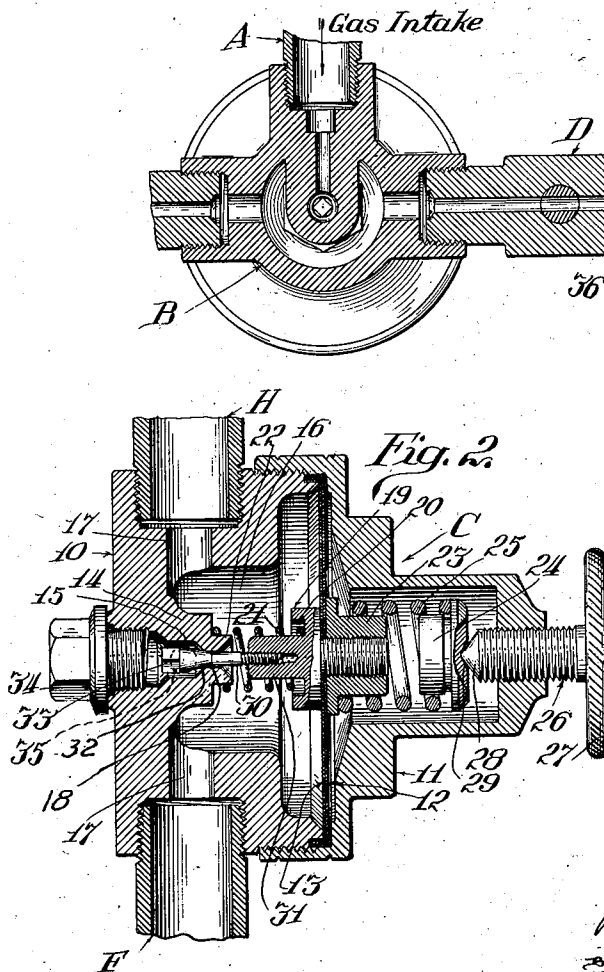
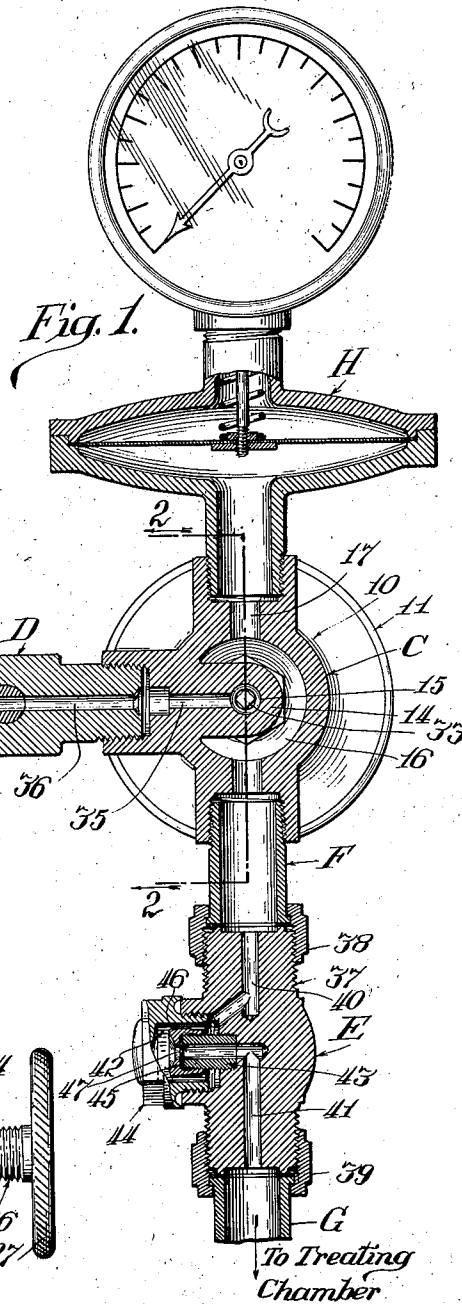
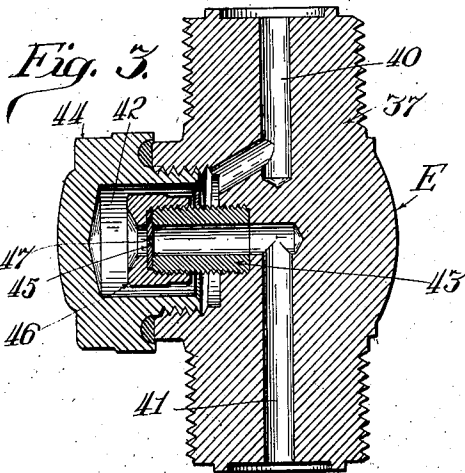
Jan. 6, 1925.

1,521,765

R. H. GUERRANT

PRESSURE CONTROLLING MECHANISM FOR FLOUR TREATING APPARATUS

Filed Sept. 19, 1923



Inventor.
Russell H. Guerrant
Barnett P. Pomeroy
Attorneys

UNITED STATES PATENT OFFICE.

RUSSELL H. GUERRANT, OF CHICAGO, ILLINOIS, ASSIGNOR TO INDUSTRIAL APPLI-
ANCE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PRESSURE-CONTROLLING MECHANISM FOR FLOUR-TREATING APPARATUS.

Application filed September 19, 1923. Serial No. 663,609.

To all whom it may concern:

Be it known that I, RUSSELL H. GUERRANT, 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 Pressure-Controlling Mechanism for Flour-Treating Apparatus, of which the following is a specification.

My invention relates to apparatus for treating flour with a gaseous agent, such as chlorine or nitrosyl chlorid or mixtures of these gases, for the purpose of improving the baking quality of the flour, the present invention being concerned with that portion of the apparatus which is employed for controlling the flow of the treating gas from its container to the treating chamber or to the place in the apparatus where it is mixed with air for application in a highly diluted state, to the flour.

The object of the invention is to provide certain improvements in this part of the apparatus, which have in view the simplification of the mechanism and the better and more accurate control and regulation of the gas flow. Specifically the invention seeks to improve, in those respects upon the apparatus of U. S. Patent to John I. Logan for apparatus for maturing and bleaching flour, No. 1,188,665, granted June 27, 1916.

In the flour treating process contemplated by this improvement, the flour is showered through an atmosphere of the gaseous treating agent. The amount of gas used in proportion to the quantity of flour treated is very small and the proper ratio as between gas and flour must be accurately maintained in order that the flour may receive proper treatment. This involves some difficulty because the gas pressures in storage cylinders are relatively high and are not constant and also the volumes of gas required for treatment of the flour are extremely small for any given period of time. Chlorine gas is quite corrosive of most metals, especially if it contains any trace of moisture, or if the metal parts themselves are moist, and the gas is likely to contain particles of foreign matter, and, as a consequence, there is likelihood of the parts of the apparatus becoming clogged or their orifices enlarged by corrosion or obstructed by sediments so

as to detrimentally affect the proper control of the gas flow to the treating chamber.

With these conditions in mind, my invention seeks to improve upon the gas controlling mechanism heretofore employed in flour treating apparatus of the general type disclosed in the Logan patent above mentioned, with the object of increasing the accuracy of control and adjustment and the maintenance with greater certainty of exactly the required amount of gas per unit of flour treated. Simplification of the apparatus and convenience in repairing the same and replacing parts that may have become corroded is another and incidental object.

The invention is illustrated in a preferred embodiment in the accompanying drawing, in which—

Fig. 1 is a sectional elevation of a gas controlling mechanism constructed in accordance with my invention.

Fig. 2 is a sectional view on line 2—2 of Fig. 1, and

Fig. 3 is a fragmentary enlarged sectional view of the fitting shown in the lower part of Fig. 1.

The general arrangement contemplates having the gas from the source of supply, for example, from the cylinder containing the same under compression in a liquid state, pass through two automatic pressure reducers arranged in tandem and then through a minute orifice in a thin barrier plate arranged across the duct leading from the second pressure reducer to the mixing nozzle for mixing the gas with air.

Referring to the drawing, A designates a pipe leading from the source of supply of gas to a pressure reducer B. C is a second pressure reducer of the same construction as pressure reducer B (but arranged in a different angular position), D is a cut off valve connecting the low pressure side of pressure reducer B with the high pressure side of the pressure reducer C and E is a fitting connected by pipe section F with the low pressure side of pressure reducer C and containing the barrier plate above referred to. G is a pipe leading from the fitting E to the mixing nozzle which is ordinarily arranged to project into the flour treating chamber (not shown). Preferably a pressure gauge H of any suitable construction is arranged on the low pressure

side of pressure reducer C to give indication of the gas pressure on the high pressure side of the barrier plate.

Fig. 2 shows in detail the construction of the pressure reducer C, the construction of pressure reducer B being preferably identical, as stated. This device comprises a casing member 10 and a bonnet 11, between which is clamped a flexible diaphragm consisting preferably of an outer copper plate 12 and an inner silver plate 13. The silver plate is used because this metal is very little affected by the treating agent. The casing member 10 is formed with an interior web portion 14 dividing the same into an inlet or high pressure chamber 15 and a low pressure chamber 16. The pressure gauge H and the pipe section F are tapped into the casing so as to communicate with the low pressure chamber through ducts 17.

The web 14 is formed with a port 18 connecting chambers 15 and 16.

The diaphragm 12, 13 has secured to its inner side a spring centering stud or abutment 19 grooved at 20 to receive one end of a spiral spring 21, the other end of which fits over a projection 22 on the web 14. On the other side of the diaphragm is a spring centering stud 23, studs 19 and 23 being clamped to the diaphragm by means of a threaded stem on the former, which is adapted to screw into an opening in the latter, the diaphragm being centrally perforated for this purpose.

Interposed between the centering stud 23 and a spring follower 24 is a coiled spring 25, considerably larger and heavier than spring 21. An adjusting screw 26 provided with a hand wheel 27 is threaded through the end of bonnet 11 and bears against the follower 24, the end of the screw 26 being preferably pointed, as shown at 28, and bearing in a tapered recess 29 in the face of the follower.

The flow of the gas from the high pressure chamber 15 to the low pressure chamber 16, through the port 18, is controlled by a reversed needle valve stem 30 having a threaded connection; for adjustment, with a boss 31 formed on the spring abutment 19, the portion of the valve stem extending through port 18 being tapered as indicated at 32 in the direction of the low pressure chamber. The valve has a square head 33 and may be adjusted by means of a wrench which can be inserted through an opening in the casing normally closed by a plug 34. 35 is a duct communicating with the duct 36 in the pipe connection D (Fig. 1) and leading to the high pressure chamber 15 of the pressure reducer.

The position of the tapered valve in duct 18 will of course depend upon the balance of pressures on opposite sides of the dia-

phragm. Increase of pressure on the low pressure side of the valve will move the valve so as to diminish the effective size of the port and slow down the flow of gas thus restoring the balance. By adjusting the pressure exerted by spring 25 on the outer side of the diaphragm, through manipulation of the adjusting screw 26, any required reduction of pressure may be obtained.

The fitting E which is interposed between the second pressure reducer C and the pipe G leading to the treating chamber is preferably constructed as follows: 37 is a member connected by unions 38, 39, with pipes F and G, respectively, and formed with an inlet duct 40, an outlet duct 41 and a gas receiving space or chamber 42 into which duct 40 opens. 43 is a hollow stud, the bore of which communicates with the outlet duct 41 and which projects into the receiving space 42, the latter being formed in a bonnet or cap piece 44 which is screwed into the fitting member 37. Extending across the end of the stud 43 is a barrier plate button or disc 45 secured to the stud by a cap 46 and formed with a minute orifice 47. The plate is preferably made of silver or other metal which will not be corroded by action of the treating agent. By arranging the barrier plate, as shown, that is in a hollow element or part which projects into the space into which the gas enters from the pressure reducers, a trap is formed for any impurities there may be in the gas, such impurities being intercepted and collected in the space 42. By arranging two pressure reducers in tandem of the construction above described, in the gas conduit in advance of the barrier plate a uniform pressure of any desired intensity may be maintained against the high pressure side of the barrier plate. So long as the orifice in the barrier plate is kept from clogging, and this is effectively accomplished by the improved arrangement shown, the quantity of gas flowing to the treating chamber per unit of time will be determined by the pressure maintained on the low pressure side of the second pressure reducer C and by the size of the orifice 47 in the barrier plate 45. The barrier plate is removable so that it may be replaced by one with a larger or smaller orifice. It will be observed that all parts of the apparatus subject to corrosion are easily accessible for cleaning and replacement.

I claim:

1. In an apparatus of the character described, a pressure reducer comprising a casing enclosing a low pressure chamber and having a web projecting thereinto and surrounding a relatively small high pressure chamber, a port through the web connecting the high and low pressure chambers, a pair

of oppositely disposed outlet passages leading from the low pressure chamber and an inlet passage leading to the high pressure chamber, the three passages being in substantially the same plane and at right angles to the port through the web, a diaphragm forming one wall of the low pressure chamber; a tapered valve adjustably connected with the diaphragm and operating within the port, and a plug in the casing in line with the port for giving access to the high pressure chamber for adjusting the valve.

2. In apparatus of the character described, the combination of means constituting a gas conduit, means for automatically maintaining a constant but adjustable pressure reduction in one end of said conduit, a fitting to which the low pressure end of the conduit leads formed with a gas receiving space and a gas outlet duct, and a hollow element communicating with said duct and projecting into the receiving space and formed with a minute orifice through which gas may enter said element from said receiving space.

3. In apparatus of the character described, the combination of means constituting a gas conduit, means for automatically maintaining a constant but adjustable pressure reduction in one end of said conduit, a fitting to which the low pressure end of said conduit leads formed with a gas receiving chamber and a gas outlet duct, a stud projecting into said chamber and formed with a bore communicating with said duct and a barrier plate extending across the bore of said stud having a minute orifice.

4. In an apparatus of the class described, means for maintaining a constant flow of low pressure gas comprising a fitting having a chamber therein, a low pressure conduit communicating with said chamber, and a gas outlet passage, a stud projecting into the chamber and formed with a bore communicating with the outlet passage, and a barrier plate having a minute orifice mounted across the bore of said stud.

RUSSELL H. GUERRANT.