

June 29, 1943.

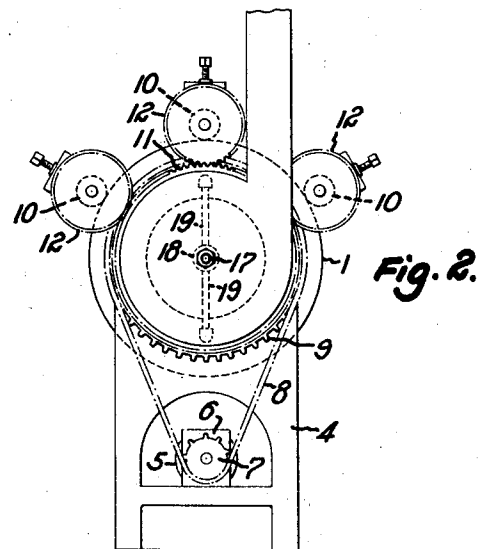
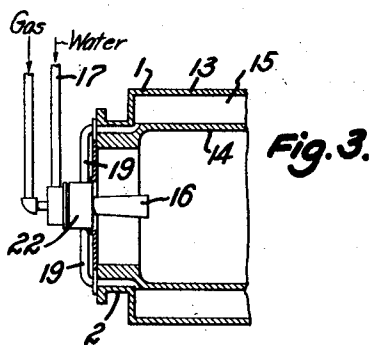
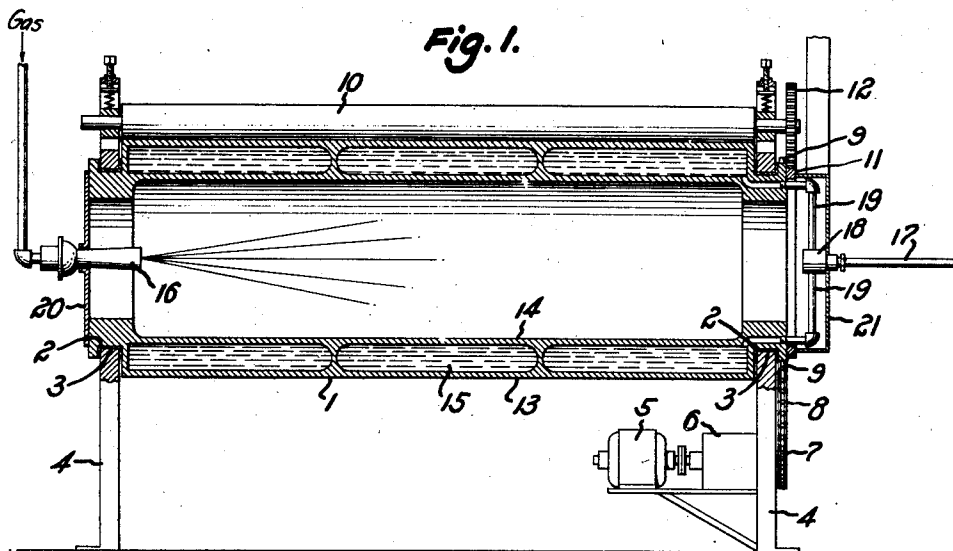
T. J. SULLIVAN

2,322,957

DIRECT FIRED SINGLE TUBE FLAT WORK IRONER AND DRYER

Filed Oct. 3, 1941

2 Sheets-Sheet 1



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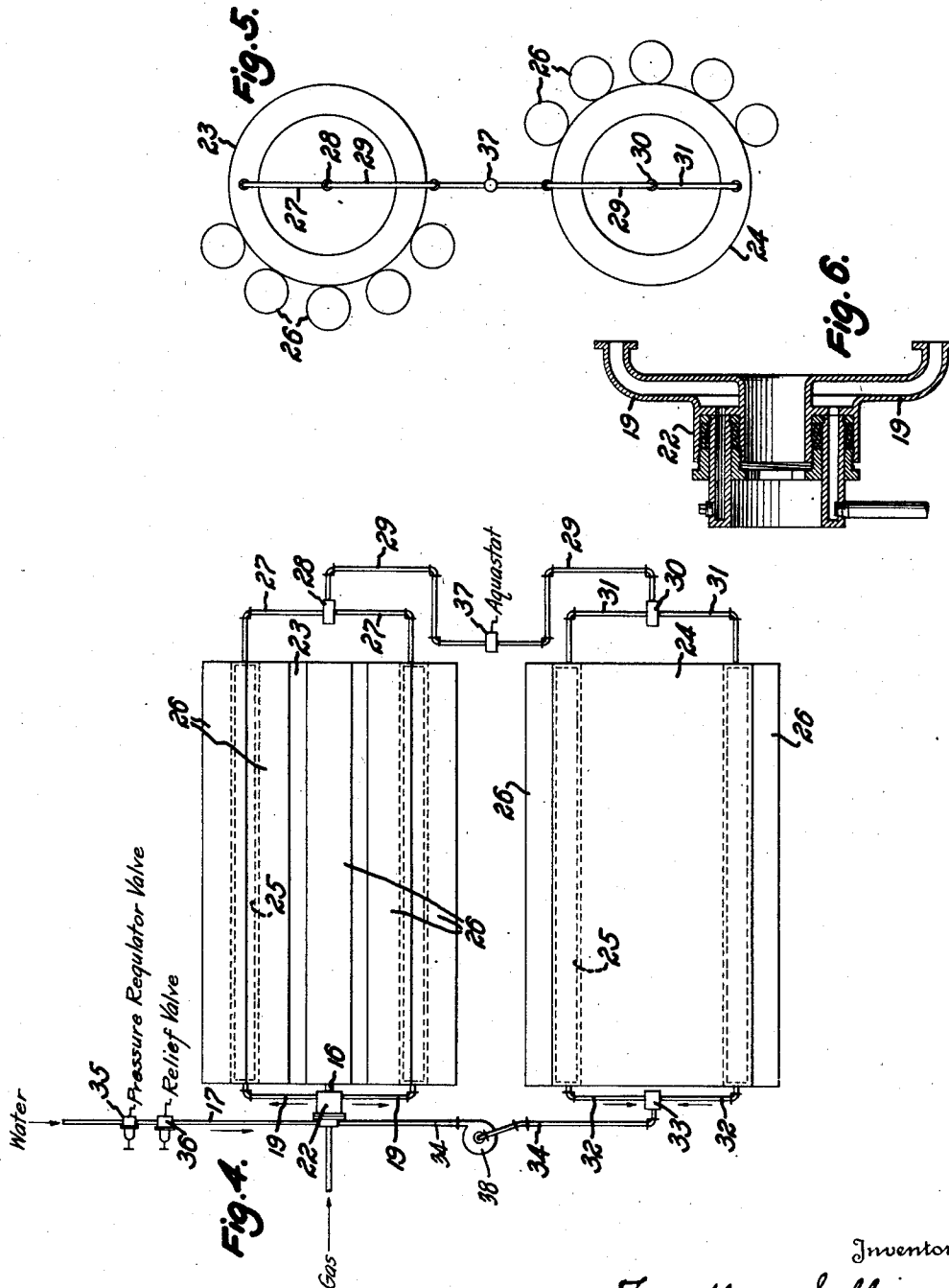
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DIRECT FIRED SINGLE TUBE FLAT WORK IRONER AND DRYER

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UNITED STATES PATENT OFFICE

2,322,957

DIRECT FIRED SINGLE TUBE FLATWORK
IRONER AND DRIER

Timothy J. Sullivan, Butte, Mont., assignor, by
mesne assignments, to Red & White Laundry &
Cleaning Company, Butte, Mont., a corpora-
tion of Montana

Application October 3, 1941, Serial No. 413,561

3 Claims. (Cl. 38—65)

This invention relates to ironing machines of the cylinder and roll type.

An object of the invention is to simplify the construction and at the same time improve the heating of such machines.

It is old to provide an ironing machine or mangle of very simple and inexpensive construction by providing a hollow cylinder with means for introducing a flame or hot gases for heating the cylinder surface, but such ironers are not satisfactory due to the practical impossibility of regulating the heating of the cylinder surface. In my Patent No. 2,131,336, dated September 27, 1938, I have disclosed an improved ironer in which the cylinder surface is heated by steam supplied thereto from a reservoir of water held in a chamber within the cylinder and heated by a flame or hot gases passing through flues which traverse the chamber.

My present invention resides in a simplification and improvement of my prior machine in that in the first place the cylinder surface is heated by a body of water or other suitable liquid held in an annular chamber within the cylinder in contact with the cylinder wall, and second in that the body of water or other heat transmitting liquid is heated by a flame or hot gases which pass through a single axial flue within the annular chamber. These and other features of my present invention, such as the provision of a double ironer both cylinders of which may be supplied with heat from a single burner operating through the flue in one of the cylinders, will be described in detail in connection with the accompanying drawings, in which,

Fig. 1 is a vertical longitudinal section of a single cylinder or drum ironer,

Fig. 2 is an end view of the right hand end of Fig. 1,

Fig. 3 is a vertical section of the end portion of the cylinder of Fig. 1 equipped with a combination gland and burner,

Fig. 4 is a front elevation of a double ironer,

Fig. 5 is an end view of the double ironer, and

Fig. 6 is a vertical section of the combination gland and burner.

Conventional parts of the apparatus are shown only diagrammatically or not at all for the sake of clearness of illustration.

Referring to the drawings, bearing surfaces 2, 2 at the ends of cylinder 1 may be supported for rotation on bearings 3, 3 carried by end frames 4, 4 and driven by the motor 5 through reducing gears 6, the drive pinion 7, chain 8 and ring gear 9. The usual ironing rollers 10 are sup-

ported in cooperative relation to the cylinder 1 and are driven by the ring gear 11 mounted on and rotating with the cylinder 1, which ring gear meshes with the gears 12 mounted on the ends of the shafts of the ironing rollers 10.

The cylinder 1, as shown, has an outer wall 13 and an inner wall 14 providing an annular space 15 which is filled with a heat transmitting liquid such as water which serves to convey heat from the hot gases, delivered by burner 16, through the wall 14, the liquid in space 15 and the wall 13 to the ironing surface thereof.

In the embodiment of the invention illustrated in Fig. 1, water or other suitable liquid is supplied to the space 15 through the stationary supply pipe 17, the packing gland 18 and the branch pipes 19 which rotate with the cylinder 1, and heat is supplied by the stationary burner 16 which projects through a suitable central opening in the end plate 20. Stack 21 is provided for carrying off the waste combustion gases. The liquid in the space 15 is maintained under sufficient pressure to prevent its vaporization at the desired temperature of operation. Due to frequent fluctuations in the volume of the liquid filling the space 15 due to changes in temperature it is desirable to connect space 15 with a supply of liquid at the desired pressure as described, but it will be evident that space 15 may be filled with the liquid under sufficient pressure to maintain it in the liquid state at the desired temperature of operation and the supply of liquid cut off, thereby sealing the liquid in the space 15. In this case, the space 15 should be provided with a safety valve to prevent explosion of the cylinder in the event that it becomes overheated and the pressure developed in space 15 exceeds the strength of the cylinder.

Fig. 3 illustrates an embodiment of the invention in which the liquid is supplied to the space 15 through a gland 22 (shown in detail in Fig. 6) which is so shaped as to provide a central opening for the burner 16. This arrangement is preferred when the chamber 15 is connected with an outside supply of liquid because it leaves the other end of the cylinder clear for the positioning of the stack 21, but this arrangement is more particularly designed for use on the double drum ironer illustrated in Figs. 4 and 5.

The double drum ironer consists of two similar cylinders 23 and 24 each having an annular space 25 similar to the space 15 in the cylinder 1 of Fig. 1 for the heating liquid and each having the customary cooperating ironing rolls 26. As illustrated, heat is supplied to the liquid in the space

25 in the upper cylinder by the gas burner 16. In this embodiment the liquid is made to circulate through the space 25 of the upper cylinder, the pipes 27 (the showing of stack 21 is omitted), gland 28, pipe 29, gland 30, pipes 31, the space 25 in the lower cylinder, pipes 32, gland 33, pump 38, gland 22 and pipes 19 into the upper cylinder again. The liquid passing through pipe 34, instead of being returned to gland 22 may be discharged to waste while fresh liquid is supplied through pipe 17 at the desired rate. As will be evident, the burner 16 may be applied to either cylinder and in the event that it is desired to omit pump 38 and rely upon gravity for circulation of the liquid between the two cylinders the heat should be applied to the lower cylinder.

It is, of course, possible within the scope of my invention to fill and seal the spaces 25 of both cylinders and to provide circulation of the liquid between the space of the heated cylinder and that of the unheated cylinder by either a pump or gravity. In that event, pipe 17 may be dispensed with. However, when the filling pipe 17 is used and is connected to a supply of liquid at the desired pressure, it is convenient to provide in this pipe a pressure regulating valve 35 and a relief valve 36. The circulation of the liquid between the cylinders may be regulated by the aquastat 37. The burner 16 may be suitably automatically regulated in accordance with the temperature or pressure in the space 25 in either or both cylinders to maintain the desired temperature of the liquid and of the cylinders.

As will be evident from the foregoing description, the apparatus is capable of considerable variation within the scope of my invention, as to the means employed for supporting the cylinders for rotation, for rotating the cylinders, for rotating the ironing rolls, for maintaining the annular space within each cylinder filled with a suitable heat transfer liquid, and for circulating the liquid between the two cylinders of the double drum ironer. It is within the scope of my invention to heat both cylinders of the double drum ironer and in that event circulation of liquid between the cylinders may be dispensed with, each cylinder of the double drum ironer being operated in the same way as the single cylinder of a single drum ironer.

It will be appreciated that the liquid in the space 15 of the cylinder 1 or the spaces 25, 25 of cylinders 23 and 24 will be continuously agitated due to the rotation of the cylinders and thus maintained at a uniform temperature within said spaces and that due to the large heat capacity of said body of liquid and the good heat conduct-

ing properties of the metal wall of the cylinder all parts of said wall will be maintained at a substantially uniform and constant temperature regardless of variations in the cooling of the cylinder surface in the ironing operation. A liquid such as water has a much greater heat capacity than heating gases such as steam or combustion gases and thus tends to eliminate the objectionable variations in the temperature of ironing cylinders which are directly heated by means of gases. At the same time, my invention makes it possible to apply a gas flame directly to the cylinders through a single central tube or flue (the simplest arrangement for a self-contained unit) without encountering the customary difficulties in such apparatus due to rapid variations in temperature and differences in temperature between different portions of the surface of a single cylinder. In addition, my invention as applied to a single drum ironer, i. e. the use of a heat transfer liquid held in an annular chamber between the outer wall of the cylinder and a central heating tube and the use of a direct gas flame for heating this liquid, makes it possible to operate a two drum ironer with a single heating burner by simply providing means for circulating the liquid between the two cylinders.

I claim:

1. A flat work ironer comprising two rotatable drums and associated rolls adapted to iron flat work on both sides, each of said drums enclosing a chamber, the chamber in at least one of said drums being annular and enclosing a central flue, means for supplying heating gases to said flue, heat transfer liquid filling said chambers, and means for passing liquid from one of said chambers to the other.

2. Apparatus as defined in claim 1 comprising means for circulating the liquid in said chambers in a closed circuit including said chambers.

3. A flat work ironer of the cylinder and roll type comprising a rotatable cylinder, an annular chamber within said cylinder and adjacent the outer wall thereof, a heat conducting fluid filling said chamber, and means for supplying fluid to said chamber and for heating the inner wall thereof comprising an annular gland having a stationary part and a rotary part surrounding the axis of the cylinder, a gas burner positioned to deliver hot gases through the central opening in said annular gland into the space within said annular chamber, a stationary conduit connected to the stationary part of said gland and a conduit connected between the rotary part of said gland and said chamber.

TIMOTHY J. SULLIVAN.