G. P. CRUMBAUGH.

HEATING MEANS FOR CORRUGATING ROLLERS.

APPLICATION FILED SEPT. 21, 1914.

1,168,171.

Patented Jan. 11, 1916.

2 SHEETS--SHEET 1.

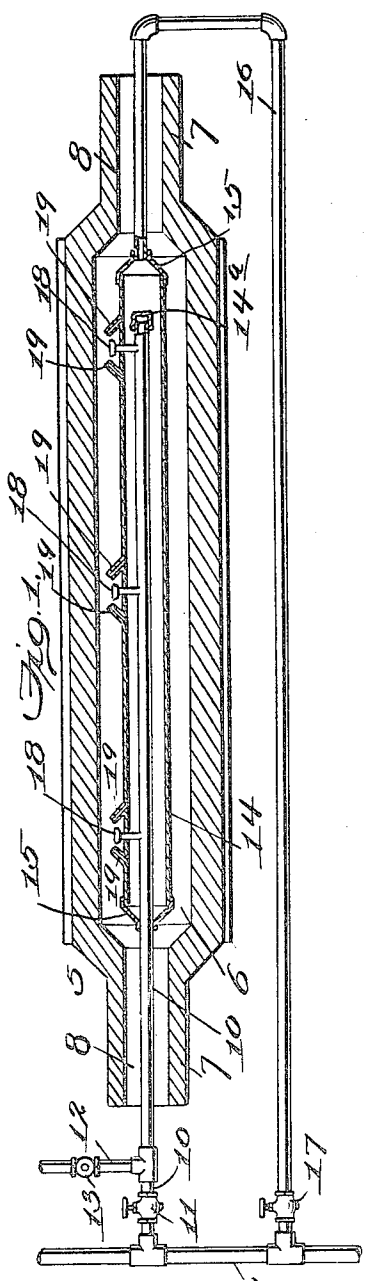


Fig. 1.

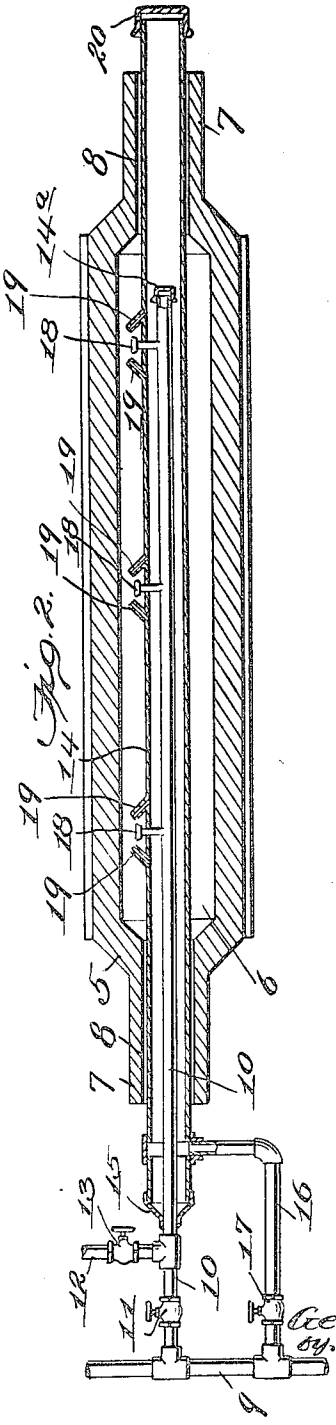


Fig. 2.

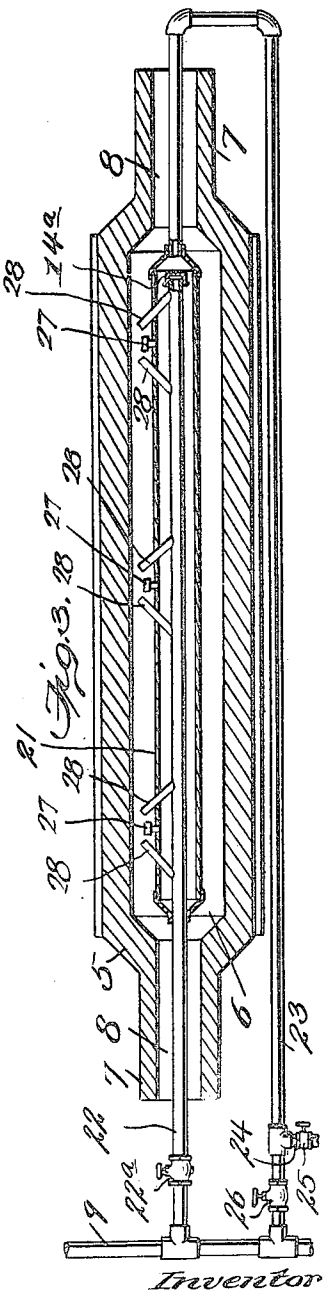


Fig. 3.

Witnesses:

E. F. Kaler

W. E. McArdle.

Inventor

George P. Crumbaugh

by.

James L. Norris

Attorney.

G. P. CRUMBAUGH.

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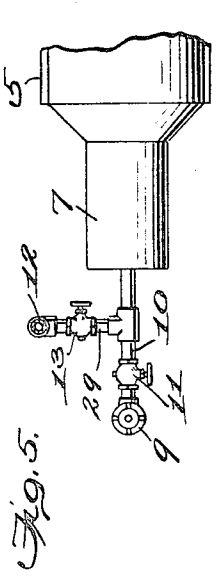


Fig. 5.

Fig. 4.

Witnesses:

C. G. Fessler

W. E. McDade.

Inventor

George P. Crumbaugh

by James L. Norris,

Attorney.

UNITED STATES PATENT OFFICE.

GEORGE P. CRUMBAUGH, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO EDWIN W. GROVE, OF ST. LOUIS, MISSOURI.

HEATING MEANS FOR CORRUGATING-ROLLERS.

1,168,171. Specification of Letters Patent. Patented Jan. 11, 1916.

Application filed September 21, 1914. Serial No. 862,764.

To all whom it may concern:

Be it known that I, GEORGE P. CRUMBAUGH, a citizen of the United States, residing at St. Louis, in the county of St. Louis City and State of Missouri, have invented new and useful Improvements in Heating Means for Corrugating-Rollers, of which the following is a specification.

This invention relates to corrugating rollers for paper and other materials, and particularly to heating means therefor, and the primary object is to provide a roller of the class specified with devices for uniformly heating the same and providing means for establishing perfect combustion of the heating medium and effecting release or escape of the products of combustion equally at opposite ends of the roller.

A further object of the invention is to equip a corrugating roller with heating means of simple construction and reliable operation that may be readily installed in connection with a roller without modifying the usual form and general organization thereof.

With these and other objects and advantages in view the invention consists in the construction and arrangement hereinafter described and claimed.

In the drawing: Figure 1 is a longitudinal vertical section of a corrugating roller showing the improved heating means applied thereto. Figs. 2 and 3 are similar views embodying slight modifications in the improved heating means. Fig. 4 is an elevation of a group of corrugating rollers showing the manner of installing the improved heating means therewith by manifolds. Fig. 5 is a top plan view of a portion of devices shown by Fig. 4.

The numeral 5 designates a corrugating roller of the usual type having a chamber 6 and end journals 7 which are cylindrical in cross-section and formed with bores 8 leading to or communicating with the chamber 6. The bores 8 are of equal diameter through their lengths, and the journals are mounted in suitable bearings with the outer ends fully exposed so that the said bores may perform their intended functions.

An air supply pipe 9 is provided of requisite diameter and mounted adjacent to one end of the roller 5 in any preferred manner, the said pipe connecting with a suitable blower to establish air under pressure therein. Connected to the supply pipe 9 is a feed pipe or branch 10 having a valve 11 and intersected by a gas supply pipe 12 also having a valve 13. The pipe 10, as shown by Fig. 1, continues into the roller 5 through the bore 8 of one of the journals 7 and has its inner end capped or closed, as at 14^a. After leaving the gas pipe 12 the pipe 10 constitutes a mixing pipe or chamber for air and gas, the relative quantities of air and gas mixed in the continuation of the pipe being regulated as desired by the valves 11 and 13 which are arranged adjacent to each other for ready and convenient adjustment. An air distributing chamber 14 envelops a portion of the pipe 10 within the chamber 6 and has contracted ends 15, the one end 15 being tightly slipped over the pipe 10 and the other end extending beyond and clear of the capped end 14^a of said pipe 10 and having one extremity of an air feed pipe 16 secured thereto and passed through the bore 8 of the journal 7 opposite that through which passes the pipe 10. The pipe 16 continues below the roller 5 and is connected to the compressed air supply pipe 9, the pipe 16 also having a regulating valve 17. The pipe 10 has a plurality of burners, nipples or air and gas outlets 18 connected thereto and extending through the chamber 14 adjacent to a portion of the wall of the chamber 6 of the roller. Near the burners, nipples or outlets 18 the air chamber 14 is provided with nipples or outlets 19, preferably converging toward and terminating over the said burners or outlets 18 and of any form of construction that may be found best adapted for the purpose. These nipples or outlets 19 supply air to the burners, nipples or outlets 18 and perfect combustion of the commingled or mixed air and gas is insured. Owing to the confined space in which the heating means is disposed within the roller, the natural air supply through the bores 8 will be insufficient to set up perfect combustion of the heating medium, and hence it is necessary to supply air to the burners or outlets 18 as just explained.

In the modified form of the heating means as shown by Fig. 2, the air chamber 14 is lengthened and extended through the bores 8 and outwardly beyond the ends of the journals 7, and the air feed pipe 16 is shortened and connected to the exteriorly located

portion of the chamber 14 adjacent to the gas supply pipe 12, the opposite exterior end of the chamber 14 in this instance being closed by a cap 20. In other respects the structure is similar to Fig. 1 and similar refernce numerals are applied thereto.

In the modified form of the heating means shown by Fig. 3, a reversal of parts is disclosed. In this instance the air chamber 14 is converted into an air and gas chamber 21 and the air and gas pipe 10 becomes a compressed air feeding pipe 22 extending into chamber 21 directly from the supply pipe 9 and having a valve 22^a, the inner end of the pipe 22 being closed as in the previous structures. The air feed pipe 16, as shown by Figs. 1 and 2, is converted into an air and gas feed pipe 23 which is connected to the end of the chamber 21 opposite that entered by the pipe 22, the pipe 23 continuing to the compressed air supply pipe 9 and intersected by a gas supply pipe 24. The pipes 23 and 24 are provided with suitable adjacent regulating valves 25 and 26 which may be readily operated to obtain the proper mixture of air and gas. The chamber 21 has a plurality of burners, nipples or outlets 27, and the pipe 22 has nipples or outlets 28 extending through the chamber 21 to the exterior of the latter and terminating adjacent to the burners 27 as in the similar structures shown by Figs. 1 and 2.

One of the most essential features of the invention is the equal liberation or escape of the products of combustion at opposite ends of the roller 5. This is accomplished by centrally disposing the pipes 10 and 16, as shown by Fig. 1, the chamber 14 as shown by Fig. 2, and the pipes 22 and 23 as shown by Fig. 3, in the bores 8 of the journals 7, or by having the spaces between the pipes and chamber and the walls of the bores of uniform dimensions at both extremities of the roller. The advantage of this arrangement is that one journal of the roller will not become heated to a greater degree than the other, and both journals will therefore run evenly and have a similar speed in their bearings in view of the fact that the expansion of the opposite journals will be practically the same.

The corrugating rollers of a machine, as shown by Figs. 4 and 5, are arranged three high in practice, and to simplify the application of the improved heating means to these rollers, manifold connections are used. That is, all of the pipes 10, as shown by Fig. 1 for instance, are connected to the supply pipe 9, one above the other, and each has a valve 11, and the gas supply pipe 12 extends downwardly close to the pipes 10 and connected to the latter by branch pipes 29 having the valves 13 therein. The air feed pipes 16 are extended downwardly in close relation beneath the lowermost roller 5 and all connected to the pipe 9 below the connection of the pipes 10 therewith, the pipes 16 each having a valve 17. All of the valves 11, 13 and 17 are within convenient reaching distance relatively to each other for quick adjustment thereof as may be found necessary to maintain a proper proportion and supply of the gas and air or fuel medium and of the flow of air through pipes 16. It will be seen that the application of the improved heating means is simple either to the rollers individually or to the group of rollers.

In all the forms of the improved heating means the operation is the same, and the roller or rollers will be regularly and uniformly heated to the proper degree and thus render the operation of corrugating positive and effective, or a sheet that is subjected to the action of the rollers provided with the improved heating means will be regularly corrugated. It will be understood that the proportions and dimensions of the several parts of the heating means or attachment may be varied to accommodate various applications.

What is claimed is:

1. The combination with a roller of the class specified, of means for feeding and burning a fuel medium in the interior of the roller, and separate means extending into the roller for feeding air under pressure and positively directing and delivering the air to the point of ignition of the burning fuel medium within the roller.

2. The combination with a roller of the class specified having a chamber, of means extending into said chamber for feeding a fuel medium and burning said medium adjacent to the interior surface of the wall of the chamber, and separate means extending into the roller chamber for feeding air under pressure and positively directing and liberating the air close to the point of combustion of the fuel medium.

3. The combination with a roller of the class specified having a chamber, of conduit devices extending into the chamber for respectively and separately feeding and burning a fuel medium and for feeding air under pressure and positively directing and delivering said air to the burning points of said fuel medium within the chamber, and supply means exterior of the roller and connected to said conduit devices.

4. The combination with a roller of the class specified having a chamber, of tubular devices in the chamber for respectively feeding and burning a fuel medium and delivering air under pressure to the burning fuel exteriorly of the devices for feeding the fuel, the tubular device for delivering air under pressure to the fuel medium maintaining the air separate from the fuel medium, one of said devices extending into the other, and

supply means exterior of the roller connected to said devices.

5. The combination with a roller of the class specified having a chamber, of tubular devices in the chamber for feeding and burning a fuel medium and delivering air under pressure to the burning fuel exteriorly of the devices for feeding the fuel, one of said devices extending into the other and both devices projecting through the opposite ends of the roller to the exterior of the latter, and supply means connected to the portions of said devices exterior of the roller.

6. The combination of a roller of the class specified having a chamber and journals at opposite ends having bores extending therethrough and opening into the chamber, means for feeding and burning a fuel medium in the roller and for positively feeding air under pressure to the burning fuel medium, portions of said means projecting through the bores of the journals and the spaces around the said means and between the latter and the walls of the bores being equal in each bore to provide escape outlets for the products of combustion of uniform dimensions at the opposite ends of the roller, and supply means exterior of the roller and connected to said fuel and air feeding means.

7. The combination of a series of superposed rollers of the class specified having chambers, tubular devices in the chambers for respectively feeding and burning a fuel medium and delivering air under pressure to the burning fuel in the chambers exteriorly of the devices for feeding the burning fuel, single supply conduits exterior of the rollers respectively for fuel and air under pressure, and manifold connections between the said supply conduits and the tubular devices in the chambers, portions of said connections being disposed below the lowermost roller so as to clear the latter for operation.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE P. CRUMBAUGH.

Witnesses:
W. J. BRASFIELD,
J. H. TOENISKOETTER.