

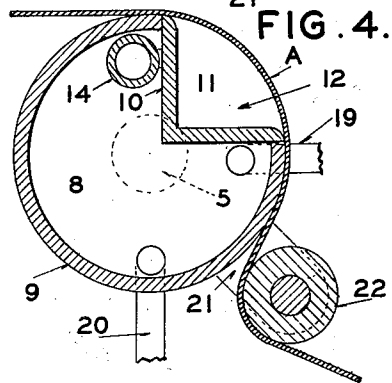
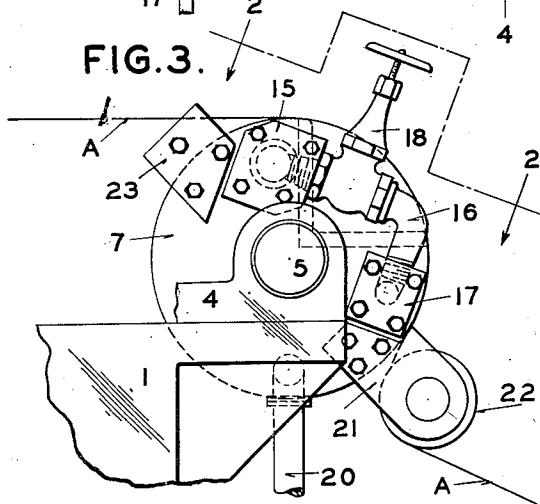
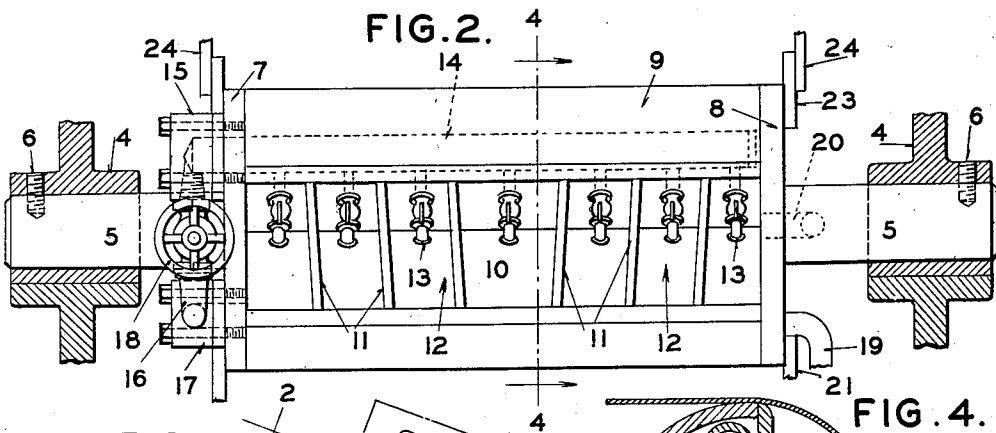
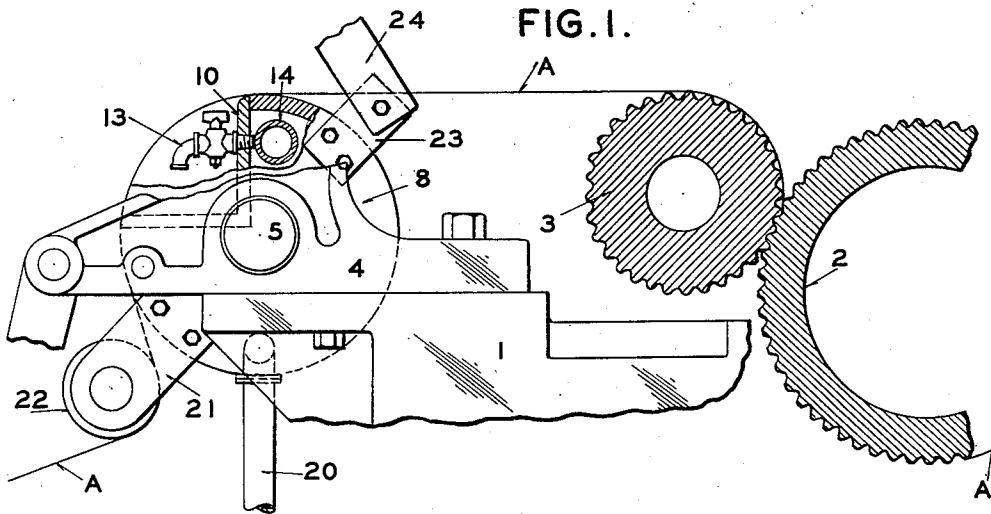
Dec. 29, 1936.

W. C. GEORGE

2,065,576

STEAMER AND PREHEATER FOR CORRUGATING MACHINES

Filed Feb. 24, 1936



INVENTOR.
WALTER C. GEORGE

BY

E. E. Huffman
ATTORNEY.

UNITED STATES PATENT OFFICE

2,065,576

STEAMER AND PREHEATER FOR CORRUGATING MACHINES

Walter C. George, St. Louis, Mo., assignor to
Robert Gaylor, Incorporated, St. Louis, Mo., a
corporation of Missouri

Application February 24, 1936, Serial No. 65,410

11 Claims. (Cl. 154—30)

In the manufacture of corrugated fiberboard the sheet to be corrugated is conditioned before it passes between the corrugating rolls to render it more pliable and to enable it to retain its corrugated form. Heretofore this has usually been accomplished by means of open jets of steam discharged against one or both faces of the sheet. This is objectionable because of the great amount of steam required which is not only wasteful but results in excessive moisture of condensation around the machine. Such moisture is not only detrimental to the machine and to the material being run, but also, in many cases, to the building itself. Further, this moisture is absorbed by the adhesive, silicate of soda, which thus becomes diluted and affects the quality of the corrugated board produced.

One object of my invention is to prevent the escape of steam around the machine. This I accomplish by conditioning the sheet through the medium of one or more closed steam chambers, of which chamber or chambers the sheet itself forms one wall, so that the steam enters and permeates the sheet as it travels across such chamber or chambers.

Another object of my invention is to so construct the conditioning device that it will act as a pre-heater for the sheet as well as a steamer. I accomplish this by supplying the steam chamber or chambers from a steam reservoir over the heated surface of which the sheet passes in traveling over the device.

In the accompanying drawing which illustrates a steamer and pre-heater made in accordance with my invention, together with a portion of a corrugating machine to which the same is applied, Figure 1 is an end view, partly in elevation and partly in section; Figure 2 is a plan view taken in the direction indicated by arrows 2—2 of Figure 3; Figure 3 is an elevation of the end opposite Figure 1; and Figure 4 is a section on the line 4—4 of Figure 2, the sheet being shown in position over the steam chamber.

Referring first to Figure 1, the numeral 1 indicates the frame of a corrugating machine in which is mounted in any usual manner (not shown) a main fluted roll 2 and a cooperating fluted roll 3 between which the sheet "A" is corrugated. Mounted on the machine frame 1 are a pair of side frames 4 in which are carried the supporting shafts 5 of the steaming and pre-heating device. These shafts are prevented from rotation by set-screws 6.

The shafts 5 each terminate in a disc 7 and 8, respectively, which are welded or otherwise se-

cured to the ends of a tubular member 9 forming the steam reservoir of the device. A portion, preferably somewhat less than one-fourth, of the periphery of the tubular member is removed and an angle bar 10 is inset, being welded or otherwise secured to the edges of the tubular member and to the discs to form steam-tight joints. The groove or trough thus formed is divided by partitions 11 to form a number of steam chambers 12. The free edges of these partitions conform to the peripheries of the discs. While these partitions may be parallel to the discs, I prefer to slightly incline them in opposite directions at each side of the center of the reservoir, as shown in Figure 2, so that they operate on the sheet "A" to stretch it laterally as it passes over them. The supply of steam to the individual steam chambers is controlled by petcocks 13 passing through one flange of the angle iron and communicating with a pipe 14 extending through the tubular member 9 adjacent said flange. This pipe has its end adjacent disc 8 closed and extends through disc 7 into a block 15 connected by pipe 16 with a block 17 communicating with the interior of the steam reservoir 9. A main valve 18 in the pipe 16 serves to control the supply of steam from the reservoir to the pipe 14. Steam is admitted to the reservoir through a supply pipe 19 and water of condensation is discharged through pipe 20 which is connected with a trap (not shown) of the type permitting the flow of water but retaining the steam.

Secured to each of the discs 7 and 8 is a bracket 21 in which brackets is journaled an idler roll 22. This roll is so positioned that the sheet "A" passing around it will contact with the periphery of the steam reservoir 9 for some distance before passing over the steam chambers. Thus the steam reservoir acts as a pre-heater for the sheet. The friction of the sheet "A" on the steam reservoir tends to rotate the latter and while this is prevented by set-screws 6, I prefer to provide either of the discs 7 or 8 or both with a bracket 23 connected by a link 24 with some part of the frame to relieve the strain on the set-screws.

In the operation of my device the tension on the sheet "A", as it is fed to the corrugated rolls, holds the sheet firmly against the periphery of the steam reservoir so that it closes all the steam chambers over which it passes. The steam thus acts upon and permeates the sheet without being allowed to escape. In case a sheet is employed of less width than the length of the steam reservoir, the petcocks of all of the chambers

not covered by the sheet are closed to prevent the escape of steam. While I have shown all the steam chambers as supplied with petcocks those at the center of the reservoir, which will
 5 be covered by the narrowest sheet employed, need not be so equipped but may remain in permanent communication with the pipe 14. When the sheet is to be changed, or other adjustments made, the steam may be cut off from
 10 all the chambers by the main valve 18. The use of pipe 14 to supply the chambers, not only enables the steam to be cut off from the chambers without stopping the supply to the reservoir and thus allowing it to cool, but also provides
 15 a super-heater to insure drier steam than would be otherwise supplied.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

20 1. The combination with corrugating rolls, of a plurality of steam chambers situated adjacent said rolls, one wall of said chambers being formed by the sheet of material operated on by said rolls, said chambers extending in a direction
 25 transverse to the travel of said sheet, means for controlling admission of steam to multiple chambers, and auxiliary means for controlling admission of steam to individual chambers.

30 2. The combination with corrugating rolls, of a steam reservoir situated adjacent said rolls, said reservoir having a trough in its periphery forming a steam chamber, said chamber having a wall formed by the material operated on by the corrugating rolls, said chamber extending
 35 in a direction transverse to the travel of the material, and means for controlling the admission of steam from said reservoir to said chamber.

40 3. The combination with corrugating rolls, of a steam reservoir situated adjacent said rolls, said reservoir having a trough in its periphery, partitions in said trough dividing it into a plurality of steam chambers, one wall of said chambers being formed by the sheet of material operated on by the corrugating rolls, said trough
 45 extending in a direction transverse to the travel of the sheet, and a plurality of valves controlling admission of steam from the reservoir to individual chambers.

50 4. The combination with corrugating rolls, of a steam reservoir situated adjacent said rolls, said reservoir having an arcuate surface over which the sheet of material operated on by the corrugating rolls travels, a steam chamber in said arcuate surface, said chamber extending
 55 in a direction transverse to the travel of the material and means for controlling the admission of steam from said reservoir to said chamber.

60 5. The combination with corrugating rolls, of a steam reservoir situated adjacent said rolls, said reservoir having an arcuate surface over which the sheet of material operated on by the corrugating rolls travels, a plurality of steam chambers in said arcuate surface, said chambers
 65 extending in a direction transverse to the travel of said sheet, and a plurality of valves for controlling admission of steam from said reservoir to individual chambers.

6. The combination with corrugating rolls, of a steam reservoir situated adjacent said rolls, said reservoir having an arcuate surface over which the sheet of material operated on by the corrugating rolls travels, a plurality of steam
 5 chambers in said arcuate surface, said chambers extending in a direction transverse to the travel of said sheet, a conduit in said reservoir, valves controlling communication between said conduit and individual chambers, and a main valve controlling communication between said conduit
 10 and the reservoir.

7. The combination with corrugating rolls, of a member situated adjacent said rolls, said member having an arcuate surface over which the
 15 sheet of material operated on by the rolls travels, a trough in said arcuate surface, said trough extending in a direction transverse to the travel of the sheet, and partitions in said trough dividing it into a plurality of steam chambers, said
 20 partitions being oppositely inclined at each side of the center of the member to stretch said sheet laterally.

8. The combination with corrugating rolls, of a member situated adjacent said rolls, said member having an arcuate surface over which the
 25 sheet of material operated on by the rolls travels, a plurality of steam chambers in said arcuate surface, said chambers extending in a direction transverse to the travel of said sheet, a steam
 30 conduit, and valves for controlling the admission of steam from said conduit to individual steam chambers.

9. The combination with corrugating rolls, of a steam reservoir situated adjacent said rolls, said reservoir having an arcuate surface over which the sheet of material operated on by said
 35 corrugating rolls travels, a steam chamber in said arcuate surface, said chamber extending in a direction transverse to the travel of the material, said arcuate surface extending beyond said chamber on at least one side thereof, and
 40 means for guiding the sheet over said extended arcuate surface to pre-heat said sheet.

10. In a conditioning device for a web of flexible material, a tubular steam reservoir, said
 45 reservoir having a convex face over which the web passes in intimate contact therewith, said face having a steam chamber therein communicating with the reservoir and extending in a
 50 direction transverse to the travel of the web, said chamber being closed by the web, and means for controlling the admission of steam from the reservoir to the chamber.

11. In a conditioning device for a web of flexible material, a tubular steam reservoir, said
 55 reservoir having a convex face over which the web passes in intimate contact therewith, said face having a steam chamber therein communicating with the reservoir and extending in a
 60 direction transverse to the travel of the web, said chamber being closed by the web, supports in said chamber extending substantially in the direction of the travel of the web, said supports conforming to the curvature of the convex surface, whereby said web is maintained in arcuate
 65 form during its travel over said chamber.

WALTER C. GEORGE.