Dec. 31, 1946. T. S. FITCHETT ET AL 2,413,409

STEAM SHOWER FOR CORRUGATORS

Filed Oct. 5, 1943 3 Sheets-Sheet 1

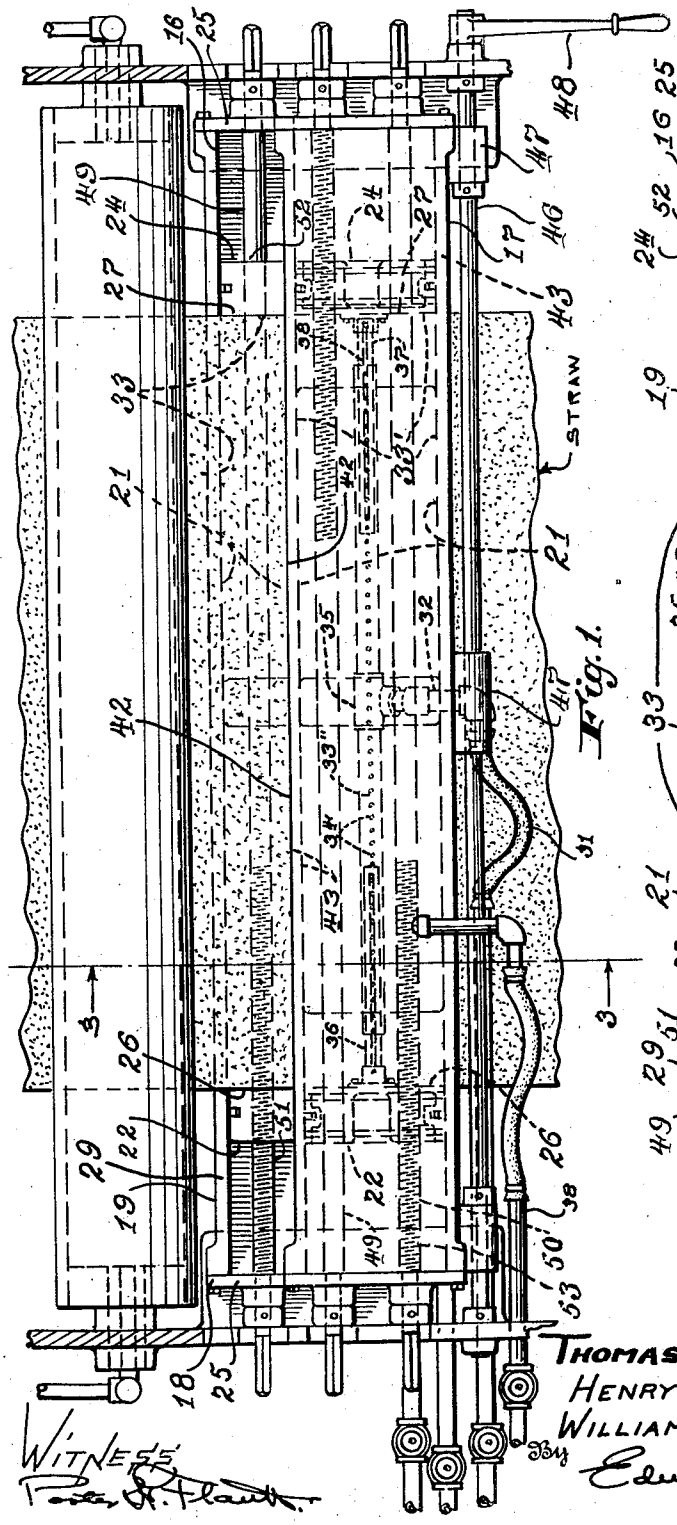


Fig. 1.

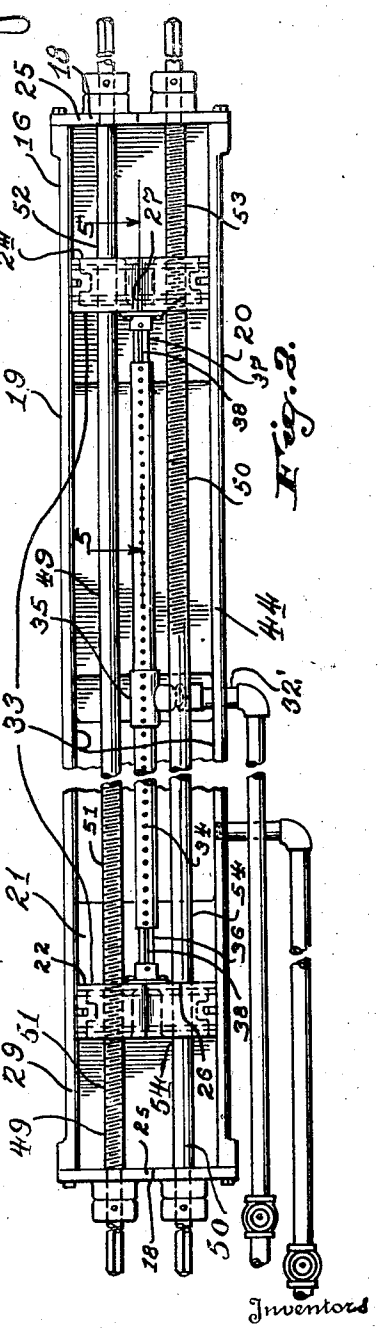


Fig. 2.

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STEAM SHOWER FOR CORRUGATORS

Filed Oct. 5, 1943 3 Sheets-Sheet 2

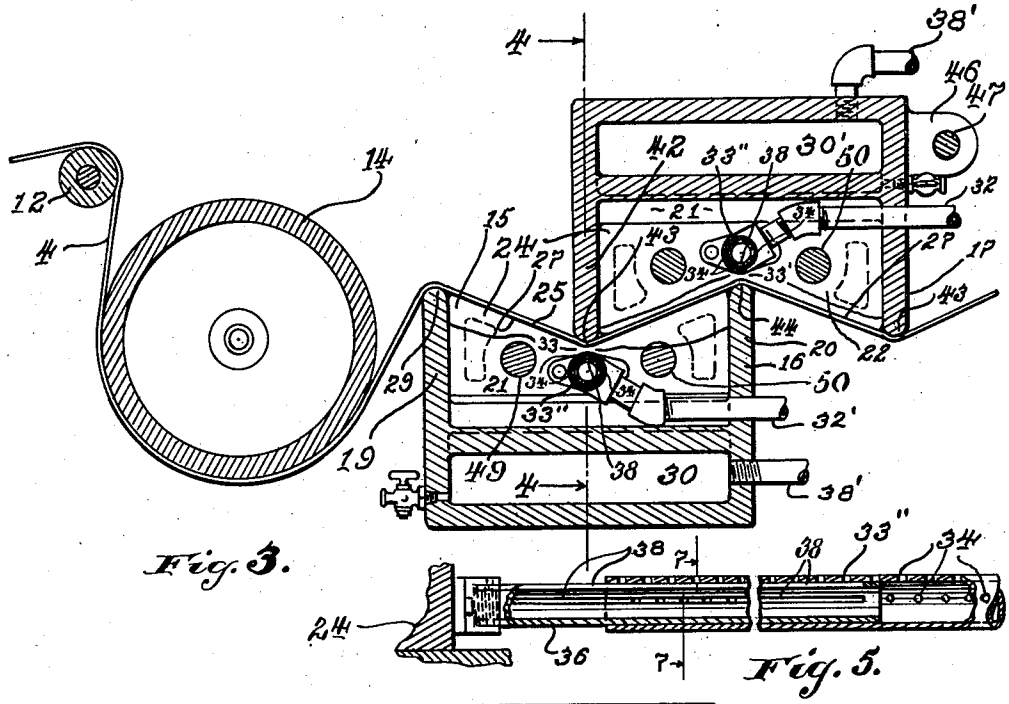


Fig. 3.

Fig. 5.

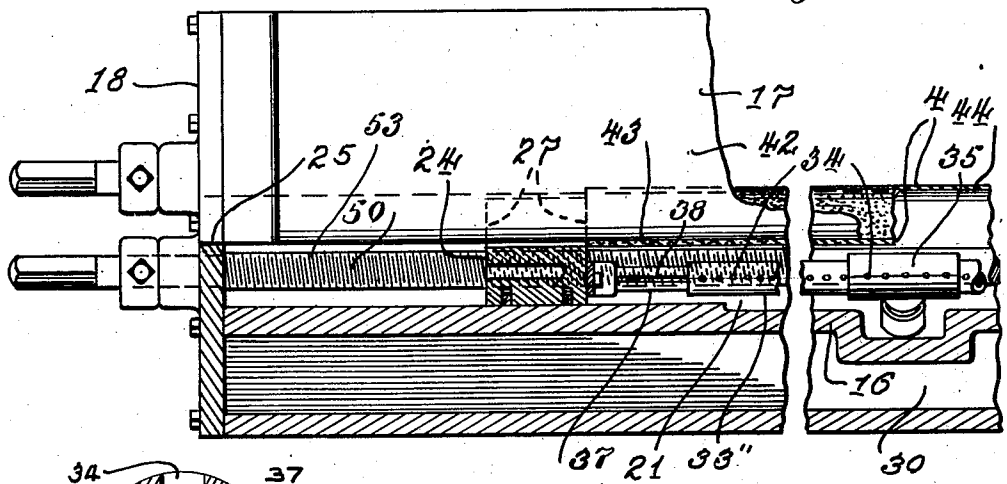


Fig. 4.

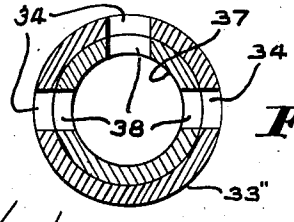


Fig. 7.

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STEAM SHOWER FOR CORRUGATORS

Filed Oct. 5, 1943 3 Sheets-Sheet 3

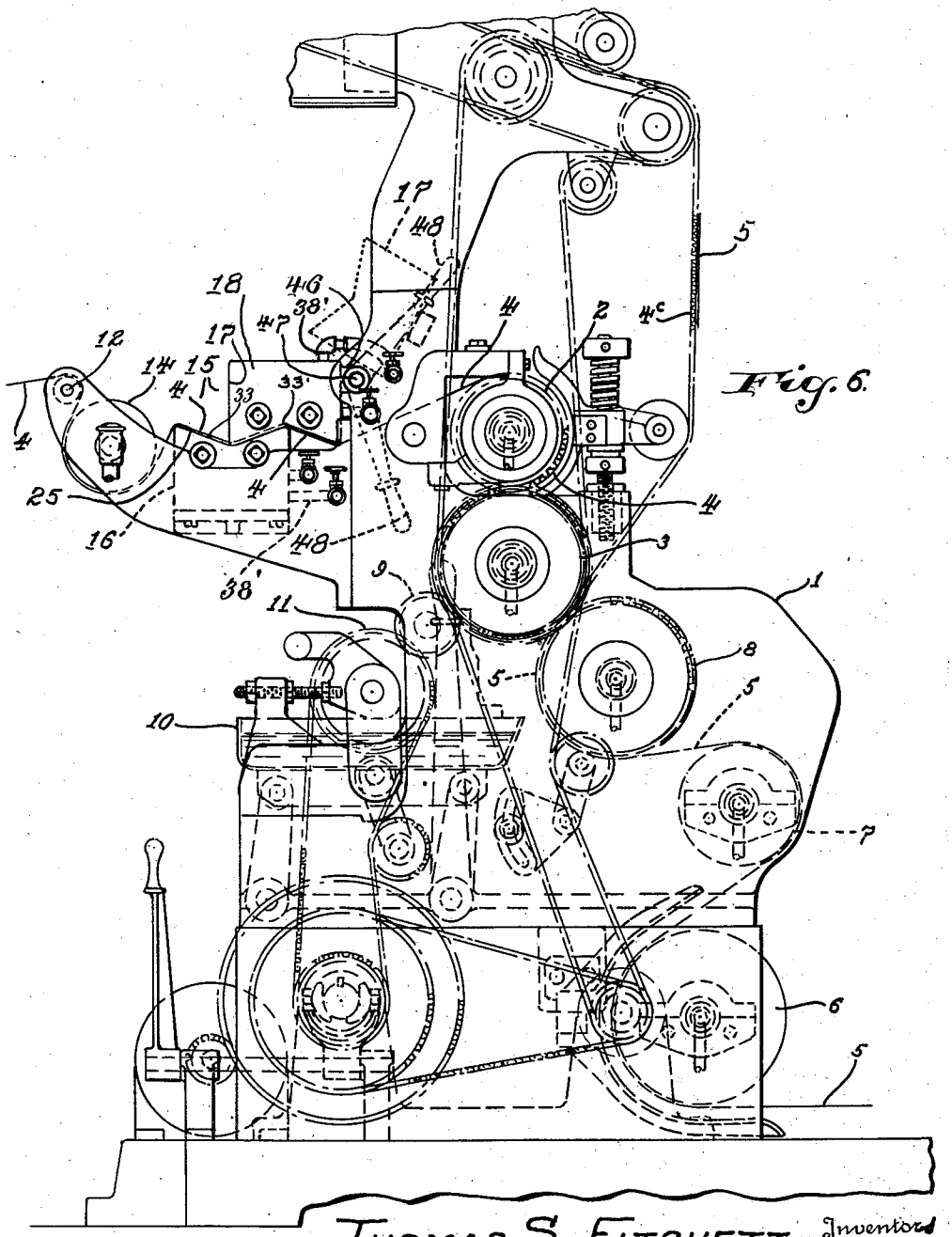


Fig. 6.

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UNITED STATES PATENT OFFICE

2,413,409

STEAM SHOWER FOR CORRUGATORS

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Application October 5, 1943, Serial No. 505,000

12 Claims. (Cl. 91—18)

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In the manufacture of corrugated board or corrugated paper for other purposes which may not include its conversion into corrugated board, it is necessary or at least desirable as a preliminary step to soften the paper or web just prior to its entrance between the corrugating rolls. This has been accomplished with some degree of success by steaming, and steaming just prior to the corrugating step has come to be regarded by those versed in the art as a necessity.

While the previous steaming devices are in use, they are defective in operation for various reasons of which the most important are:

First, the quantity of steam which is applied to the web is insufficient.

Second, discharge of steam into the atmosphere of the room where the machine is located is excessive. This tends to dilute the adhesive employed in the assembling of the corrugated board, and causes discomfort to the operators, also reducing their efficiency in this way and by clouding the atmosphere of the room and obscuring the view of the operators.

Third, the existing apparatus is not easily adjustable to the width of the web.

Fourth, the previous apparatus presents considerable difficulties in threading a new web through the machine.

The object of the invention is to overcome these and other difficulties, providing a web steaming apparatus or steam shower which will operate in a satisfactory manner under the conditions presented.

By the invention herein disclosed all of the known difficulties have in effect been overcome, a steam shower, which is highly satisfactory according to all existing standards being produced.

This steam shower comprises one or more, preferably a pair of troughs, located on opposite sides of the web, and applying steam to the upper and lower surfaces of the web. These troughs extend transversely across the web, each providing a steam chamber, which has one open side, referred to for convenience as the top. The web covers the said openings which conform to the width of the web, and are disposed each toward the other, the web being passed between the troughs, from which it is led to the corrugating rollers. The size of the troughs and the openings may be so determined as to provide a suitable steaming area to give such steaming of the web as may be found necessary to soften to the desired degree the type of paper to be used.

According to the practice prevailing in the paper corrugating art, a single machine is used with

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webs of widely different widths. The length of the steam chamber in the device of the invention is adjustable to the width of the web by means of sliding blocks, preferably, one at each end of each trough, said blocks being fitted to the troughs after the manner of a piston in a steam cylinder. In adjusting the steam chamber to the width of the web, these blocks may be moved by hand or by any suitable device, two parallel screws being shown as an example of the various different mechanisms regarded as available for this purpose.

The peripheral surface of each block where it crosses the opening is shaped to correspond to the plane of the web where it passes the opening, and this surface of the block is closely contacted by the corresponding side portion of the web, and the long edges of the openings extend across the web from side to side in close engagement therewith, the web being drawn tightly over the opening, forming a seal to confine the steam within the chamber, practically eliminating any and all difficulties incident to the escape of steam, the passage of small quantities of steam through the web being regarded as essential to steaming.

In the preferred arrangement one trough is superimposed on the other, the openings being partially in registration, the web passing between the troughs and closing both openings, variation of this arrangement and the use of a single trough when regarded as sufficient being contemplated.

To maintain the desired temperature in the steam chamber, any suitable means as a steam jacket, most conveniently located in the bottom wall of the trough, may be employed, other heating means as gas jets, or electrical heating units having been used for this and similar purposes with a degree of satisfaction, the particular external heating means not being regarded of primary importance.

In the practice of this invention, the steam chambers and steam jackets are fed with steam by way of flexible pipes, and one or both troughs are movably mounted, so that they can be moved and separated, to provide for convenient threading of new webs through the machines.

Preheating or any additional heating of the web which may be required is performed in any suitable manner as by means of one or more steam heated rollers, and to give equalization of steam supply throughout the width of the web, steam may be fed to the steam chamber throughout its length, or substantially so, or any suitable method of feeding the steam which is adapt-

ed to the conditions presented may be employed, suitable variation as to the details, combination and arrangement of the elements of the invention above suggested, being contemplated.

In the accompanying drawings, I have shown a corrugator equipped with a steam shower, which is illustrative of the invention.

In the drawings:

Figure 1 is a top plane view, which may be regarded as of a fragmentary nature showing the steam shower in its relation to the web, and heater.

Figure 2 is a top plan of a single element or trough of the shower, particularly the bottom trough, the upper trough being removed or omitted.

Figure 3 is a vertical section on the line 3—3 in Figure 1, looking in the direction of the arrows.

Figure 4 is an elevation of the upper trough, the lower trough being shown in section on the line 4—4 in Figure 3.

Figure 5 is a longitudinal section showing fragmentarily the steam discharge pipe, whereby the steam is distributed throughout the length of the steam chamber.

Figure 6 is a side elevation, showing the elements of a corrugating machine for making single face corrugated board and having the steam shower of the invention applied thereto.

Figure 7 is a cross sectional view on line 7—7 of Figure 5.

Referring to the drawings by numerals, each of which is used to indicate the same or similar parts in the different figures, the machine, as shown in Figure 6 which is for example only, comprises upright side frame members 1, on which corrugator rollers 2 and 3 of the usual type used in making corrugated paper are mounted. The straw or other web to be corrugated and to the treatment of which the invention relates is indicated by reference character 4.

The facer web 5 is fed from a supply roll not shown to and about heating rollers 6 and 7, and presser roller 8. The latter roller is closely related to the lower corrugator roller 3, and serves to press the facer web 5 against the corrugated web 4C, after the peaks of the corrugations have been coated with adhesive.

The straw or other web 4 to be corrugated is fed about the upper corrugator roller 2, and passes rearwardly and downwardly and then forwardly between the upper and lower corrugator rollers 2 and 3, whereby it is corrugated, and at the forward side of the lower corrugator roller the peaks of the corrugations are coated with adhesive by a distributor roller 9, which receives adhesive from a pot 10, by way of a pick up roller 11. The single face corrugated board is then completed by pressing the facer web against the adhesive coated peaks of the corrugations as above suggested.

All of the features and details in the drawings so far described are in a general way known to the prior art.

As the web 4 enters the machine, it passes over a small supporting idler roller 12, at the front of the machine, and downwardly and rearwardly about a heating roller 14, which may be referred to as a preheating roller. While such rollers may be heated in any suitable manner, the preferred practice is to heat them by steam which enters at the axis. In the present device, any suitable pre-heating means may be employed.

In the form shown, the web 4 passes from the roller 14 to and through the steam shower which is indicated in a general way by reference character 15.

A steam shower illustrating the practice of the invention is shown in detail in Figures 1 to 5.

The steam shower per se as shown, may consist of one or more elongated receptacles, which for convenience are referred to as troughs 16 and 17, Figure 3. These are open at one side, referred to for convenience as the top, the upper trough being shown as inverted. In operation the troughs are connected to a continuous supply of steam in a manner to be further described and the top openings 33 and 33' are closed by the web 4 of paper or suitable material to be corrugated, to which web as much tension is applied as it will stand without danger of injury. It is considered of advantage that the web may be deflected into the troughs and for this purpose, the top edges 25 of the walls 18 and the corresponding edges of the sliding blocks, to be described, are preferably depressed at the center or otherwise concave between the front and back sides 19 and 20 of the trough.

To provide for adjustment of the length of the steam chambers 21, within the trough, and particularly the said top opening 33 to the width of the web, the trough or each trough as the case may be, contains a sliding block or preferably two sliding blocks or partitions 22 and 24, one at each end, extending from the front wall 19 to the back wall 20, closing the cross-section of the trough, and these blocks or walls are upright or vertical, and mounted in the troughs to slide in the direction of the length thereof, being fitted somewhat after the manner of the piston in a steam cylinder, as most clearly shown in Figures 2 and 3.

These blocks or sliding walls 22 and 24 are intended to be adjusted to the width of the web i. e. to provide an opening 33 of a length, corresponding to the width of the web, the longitudinal edge portions of the web bearing at all times against the exposed edge portions 26 and 27 of the sliding blocks or walls 22 and 24. It may be noted that the opening is of substantial width as from six to eight inches to give an ample steaming area. As shown it comprises an entire side of the trough.

It has been suggested that the top edges 25 of the end walls 18 of the troughs are intermediately depressed, and the exposed edges 26 and 27 of the sliding blocks 22 and 24 are shown as similarly concaved or centrally depressed. While this concavity is desirable as to the top edges of the end walls, it is more important as to the exposed edges of the sliding blocks 22 and 24 as shown in plan at 26 and 27 in Figure 2. These latter edges effect the sealing of the ends of the openings.

While these edges 26 and 27 may be of any suitable shape which the edges of the web can be made to follow to effect the essential sealing of the opening, they are preferably in the form of a wide blunt V, as best shown in Figure 3, the plane of the web and of the edges of the openings being rectilinear in directions transverse to the length of the web, meaning the lines of the intersection of all vertical transverse planes with the web and the plane of said edges.

In the form of the invention shown, the top longitudinal edges of the front and rear walls of both the front trough 16 which is the bottom trough, and the rear or upper trough 17, the latter being preferably inverted, are rectilinear in the said direction and rounded as at 29 to per-

mit the web to be bent about these edges, and to form a satisfactory seal without injury to the web, substantially in the manner illustrated in Figure 3 which shows what is at present regarded as the preferred arrangement. The exposed surface surrounding the openings 33 and 33', which would be contacted by the web is referred to hereinafter as in the plane of the opening.

This is likewise true of the upper or rear trough. The web 4 by close contact with the top edges 29, 43 and 44 which extend lonigtudinally of the troughs at the front and rear of the troughs and transversely of the web and similar contact of the longitudinal edge portions of the web with the exposed edges 26 and 27 of the sliding blocks effects a satisfactory closure or sealing of the openings 33 and 33' of the bottom and top troughs, respectively. The web whereby the seal is effected is in continuous motion in the direction of its length so that its entire area is steamed as it passes.

While it is believed that satisfactory steaming may be attained by means of a single trough operating from one side of the web, the apparatus as shown, which may be treated as the preferred form, comprises two troughs 16 and 17, as already pointed out, one being movable, relatively to the other in order to permit the new webs to be threaded between the troughs.

In accordance with the preferred form illustrated, the bottom trough 16, shown at the front is stationary and placed with the open side upwardly, and extending transversely across the web, the troughs, both being of a length corresponding to the width of the web of greatest width to be passed through the machine.

The upper trough 17 as shown, has its opening 33' or open side downwardly disposed, this arrangement being preferred but subject to variation, and it likewise extends across the web, being to best advantage of the same length as the bottom trough, i. e. slightly longer than the width of the widest web.

In the form shown, the top edges of the end walls are centrally depressed or concaved as already described and the sliding blocks 22 and 24 are similarly formed as to the surfaces 26 and 27 which are exposed in said openings. The two openings 33 and 33' are in the form shown partly in registration, the front side wall 42 of the upper trough, extending longitudinally of the lower trough 16, at its fore and aft center and having one long free edge 43, overlying and closely related to the center of each depression or concavity in the sliding blocks and said walls, the top longitudinal edge 44 of the rear wall 20 of the lower trough 16, being correspondingly at the center of the upper trough, and occupying the deepest portion of the concavity in the end walls and sliding blocks of said upper trough. It should be borne in mind that either trough may be omitted, suitable means being provided for holding the web in contact with the edges of the opening in the remaining trough, whereby the web closes the opening, preventing harmful escape of the steam therefrom. In operation the greatest tension which can be safely applied to the web is most satisfactory for sealing the openings.

The bottom wall of each trough is shown as provided with a steam jacket as at 30 to assist in maintaining the desired temperature of the steam in the trough. The steam chambers are supplied with steam by way of flexible tubes 31, connected to a feed pipe 32, which in the form of the invention shown, leads to a longitudinal dis-

charge pipe 33''. This discharge pipe as shown extends along the fore and aft center of the chamber for the length of the steam chamber between the blocks in their closest relation. This discharge pipe 33'' as shown is perforated as at 34 and is to best advantage of a length slightly less than the minimum width of the web.

Discharge pipe 33'' is supported in any suitable manner as by means of T fitting 35, connected to the bottom of the trough in which it is located, and in the form shown, pipe 33'' is provided with telescoping connections 36 and 37. These telescoping connections 36 and 37 terminate at and are mounted as to their outer closed ends on the respective sliding blocks or walls 22 and 24. Members 36 and 37 are slotted longitudinally as at 38, the telescoping relation being clear from the drawings. The purpose is by discharge through the openings 34 and through the slots 38 to distribute the steam with substantial uniformity throughout the length of the steam chamber which term is applied to the area within the trough and between the sliding blocks 22 and 24.

While this method of distribution of steam within the steam chambers is regarded as desirable, various methods of distribution will occur to those skilled in the art, and can be substituted for this arrangement within the scope of the invention and without departure therefrom. While distribution by this or some equivalent means is considered desirable, the natural flow of the steam from one or more inlets may be regarded as sufficient for the practice of the invention under most favorable conditions, reference being had to the piping of steam to the steam chamber direct wtihout distribution by a manifold or discharge pipe as exemplified by numbers 33'', 36 and 37.

Super-heated steam or saturated steam may be supplied to jacket 30 by way of the pipe 38', or any suitable heating means may be used to maintain the temperature of the steam in the steam chambers i. e. between the sliding blocks 22 and 24.

The web may be pre-heated in any suitable manner as by means of a steam roll 14, see Figure 3, which engages the web as it approaches the steam fountain.

As already suggested, the steam connections at least to the upper trough are preferably flexible and at least one trough preferably the upper one as shown in Figure 3 is movably mounted to provide for separation of the troughs to admit the web, i. e. to permit the forward end of a new web to be threaded therebetween.

In the form of the invention shown, the upper trough is provided with rearwardly extending ears 46, and there is a shaft or pivot pin 47, extending therethrough, and through suitable bearings in the side frames 1. In the form of the invention shown, the ears 46, are nonrotatively connected to the shaft 47, and the latter is provided with a handle or crank 48, whereby the shaft may be turned through a suitable angle to raise and lower the upper trough 17.

In this connection, it should be understood that the separation of the troughs to admit the web may be accomplished in any suitable manner, suitable means of which the device shown is an example being provided and that one or any suitable number of troughs may be employed.

According to the practice of the invention at present developed, the sliding blocks 22 and 24 would be moved each backwardly and forwardly

toward and from the other by hand or in any suitable manner the device as shown being for example only so that the edges of the web of whatever width will bear on the exposed surfaces 26 and 27 of these blocks. In accordance with this arrangement each shaft 49 and 50 has a threaded engagement with one of the sliding blocks and passes through the other block in guiding relation thereto.

The thread 51 which engages and moves the block 22 is on the shaft or rod 49, the guiding portion where the same rod or shaft extends through block 24, being shown at 52. The rod or shaft 50 is threaded at 53, through the block 24, and has a guiding portion 54, which extends in guiding relation through the block 22. It should be understood that the shafts 49 and 50 may be omitted in favor of other adjusting means, or the blocks may be moved and adjusted by hand. The ends of the shafts 49 and 50 project from the ends of the troughs and are shaped for engagement by a crank or wrench. While the shafts 49 and 50 have been described in connection with a single trough, both troughs where a plurality of troughs are employed would be to best advantage similarly equipped and are so illustrated, the exact method of moving the blocks and adjusting the same being regarded as unimportant.

In operation, assuming that a new web is being introduced into the corrugating machine, it is passed about the idler roller 12 at the left in Figure 3, and then about the heating roller 41. Prior to introducing the web, the blocks 22 and 24, if not suitably located are adjusted to the width of the new web, so that these blocks can support the side edge portions of the web. The upper trough 17, having been raised to the dotted position shown in Figure 6, the web is then passed over the forward or lower trough 16, and drawn forwardly about the corrugator rollers 2 and 3, as shown, and then between the paste roller 9 and the lower corrugator roll 3, and hence into the bight of the presser roller 8, where it is to be combined with the facer web 5.

The upper trough 17 is then lowered to the position shown in Figure 3, and in full lines in Figure 6, whereby tension is applied to the web, so that it closes and seals the openings 33 and 33' in the steam chambers.

Wet steam having been introduced by way of pipes 32 and 32', and the jackets 30 and 30' being first supplied with heating fluid which may be super-heated steam or other heating means, the machine is ready for operation.

If a single trough is regarded as sufficient, any suitable means as for example a tension device operating to apply tension somewhat after the manner of the upper trough, but lacking the steaming feature, may be provided for close contact of the web with the lips of the opening, whereby the steam chamber is sealed, and the discharge steam confined wholly or almost wholly to the passage of steam into and through the web as in the operation of the multiple trough device.

Having thus described a machine bodying what may be regarded as the preferred form of the invention what we claim as new and desire to secure by Letters Patent is:

1. A steam shower for a corrugating machine, comprising a trough having an opening elongated in a direction transverse to the length of the web, said opening being of a length corresponding to the width of the widest web to be treated, blocks closing the cross-section of the trough, and each having an exposed edge portion with a surface, bridging said opening in the direction of the length of the web, said blocks being adjustable in the direction of the length of the opening, to conform to the width of different webs, the said opening having two opposite edge portions extending transversely of the web and adapted to form a sealing contact with the web, substantially throughout its width, and said exposed edge portions of the sliding blocks being adapted to contact the longitudinal edge portions of the web throughout the length of said exposed portions, whereby the entire periphery of the opening is contacted by the web, the opening being sealed thereby and means for supplying steam to the opening by way of the trough, said means being adjustable to vary the extent of the steam supply with the length of the trough opening.

2. A steam shower for a corrugating machine, comprising a trough having an opening elongated in a direction transverse to the length of the web, said opening having its entire periphery in two intersecting planes and being of a length corresponding to the width of the widest web to be treated, blocks closing the cross-section of the trough, and each having an exposed edge portion with a surface, bridging said opening in the direction of the length of the web, said blocks being adjustable in the direction of the length of the openings, to conform to the width of different webs, the said opening having two opposite edge portions extending transversely of the web and adapted to form a sealing contact with the web, substantially throughout its width, and said exposed edge portion of the sliding blocks, being adapted to contact the longitudinal edge portions of the web throughout the length of said exposed portions, the planes of the opening being substantially rectilinear in all vertical planes transverse to the length of the web, whereby the entire periphery of the opening is contacted by the web, the opening being sealed thereby, and means for supplying steam to the opening by way of the trough, said means being adjustable to vary the extent of the steam supply with the length of the trough opening.

3. A steam shower for a corrugating machine, comprising a trough having an opening elongated in a horizontal direction, transverse to the length of the web, said opening being of a length corresponding to the width of the widest web to be treated, blocks closing the cross-section of the trough, near its respective ends, and each having an exposed edge portion, bridging said opening in the direction of the length of the web, said blocks being movable and thus adjustable in the direction of the length of the opening to conform the length of the opening to the width of different webs, means for supplying steam to the trough between the blocks, the said opening having opposite horizontal edge portions transverse to the web and adapted to form a sealing contact with the web, substantially throughout its width, and said exposed edge portions of the sliding blocks being in substantial horizontal alignment in all vertical planes transverse to the length of the web and thus adapted to contact the longitudinal edge portions of the web throughout the length of said exposed portions of the blocks, whereby the entire periphery of the opening is contacted by a surface of the web, the opening being sealed thereby, means for applying tension to the web to perfect the sealing of said opening throughout the feeding of the web,

and means for supplying steam to the trough opening, said last named means being adjustable to vary the extent lengthwise of the trough opening of the steam supply with the length of the trough opening.

4. A steam shower as per claim 3 in which the exposed edges of the blocks are depressed intermediately of their extent in the direction of the length of the web, said tension means comprising means engaging the opposite surface of the web at the greatest depth of the depressions to apply sealing tension to the web.

5. A steam shower as per claim 3 in which the exposed edges of the blocks are depressed intermediately of their extent in the direction of the length of the web, said tension means comprising means engaging the opposite surface of the web at the greatest depth of the depressions to apply sealing tension to the web, said latter means extending in a straight line across the web transversely to its length.

6. A steam shower for a corrugating machine, comprising a trough having an opening elongated in a direction transverse to the length of the web, said opening being of a length corresponding to the width of the widest web to be treated, blocks closing the cross-section of the trough, and each having an exposed edge portion with a surface bridging said opening in the direction of the length of the web, said blocks being movable and hence adjustable in the direction of the length of the opening, to conform to the width of different webs, the said opening having substantially rectilinear edge portions extending transversely of the length of the web and adapted to form a sealing contact with the web substantially throughout its width, said exposed edge portions of the sliding blocks being adapted to contact the longitudinal edge portions of the web throughout the length of said exposed portions whereby the entire periphery of the opening is contacted by the web, the opening being sealed thereby, means for applying tension to the web to perfect the sealing of said opening throughout the feeding of the web, and means for supplying steam to the trough between the blocks.

7. A steam shower for a corrugating machine, comprising a steam trough extending transversely of the web, said trough having an opening with its entire periphery in planes which are substantially rectilinear transversely to the length of the web and hence adapted to be sealed by the passing web, said opening comprising substantially an entire side of the trough, and being elongated and having its maximum length extending transversely of the length of the web and corresponding to the width of the widest web to be passed through the machine, means for adjusting the length of the opening to conform to the width of the web and means for supplying steam to the opening by way of the trough, said last named means being adjustable to vary the extent of the steam supply with the length of the trough opening.

8. A steam shower for a corrugating machine, comprising a steam trough extending transversely of the web, said trough having an opening with its entire periphery in planes which are substantially rectilinear transversely to the length of the web and hence adapted to be sealed by the passing web, said opening being elongated and having its maximum length extending transversely of the web, and corresponding to the width of the widest web to be passed through the machine, means for adjusting the length of the opening to

conform said length to the width of the web and means for supplying steam to the opening by way of the trough, said adjusting means comprising a block fitting in the trough, after the manner of the piston in a steam engine cylinder but having an exposed edge portion spanning the opening and adapted to contact a marginal edge portion of the web, and forming part of said periphery of the opening, and means for supplying steam to the trough opening, said last named means being adjustable to vary the extent lengthwise of the trough opening of the steam supply with the length of the trough opening.

9. A steam shower for a corrugating machine, comprising a steam trough, extending transversely of the web, said trough having an opening with its entire periphery in planes which are substantially rectilinear transversely to the length of the web and hence adapted to be sealed by the passing web, said opening being elongated and having its maximum length extending transversely of the web and corresponding to the width of the widest web to be passed through the machine, means for adjusting the length of the opening to conform to the width of the web and means for supplying steam to the opening by way of the trough, and a second trough, substantially identical with the first said trough, and having an opening with its entire periphery in planes which are substantially rectilinear transversely to the length of the web and hence adapted to be sealed by the passing web, said opening being elongated and having its maximum length extending transversely of the web and corresponding to the width of the widest web to be passed through the machine, means for adjusting the length of the opening to conform to the width of the web and means for supplying steam to the opening by way of the trough, the two steam troughs being located on opposite sides of the web with their said openings opposed, one of said troughs being movably mounted to permit the troughs to be separated to provide for threading a new web between the troughs, the opening of the second trough also having its entire periphery in contact with the web and one plane of the openings of each trough substantially coinciding in the operative position of the parts.

10. A steam shower for a corrugating machine, comprising a steam trough, extending transversely of the web, said trough having an opening with its entire periphery in planes which are substantially rectilinear transversely to the length of the web, and thus adapted to be sealed by the passing web, said opening being elongated and having its maximum length extending transversely of the web, and corresponding to the width of the widest web to be passed through the machine, means for adjusting the length of the opening to conform to the width of the web and means for supplying steam to the opening by way of the trough, and a second trough, substantially identical with the first said trough, and having an opening with its entire periphery in planes which are substantially rectilinear transversely to the length of the web and thus adapted to be sealed by the passing web, said opening being elongated and having its maximum length extending transversely of the web and corresponding to the width of the widest web to be passed through the machine, means for adjusting the length of the opening to conform to the width of the web and means for supplying steam to the opening by way of the trough, the two steam troughs being located on opposite sides of

the web with their said openings opposed, one of said troughs being movably mounted to permit the troughs to be separated to provide for threading a new web between the troughs, the second opening having its entire periphery in the operative position of the parts in contact with the web, the said openings of the respective troughs being in partial registration.

11. A steam shower as per claim 10 in which the ends of the openings are intermediately depressed, a long edge of each opening being, in operative position, in the depression in the ends of the other opening, thus applying sealing tension to the web as it advances.

12. A steam shower for a corrugating machine for paper and the like, comprising two steam troughs, located on opposite sides of the web in

front of the corrugating rollers, each trough having an elongated opening extending transversely across the web, the entire periphery of each opening being adapted for continuous sealing by the web as it advances in the operative relation of the troughs, means for feeding steam to each opening by way of the corresponding trough, the openings being opposed and one trough being movably mounted, whereby the troughs may be separated to provide for threading a new web through the machine and means applying sealing tension to the web when the troughs are in operative relation.

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