

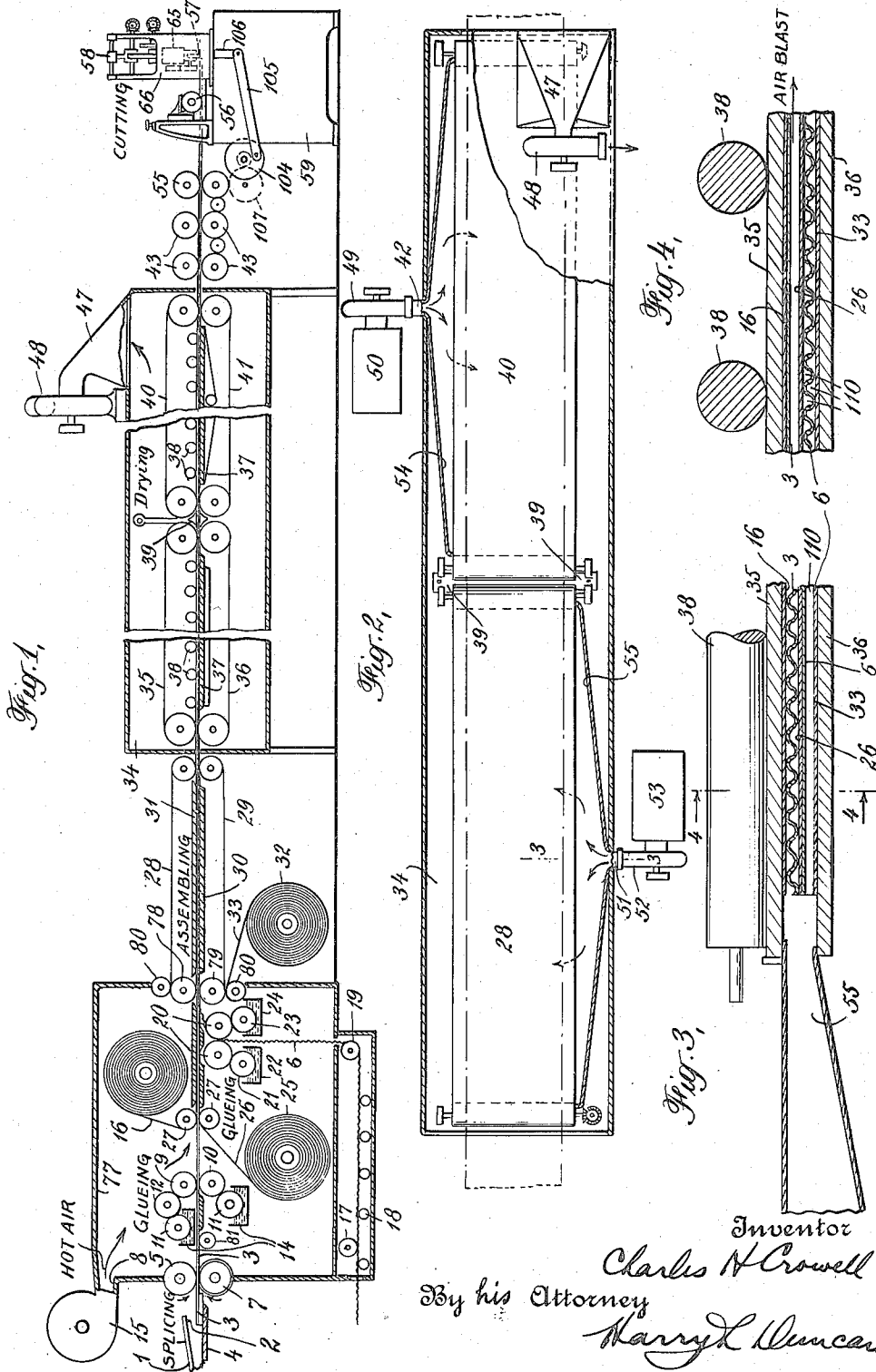
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PROCESS AND MACHINE FOR MAKING CROSS CORRUGATED PAPER BOARD

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PROCESS AND MACHINE FOR MAKING CROSS-CORRUGATED PAPERBOARD.

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To all whom it may concern:

Be it known that I, CHARLES H. CROWELL, a citizen of the United States, and resident of the borough of Brooklyn, county of Kings, city and State of New York, have made a certain new and useful Invention Relating to Processes and Machines for Making Cross-Corrugated Paperboard, of which the following is a specification taken in connection with the accompanying drawing.

This invention relates especially to processes and machines for making cross corrugated paper board for fiber shipping containers, etc., the corrugated paper liner forming the transverse corrugations being continuously fed into the machine in the form of a web and adhesively secured between facing sheets as by silicate of soda or other adhesive. The longitudinally corrugated liner is preferably supplied in the form of lengths or strips of the longest convenient length that can be formed by transversely corrugating a wide web of suitable paper and then cutting the web into strips of the width desired in the cross corrugated paper to be produced. In this way the strips may have a length of one hundred inches more or less when wide webs are corrugated for this purpose and these strips may be adhesively connected or spliced together as by being manually or mechanically placed with slightly overlapping ends as they are continuously fed into the assembling machine between corrugated splicing and feeding rolls, for instance, so as to be assembled between two of the facing sheets of suitable paper and adhesively secured thereto. It is advantageous to feed the assembled elements forward through suitable feeding and holding belts or guides and simultaneously dry the adhesive by blowing hot air through the assembled corrugated paper board for which purpose an initial pressure or exhaust chamber may be arranged where the elements are assembled so as to effect the movement of drying currents of hot air longitudinally through the spaces left around the longitudinally corrugated liner, this drying medium thus passing in either direction through the length of assembled corrugated paper board up to the point where it is cut or sheeted into the lengths desired. Currents of hot air may also be passed transversely through the as-

sembled board so as to pass around the transverse channels formed in connection with the transversely corrugated liner material and for this purpose heated air may be blown in one or both directions through these transverse channels after the paper has been assembled and during its forward movement.

In the accompanying drawing showing in a somewhat diagrammatic way various illustrative embodiments and arrangements of this invention—

Fig. 1 is a diagrammatic sectional elevation showing an illustrative machine.

Fig. 2 is an enlarged horizontal section showing the drying devices.

Fig. 3 is an enlarged detail section therethrough taken along the line 3—3 of Fig. 2, and

Fig. 4 is a longitudinal detail section taken along the line 4—4 of Fig. 3.

As indicated diagrammatically in Fig. 1 the web 6 of transversely corrugated straw board paper or other suitable material may be continuously fed into the machine by any suitable means as the guiding and feeding rolls 17, 18, 19. This liner web may then pass between the gluing rolls 20 to apply thereto the desired quantities of any suitable adhesive such as silicate of soda, gum or glue compositions. This adhesive may be supplied to these rolls 20 by the cooperating rolls 21, 23 in the tanks 22, 24 of adhesive. Facing webs of the desired grade of facing or lining paper may be continuously fed into the machine on each side of this transversely corrugated web 6 and, for instance, the facing web 26 may be fed from the roll 25 over the guide roll 27 so as to be supplied above the corrugated web 6 while a similar facing web 33 from the roll 32 may pass between the guide rolls 79, 80 so as to be forced against the lower side of this corrugated liner.

The longitudinally corrugated liner material may be supplied to the machine in long lengths such as 1 which may be spliced together in any desired way as by applying silicate or other adhesive to a short portion 2 at one end of these strips and then manually or mechanically overlapping it slightly with the preceding strip 3 so that the strips are forced tightly together and spliced as they pass through the splicing and feeding rolls 5, 7 formed with corresponding cir-

cumferential corrugations. This longitudinally corrugated liner 3 may thus be continuously fed forward over suitable guide rolls such as 81 and adhesive such as silicate or the like may be applied to both sides by gumming rolls such as 9, 10 supplied with silicate or other adhesive from the tanks 14 through suitable supply rolls 11, 12. This liner is then assembled between the central lining web 26 and the upper lining or facing web 16 as the material is continuously fed between the rolls 27, the completely assembled cross corrugated board thereafter passing between the assembling belts or guides such as the belts 28, 29 passing over guide rolls such as 78, 79 so as to press the assembled webs together with the desired force in connection with suitable rolls or spring supported guides such as 31, for instance, as the belts pass over the table or support 30. These assembling belts are preferably amply long to preliminarily set the adhesive so as to hold the elements together before the corrugated board then passes into one or more drying chambers such as 34 where air blasts or other means are used to still more thoroughly dry the adhesive used. For this purpose similar belts such as 35, 36, 40, 41 may be used to support and feed along the assembled paper board over such supports or tables as 37, a series of presser rolls 38 being arranged above this run of the upper belts, if desired. As shown in greater detail in Figs. 2, 3 and 4, heated air or other drying medium may be blown through the transverse channels 110 around the transversely corrugated liner 6. For this purpose a suitable heater 53 may communicate with the blower 52 which may have its discharge pipe 51 connected with a distributor 55 which fits between the two adjacent edges of the belts 35, 36 as is shown in Fig. 3. This hot air is thus forced through any transverse channels in the paper board and is thus blown through the channels 110 shown in greater detail in Fig. 4 so as to dry the adjacent elements of the paper board. A similar heater 50 and blower 49 may be arranged on the other side of the assembled paper board in connection with a discharge pipe 42 and spreader 54 to supply the heated drying medium to the other edges of the belts 40, 41 engaging the paper board at this point so that the hot air is thus blown in the other direction through these transverse channels to more thoroughly and uniformly dry the elements of the paper board and adhesively secure them together. This hot air may of course be discharged from the drying chamber 34 in any desired way as by a discharge blower 48 having an inlet 47 as indicated in Fig. 2. If desired, suitable stationary guides or closers 39 may be arranged between the two sets of belts

so as to hold the paper board together at these points and counteract any tendency for the elements to separate.

The paper board may then be passed through suitable feed rolls as 43 shown at the right of Fig. 1 and may then be cut or sheeted into pieces of the desired length by any suitable mechanism, illustrated diagrammatically as comprising a reciprocating cutter carriage 66 which may be reciprocated longitudinally of the paper board sheet or web by any suitable devices such as the crank 104 and connecting rod 105, connected to the projection or bracket 106 on the carriage. Any suitable gearing such as 107 may operate this carriage mechanism in unison with the feed rolls 43, 55, 56 so as to have the carriage moving substantially in unison with the paper board when the cutter wheels or knife 57 are forced down through the paper board by any suitable mechanism such as 58, 65 of the desired construction. Where rotary knives are used to sever the paper board web clean cuts may be made therethrough so as to leave open the longitudinal channels and this is quite desirable since hot air or other drying medium may advantageously be fed through the channels around the longitudinally corrugated liner 3 as shown in Fig. 3.

For this purpose hot air may be supplied to these channels at either end of the web of paper board by means of a chamber such as 77 which may, for example, enclose the assembling and gluing mechanism so that air may be exhausted therefrom or forced into the same to effect the desired longitudinally moving air currents through the paper board. In this instance a blower 15 may force heated air into this chamber through the passage 8 so that it may enter the longitudinal channels around the liner 3 and dry these elements in the desired adhesive engagement which is maintained by the guiding and holding belts or other means referred to. Of course such a chamber as 77 is preferably substantially sealed and the various rolls such as 5, 7, and 80 form substantially tight contact with the walls of this chamber to prevent leakage of air therefrom.

This invention has been described in connection with a number of illustrative embodiments, forms, portions, parts, materials, arrangements and methods of manufacture and use, to the details of which disclosure the invention is not of course to be limited, since what is claimed as new and what is desired to be secured by Letters Patent is set forth in the appended claims:

1. The process of making cross corrugated paper board, which comprises forming transverse corrugations in a web of liner paper and cutting therefrom long longitudinally corrugated strips assembling said liner

strips substantially end to end and adhesively splicing them together, continuously feeding forward said liner strips and a continuous web of transversely corrugated paper liner and applying adhesive to said liners, feeding webs of paper facing between and outside said liners to form a continuous web of cross corrugated paper board and holding the same in assembled position and forcing hot drying gases through the transverse and longitudinal channels around said liners to dry the adhesive in the moving paper board and cutting the same into sheets when substantially dried.

2. The process of making cross corrugated paper board, which comprises forming transverse corrugations in a web of liner paper and cutting therefrom longitudinally corrugated strips assembling said liner strips substantially end to end, continuously feeding forward said liner strips and a continuous web of transversely corrugated paper liner, feeding webs of paper facing between and outside said liners and uniting them thereto to form a continuous web of cross corrugated paper board and holding the same in assembled position and forcing hot drying gases through the channels around said liners to dry the adhesive in the moving paper board.

3. The process of making corrugated paper board, which comprises forming transverse corrugations in a wide web of liner paper and cutting therefrom longitudinally corrugated strips assembling said liner strips substantially end to end, continuously feeding forward said liner and a continuous web of transversely corrugated paper liner, feeding webs of paper facing on both sides of each of said liners and adhesively securing the same thereto to form a continuous web of cross corrugated paper board and holding the same in assembled position to set the adhesive and drying the paper board.

4. The process of making corrugated paper board, which comprises forming transverse corrugations in a web of liner paper and cutting therefrom longitudinally corrugated strips, assembling said liner strips substantially end to end, continuously feeding forward said assembled liner, feeding webs of paper facing on both sides of said liner and adhesively securing the same thereto to form a continuous web of corrugated paper board and holding the same in assembled position to set the adhesive.

5. The process of making corrugated paper board, which comprises forming transverse corrugations in a web of liner paper and cutting therefrom longitudinally corrugated strips, assembling said liner strips substantially end to end, and splicing them together continuously feeding forward said assembled liner, feeding webs of paper facing on both sides of said liners and adhesively

securing the same thereto to form a continuous web of corrugated paper board and holding the same in assembled position to set the adhesive.

6. The process of making corrugated paper board, which comprises assembling substantially end to end and splicing together strips of longitudinally corrugated paper liner, continuously feeding forward said assembled liner and applying adhesive thereto, feeding webs of paper facing on both sides of said liner to form a continuous web of corrugated paper board and holding the same in assembled position and forcing hot drying gases through the longitudinal channels around said liner to dry the adhesive in the moving paper board and cutting the same into sheets when substantially dried.

7. The process of making corrugated paper board, which comprises assembling substantially end to end and splicing together strips of longitudinally corrugated paper liner, feeding forward said liner and applying adhesive thereto, feeding webs of paper facing on both sides of said liner to form a continuous web of corrugated paper board and forcing hot drying gases through the longitudinal channels around said liner to dry the adhesive in the paper board.

8. The continuous process of making cross corrugated paper board, which comprises assembling substantially end to end and adhesively splicing together long strips of longitudinally corrugated paper liner, continuously feeding forward said liner and a continuous web of transversely corrugated paper liner, feeding webs of paper facing between and outside said liners and adhesively securing them thereto to form a continuous web of cross corrugated paper board and holding the same in assembled position and forcing hot drying gases through the transverse and longitudinal channels around said liners to dry the adhesive in the moving paper board and cutting the same into sheets when substantially dried.

9. The continuous process of making cross corrugated paper board, which comprises assembling substantially end to end and splicing together strips of longitudinally corrugated paper liner, continuously feeding forward said liner and a continuous web of transversely corrugated paper liner, feeding webs of paper facing between and outside said liners and adhesively securing them thereto to form a continuous web of cross corrugated paper board and holding the same in assembled position and forcing hot drying gases through the channels around said liners to dry the adhesive in the moving paper board.

10. The process of making cross corrugated paper board, which comprises as-

sembling and splicing together strips of longitudinally corrugated paper liner, feeding forward said liner and a web of transversely corrugated paper liner and applying adhesive to said liners, feeding webs of paper facing between and outside said liners to form a continuous web of cross corrugated paper board and holding the same in assembled position, drying the paper board and cutting the same into sheets.

11. The process of making cross corrugated paper board, which comprises assembling and splicing together strips of longitudinally corrugated paper liner, feeding forward said liner and a web of transversely corrugated paper liner, feeding webs of paper facing between and outside said liners and uniting them thereto to form a continuous web of cross corrugated paper board drying the paper board.

12. In machines for making cross corrugated paper board, circumferentially corrugated splicing rolls to splice and continuously feed forward strips of longitudinally corrugated paper liner, gluing rolls to apply adhesive to both sides of said liner, means to continuously feed and apply adhesive to a transversely corrugated web of paper liner, feeding rolls to feed between and on the outside of said liners paper facing webs to form a continuous web of cross corrugated paper board, feeding belts and guides to hold said paper board in assembled position and continuously feed the same forward, and drying means including a substantially airtight chamber provided with air circulating devices around the assembling webs to force blasts of hot drying medium through the transverse and longitudinal channels around said liners to dry the adhesive in the moving paper board, and means to cut the assembled and substantially dried paper board into sheets.

13. In machines for making cross corrugated paper board, circumferentially corrugated splicing rolls to splice and continuously feed forward strips of longitudinally corrugated paper liner, gluing rolls to apply adhesive to both sides of said liner, means to continuously feed and apply adhesive to a transversely corrugated web of paper liner, feeding rolls to feed between and on the outside of said liners paper facing webs to form a continuous web of cross corrugated paper board, feeding belts and guides to hold said paper board in assembled position and continuously feed the same forward, and drying means including air circulating devices to force blasts of hot drying medium through the transverse and longitudinal channels around said liners to dry the adhesive in the moving paper board, and means to cut the assembled paper board into sheets.

14. In machines for making cross corrugated paper board means to splice and feed

forward strips of longitudinally corrugated paper liner, gluing rolls to apply adhesive to both sides of said liner, means to continuously feed and apply adhesive to a transversely corrugated web of paper liner, feeding rolls to feed between and on the outside of said liners paper facing webs to form a continuous web of cross corrugated paper board and drying means to force blasts of hot drying medium through the transverse and longitudinal channels around said liners to set or dry the adhesive in the moving paper board, and means to cut paper board from said web.

15. In machines for making cross corrugated paper board, means to feed forward strips of longitudinally corrugated paper liner, gluing rolls to apply adhesive to both sides of said liner, means to continuously feed and apply adhesive to a transversely corrugated web of paper liner, means to feed between and on the outside of said liners paper facing webs to form a continuous web of cross corrugated paper board, and drying means to set or dry the adhesive in the moving paper board, and means to cut paper board from said web.

16. In machines for making cross corrugated paper board, means to feed strips of longitudinally corrugated paper liner and apply adhesive to both sides of said liner, means to feed and apply adhesive to a transversely corrugated web of paper liner, means to feed between and on the outside of said liners paper facing webs to form a web of cross corrugated paper board, and drying means including a substantially airtight chamber provided with air circulating devices around one end of said continuous web to force blasts of hot drying medium through the longitudinal channels around said longitudinally corrugated liner to set or dry the adhesive thereon, and means to cut paper board from said web.

17. In machines for making cross corrugated paper board, means to feed strips of longitudinally corrugated paper liner and apply adhesive to both sides of said liner, means to feed and apply adhesive to a transversely corrugated web of paper liner, means to feed said liners paper facing webs to form a web of cross corrugated paper board, and drying means to force blasts of hot drying medium through the longitudinal channels around said longitudinally corrugated liner to set or dry the adhesive thereon.

18. In machines for making corrugated paper board, circumferentially corrugated splicing rolls to splice and continuously feed forward strips of longitudinally corrugated paper liner, gluing rolls to apply adhesive to both sides of said liner, means to feed to said liner paper facing webs to form a continuous web of corrugated paper board, feeding belts to hold said paper board in as-

sembled position and continuously feed the same forward, and drying means including a substantially airtight chamber provided with air circulating devices around one end of said continuous web to force blasts of hot drying medium through the channels around said liner to set or dry the adhesive in the moving paper board, and means to cut paper board from said web.

19. In machines for making corrugated paper board, circumferentially corrugated splicing rolls to splice and feed forward strips of longitudinally corrugated paper liner means to feed into contact with and adhesively secure to said liner paper facing webs to form a continuous web of corrugated paper board, and drying means to force blasts of hot drying medium through the channels around said liner to set or dry the adhesive in the moving paper board, and means to cut paper board from said web.

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