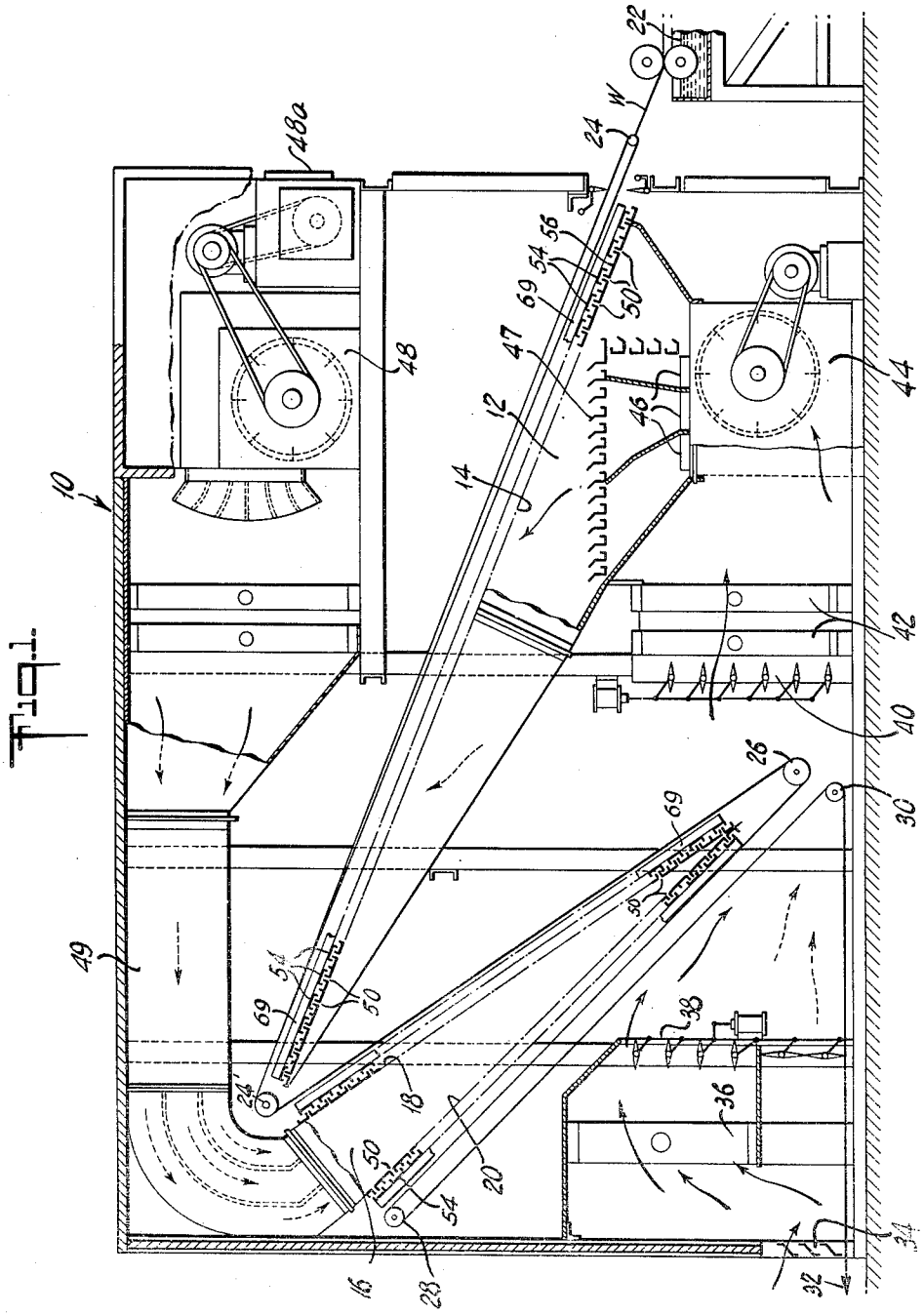
June 17, 1952 J. R. ANDREWS, JR 2,601,080

METHOD AND APPARATUS FOR DRYING WARP SHEETS AND THE LIKE

Filed Oct. 20, 1949 2 SHEETS—SHEET 1

Fig. 1.



INVENTOR
JOHN R. ANDREWS JR.

BY
Hoag, Killburn & Carlson
ATTORNEYS

June 17, 1952 J. R. ANDREWS, JR 2,601,080

METHOD AND APPARATUS FOR DRYING WARP SHEETS AND THE LIKE

Filed Oct. 20, 1949 2 SHEETS--SHEET 2

Fig. 2.

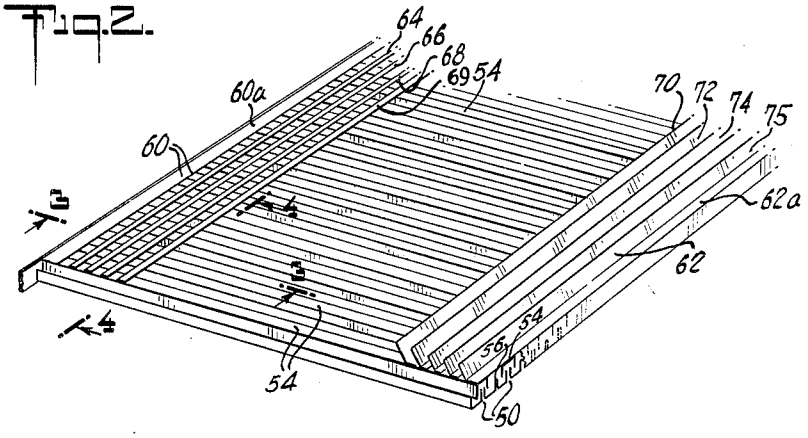


Fig. 3.

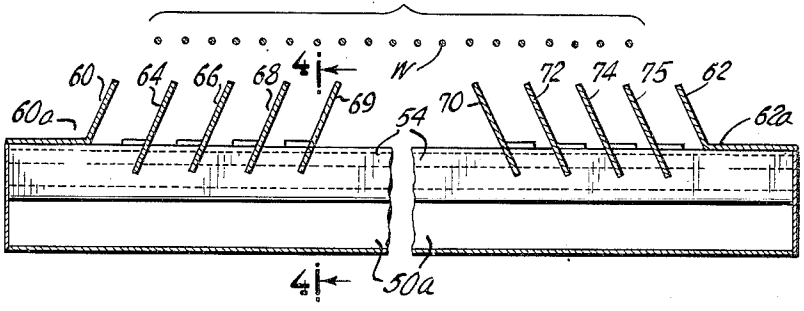
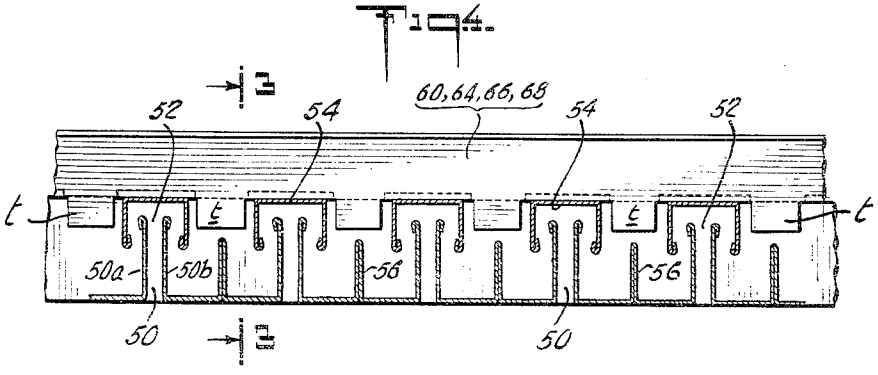


Fig. 4.



INVENTOR
JOHN R. ANDREWS JR.

BY
Hoag, Kilburn & Carlson,
ATTORNEYS

Patented June 17, 1952

2,601,080

UNITED STATES PATENT OFFICE

2,601,080

METHOD AND APPARATUS FOR DRYING WARP SHEETS AND THE LIKE

John R. Andrews, Jr., Uxbridge, Mass., assignor to Bachmann Uxbridge Worsted Co., Inc., Uxbridge, Mass., a corporation of Massachusetts

Application October 20, 1949, Serial No. 122,482

7 Claims. (Cl. 34—23)

1

This invention relates to method and apparatus for drying warp sheets and the like.

It relates to an air drier of the type disclosed in copending application Serial No. 25,565, now Patent No. 2,541,383, and discloses improvements upon the method and apparatus disclosed in that application.

In the use of apparatus of the kind disclosed in said copending application I have found that air directed against the lateral margins of a sized warp sheet tends to flow outwardly, around the edges of the warp sheet, instead of through its lateral margins, thereby causing the margins of the warp sheet to roll. This is objectionable because it results in uneven drying of the warp sheet and because it causes the lateral margins of the warp sheet to roll with the result that the sized threads comprising the marginal portions of the warp sheet are brought into contact with one another and tend to stick together.

An object of the invention is to provide a method and means for drying a warp sheet uniformly throughout its width.

Another object of the invention is to provide method and means for drying a warp sheet without rolling the lateral margins, and without setting up vibratory action or flutter in the warp sheet.

Other objects of the invention will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, arrangements of parts, and in the several steps and relation and order of each of said steps to one or more of the others thereof, all as will be pointed out in the following description, and the scope of the application of which will be indicated in the following claims.

The invention will best be understood if the following description is read in connection with the drawings, in which,

Figure 1 is a side elevation partly in cross section, with some parts broken away;

Figure 2 is a perspective view showing in full width a portion of a header surface;

Figure 3 is a vertical section taken on line 3—3 of Figures 2 and 4; and

Figure 4 is a vertical section taken on the line 4—4 of Figures 2 and 3.

While applicable to headers of various shapes and applications my improvements are illustrated and applied herein to the type of air drier disclosed in detail in said co-pending application Serial No. 25,565. It comprises a housing 10, which contains an air header 12 having an air discharging surface 14, and the header 16 having the air discharge surfaces 18 and 20. A warp sheet w is led into the closure 10 after being sized in vessel 22, and preferably after having been split into a plurality of warp sheets by the splitter roll 24, and is passed through a long reach, in close proximity to surface 14 of header 12, to the roller 24'. From the roller 24' it passes over the air distributor surface 18 of header 16 to roller 26, below the lower end of header 16, and from roller 26 it passes over the air distributing surface 20 of header 16 to roller 28, and then back to and around roller 30 adjacent the bottom of the closure, and from which it passes out of the closure in the direction indicated by the arrows 32 (Figure 1) through port 34 adjacent the bottom of the closure. From roller 30 to port 34 the warp sheet is moving in opposition to an incoming stream of air which flows through port 34, through heating means 36 and baffle means 38, which as illustrated comprises a number of baffles operated by solenoid means which need not be further referred to herein as they form no part of the invention which is the subject of this application; through baffle means 40, heater 42, and fan member 44 by which it is impelled through port 46 into the interior of header 12, and through the air distributing members 47 to the discharge surface 14 of header 12.

2

The air issues from the ports in the discharge surface substantially evenly and with a gentle non-turbulent flow due to the employment of baffle means which are referred to hereafter, and which are disclosed in detail in said co-pending application Serial No. 25,565, and after passing through the warp sheet is drawn into fan 48 and expelled through the duct 49 in the direction of the arrows into header 16, being discharged through both surfaces 18 and 20 of header 16 through the reaches of the warp sheet which pass over said surfaces respectively as has been described. The air discharged through surfaces 18 and 20 of header 16 is drawn into fan 44 and reheated and recirculated together with new air supplied through port 34 which replaces air discharged through outlet port 48a, which it will be observed is positioned above the lower end of header 12 to exhaust the portion of the air which has passed through the warp immediately after its entrance into closure 10 and while it is in its wettest condition.

It will be understood that the number and disposition of the air headers employed, and the flow of air between the headers, after passing through the reach or reaches of the warp sheet, form no

part of this invention which is directed to improvements in the control of air flow between a header discharge surface and the reach of the warp sheet which passes over said surface.

As shown herein each of the air discharge surfaces comprise laterally extending air slots **50** which extend across the path of a warp sheet and are disposed at right angles to the path of the warp sheet in spaced, substantially parallel relation.

The air slots **50** are defined by lips or projecting flanges **50a** and **50b** (Figure 4) extending the full width of the slot and projecting outwardly from the surface of the header toward the path of the warp sheet. Extending over the open mouth or nozzle **52** of each air slot **50** is a U-shaped deflector **54** of the type disclosed in said co-pending application Serial No. 25,565, against which air strikes upon leaving the said mouth **52**. Baffle **54** reverses the direction of flow of air from the slot **50**, dividing it and directing it back toward the header surface between slots or ports **50**, but the resulting air streams are again directed outwardly toward the warp sheet by means of baffles **56** projecting from the surface of the header between adjacent air slots **50**.

While this baffle and deflector means, as well as the baffle means shown in Figure 3 of said co-pending application Serial No. 25,565, is of great utility and effectiveness in eliminating turbulence in the air stream and in providing a flow of gentle air against a warp sheet, nevertheless it has been found in many instances, as for example where the sizing tends to bridge over between adjacent threads of a warp sheet, that the air which is discharged from the end portions of the air slots **50** may tend to flow sidewise around the lateral margins of the warp sheet, thus causing under drying of the lateral margins of the warp sheet.

To overcome this difficulty I close the ends of the air slots **50** if they are not already closed by the sides of the header as shown herein, and provide the air intercepters **60** and **62** extending lengthwise of the header adjacent its lateral margins, preferably with the outer ends of the intercepters extending to about ¾'' from the path of the warp sheet and disposed laterally about 1'' beyond the margins of the warp sheet. However, it is not sufficient to employ intercepters **60** and **62** alone because of the vibration or flutter which is then set up in the warp sheet travelling over the header surface, and is harmful since it tends to stretch the threads comprising the warp sheet margins more than those at the center of the warp sheet thus rendering the warp sheet non-uniform. I have found, however, that by providing additional intercepters, such for example as **64**, **66** and **68** positioned inwardly of, and in substantially parallel relation to intercepter **60**, at spaced intervals under a warp sheet margin, and intercepters such as **70**, **72** and **74** in substantially parallel relation to intercepter **62**, at spaced intervals inwardly from intercepter **62**, the vibration or flutter is substantially eliminated.

Good results have been obtained with the intercepters spaced about two inches apart, starting from the outside intercepters **60** and **62** positioned with their outer ends about one inch beyond the lateral margins respectively of the warp sheet and approximately three-quarters of an inch from the plane of the warp sheet.

The extreme marginal intercepter members **60** and **62** may be angular members having portions **60a** and **62a** respectively, overlying and covering the extreme marginal areas respectively of the header surface, especially if the warp sheet is substantially narrower than the width of the header surface. I have found it desirable to extend the intermediate intercepters **64**, **66**, **68**, **69** and **70**, **72**, **73**, **75** into the air slots **50**, and thus below the level of the tops of the deflectors **54** and into the plenum chamber of the header. Thus the intercepters may be formed with the projecting tongues *t* adapted to be inserted between adjacent baffles **54** and to extend well down toward the top of the baffles **56**.

I have found that the exact inclination of the marginal air deflecting members **60**, **62** and of the members **64**, **66**, **68**, **69** and **70**, **72**, **74**, **75**, may be best determined by trial and error for each header surface and for each of said members since slight variations occur in manufacture in the height or spacing of the air discharge nozzles **50** and baffles **54** and **56** and in the volume of air delivered through the several air slots. After having determined the optimum inclination for each the intercepters may be secured in place in any suitable way as for example by welding to the tops of the baffle members **54**.

By the steps and apparatus disclosed herein a drying action is obtained which is satisfactorily uniform throughout the full width of the warp sheet, and the difficulties of inward rolling of the edges of the warp sheet, or vibration or flutter of the warp sheet are substantially eliminated.

It will thus be seen that there has been provided by this invention a method and apparatus in which the various objects hereinabove set forth together with many thoroughly practical advantages are successfully achieved. As various possible embodiments might be made of the mechanical features of the above invention and as the art herein described might be varied in various parts, all without departing from the scope of the invention, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

What I claim is:

1. An air distributing header for drying warp sheets and the like having a plurality of substantially parallel air discharge slots including baffle means extending over said slots in the direction of the path of a warp sheet, to modify the flow of air from said slots, and deflector members projecting outwardly from said baffle members over the lateral margins of said air slots respectively to intercept the air from adjacent the lateral margins of the slots and direct it to pass through the lateral margins respectively of the warp sheet and minimize flow of the air laterally around the edges of the warp sheet.

2. The device as claimed in claim 1 wherein a number of said deflector members are provided extending over the margins of said air slots and disposed in spaced substantially parallel relation to one another and substantially at right angles to said slots.

3. The device as claimed in claim 1 in which there is one air deflecting member positioned in substantial alignment with each extreme lateral margin of said air slots to intercept air circling around the edge of the warp sheet and to direct said air through the adjacent lateral margin of said warp sheet, and other air deflecting members are disposed inwardly from said marginal air deflecting members at spaced intervals and

substantially parallel with the said extreme marginal air deflecting members.

4. The method of drying a warp sheet which comprises moving the warp sheet across and substantially at right angles to a flow of substantially non-turbulent air, and confining and directing the air flow to prevent the extreme lateral portions thereof from flowing around the lateral edges of the warp sheet, and directing air against the warp sheet along lines substantially parallel to the edges of the warp sheet at spaced intervals from the lateral margins of the warp sheet to avoid flutter in the warp sheet.

5. The method as claimed in claim 4 which includes the step of intercepting and deflecting inwardly air directed toward said warp sheet at a plurality of spaced intervals from the lateral margins respectively of the warp sheet, to prevent rolling of the extreme lateral margins of the warp sheet and to prevent flutter in the warp sheet.

6. An air distributing header having a surface adjacent and parallel to the path of a warp sheet, air ports in said surface extending laterally of said header through which air from the header is discharged toward the warp sheet and substantially at right angles thereto, marginal air deflecting members extending at right angles

to said air ports along its lateral margins respectively, and toward the path of a warp sheet, and additional air deflecting members positioned inside but adjacent to said marginal members, and substantially parallel to said marginal members and adapted to deflect air inwardly from the marginal portions of said air ports against a plurality of portions of a warp sheet travelling through its said path parallel to the said header surface.

7. The device as claimed in claim 6 wherein said additionl air deflecting members extend into said air ports and into the plenum chamber below the said surface of said header.

JOHN R. ANDREWS, JR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,357,314	Cobb	Nov. 2, 1920
1,945,851	Freeland	Feb. 6, 1934
2,141,403	Offen	Dec. 27, 1938
2,152,238	Bridges	Mar. 28, 1939
2,282,946	DeRoo	May 12, 1942
2,426,415	Rose	Aug. 26, 1947