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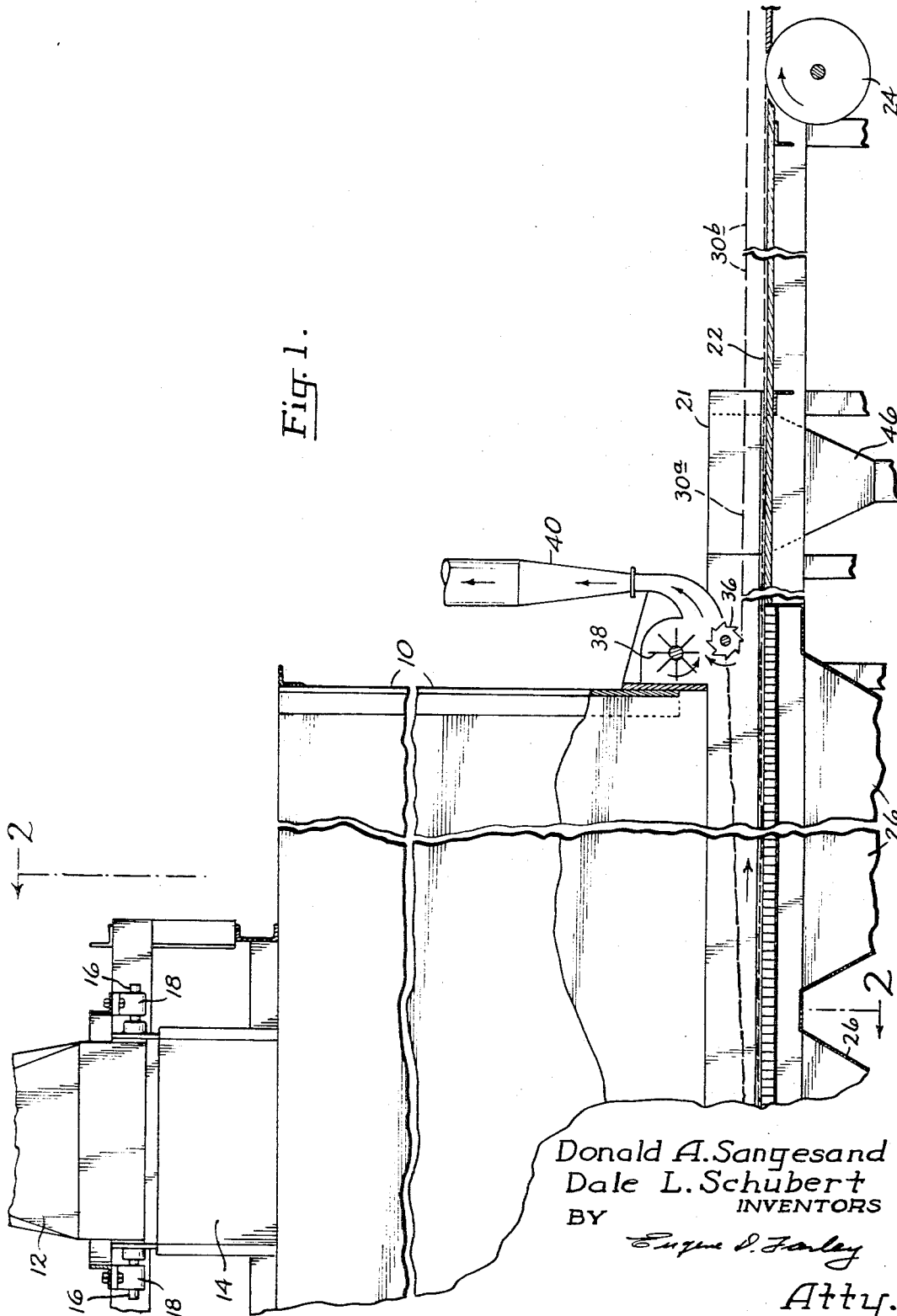
D. A. SANGESAND ET AL

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MAT FORMING APPARATUS AND METHOD

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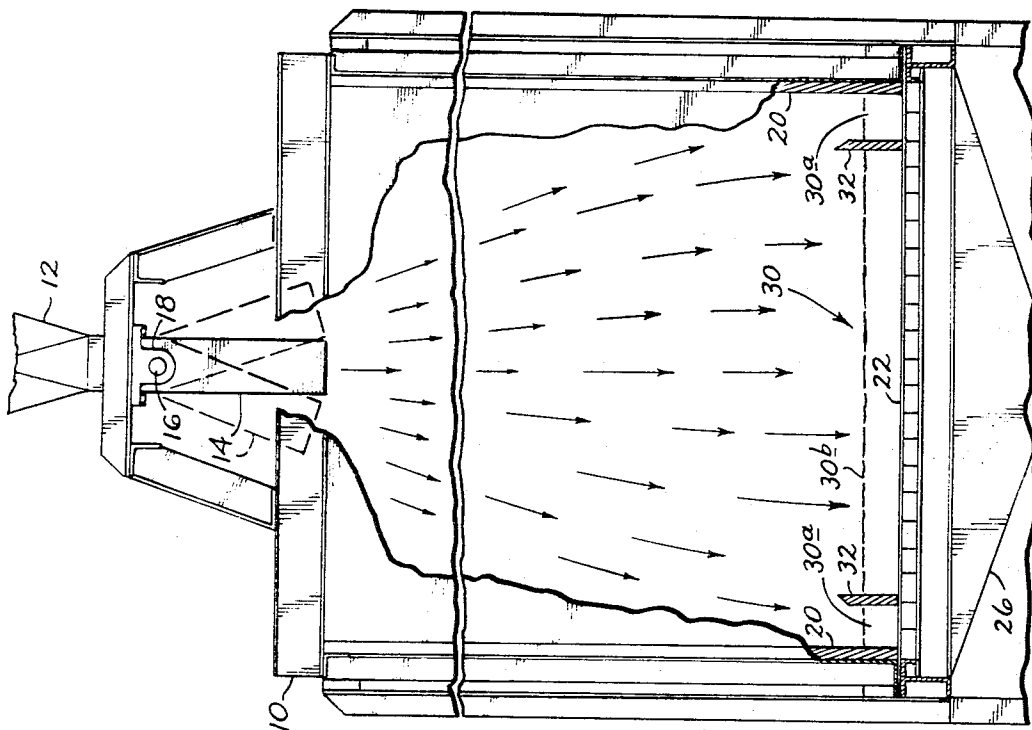
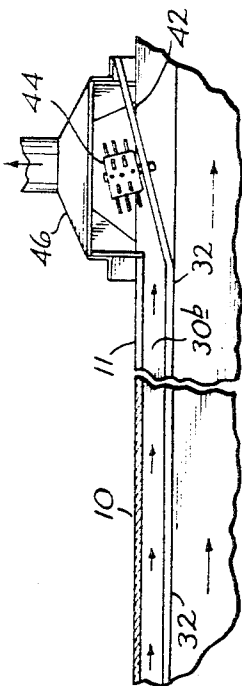


Fig. 3.

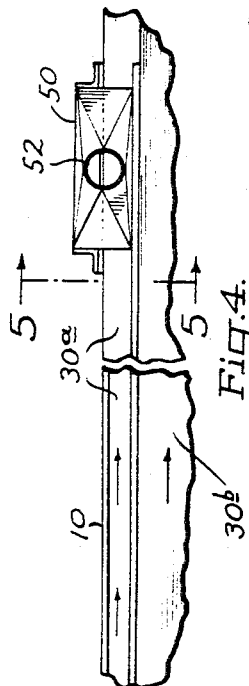


Fig. 4.

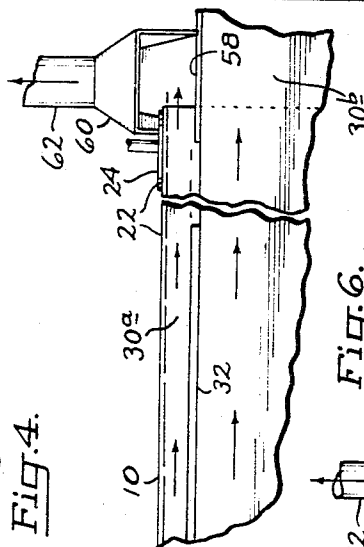


Fig. 5.

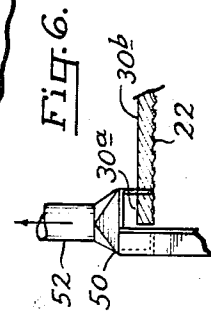


Fig. 6.

Donald A. Sangesand
Dale L. Schubert
INVENTORS

BY

Eugene D. Farley
Att'y.

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MAT FORMING APPARATUS AND METHOD
Donald A. Sangesand and Dale L. Schubert, Tacoma,
Wash., assignors to International Design Corporation,
Tacoma, Wash., a corporation of Washington
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ABSTRACT OF THE DISCLOSURE

Felted mats useful in the production of wood composition board are produced by felting lignocellulose particles on a forming screen in a felter provided with longitudinally extending deckles positioned a spaced distance inwardly from the side edges of the screen. The particles are deposited on both sides of the deckles, forming a felted mat having separate central and marginal sections. The marginal sections are removed selectively, leaving a center section having sharply defined side edges of uniform thickness. The center section then may be hot pressed into a composite board having uniform properties across its width.

Background of the invention

This invention relates to apparatus and method for forming felted mats having sharply defined side edges of uniform thickness. It relates particularly to apparatus and method for producing felted mats of lignocellulosic pieces, useful in the production of wood composition board.

In the manufacture of wood composition board, it is usual practice to form a felted, binder-containing mat of wood fibers, chips, flakes, particles milled shavings or bagasse and then to press the mat until the desired degree of consolidation has been achieved. A difficulty inherent in this procedure is that of providing a mat of uniform thickness, a desirable quality since non-uniformity of mat thickness is reflected in non-uniformity of density and other properties of the finished consolidated product.

It is particularly difficult to provide a mat of uniform thickness using the various high-capacity continuous felters, in part because of the irregular action of the felters and in part because of the inherent tendency of the finely divided lignocellulosic felting stock to produce undesirable irregularities when deposited into a mat.

This difficulty is observed particularly in the operation of the commonly used wig-wag type felters wherein the material to be felted is passed rapidly through an oscillating spout and deposited on a moving conveyor between longitudinally arranged side plates, or deckles. The mat formed by such a felter may be non-uniform along its side edges, since the spout motion reverses at the end of each stroke. Also, the material being felted tends to hang up on the side walls of the deckles, dropping down on the margins of the mat at irregular intervals whenever a sufficient weight has accumulated.

The conventional manner of correcting this difficulty by scalping the upper surface of the mat is not a complete success. Even though scalping results in the formation of a mat of uniform thickness, it still may be of non-uniform density since the edge portions of the mat have been consolidated irregularly by the weight of the accumulated material.

It is a general object of the present invention to provide apparatus and method for overcoming the foregoing deficiencies of the felting apparatus and producing as a final product a mat or felt of uniform thickness and density which may be consolidated to form a final product of uniform properties.

Still a further object of this invention is the provision

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of felting apparatus which is of simple, inexpensive construction and characterized by trouble-free operation.

In the drawings:

FIG. 1 is a view in side elevation, partly in section, of felting apparatus employed in the manufacture of felted mats having uniform side edges by the method of the present invention;

FIG. 2 is a sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a detail plan view further illustrating the apparatus of FIGS. 1 and 2 and illustrating in particular the means employed for producing sharply defined, uniform, mat side edges;

FIG. 4 is a fragmentary plan view illustrating alternate means for producing sharply defined mat side edges;

FIG. 5 is a sectional view taken along line 5—5 of FIG. 4; and

FIG. 6 is a fragmentary view of still another means for producing a mat with sharply defined side edges.

Generally stated, the mat forming apparatus of our invention comprises a traveling endless conveyor with mat-forming means arranged over the conveyor for depositing a continuous mat thereon. Mat divider means are positioned longitudinally of the conveyor beneath the mat forming means a spaced distance inwardly from the longitudinal side edges of the conveyor.

The divider means acts during the operation of the mat forming means to divide the mat into a central section and longitudinal marginal sections physically apart from the central section. Separating means are positioned adjacent the conveyor means downstream from the mat forming means for separating the marginal mat section from the central mat section.

In a preferred form of the invention the divider means may comprise one or more deckle plates positioned longitudinally of the conveyor and arranged in such a manner that as the lignocellulosic particles are driven downwardly upon the conveyor, those forming the central section of the mat are deposited inside the deckles while those forming the longitudinal side margins of the mat are deposited outside the deckles. Then as the composite mat formed in this manner is conveyed along the conveyor, the separate mat marginal sections are guided away from the central section, thereby leaving a central section having uniform, sharply defined side edges.

Considering the foregoing in greater detail and with particular reference to the drawings:

The raw material which may be employed in the herein described mat forming apparatus broadly comprises any material of the class from which felted mats are formed. Thus it may comprise plant material such as bagasse or straw reduced to the form of small pieces. Preferably, however, it comprises wood in the form of fibers, chips, shavings or flakes, to be used in the manufacture of wood composition board.

The raw material is mixed with a suitable portion of a suitable binder and is fed to felting apparatus such as the wig-wag or oscillating-spout type felter illustrated in FIGS. 1 and 2. In such an apparatus a felter box or housing 10 is fed with the felting furnish from the transition section of air conveying duct 12 communicating with the furnish source. Duct 12 delivers the furnish into an oscillating spout 14, the upper end of which is mounted on a shaft 16 journaled in bearings 18 and driven in reciprocating, oscillating movement by drive means not illustrated.

Spout 14, moving in characteristic wig-wag fashion, delivers a continuous flow of raw material between felting box side plates 20 having downstream extensions 21 arranged along the longitudinal side edges of an endless traveling conveyor 22. The latter preferably comprises an endless screen or other foraminous member reeved

about and driven by suitably positioned pulleys, one of which is indicated at 24. The screen traverses a suction box 26 located below spout 12 and creating an air flow which assists in depositing a felted mat 30 on the screen.

As indicated above, because of the eccentric motion of sprout 14, and because of fall off of accumulated material from side walls 20 of the felting box, the longitudinal margins 30a of the felt may be thicker and less uniform than the central portion 30b thereof. Accordingly means are provided for forming and maintaining the side margins separate and apart from the central portion and thereafter guiding them away from the central portion to leave the latter as a residue having the desired marginal characteristics.

The form of the invention illustrated in FIGS. 1, 2 and 3 for performing this function comprises mat divider means in the form of deckle plates 32 having beveled upper edges positioned longitudinally of the conveyor beneath the mat-forming means, a spaced distance inwardly from the longitudinal side edges of the conveyor. The deckle plates are maintained and supported in this position by suitable means such as, for example, brackets fixed to the respective ends of the felting box.

As the particles are driven downwardly (FIG. 2), those forming the marginal portions of the mat fall outside of deckle plates 32 to form the above noted marginal portions 30a which are kept separate from central portion 30b. All three portions travel together on the conveyor, however, and together pass outside of the felter as is shown particularly in FIG. 1.

Immediately upon leaving the felter, the mat is scalped to uniform thickness by means of conventional motor driven scalping roll 36. The scalped material is disintegrated by picker roll 38 as it is exhausted through vacuum conduit 40.

The leveled mat, still in three sections, then passes to divider means illustrated in FIG. 3 and having for its purposes guiding the mat side section 30a laterally away from central section 30b.

To this end angularly arranged guide plates 42, which may be formed as outwardly diagonal extensions of deckle plates 32, are positioned in such a manner as to act as plows, guiding the marginal portions 30a of the mat outwardly and thus separating them from the central portion 30b thereof. Associated with guide plates 42 are a motor driven disintegrating roll 44 and a vacuum collector 46 which disintegrate and convey away, respectively, the marginal portions and return the disintegrated material to the feed source.

Alternate means for separating marginal side portions 30a from the central portion 30b are shown in FIGS. 4 and 5.

In this form of the invention a suction box 50 is placed over the margins of the mat at a location downstream from the felter. This unit is arranged to suck away the undesired marginal mat portions 30a, thereby separating them from the central portion 30b and returning them to the feed source through duct 52.

Yet another means for dividing the irregular margin portions 30a from the desired mat portion 30b is illustrated in FIG. 6.

In this form of the invention deckle plates 32 are extended substantially to the end of endless felting screen 22. A transfer plate 58 is aligned with screen 22 and overlaps the screen at its downstream end. It has a width which is equal substantially to the width of central section 30b of the mat with which it registers. It communicates downstream with an off bearing conveyor, not illustrated. A funnel-shaped collector 60 is positioned beneath each of the outer ends of screen 22, below and downstream from roll 24. It communicates with a suction duct 62 which returns to the feed source mat margins 30a as they drop off the end of roll 24 and are collected in funnel 60.

Operation

The operation of all of the forms of the invention illustrated herein is essentially similar. In all of them, the material is felted onto a continuously moving endless screen 22 in a felting chamber 10 provided with longitudinally extending baffles 32 positioned a spaced distance inwardly from the side walls 20 of the felting chamber. The mat thus is formed in three sections, two marginal sections 30a which may be of non-uniform thickness and density, and a central section 30b of more uniform properties.

Though physically separated from each other, these three sections move together out of the felting chamber, beneath scalping roll 36, and to means for separating the marginal sections 30a from central section 30b. In the FIG. 3 form of the invention, the separating means comprise diagonal guide plates or plows 42 which guide the margins away from the center section. In the FIGS. 4 and 5 form of the invention the separating means comprise suction box 50 which sucks the margins away from the central section. In the embodiment of FIG. 6, the separating means comprise transfer plate 58 of predetermined width which selectively transfers the central section 30b of the mat to the offbearing conveyor, leaving side sections 30a to gravitate into funnel 60.

In all cases the side margins thus are separated from the central section, leaving the latter with sharply defined side edges of uniform thickness and density, well suited for transfer to the hot press for the production of a superior grade of wood composition board.

It is to be understood that the forms of our invention herein shown and described are to be taken as preferred examples of the same and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of our invention or the scope of the subjoined claims.

Having thus described our invention, we claim:

1. Mat forming apparatus comprising:

- (a) a traveling endless conveyor,
- (b) mat forming means arranged over the conveyor for depositing a continuous mat thereon,
- (c) mat divider means positioned longitudinally of the conveyor beneath the mat forming means a spaced distance inwardly from the longitudinally side edges of the conveyor,
- (d) the divider means acting during operation of the mat forming means to divide the mat into a central section and longitudinal marginal sections physically apart from the central section but traveling therewith on the endless conveyor,
- (e) separating means positioned adjacent the conveyor downstream from the mat forming means for separating the marginal sections of the mat selectively from the central section thereof, and
- (f) mat transfer means at the downstream end of the conveyor means, the mat transfer means having a width substantially equal to the width of the central mat section only, thereby selectively transferring the central mat section away from the longitudinal marginal sections.

2. The mat forming apparatus of claim 1 including gravitational collecting the separated marginal sections.

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MERVIN STEIN, *Primary Examiner*.

IRA C. WADDEY, JR., *Assistant Examiner*.