March 24, 1964 F. S. BARKER 3,125,919

MATERIAL FABRICATING MACHINE

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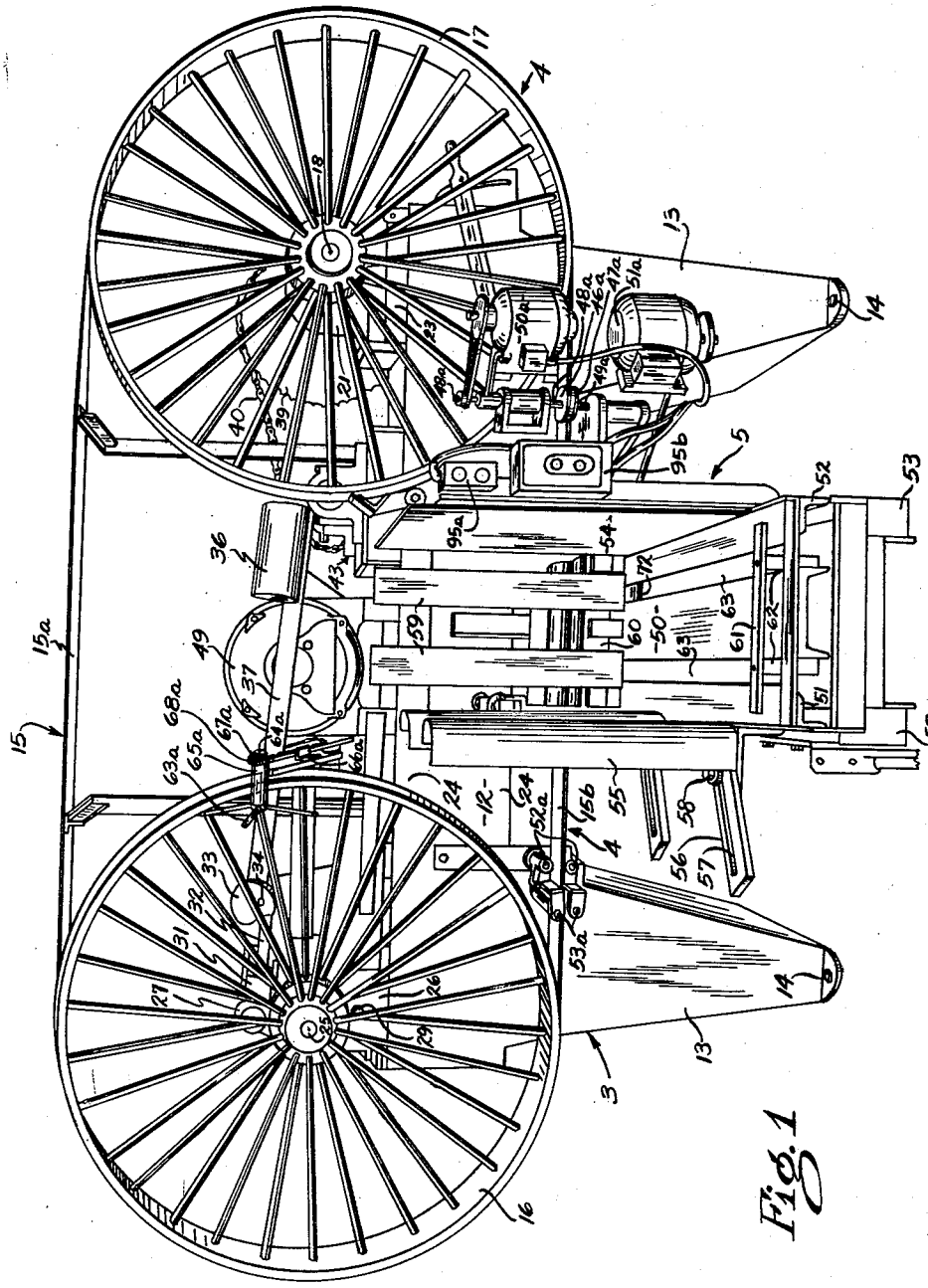


Fig. 1

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Filed Jan. 7, 1959 6 Sheets-Sheet 2

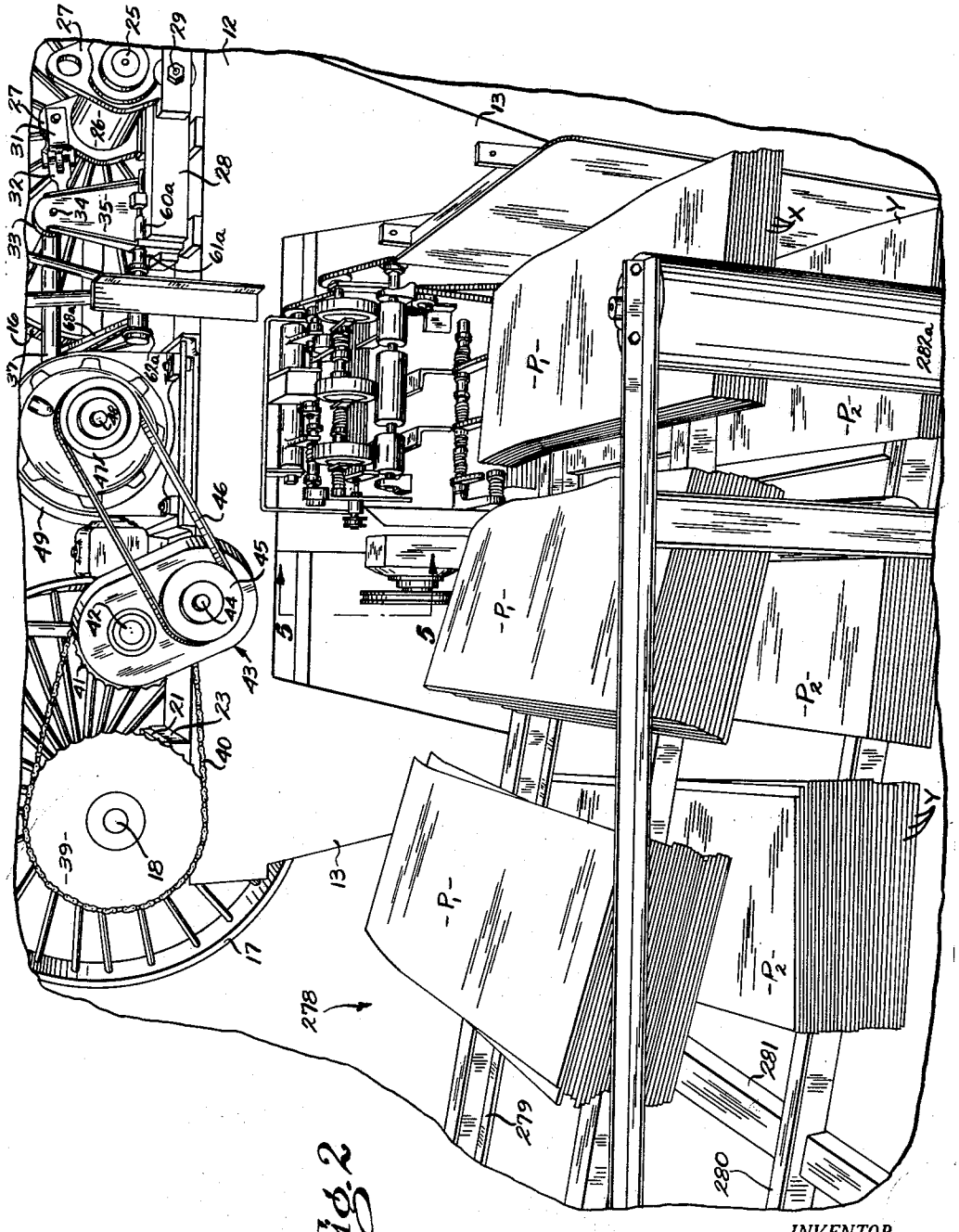


Fig. 2

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Fig. 4

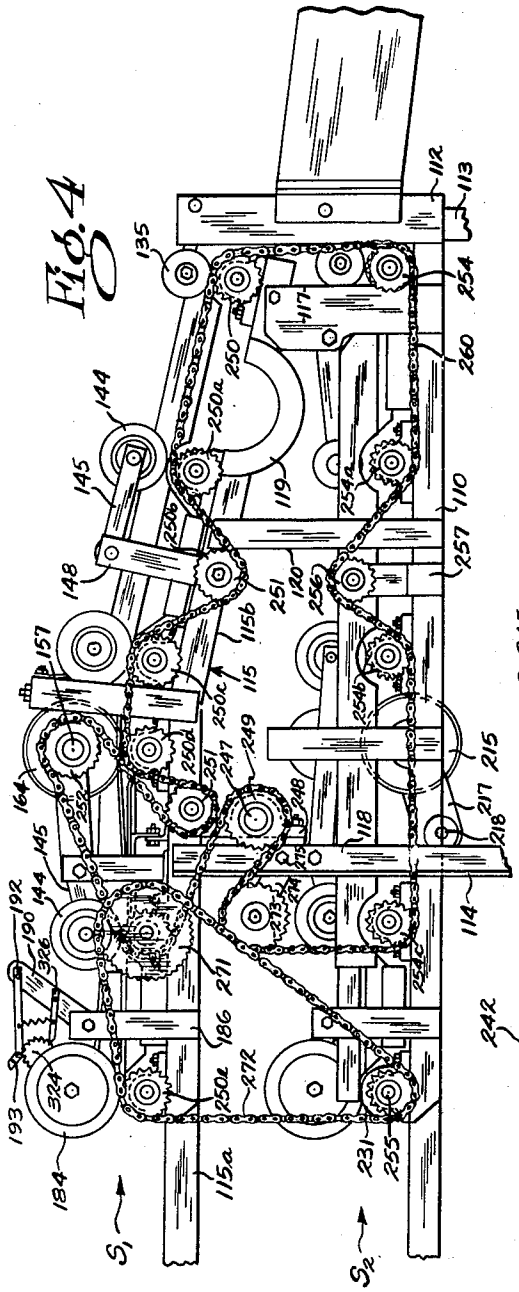
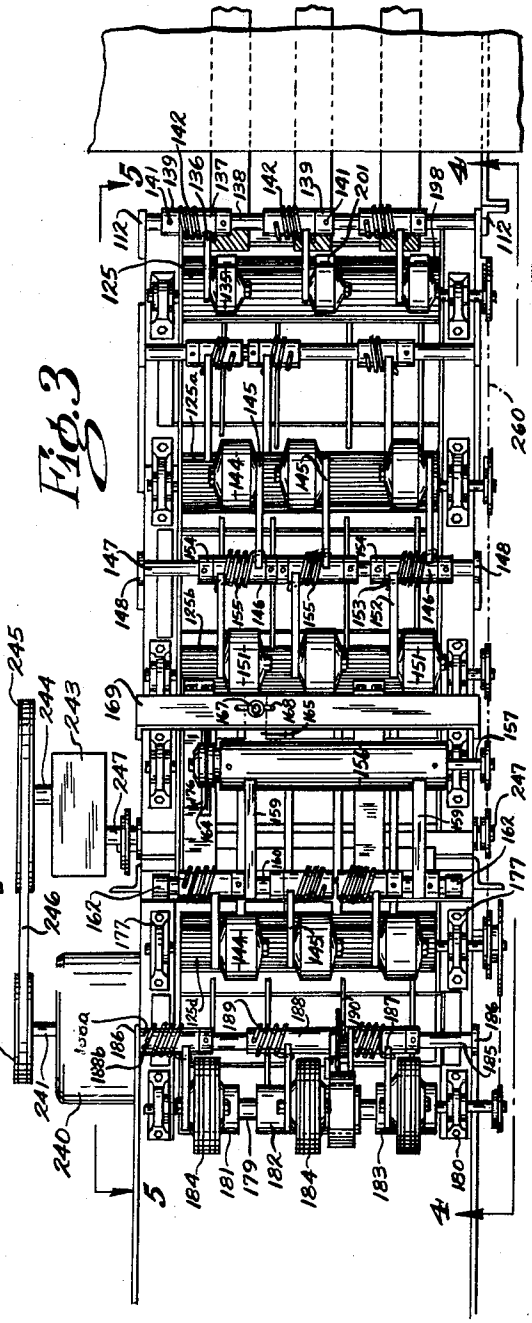


Fig. 3



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MATERIAL FABRICATING MACHINE

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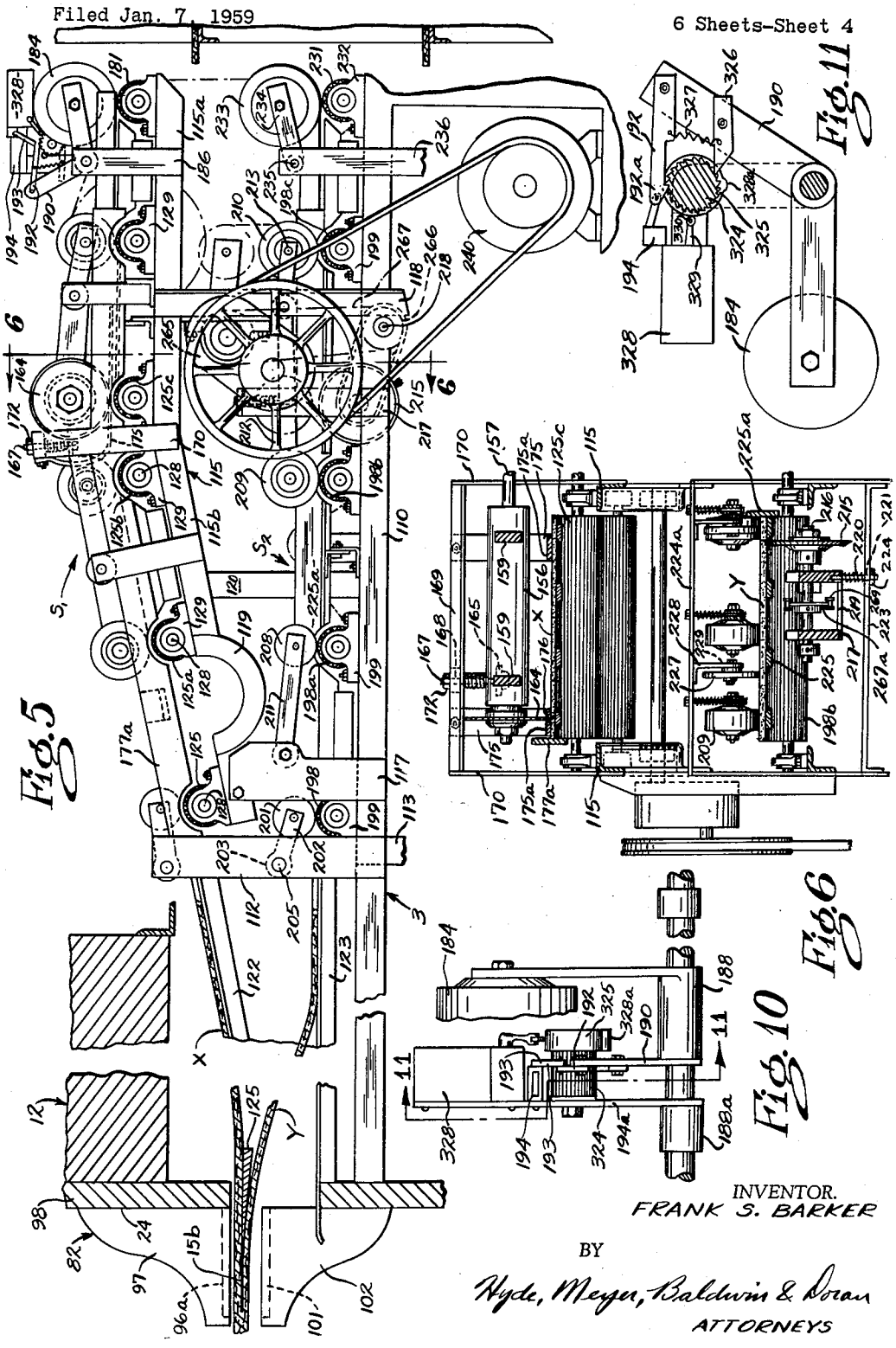


Fig. 5

Fig. 11

Fig. 6

Fig. 10

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MATERIAL FABRICATING MACHINE

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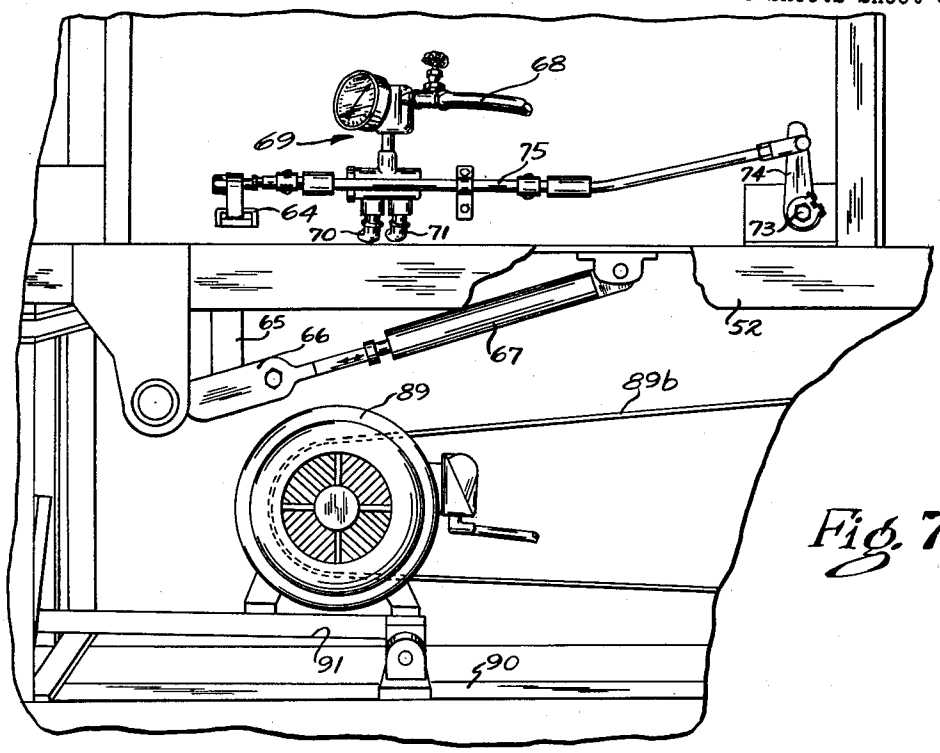


Fig. 7

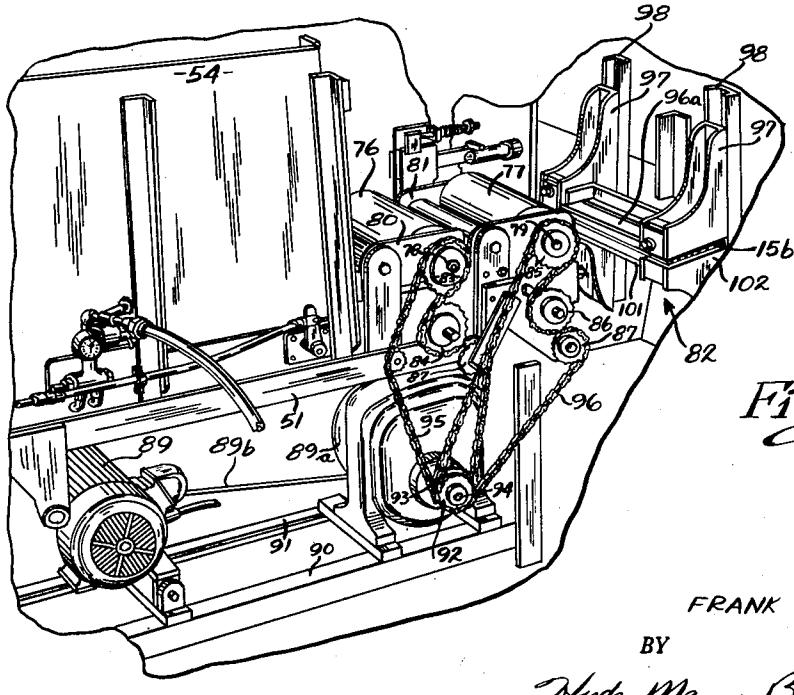


Fig. 8

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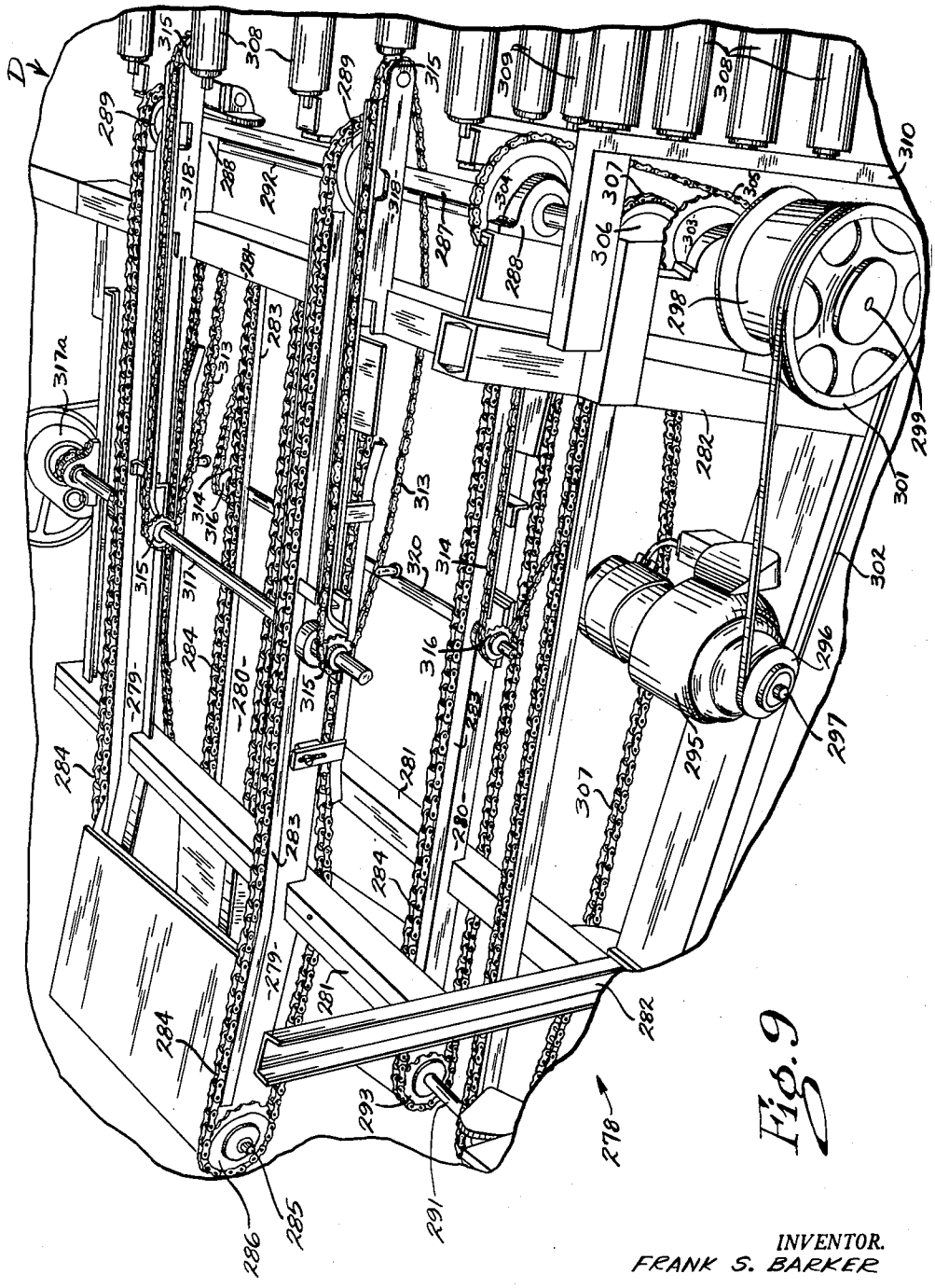


Fig. 9

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3,125,919
MATERIAL FABRICATING MACHINE

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Filed Jan. 7, 1959, Ser. No. 785,418
5 Claims. (Cl. 83—201)

This invention relates to a fabricating machine and more particularly to a machine especially designed for automatically forming a fibrous panel which is utilized to provide a backing or support for wooden shakes or shingles or other suitable materials.

In forming shake or shingle panels, as is referred to in the art, particularly one consisting of a preformed wall section adapted to be utilized in building construction such as for use in residential building or the like, the aforesaid section usually comprises a fibrous backing board mounting a plurality of shakes or woden shingles. It is usually required to separately fabricate the fibrous backing board in such manner that the shakes or shingles are subsequently mounted on one surface of the finished board and said combined structure is then mounted to the frame members of the building to form the aforementioned wall section.

The backing board may be provided with a narrow groove running lengthwise closely adjacent one side edge thereof such that upon placement of the shingle panel upon the building frame, the board or other suitable stripping element may be separated along said groove thereby leaving space for lath to be placed against the associated end of the backing board. In this manner, the shingle panels as thus formed may be placed one against the other, and rigidly attached through said lath to the aforesaid frame members. The shingles in adjoining panels may overlap one another to thus form a lapped wall section as is well known in the art.

The present invention, more particularly relates to a fabricating machine which is operable to automatically form shingle support panels from a supply of fibrous sheets of material sequentially delivered to said machine.

One of the primary objects of the present invention is the provision of a novel and improved fabricating machine especially designed to form a shingle or shake support panel of the type referred to to form a fibrous sheet of material wherein said sheet is automatically split into a plurality of board sections, each of which is thereafter automatically provided with a longitudinally extending groove to thereby form a preferred embodiment of said support panel.

Another object of the present invention is the provision of a novel and improved fabricating machine especially designed to form shingle or shake support panels of the type referred to and which includes splitting means operative to automatically split a fibrous sheet of material into a plurality of board sections of predetermined thickness and also to provide a longitudinally extending groove in each of said sections to thus fabricate a preferred embodiment of said support panel.

Another object of the present invention is the provision of a novel and improved fabricating machine which is especially designed to form a fibrous support panel which is thereafter utilized for mounting wooden shakes or shingles thereto or other suitable materials, and which includes a frame mounting conveying means, fabricating means mounted on said frame and positioned to intercept a fibrous sheet of material carried by said conveying means through said machine frame and which fabricating means are automatically operative to separate said sheet of material into a plurality of board sections of predetermined thickness and to provide a longitudinally extending groove in each of said sections to thereby form one of said support panels.

Additional objects and advantages will be realized by one skilled in the art to which it pertains and upon reference to the following description of a preferred embodiment thereof and as is illustrated in the accompanying drawings in which:

FIG. 1 is a front perspective view of a material fabricating machine embodying the present invention;

FIG. 2 is a fragmentary perspective view looking at the fabricating machine in substantially the opposite direction to that shown in FIG. 1;

FIG. 3 is a fragmentary plan view showing the scoring and separating mechanism for the fabricating machine of FIG. 1;

FIG. 4 is a fragmentary side elevational view of the scoring and separating mechanism of FIG. 2 and showing the chain drive for the same;

FIG. 5 is a fragmentary side elevational view of the scoring and separating mechanism taken approximately along the plane of line 5—5 of FIG. 2;

FIG. 6 is a sectional view of the scoring and separating mechanism taken approximately on line 6—6 of FIG. 5;

FIG. 7 is a fragmentary side elevational view showing the pneumatically operated feeding means for the fabricating machine of the present invention;

FIG. 8 is a fragmentary perspective view showing the driving means for the input conveyor device; and,

FIG. 9 is a fragmentary perspective view of the transfer conveyor of the instant fabricating machine looking substantially rearwardly of the splitting mechanism.

FIG. 10 is a fragmentary plan view of the counter mechanism located at the rear end of the scoring run S_1; and,

FIG. 11 is a sectional view taken approximately through the plane as indicated by line 11—11 in FIG. 10.

Before describing in detail the embodiment of the present invention disclosed herein, it is to be understood that the same is not intended to be limited to the structural details or the particular arrangement of parts as herein disclosed or described, as devices embodying the present invention may take other forms. It is also to be understood that the phraseology and terminology used herein are for purposes of description only and not of limitation, as the scope of the present invention is denoted by the appended claims.

Referring now to the drawings throughout which like elements are designated by the same reference numeral, the embodiment of material fabricating machine herein shown includes briefly, a supporting frame, designated in its entirety by the reference numeral 3 in FIG. 1, upon the forward end of which is mounted a material splitting mechanism as is indicated at 4, the latter being adapted to be sequentially provided with sheets or mats of fibrous material by a feeding mechanism as indicated at 5, said last named mechanism being preferably attached to the front face of the aforesaid supporting frame 3 and in substantial horizontal extension thereto.

Said splitting mechanism is intended to split the fibrous sheet or mat preferably along the longitudinal axis thereof and into panel sections, as hereinafter referred to, wherein each of said panels is of predetermined thickness.

The instant machine also includes scoring or grooving means whereby a narrow groove is formed on one face of each panel section, said groove running longitudinally along said face, closely adjacent one side edge thereof. As best seen in FIGS. 5 and 6 the machine structure herein shown utilizes a pair of scoring mechanisms as indicated by the reference numerals S_1 and S_2, the same being disposed in substantial vertical spaced relation one to the other and supported on the aforementioned frame 3 rearwardly of the splitting mechanism 4.

Means, later to be described in more detail, are also provided in the instant machine structure to convey the

panel sections as formed by said splitting mechanism to and from the afore-said scoring mechanisms and thereafter to a loading station for each of said latter mentioned fabricating means.

Referring now in detail to the instant form of fabricating machine, the supporting frame 3, as seen in FIG. 1, comprises a table top member 12 supported at a predetermined raised level above the work floor (not shown) by means of leg members or stanchions 13 which are rigidly attached to said member and project substantially vertically downwardly from the under surface of the latter from each of its ends. Suitable fastening means such as bolts 14 may be used to securely anchor said legs to the work floor.

The splitting mechanism 4 is mounted on the aforesaid table top member 12, and in its present form includes an endless band-like knife 15 carried on a pair of horizontally spaced band wheels, as indicated at 16 and 17, to define horizontally movable upper and lower blade runs 15*a* and 15*b* respectively, said lower run 15*b* being also hereinafter referred to as the splitting run. As seen in FIGS. 1 and 2, the band wheel 17 is carried on a shaft 18, the latter, in turn, being rotatably mounted in bearing 21. Said bearing is rigidly mounted in a cradle 23, the latter being located in such manner as to suspend the band wheel 17 in a vertical position slightly forwardly of the front face 24 of the aforementioned table top member 12.

The band wheel 16 is also mounted on the table top member 12 on the end thereof opposite the aforesaid wheel 17. To accomplish this, the band wheel 16 is carried on a shaft 25, said shaft, in turn being suitably journalled in bearing 25. As best seen in FIG. 2, bearing 26, mounts a flange member 27 on each of its ends. One end of each of said flange members 27 is pivotally mounted to opposite sides of a bearing block 28 by means of pin 29, said block being adjustably fastened to the upper surface of the table top member 12, in such manner that the bearing 26 extends transversely horizontally across said member 12, so that the aforesaid band wheel 16 is located slightly forwardly of the front face 24 of said member and in coplanar relation to the aforesaid band wheel 17.

One of the flange members 27, as seen in FIG. 2, in the end thereof opposite to the pivotal pin connection just described, is suitably pivotally fastened to one end of lever 31. The opposite end of lever 31, in turn, is connected to one end of yoke arm 32, the latter being pivotally connected at its opposite end to a cam element 33. Said cam element is rotatably journalled by shaft 34 to a vertically disposed stanchion 35 mounted on the aforementioned bearing block 28.

A counterweight, as indicated at 36 in FIG. 1, is mounted on one end of arm 37, the opposite end of said arm being rigidly attached to the aforesaid cam element 33 at a point therealong spaced from its mounting shaft 34 and preferably spaced a predetermined distance from the pivotal connection of the yoke arm 32 with said cam element.

With this construction and with a counterclockwise rotation of the counterweight 36 and connected arm 37, as viewed in FIG. 1, the cam element 33 will also be rotated counterclockwise whereby the yoke arm 32 and connected lever 31 is pulled to the right. As a result, the flange members 27 and attached bearing 26 are pivoted clockwise, as seen in FIG. 1, about the pins 29 whereby the band wheel 16 is moved slightly to the right, so as to decrease the distance between the centers of wheel supporting shafts 18 and 25.

As previously mentioned, the endless knife blade 15 is carried on the band wheels 16 and 17. Hence, with the counterweight 36 and connected arm 37 moved in the direction as just described, whereby the band wheel 16 is moved slightly to the right as viewed in FIG. 1, the tension is removed from the aforesaid knife blade 15 and it may then be replaced and/or removed for sharpening or the like.

With the knife blade properly placed over the periphery of the aforementioned band wheels 16 and 17, and thence passed through guiding and sharpening means, later to be described, the counterweight 36 and connected arm 37 are rotated clockwise to a position substantially as shown in FIG. 1, resulting thereby in pivotally moving the bearing 26 and band wheel 16 to the left. The distance between the band wheel centers is increased from the previously described condition and sufficient tension is thereby placed on the knife blade to retain the same on said band wheels.

The knife blade 15, as hereinabove mentioned, is carried on the band wheels 16 and 17 in such manner as to provide horizontally movable upper and lower blade runs 15*a* and 15*b*, respectively; the lower blade run 15*b* being also hereinafter referred to as the splitting or material cutting run.

Means are provided to rotatably drive said endless knife blade so as to carry the aforesaid blade run 15*b* longitudinally of the frame 3 and across the rearward end of the material feeding mechanism 5. For this purpose, the end of the shaft 18, opposite the band wheel 17, projects rearwardly of the bearing 21 and mounts a sprocket wheel 39. An endless link belt 40 is threaded over said sprocket wheel and also a drive sprocket 41 carried by the output shaft 42 of a conventional gear reduction drive unit 43. The input shaft of said drive unit as indicated at 44 preferably carried a multiple grooved sheave 45 around which is passed a plurality of V-belts 46, the latter also being passed around a similar drive sheave 47 carried on shaft 48 of electric motor 49. Said electric motor is connected to a suitable source of electrical energy (not shown) in a manner understood in the art to thus provide for the energization of the same and hence the rotation of the endless knife blade 15.

As is best seen in FIG. 1, means are provided to automatically sharpen the endless knife blade 15 as the same is carried about its supporting band wheels 16 and 17. For this purpose, a pair of sanding discs 46*a* and 47*a* is rotatably mounted on shafts 48*a* and 49*a*, respectively, on opposite sides of the lower cutting run 15*b* of said knife blade, and thus positioned to engage the opposed surfaces of said cutting run. A suitable power source such as electric motors 50*a* and 51*a*, each of which is drivingly connected by suitable belt drives to the aforesaid shafts 48*a* and 49*a* respectively, is operable to thus rotatably drive its associated sanding disc and thereby provide for the automatic sharpening of the knife blade 15.

A pair of brush members 52*a* is pivotally attached to the front face of the table top member 12 on the opposite end thereof as is indicated at 53*a*, one of said brush members being thus movably disposed to thus engage one surface of the aforesaid cutting run 15*b* of the knife blade and thereby remove any fibrous particles or other foreign matter disposed thereon in the next preceding splitting operation. Said brush members also function to remove any excess blade lubricant from said cutting run.

As is best seen in FIGS. 1 and 2, the instant fabricating machine is also provided with means to tilt at least one of the band wheels 16 and 17 and thus enable the endless knife blade 15 to properly track thereon and for this purpose, the aforesaid bearing block 28 for the band wheel 16 is shown to be connected to a shaft 60*a* which is rotatably carried adjacent its one end in a bearing block 61*a*, the latter being rigidly supported on the aforesaid table member 12. The opposite end of the shaft 60*a* mounts a suitable sprocket 62*a*. A handle 63*a*, FIG. 1, is carried on one end of a shaft 64, the latter being rotatably supported in a sleeve member 65*a* rigidly attached to one end of an arm member 66*a*. Said arm member, in turn, is attached at its opposite end to the aforemen-

tioned table member 24. The opposite end of the shaft 64*a* also carries a sprocket 67*a* and a suitable endless link chain 68*a* is passed over the aforesaid sprockets 62*a* and 67*a*. With this construction, by turning the handle 63*a* in the proper direction the shaft 60*a* and hence the bearing block 28 is tilted slightly from its pre-arranged position whereby the knife blade 15 will properly track upon the same.

As previously mentioned, the material cutting run 15*b* of the aforesaid endless knife blade 15 is passed rearwardly of the feeding mechanism 5 whereby the latter is thus operable to sequentially feed sheets of material to said run to be split thereby into board sections of predetermined thickness.

For this purpose, the feeding mechanism 5 in its present form, includes a bin consisting of an elongated flat plate or bed 50 supported by frame members 51 and 52 above the aforementioned work floor by means of suitable leg members 53, in such manner as to be in substantially a horizontal plane, and located forwardly of the material cutting run 15*b* of the knife blade 15. The aforesaid bin also includes a flat plate 54 mounted in a vertical position on one side of the bed 50 and extending thereabove, and a plurality of curved buttress plates 55 also disposed in substantially a vertical position on the opposite side of said bed. As seen in FIG. 1, each of said buttress plates is mounted at its lowermost end to a bracket 56, said bracket being formed with a slot 57 extending preferably longitudinally centrally therethrough. Each of said brackets is adjustably mounted on said opposite side of the bed 50 by means of a suitable fastener, such as bolt 58, in such manner that said bracket and hence its supported buttress plate 55 may be adpustable transversely of said bed to thus accommodate for different sizes of fibrous material.

The discharge end of the bin is defined by a wall comprising a pair of vertical rails 59 supported by horizontal bars 60 and spaced one from the other at the rearward edge of the bed 50, as seen in FIG. 1. The lower end of each of the rails 59 is selectively spaced above the surface of the bed 50 a distance which allows only a single sheet of fibrous material of predetermined thickness to pass between the same and the surface of the bed 50.

A plurality of sheets of said fibrous material are adapted to be placed into the bin and thereafter discharged one at a time from said bin and thence to the aforesaid splitting mechanism 4.

For this purpose, the instant form of feeding mechanism includes a feeder bar 61 which preferably extends transversely across the bed 50 and rests upon the top surface thereof. Said feeder bar is sequentially actuated to discharge the bottommost sheet out of the bin and to said splitting mechanism, and to accomplish this said bar is rigidly attached to the top of a pair of fingers 62 which project upwardly through a pair of slots 63 formed in the aforesaid bed 50, said slots extending substantially longitudinally along said bed in parallel spaced relation to each other. The lower end of said fingers 62 are attached to opposite ends of a connecting bar 64, disposed below the bed 50.

Said connecting bar 64 is attached to one end of link arm 65, as best seen in FIG. 7, and said link arm at its medial part, is connected to coupling 66. Said coupling in turn, is connected to the end of piston rod of a conventional double acting air motor 67. A source of air supplied by conduit 68 is connected to a suitable conventional valve 69 whereby air is alternately applied to opposite ends of the piston chamber of the motor 67 by means of conduits 70 and 71 as will be understood in the art to thus reciprocally drive the aforesaid piston rod and hence the feeder bar 61 longitudinally of the bed 46.

As the feeder bar 61 is moved toward the discharge end of the bin as seen in FIG. 1, it engages the forward transverse edge of the bottommost fibrus sheet and slides the latter out from under the stack and out through said discharge end toward the splitting mechanism.

A transfer roll 72 disposed in one of the bed slots 63 adjacent the rear edge of the bed 50, is mounted on a shaft 73 and is rotatably reciprocated with feeder bar 61 to assist in transferring the separated sheet to the aforesaid splitting mechanism. To accomplish this movement for said transfer roll, the shaft 73 mounts a bell crank lever 74 as best seen in FIG. 7, which lever, in turn is connected by means of link 75 to the aforementioned connecting bar 64. With the actuation of said air motor, the roll 72 is therefore rotatably reciprocated in the same direction of movement as that of the feeder bar 61.

As the bottommost sheet of fibrous material is discharged from the bin of the feeding mechanism in the manner just described, it is then picked up by conveying means now to be described which moves and directs the said sheet into engagement with the cutting run 15*b* of the knife blade 15 wherein it is split into two board sections.

With particular reference now directed to FIG. 8, the conveying means herein shown comprises pairs of rolls 76 and 77 rotatably supported on shafts 78 and 79, respectively, between plates 80 and 81 mounted between the frame members 51 and 52 of the feeding mechanism, rearwardly of the aforesaid bin, and spaced directly in front of gate 82, later to be referred to in greater detail, through which transgresses the aforementioned cutting run 15*b* of the knife blade 15. Said pairs of rolls are preferably spaced one from the other longitudinally along the supporting frame members and the rolls of each pair are disposed in an adjustable substantial vertically spaced relation to define a space therebetween sufficient to permit the discharged sheet of fibrous material to pass through the same.

The rolls of each pair are rotatably driven in such manner as to feed a sheet of material toward the aforesaid gate 82 or to the right as seen in FIG. 8. For this purpose, the shaft carrying the upper roll in said pair of rolls 76 mounts a sprocket wheel 83 and the shaft carrying its associated lower roll mounts a similar sprocket wheel 84. In like manner, the vertically disposed upper and lower shafts for the pair of rolls 77 mount a sprocket wheel 85 and 86, respectively. In addition, an idler sprocket as indicated at 87 is rotatably mounted on the aforesaid frame member 52 below and slightly to the right of each of the sprocket wheels 84 and 86. Drive motor 89 supported on horizontal frame members 90 and 91 of the feeding mechanism is drivingly connected to a gear drive device 89*a* by means of endless belt 89*b*. Said gear device, in turn, mounts a pair of drive sprockets 92 and 93 on its shaft 94. An endless link belt 95 is passed around the drive sprocket 92, over the upper sprocket wheel 83 on shaft 78, reversably around lower sprocket wheel 84 and thence over idler sprocket 87 associated therewith. An endless link belt 96 is likewise passed over the remaining drive sprocket 93 and over the upper sprocket wheel 85 on shaft 79, thence reversably around lower sprocket wheel 86 and over the idler sprocket 87 disposed adjacent thereto.

With this drive connection thus established between the drive motor 89 and the aforementioned pairs of conveyor rolls 76 and 77, it will hence be realized that by energizing the aforesaid motor 89 in such manner as to obtain its counterclockwise rotation as seen in FIG. 8, the aforesaid pairs or rolls will be rotated so as to take a sheet of fibrous material discharged from the bin and drivingly move it to and into the gate 82.

The electrical motors 49, and 89 actuating respectively, the knife blade 15 and conveyor rolls 76 and 77, may be connected to a suitable electrical source of power by means of electrical conductors (not shown) and controlled by means of a conventional on-off switch as indicated at 95*a* in FIG. 1, in a manner as well known in the art.

The on-off switch 95*b* as is also seen in FIG. 1 may, in like manner, be connected in circuit with a suitable electrical power source and the aforesaid sharpening motors 50*a* and 51*a* to thus energize the latter when needed to sharpen the knife blade 15.

In the form of fabricating machine shown herein, the cutting run 15*b* of the knife blade 15 transgresses approximately through the center of the gate 82 in such manner as to preferably split the sheet of material presented thereto into two slabs or board sections of substantial equal thickness. Said gate hence functions to align the sheet of material with respect to the cutting run 15*b* and also prevents the board sections, once they are thus formed, from falling out of the machine. As will be hereinafter apparent said gate is equally operative to direct each of said board sections to the conveying means, later to be described, for the scoring mechanism preparatory to scoring or grooving the same.

To accomplish this result, the gate 82 comprises, in its present form, an upper substantially flat alignment plate 96*a* which is disposed directly over the cutting run 15*b* of said blade and supported at each of its ends by an L-shaped bracket 97, each of which is vertically adjustably mounted in a rail member 98, the latter being rigidly attached to the front face of the table top support 12 in the aforesaid frame 3. Said plate 96 is selectively positioned by said supporting brackets 97 so as to be disposed closely above the transgressing cutting run 15*b* and preferably substantially parallel thereto.

Said gate also includes a flat alignment plate 101, identical to plate 96, and which is supported at each of its ends beneath the aforesaid cutting run 15*b* of the knife blade by means of L-shaped brackets 102. Said brackets are also vertically adjustably mounted on the aforesaid frame 3 so as to position the plate 101 preferably closely below the said cutting run and parallel thereto.

In the instant fabrication of fibrous material, the board sections as formed thereby are each intended to be approximately of the same thickness. Consequently, the alignment plates 96 and 101 of the said gate are located substantially the same distance from the cutting run 15*b* of the knife blade on opposite sides thereof such that the distance between said plates is slightly greater than the thickness of said sheet of material to thereby permit the entry of the latter into the aforesaid gate 82. It is also to be understood that the aforesaid alignment plates of the gate may be located in any preselected relative position on either side of the cutting run 15*b* to thus obtain any desired thickness and/or configuration for each of said board sections. For example, said alignment plates may, if so desired, be positioned as to obtain flat board sections of unequal thickness or tapered board sections wherein the transverse thickness is varied from one side to the other.

As the sheet of fibrous material is thus split into two slabs or board sections, each being identified in FIG. 5 by the reference characters X and Y, respectively, the same are fed into a double-deck scoring mechanism wherein a narrow groove is provided on one face thereof, running longitudinally therealong closely adjacent one side edge.

Referring particularly to FIG. 4, the instant form of scoring mechanism includes basically an upper scoring run S_1 and a lower scoring run S_2 disposed in vertical spaced relation, being carried in a supporting structural framework and simultaneously power driven by common drive means, later to be more fully described.

The supporting framework includes a pair of rails 110 (only one of which is herein shown) disposed in horizontal parallel spaced relation and which extend substantially perpendicularly rearwardly of the supporting frame table support member 12 of the aforesaid splitting mechanism. At the forward end thereof, each of said rails 110 is securely fastened, by any suitable means, to one of a pair of frame members 112, the latter being disposed in substantial vertical spaced relation closely adjacent the rear face of the aforesaid table support member 12.

Each of said frame members 112, in turn, is connected at its lowermost end to a leg 113. The opposite end of each of the rails 110 is likewise securely fastened to the upper end of a leg 114.

Each of the aforesaid legs 113 and 114 is preferably of predetermined length sufficient to space the rails 110 above the work floor in a horizontal plane slightly below the plane of the cutting run 15*b* of the knife blade 15, the purpose for which will be hereinafter apparent.

The instant scoring mechanism framework also includes a pair of rail members 115 (only one of which is herein shown), which is also disposed in parallel spaced relation to each other, which members are also supported above the aforementioned rails 110 by means of front and rear frame bars 117 and 118, respectively.

As seen in FIG. 5, each of said rail members 115 comprises a rearward portion 115*a* which is supported in substantially a horizontal plane by said frame bars and a forwardly disposed inclined portion as at 115*b*, the latter projecting downwardly and forwardly toward the rear face of the supporting frame table member 12 at a desired preselected angle. The forward end of each of the inclined rail portions 115*b* is rigidly attached by welding or the like to one end of an upwardly facing U-shaped member 119. The opposite end of each of said U-shaped members 119 is also attached in like manner to the upper end of the aforesaid supporting frame bar 117. The lower end of said frame bar in turn, is rigidly attached to the aforementioned rail member 110 located vertically therebelow, rearwardly of the frame member 112. Additional support members 120 may also be disposed vertically between the lower and upper rail members 110 and 115 being rigidly attached to said latter members at spaced points therealong so as to provide support thereto.

In the present form of fabricating machine, the scoring mechanism is connected to the splitting mechanism in such manner as to receive the split board sections X and Y and to thereafter direct the same, respectively, to the upper and lower scoring runs S_1 and S_2 of said scoring mechanism.

For this purpose, separate sets of upper and lower guiding rails 122 and 123 respectively (only one of each set being seen in FIG. 5) are attached to the frame supporting member 112 and extend forwardly thereof, to connect with the table support member 12 rearwardly of the aforementioned gate 82. As seen in FIG. 5, the lower set of guide rails 123 is disposed in substantially a horizontal plane, and attached to said support member 12 below the plane through which the cutting run 15*b* of the knife blade transgresses, its position being further defined by being disposed in a horizontal plane spaced above the framework member 110 for said scoring mechanism. The upper set of guide rails 122, however, is seen to be inclined upwardly and rearwardly of the aforesaid table support 12 at preferably an angle of inclination slightly less than that of the inclined portion 115*b* of the rails 115, and is thence connected at its rearward end to the framework member 112 at a point slightly above the upper surface of the said rails 115. The forward end of the upper set of guide rails 122, as seen in FIG. 5, is rigidly attached to the aforesaid table support 12 rearwardly of a platen 125.

As the sheet of fibrous material is split into the aforementioned board sections X and Y, the platen 125 is operable to direct the board section X onto the guide rails 122 as is seen in FIG. 5 whereby said board section slides over said rails toward the scoring run S_1 of the aforementioned scoring mechanism. It is then picked up by the conveying means for the aforesaid scoring run S_1 and passed thereby through the latter wherein it is then scored.

In the present machine, the conveying means for the scoring run S_1 includes a plurality of cylindrical conveyor rolls 125, 125*a*, 125*b* and 125*c*, preferably of the corru-

gated type, having axially extending and circumferentially spaced raised land portions adapted to firmly grip the board section X as the same is moved thereby. Each of said rolls is seen to be centrally mounted on a shaft 128, which shaft in turn, extends substantially transversely across the framework rails 115, being rotatably journalled in bearing mounts 129 supported on the top face of the aforesaid rails. As best seen in FIG. 5, said conveyor rolls are mounted in tandem relation longitudinally along the supporting framework for the scoring run S_1.

The instant conveying means for the scoring run S_1 also includes means for pressing the board section X into positive engagement with each of said conveyor rolls to thus assure that said board section is substantially continuously carried through said scoring run.

For this purpose, separate groups or sets of wheels, preferably constructed of a rubber-like material, are movably mounted on the aforementioned framework for the scoring run S_1, each of said groups being adapted to lie preferably directly over one of the aforesaid conveyor rolls and biased toward the same in a manner as will now be more fully described.

As best seen in FIGS. 3 and 5, one set of said wheels is identified by the reference numeral 135 and is seen to be disposed over the roll 125 at the forward end of the inclined part 115*b* of the rails 115, said wheels being preferably equally spaced one from the other. Each of said wheels in addition is rotatably mounted on the free end of an arm member 136, the opposite end of said arm member being rigidly attached to a bearing sleeve 137. Each of said bearing sleeves is carried on a shaft 138 which is journalled at its ends to the aforementioned frame members 112. A collar 139 may also be mounted on said shaft, on each side of the aforesaid bearing sleeves 137, preferably abutting the opposite end faces thereof, being pinned to the shaft by pin 141 to thus retain the aforesaid wheels and supporting sleeves in their preferred location with respect to the roll 125. Suitable biasing means, such as coil spring 142, is carried on each bearing sleeve 137, the instant form of said spring having its one end securely fastened to one of said collars and the opposite end thereof extending into a suitable hole provided in the arm member 136 associated therewith preferably closely adjacent said sleeve. Said coil spring is thereby mounted to exert a force on the arm member 136, the latter thence acting as a cantilever, to thus positively bias the wheel carried thereon toward the conveyor roll 125 located therebelow whereby the latter and said wheel firmly grip the board section X as the same passes therebetween.

Disposed longitudinally along the aforesaid framework rails 115 are two additional groups of biasing wheels, positioned over the conveyor rolls 125*a* and 125*b* respectively, being similarly operative therewith firmly grip the board section X transgressing therebetween.

As best seen in FIG. 3, the first of said two additional groups consists of three individual wheels each being identified by the reference character 144, and which are in addition, each rotatably carried on the free end of an arm member 145. The opposite end of each supporting arm member 145, in turn, is rigidly attached to a sleeve member 146, the present construction providing one of said sleeve members for each supporting arm member. Each of said sleeve members, in turn, is carried on a shaft 147 which is journalled at its ends to a pair of upright support bars 148 in such manner as to extend substantially transversely across the scoring run framework intermediate to and above the conveyor rolls 125*a* and 125*b*.

The remaining group of said biasing means also includes three individual wheels 151, identical to wheels 144, and which are each rotatably mounted on the free end of a separate arm member 152, the instant construction also providing one arm member for each of said wheels.

As best seen in FIG. 3, the opposite end of each of said arm members 152 is rigidly attached to a separate sleeve member 153, each of which is mounted on the aforesaid shaft 147 preferably abutting one of the sleeve members 146.

Suitable collars as indicated at 154, are likewise carried on the aforesaid shaft 147, being located on either side of each pair of said adjoining sleeve members 146 and 153, in abutting relation to the opposed end faces thereof, said collars being suitably fastened to said shaft to thus position each of the wheels 144 and 151 in preselected spaced relation longitudinally along the aforementioned conveyor rolls 125*a* and 125*b*, respectively.

A coil spring 155, which is disposed over each of said pair of adjoining sleeve members, has its one end anchored to arm member 145 connected to sleeve member 146 and its opposite end likewise anchored to arm member 152 connected to the adjoining sleeve member 151. Said spring is thence effective to exert an oppositely directed force on each of said arm members carried by said adjoining sleeve members to thus positively bias the wheels 144 and 151 toward the conveyor rolls 125*a* and 125*b*, respectively whereby the latter, cooperating with said wheels, are also capable of firmly gripping the board section X as the latter passes therebetween.

Spaced longitudinally along the aforementioned structural framework rail members 115, rearwardly of the latter described conveyor roll 125*b*, is a tubular housing 156 which has a shaft 157 passed centrally therethrough, said housing, in addition, having suitable bearing means (not shown) adapted to rotatably support said shaft preferably at each end of said housing.

As best seen in FIG. 3, the tubular housing 156 is suspended between the aforesaid rail members 115, and for this purpose, said housing, adjacent each of its ends is rigidly affixed to one end of a pair of arms 159. The opposite end of each arm 159 is journalled over a shaft 160, longitudinally rearwardly spaced along said framework rail members 115, extending tranversely thereacross and supported between a pair of upstanding plate members 162.

As previously mentioned, the instant scoring mechanism is adapted to provide a narrow groove on said board section X extending longitudinally therealong, closely adjacent its one side edge.

For this purpose the scoring run S_1 herein shown includes a circular disc-shaped knife 164 which is mounted on one end of shaft 157, and as is best seen in FIG. 6, said knife is disposed in substantial parallel spaced relation and closely adjacent one of the aforementioned rail members 115.

The tubular housing 156 is adapted to be adjustably positioned on said framework supporting members to thus selectively locate the cutting edge of the circular knife 164 in spaced relation to the surface of the aforementioned conveyor roll 125*c* which roll is mounted on said rail members substantially vertically therebelow. For this purpose, as seen in FIGS. 3 and 6, a bar as identified by the reference numeral 165, has its one end rigidly connected to the tubular housing 156 so as to extend approximately in the opposite direction to that of the aforesaid arm members 159 to thus project generally toward the wheel members 151. The opposite end of said bar member mounts a threaded rod member 167, the latter preferably extending substantially perpendicularly upwardly therefrom and through a suitable aperture 168 formed in an elongated plate member 169. Said plate member, in turn, is rigidly mounted at its ends to a pair of support bars 170 attached to the aforesaid framework rails 115 preferably intermediate the conveyor rolls 125*b* and 125*c*. A suitable fastener such as nut 172 may be threaded over the end portion of the rod member 167 protruding upwardly through the aforesaid aperture 168 in the plate member 169. By an appropriate threadable adjustment of said nut, the member 167 may be raised or lowered to thus pivot the supporting end of the bar member 165 in

the same direction whereby the circular knife 164 is raised or lowered, respectively, relative to the conveyor roll 125c. With this construction, as will be hereinafter more fully realized, the depth of the groove formed in the board section X may hence be selectively regulated.

As will be seen in FIGS. 5 and 6, a pair of substantially L-shaped guide elements 175, rigidly fastened to the front face of the plate member 169 and in spaced relation to each other, extend downwardly from the latter member, and over and rearwardly of the conveyor roll 125c, one of said elements preferably being disposed directly beneath the scoring circular knife 164. Said latter mentioned element is provided with a longitudinally extending slot at 176 to permit the aforesaid circular knife to be projected therethrough to thus enable the same to score the board section X as it transgresses underneath. Each of said guide elements 175 is preferably constructed of a spring-like material and the bottom leg thereof as identified at 175a is disposed closely adjacent the surface of the conveyor roll 125c such that it engages the upper face of the board section X and thereby holds the latter in its proper position during the scoring operation, as will be hereinafter more fully explained.

Disposed along on each side of the rail members 115 is a guide plate 177a which is positioned to provide a guiding surface for either of the longitudinal edges of the board section X to thus enable the same to be positioned in the scoring run S_1 such that the narrow groove formed in said board in properly located.

The instant scoring run S_1 also includes a conveyor roll 125d mounted on the framework rail members 115 by bearing members 177 in substantially the same manner as is the aforementioned conveyor roll 125. A set of wheels are also seen in FIG. 3 to be pivotally attached to the shaft 160 and biased toward the aforesaid conveyor roll 125d. As said wheels and associated mounting structure therefor are each identical to wheels 144 and the structure associated therewith, the same reference numerals have been used in the present instance merely for purposes of brevity.

Spaced longitudinally along the supporting framework for the scoring run S_1, and rearwardly of the conveyor roll 125d, is additional conveying means which are also effective to carry the board section X through the scoring run S_1.

For this purpose, a shaft 179 is rotatably supported at its ends in suitable bearing mounts 180, the latter being rigidly mounted on the framework rail member 115 in such manner that the aforesaid shaft 179 extends thereacross substantially perpendicularly to said rail members.

A plurality of cylindrical rolls 181, 182 and 183, are mounted on said shaft 179 being preferably fixedly attached thereto, in spaced relation to each other, by any suitable fastening means. As best seen in FIG. 3 each of said rolls preferably has a substantially smooth outer surface. A group of wheels 184 is pivotally mounted on the aforesaid scoring run framework so as to press the board section firmly against the aforesaid conveyor rolls 181–183, and to accomplish this a shaft 185 is suspended above the rail members 115 by a pair of upright plates 186, the latter being spaced closely adjacent to and positioned forwardly on said framework relative to the bearing mountings for the shaft 179. Each of said wheels 184 is rotatably carried on the free end of one of a plurality of arm members 187, the opposite end of each of said arm members being, in turn, rigidly attached to a sleeve member 188. Said sleeve members are rotatably carried on the aforesaid shaft 185. A coil spring 189, placed over each of said sleeve members 188 has its one end suitably anchored to a bushing 188a mounted on said shaft adjacent each of said sleeve members and suitably pinned thereto as indicated at 188b. The opposite end of said spring is likewise anchored to the arm member 187 associated with said adjacent sleeve member such that the wheel 184 carried therewith is biased toward the cylindrical roll located directly below on the shaft 179, much in the same manner as is the previously described biasing wheels 135.

As the board section X passes between the wheels 184 and the cylindrical rolls 181–183, the said wheels are moved upwardly as viewed in FIG. 5, such as to pivot the arm members 187, connected thereto and thereby rotate sleeve members 188 attached to the latter in a counterclockwise direction about the supporting shaft 185. In the instant machine structure, this rotational movement of the aforesaid sleeve members is utilized to actuate a counter mechanism which is effective to register the total number of board sections X processed by the scoring run S_1.

To accomplish this, a lever 190 is rigidly attached to the central sleeve member 188 in such manner as to extend upwardly and forwardly of the mounting plates 186 for the shaft 185. A ratchet pawl 192 is pivotally attached at its one end to the opposite end of lever 190 and thence similarly attached to the trigger arm 193 of a conventional mechanical counter device 194 preferably mounted on a strap member 194a rigidly attached to the adjacent bushing 188a.

As the central sleeve member 188 is rotated, the lever 190 hence swings in a counterclockwise direction, as seen in FIG. 5, in such manner as to actuate the counter device 194. As will be understood by one skilled in the art, for each actuation of the trigger arm 193, the numerical total registered by the counter device 194 is increased by one, whereby said device is thus capable of accurately totalizing the number of board sections X processed by the aforesaid scoring run S_1.

The bottom scoring run S_2 of the double deck scoring mechanism is operative in a manner identical to that of the aforesaid run S_1 to also provide a narrow groove in the board section Y, said scoring run S_2 however differing somewhat in structure from the scoring run S_1 as will now be described in detail.

As best seen in FIG. 5, the scoring run S_2 in the instant machine embodiment utilizes a plurality of conveyor rolls 198, 198a, 198b and 198c, which are preferably identical to the conveyor roll 125 in the previously described scoring run S_1, and which are spaced longitudinally along the rails 110 of the supporting framework, being rotatably mounted thereon by means of suitable bearing mounts 199, said rolls extending transversely therebetween.

Said scoring run S_2 also includes means for pressing the board section Y into positive engagement with each of the aforesaid conveyor rolls to thus assure that said section is continuously passed therethrough.

For this purpose, said means includes a set of wheels 201, preferably three in number, which are each rotatably mounted on one end of an arm member 202, each of said arm members, in turn, being rigidly attached at the opposite end thereof to a sleeve member 203. As best seen in FIG. 5, each of the sleeve members 203 is carried on a shaft 205 which shaft, in turn, is journalled at its ends to the aforementioned vertical support bars 112 preferably above the adjacent conveyor roll 198. Each of said wheels is biased by means of a coil spring toward the conveyor roll 198 in identically the same manner as is coil spring 142 which operates in conjunction with wheel elements 135 in the scoring run S_1 to bias said latter elements toward conveyor roll 125.

In like manner, additional sets of wheels identified by the reference numerals 208, 209, and 210 are each likewise supported from arm members 211, 212 and 213, respectively, longitudinally along the scoring run S_2 and adapted to be biased toward wheel elements 198a, 198b and 198c to thus press the board section Y into positive engagement with the latter as it is passed thereby through said run S_2.

As seen in FIG. 5, arm members 211 are pivotally mounted between the aforementioned vertical supporting plates 117, extending rearwardly therefrom longitudinally

of the scoring run, whereas, arm members **212** are pivotally supported between framework members **118** so as to extend forwardly of the same longitudinally along the scoring run S_2. Arm members **213**, are also pivotally supported between framework members **118** in such manner as to project rearwardly, longitudinally along said scoring run.

The scoring means used in the instant scoring run S_2 is operative in substantially the same manner as the scoring means utilized in the previously described run S_1, except that in the instant structure, the scoring device, i.e., the circular knife as is indicated at **215**, is suspended below the plane transgressed by the board section Y so as to form a narrow groove in the underside face of said section.

More particularly, as is best seen in FIGS. 5 and 6, the circular knife **215** is mounted on a shaft **216**, said shaft being rotatably supported between a pair of arm members **217** extending longitudinally along the rails **110** within the supporting framework preferably in closely spaced relation, and pivotally mounted at their one end on a shaft **218**. Said shaft **218**, as seen in FIG. 5 is rotatably supported at its ends between said rail members **110** such that the aforesaid arm members **217** extend forwardly thereof longitudinally along the scoring run and toward the conveyor roll **198***b*.

The opposite ends of the arm members **217** are preferably attached to each other by means of a suitable cross bar, as indicated at **219** in FIG. 6, to thereby lend additional rigidity to the knife supporting structure while permitting the same to be adjustably raised and/or lowered within the supporting framework to thus preselect the depth of groove it will then form with board section Y. For this purpose, suitable adjustment means such as rod member **220** may be attached to one of the arm members **217**, preferably at its free end remote from the shaft **218**, and which extends downwardly therefrom to project through an aperture **221** formed in bracket plate **223**, the latter being rigidly attached to said framework by welding or the like. Suitable adjustment means, such as nut **224** threadably disposed on the protruding end of said rod member **220** may hence be threaded over the latter and thereby pivotally move said arm members **217** in a corresponding upward or downward direction to thus position the cutting periphery of the knife **215** at a predetermined plane relative to the plane through which the underside surface of the board section Y will transgress. In this manner, the depth of groove formed by said circular blade **215** may hence be selected as desired by the operator.

As the board section Y passes between the conveyor roll **198***b* and biasing wheels **209** it emerges rearwardly of the same and slides over a plurality of supporting rails **225**, as is best seen in FIGS. 5 and 6, said rails extending longitudinally along through the supporting framework, being disposed preferably in parallel spaced relation transversely of said framework. Said rails **225**, in addition, are preferably of such length as to extend between the conveyor rolls **198***b* and **198***c*, pass the circular knife **215** and supporting structure for the latter, being, in turn, suitably attached to the framework such that the top surface of each rail lies in substantially the same horizontal plane as that plane through which passes the undersurface of the said board section Y. With this construction, the board section Y is supported throughout its width as it is passed over the circular knife **215** whereby it is then scored.

Means are also provided in the instant structure to assure that the board section Y lies firmly against the rails **225** so that the scoring groove formed therein is substantially the same depth through the length of said board section.

For this purpose a pair of rollers **227**, is rotatably individually mounted on the depending leg of a pair of inverted L-shaped brackets **228**, each of said brackets in turn, being suitably rigidly attached to the underside of a cross bar **224***a*, being disposed thereon in transverse spaced relation one to the other across said bar. As best seen in FIG. 6, the depending bracket leg is centrally provided with an elongated slot **229** through which extends the mounting structure for said roller. With this construction, said mounting structure may be adjustably vertically positioned within said slot as to locate the periphery af the roller **227** in predetermined spaced relationship above the rails **225**. In this manner, the rollers **227** may thus be positioned so as to engage the top surface of a board section Y of preselected thickness, and thereby press the same firmly against the rails **225** while said board section is being scored.

After the board section Y is thus scored, it passes between the conveyor roll **198***c* and associated biasing wheels **210** and is hence moved thereby rearwardly through the scoring run S_2.

The instant scoring run S_2 also includes guide plates **225***a* which are disposed on each side of the rail members **110** and thus positioned to properly guide the board section Y through the scoring run S_2.

Adjacent the rearward end of said scoring run, there is provided additional conveying means now to be described which are capable of passing the aforesaid board section Y onto a transfer conveyor mechanism, the latter of which will be described in detail.

As is best seen in FIG. 5, this is accomplished by means of a cylindrical roll structure preferably identical to that located at the rearward end of the scoring run S_1 previously described and which is identified in its entirety in the present instance by the reference numeral **231**. Said structure is rotatably supported between suitable bearing mounts **232** mounted on the rearward extremity of the rails **110**. A plurality of biasing wheels **233**, preferably identical to the previously described wheels **184** associated with the cylindrical rolls **181–183**, are each likewise rotatably supported on one end of a cantilever arm, **234**, the latter, in turn, being pivotally mounted in transverse spaced relation on a shaft **235** journalled on the upper end of opposed vertically upwardly extending plates **236**. Suitable spring means (not herein shown), similar to coil springs **189** utilized with biasing wheels **184**, may also be used in the present construction to bias the wheels **233** toward the aforementioned conveyor roll structure **231** suspended vertically therebelow.

With reference now directed particularly to FIGS. 3 and 4, the scoring means and conveying means for the scoring runs S_1 and S_2 as just described, are seen to be preferably power driven from a common power source in a manner as will now be described in detail. The machine embodiment, as herein shown, is provided with a suitable electric motor **240** which is rigidly mounted on the supporting framework, its drive shaft **241** mounting in turn, a drive sheave **242**. Said motor may be connected into a suitable electrical power source and controlled by any conventional switch means, not herein specifically shown, as will be well understood. Above said electric motor, a suitable conventional gear reduction unit **243** is mounted on said supporting framework, its input shaft, as indicated at **244**, mounting a pulley **245**. A suitable endless belt **246** is passed around thte motor sheave **242** and the pulley **245**, the latter being thereby directly driven from said electric motor.

The output shaft **247** of the aforesaid gear reduction unit **243** projects transversely across the supporting framework and is rotatably mounted adjacent ts remote end in a suitable bearing mounting **248** as best seen in FIG. 4, said mounting being rigidly attached to the aforementioned vertically disposed bar **118**. The remote end of said output shaft mounts a sprocket wheel as is indicated at **249**. The power delivered to the output shaft **247** of said gear unit is utilized preferably through means of a sprocket and chain drive means now to be described to actuate each of the above defined elements in each of the aforesaid scoring runs S_1 and S_2.

To accomplish this, and referring now particularly to FIG. 4, each of the conveyor rolls 125, 125*a*–125*d* and shaft 179 in the scoring run S_1 mounts a sprocket wheel, each being identified in sequential order respectively, by the reference numerals 250, 250*a*–250*d* and 250*e*, each being disposed on the same side of the supporting framework as the aforementioned drive sprocket wheel 249.

In like manner, a pair of idler sprockets 251 is rotatably mounted on the inclined part 115*b* and rearward part 115*a* of the aforementioned supporting framework rails 115 in preselected longitudinal spaced relation one to the other.

A drive sprocket 252 is likewise mounted on the adjacent end of the shaft 157 supporting the aforesaid circular knife 164, the latter of which defines the scoring means for forming the narrow groove in the board section X.

The scoring run S_2 is also provided with suitable sprocket means capable of transmitting the power delivered to the previously mentioned drive sprocket wheel 249. For this purpose, each of the conveyor rolls 198, 198*a*–198*c* and 231 mounts a sprocket wheel, each being also identified in sequential order respectively by the reference numerals 254, 254*a*–254*c* and 255, which are each disposed, in addition, on the same side of the machine framework as is the aforementioned sprocket means for the scoring run S_1. An idler sprocket wheel 256, is also seen to be rotatably supported on the uppermost end of vertical brace member 257, located above and in between the sprocket wheels 254*a* and 254*b*.

An endless link chain as identified at 260 is passed around each of the above mentioned sprocket wheels, as is seen in FIG. 4, in such manner that a clockwise rotation of the drive sprocket wheel 249 will cause said chain to move from right to left alongside the upper scoring run S_1 and from left to right along the lower scoring run S_2. In this manner, the conveyor rolls 125, 125*a*–125*d* and shaft 179 in the scoring run S_1 are each rotatably driven in a counterclockwise direction so as to carry the board section X longitudinally through said scoring run S_1 from left to right as viewed in FIGS. 3 and 4.

As is also seen, particularly in FIG. 4, the sprocket wheel 252 is mounted on the shaft 157, and is rotatably driven in a counterclockwise direction, such as to rotate the circular knife 164 carried by said shaft also in a counterclockwise direction. With this particular direction of rotation given the aforesaid circular knife 164, it is seen that the latter sweeps into the board section X as said section is passed longitudinally therealong.

As will now be further realized, the conveyor rolls 198, 198*a*–198*c* and 231 of scoring run S_2 are also each rotatably driven in a counterclockwise direction as seen in FIG. 4, in such manner as to carry the board section Y longitudinally along said scoring run S_2 from left to right through the aforementioned supporting framework.

With reference now directed to FIGS. 4–6, the circular knife 215, utilized in scoring run S_2 in the present machine embodiment to score the underside face of the aforesaid board section Y, is also power driven simultaneously from the primary electrical source, namely motor 240, and for this purpose, the output shaft 247 of the gear reduction unit 243, mounts a suitable sprocket wheel 265. The previously described shaft 218 supporting the arm members 217 also mounts a sprocket 266 preferably directly below said sprocket wheel 265. An endless link chain 267 is passed around the aforesaid sprocket wheel 265 and the sprocket 266 such that the shaft 218 is rotatably driven directly from the aforementioned gear reduction unit 243.

To transfer the rotatable actuation of the shaft 218 to the circular knife 215, the shaft 216 has a sprocket wheel 267*a* mounted thereon preferably intermediate the aforesaid arm members 217. In like manner, the shaft 218 has a sprocket 268 mounted thereon preferably intermediate its ends so as to be disposed longitudinally rearwardly of said sprocket wheel 267*a*. An endless link chain 269 is extended around the sprocket wheels 267*a* and 268 so as to linkably connect the same together. With this construction, it will now be seen that with the output shaft 247 and sprocket wheel 265 mounted thereon being rotatably driven in a counterclockwise direction, as viewed in FIG. 5, the shaft 218 and hence the circular knife 215 mounted thereon will also be rotatably driven in a counterclockwise direction. As will be further realized, the aforesaid circular knife 215, being driven in this direction, is therefore swept into the under face of the board Y in a direction opposite to the movement of said board section as the latter is conveyed longitudinally through the scoring run S_2.

The previously described counter device 194 of the aforementioned counter mechanism is also intended to be driven from the aforesaid electric motor 240 simultaneously with the actuation of the scoring runs S_1 and S_2.

For this purpose, the conveyor roll 125*d* rigidly mounts a transfer sprocket 271 as best seen in FIG. 4, over which is extended an endless link chain 272. Said chain is also passed around sprocket wheel 250*e* mounted on shaft 179 in scoring run S_1 and likewise around sprocket wheel 255 mounted on the conveyor roll structure 231 carried at the rearward end of the scoring run S_2. With the conveyor roll 125*d* being rotatably movable in a counterclockwise direction, as viewed in FIG. 4, the link chain 272 is likewise carried in a counterclockwise direction of travel to thus rotate the shaft 179 and conveyor roll structure 231 in the proper direction. And, as previously described, with the board section X passing through the scoring run S_1, its leading transverse edge will strike the biasing wheels 184 sufficiently to pivot the arm members 187 connected thereto upwardly, as viewed in FIG. 5, so as to effect the actuation of the mechanical counter 194 in the same manner as previously explained to thus indicate the simultaneous fabrication and the passage of a board section X and/or Y through the respective scoring runs S_1 and S_2.

In order to maintain proper tension on the endless link chain 260, a sprocket wheel 273 is rotatably carried on the end of arm member 274, the latter being fixedly attached to the vertically disposed brace member 218 by means of a suitable fastener 275.

The endless link chain 260, as seen in FIG. 4, is passed around said sprocket wheel 273 as it passes between the scoring runs S_1 and S_2. With this construction, the sprocket wheel 273 may be raised or lowered by swinging the same about its fixed end to thus properly regulate the tension on the link chain 260.

As previously mentioned the instant fabricating machine also includes conveying means which are operable to receive the fabricated board sections X and Y from their respective scoring runs S_1 and S_2 and thereafter transfer said sections to suitable dispensing stations whereat the same are dispensed to other mechanism in preparation to forming a completely fabricated shake panel.

For this purpose, and with particular reference now directed to FIGS. 2 and 9, the present machine embodiment includes a double-deck conveyor frame indicated in its entirety by the reference numeral 278, and which extends transversely outwardly from the rearward end of the supporting framework for the scoring runs S_1 and S_2.

Said conveyor frame comprises pairs of rail members 279 and 280 supported in parallel spaced relation by means of a plurality of tie bars 281, extending transversely across and underneath each of said members and rigidly fastened thereto by means of welding or the like as seen particularly in FIG. 9. Said rail members 279 and 280 are disposed and rigidly supported in upper and lower vertically spaced horizontal planes by means of leg members 282 securely fastened by any suitable means to the ends of the tie bars 281. Said leg members, in turn, are preferably of such length as to locate the upper pair of rail members 279 in a horizontal plane raised from

the working floor and which is somewhat below the plane through which the board section X transgresses as it travels longitudinally through the scoring run S_1 and in like manner so as to locate the lower pair of rail members 280 in a horizontal plane that is somewhat below the plane through which the board section Y transgresses as it likewise passes through the scoring S_2, the purpose for which will be hereinafter apparent.

As best seen in FIG. 2, the instant form of transfer conveyor frame 278 is provided with a buffer member as indicated at 282*a*, in the form of an upright cylinder which is rotatably mounted at the input end of said frame preferably directly opposite the discharge end of the aforesaid scoring mechanism. With this construction, the board sections X and Y strike said buffer member as they are discharged from the scoring mechanism and are thereby properly positioned on the transfer conveyor for their subsequent disposition.

Mounted securely to the top face of each of said rail members is an elongated channel member 283 which is adapted to slidably accommodate individual endless link chains identified as at 284, which are effective in a manner as will now be explained to carry the board sections X and Y to the aforementioned dispensing station indicated generally in its present form by the reference character D.

As best seen in FIG. 9, a shaft 285 is rotatably supported between the aforesaid upper pair of rail members 279, preferably at the ends thereof defining the inlet end of the instant conveyor frame 278, or that end juxtaposed the supporting framework for the scoring runs S_1 and S_2. A pair of sprockets 286, only one of which is shown, is mounted on said shaft 285, being spaced thereon as to locate one of said sprockets in substantial longitudinal alignment with each one of the aforementioned channel members 283 carried by the aforesaid rail members 279.

At the opposite end of the upper pair of rail members 279, or at that end of the conveyor frame 278 defining the discharge end of the same, a shaft as identified at 287, is journalled at its ends within suitable bearing mounts 288, the latter preferably being rigidly attached to the adjacent leg members 282 for said frame. The shaft 287 rigidly mounts a pair of sprockets 289, the latter, in addition, being spaced therealong in such manner as to locate each of said sprockets in longitudinal alignment with one of the aforesaid channel members 283, at the end thereof opposite the sprockets 286. In this manner one sprocket of each pair of sprockets 286 and 289, is disposed on opposite ends of each of the channel members 283, being substantially located in longitudinal alignment to the latter and hence to each other.

With this structure, one of the aforementioned endless link chains 284 is extended around each of the aligned pairs of said sprockets, such that its upper run is partially disposed within the channel member 283 located therebetween and moves longitudinally therethrough from right to left as viewed in FIG. 9 as it is actuated by means to be presently described.

In like manner, the lower pair of rail members 280 rotatably supports a shaft 291 at the input end of the conveyor frame 278 and a shaft member 292 at the discharge end of said frame. The shaft 291 carries a pair of sprocket wheels 293, each of which is disposed in longitudinal alignment relative to the adjacent end of the channel members 283 on said lower rail members 280, and in like manner, the shaft 292 also carries a pair of sprocket wheels (not shown) each of which is likewise disposed in longitudinal alignment with respect to the aforesaid rail members 280 adjacent the opposite end thereof.

One of the aforementioned endless link chains 284 is extended around each of the sprocket wheels located adjacent each of said lower rail members 280 in such manner that its upper run is also partially disposed within the channel member 283 extending therebetween.

As is best seen in FIG. 9, the upper run of each of the endless link chains 284 protrudes upwardly above the supporting channel members 283 such that the board sections X and Y, as they are discharged from the scoring runs S_1 and S_2, respectively, are each supported on said upper runs and conveyed thereby to the dispensing station D.

As will be further realized upon reference to FIG. 9, the upper and lower rail members 280 at the input end of the conveyor frame 278, are preferably slightly upwardly inclined such that as the board sections X and Y fall thereon, the weight of the same will tend to initiate their movement toward the right and thereby aid in their transfer to the discharge end of said frame.

The endless link chains 284 on the upper and lower rail members 283 are intended to be power driven and for this purpose an electric motor, as indicated at 295, is mounted in the lowermost part of the conveyor frame 278, and has a drive pulley 296 mounted on its drive shaft 297. Said motor is preferably connected in circuit with an electric switch 328 of the aforementioned counter mechanism on the rear end of the scoring run S_1, said motor being periodically connected in circuit through said switch to a suitable source of electrical power to thus periodically drive the aforesaid endless link chains 284 in a manner as will hereinafter be fully described. A conventional gear drive unit 298 rigidly attached to the side of said conveyor frame at its discharge end is provided with an input shaft 299 which mounts a drive sheave 301. An endless belt 302 is passed around said drive pulley and sheave whereby the aforesaid gear housing is directly actuated from said electric motor.

The gear drive unit 298 is also provided with an output shaft (not shown) upon which is mounted a drive sprocket 303. The aforementioned shaft 287 mounted adjacent the discharge end of the upper rail members 283 also rigidly mounts a sprocket member as is identified by the reference numeral 304. An endless link chain 305 passed around the sprockets 303 and 304 rotatably drives the shaft 287 and hence the endless link chains 284 for the upper rails 280.

The aforesaid output shaft of the gear drive unit also has a drive sprocket 306 mounted thereon which, through means of endless link chain 307 linkably connected therewith and a similar sprocket (not shown) mounted on shaft 291, rotatably actuates the latter and hence endless link chains for the lower rails 280. With this conveyor construction, the board sections X and Y are thus transferred from the discharge end of the scoring runs S_1 and S_2 respectively to the aforementioned dispensing station D.

In the embodiment of fabricating machine herein shown, the preferred construction for the dispensing station D includes upper and lower sets of conveyor rolls 308 and 309, respectively, each of which is rotatably supported in a suitable framework, a part of which is indicated in FIG. 9, by the reference numeral 310. Said rolls are seen to be supported in said framework adjacent the discharge end of the transfer conveyor 278, in substantial parallel spaced relation to each other, and to thus extend transversely of said conveyor, being likewise in longitudinal prolongation relative to the rail members 280 thereof.

The conveyor rolls 308 and 309 located directly opposite the discharge end of the transfer conveyor 278 are preferably spaced slightly below the upper and lower rail members 280 respectively of the aforesaid conveyor to thus be in position to readily receive the board sections X and Y. In addition, said conveyor rolls 308 and 309 are preferably disposed in slightly downwardly inclined planes from said discharge end of the transfer conveyor 278 whereby the weight of the aforementioned board sections X and Y thus assist in their being moved therealong.

The transfer conveyor 278 also includes secondary conveying means which are operable to carry the board sections X and Y substantially completely clear of the

upper and lower pairs of endless link chains 284 to thus permit their continuous operation and to deposit said board sections on the aforementioned sets of conveyor rolls 308 and 309.

For this purpose, the instant form of secondary conveying means includes upper and lower pairs of endless link chains 313 and 314, each pair of which is carried on opposed pairs of upper and lower sprocket wheels 315 and 316, respectively. One of the sprocket wheels 315 in each upper pair is seen to be mounted on a shaft 317 rotatably journalled to the aforesaid transfer conveyor upper rail members 279 intermediate the ends thereof. The remaining sprocket wheel 315 in each of said upper pair is rotatably supported on the projecting end of an extension rail 318 rigidly attached to the tie bar 281 at the discharge end of the transfer conveyor, preferably closely adjacent and parallel to the upper rail members 279 of the latter. The shaft 317 is connected to a conventional gear drive unit 317*a*, the latter of which is power driven by means of a sprocket and chain connection (not shown) between the aforesaid shaft 317 and the output shaft for the gear drive unit 298.

In like manner, one of the sprocket wheels 316 in each lower pair is seen to be mounted on a shaft 320 closely adjacent the lower pair of rail members 280 in said transfer conveyor whereas the remaining sprocket wheel in each of said lower pairs is rotatably attached to an extension rail (not shown) which is preferably identical to extension rail 318.

As seen particularly in FIG. 9, each of said extension rails 318 in the upper and lower secondary conveying means projects beyond the discharge end of the transfer conveyor 278 and in between the conveyor rolls 308 and 309 of the dispensing station D.

With this preferred construction it is hence realized that as the board sections X and Y leave the endless link chains 284 of the transfer conveyor, they rest upon and are thereafter carried by the endless link chains 313 of the secondary conveying means onto the aforesaid conveyor rolls 308 and 309. In this manner, therefore, said board sections are carried completely clear of the aforementioned link chains 284 of the transfer conveyor and thereby do not prevent the operation of the same.

The transfer conveyor and associated secondary conveyor are preferably operated intermittently such that during each "off" period for the same, the board sections X and Y discharged from the scoring run S_1 and S_2, respectively, form separate stacks or piles as indicated at P_1 and P_2. After a predetermined number of board sections X and Y are thus stacked in said piles, the aforesaid conveyors are operated to move the same toward the dispensing station D. After a predetermined number of periodic actuations of the said conveyors, the stacks P_1 and P_2 are thus carried to the discharge end of said transfer conveyor and thence discharged into the dispensing station D as previously described.

For this purpose, the instant embodiment of transfer and secondary conveyors are preferably operated each time a predetermined number of board sections X and Y have been deposited on said transfer conveyor to comprise the stacks P_1 and P_2, respectively. Merely for purposes of disclosure, it will be assumed herein that the number of board sections comprising each of said stacks will be twenty-two; it being clearly understood that the number thereof may be changed at will, as will be hereinafter realized.

Referring now to FIGS. 10 and 11, the previously mentioned counter mechanism, described hereinabove as having a mechanical counter device 194 actuated each time a board section X is processed by the scoring run S_1, also includes a conventional single pole single-throw electrical switch 328 which is suitably attached to strap 194*a* and connected in series circuit between an electrical power source (not shown) and the aforesaid transfer conveyor motor 295. Said switch is mounted on said strap preferably closely adjacent the previously described counter device 194.

A ratchet wheel 324 is rotatably mounted on the aforesaid strap 194*a* and carries a cam element 325 on its free end. Said ratchet wheel has, in its present form, twenty-three teeth formed on its periphery defining twenty-three grooves therebetween.

The aforementioned ratchet pawl 192, as best seen in FIG. 11, is provided with a driving end 192*a* which, in turn, is adapted to be in meshing engagement with the ratchet wheel 324.

A stop pawl 326 is also carried on the lever 190 and has its free end in meshing engagement with the aforesaid ratchet wheel 324. A spring element 327 connected at its ends between the ratchet pawl 192 and stop pawl 326 is effective to bias each of said pawl members into engagement with said ratchet wheel.

The cam element 325 is seen to have a cam lobe 328*a* formed integrally therewith.

The aforesaid switch 328 has an operating lever 329 which rotatably carries a cam follower wheel 330 on its free end, said lever being resiliently biased by suitable spring means (not shown) to press said follower wheel firmly against the surface of said cam element.

With this construction, it will now be realized that as the board section X passes through the scoring run S_1, the lever 190 is pivoted counterclockwise as previously mentioned, and as is also best seen in FIG. 5. The ratchet pawl 192 is also carried with the lever 190, and is effective to rotate the ratchet wheel 324 in a counterclockwise direction. The ratchet wheel 324 is thus advanced one tooth per each actuation of the lever 190 by a board section X. Said lever actuation, as previously described, likewise operates the mechanical counter device 194 to thus record the processing of another board section X.

As best seen in FIG. 10, the cam element 325, affixed to the ratchet wheel 324, is also rotated with said wheel. The cam element therefore is carried through one complete revolution per each revolution of the aforesaid ratchet wheel 324.

As previously mentioned, the cam element 325 has a cam lobe 328*a* formed integrally therewith, which preferably has a dimensional magnitude circumferentially of said cam element, that is approximately equal to the distance through which any one point on the circumferential surface on said lobe is carried in one actuation of the aforesaid ratchet wheel. The purpose for this preferred construction is as follows.

As previously mentioned, it is intended that the motor 295 for the transfer and secondary conveyors be actuated when the stacks P_1 and P_2 have twenty-two board sections X and Y, respectively, deposited therein.

To accomplish this, and assuming that the stacks P_1 and P_2 are thus complete, it is intended that the cam element has thus been rotated so as to locate the leading end of the cam lobe 328*a* closely adjacent the follower wheel 330 on switch operating lever 329.

With the next succeeding board section X pivoting the lever 190, the cam lobe 328*a* is carried under the aforesaid lever 329, so as to operate switch 328 to its closed position effective to connect the motor 295 in circuit with the aforementioned electrical power source. Said switch remains actuated in its closed position until the lever 190 is again pivoted by the passing of another board section X at which time, the cam lobe 328*a* is carried past the switch lever 329 whereby the latter then moves to engage its follower wheel 330 with the surface of the remaining part of said cam element. As a result, the switch 328 is actuated to its open position and the motor 295 is hence disconnected from the aforesaid power source.

During this interval, the stacks P_1 and P_2 are moved toward the dispensing station D to thus clear the receiving end of each of the upper and lower conveyors of

the aforesaid transfer conveyor whereby another stock of board sections may be deposited thereon.

Having thus described a preferred embodiment of the fabricating machine of the present invention, it is realized that the same is susceptible to various modifications and arrangements of parts without departing from the inventive concepts as are described herein and defined in the appended claims.

What is claimed is:

1. In a machine of the class described, a frame, bin means for supporting a plurality of sheets of fibrous material on said frame, means forming conveyor means and including pneumatically actuatable feeding means for sequentially feeding said sheets of material longitudinally along said frame, fabricating means supported on said frame in position to intercept and fabricate a sheet of material as the same is carried through said frame, at least one of said fabricating means including an endless bandlike knife having a horizontal cutting run positioned for splitting said sheet of material into two board sections of equal thickness, said conveyor means having upper and lower conveying runs for moving each of said board sections through said frame, and said fabricating means including knife means adjacent each of said conveying runs to simultaneously form a continuous groove in each of said board sections longitudinally along the same closely adjacent its one edge.

2. In a machine as defined in claim 1 and wherein the feeding means includes reciprocating means for sequentially feeding the bottommost sheet of material from said bin means and longitudinally along said frame.

3. In a machine of the class described, a frame, means forming conveyor means on said frame, fabricating means on said frame in position to intercept and fabricate a sheet of material carried through said frame by said conveyor means, gate means on said frame and positioned to receive said sheet of material, at least one of said fabricating means including an endless band-like knife having a horizontal cutting run movably disposed in said gate means for splitting said sheet of material into two board sections of predetermined thickness, said conveyor means having upper and lower conveying runs for moving each of said board sections through said frame, and another of said fabricating means including circular knife means operable to simultaneously form a continuous groove in at least one of each of said board sections longitudinally along the latter closely adjacent one edge.

4. In a machine as defined in claim 3 and wherein the gate means is adjustable to position the cutting run of said band knife in predetermined relation with said sheet of material to thus split the latter into two board sections of tapered transverse thickness.

5. In a machine of the class described, a supporting frame, means forming conveyor means on said frame, fabricating means on said frame in position to intercept and fabricate a sheet of material carried through said frame by said conveyor means, gate means on said frame in position to receive said sheet of material, at least one of said fabricating means including an endless band-like knife having a horizontal cutting run movably disposed in said gate means for splitting said sheet of material into two board sections of predetermined thickness, said conveyor means including a pair of scoring runs each having a transfer conveyor operable to receive one of said board sections from said band knife and transfer the same through said frame and another of said fabricating means including circular knife means in each of said scoring runs and in position to intercept and form a continuous groove in the board section conveyed thereby adjacent its one longitudinal edge.

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