

March 18, 1952

A. T. DILDILIAN ET AL
APPARATUS FOR CONTINUOUS SEAMING
OF PILE FLOOR COVERINGS

2,589,929

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2 SHEETS—SHEET 1

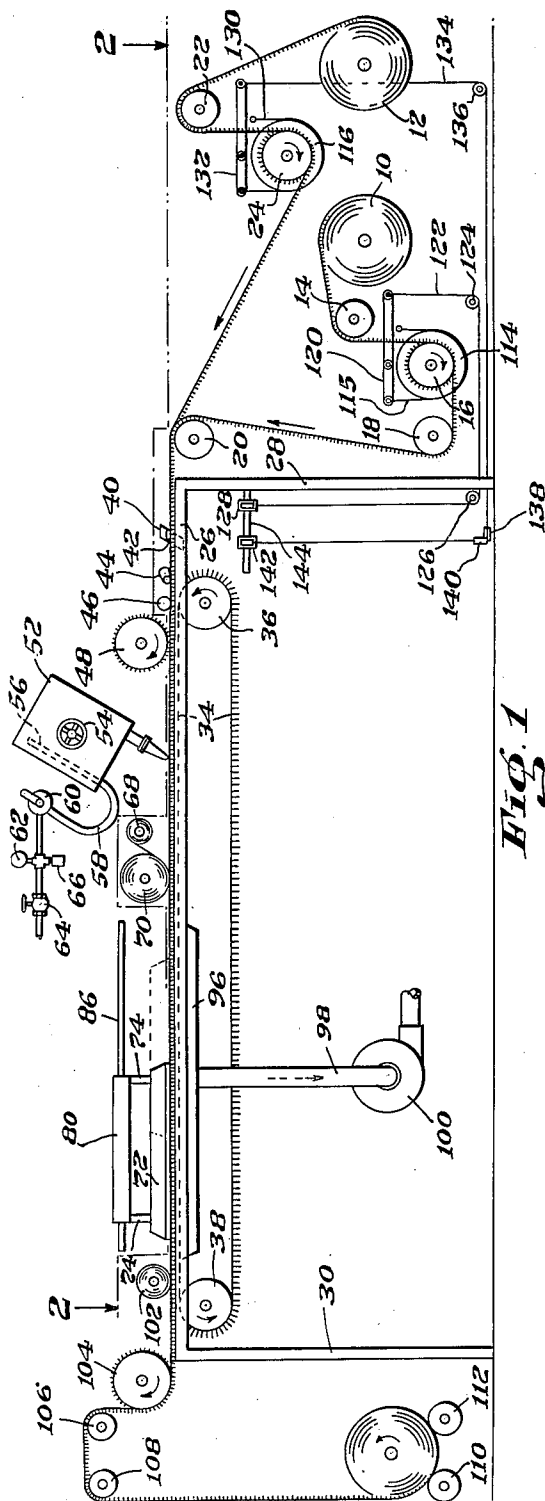


Fig. 1

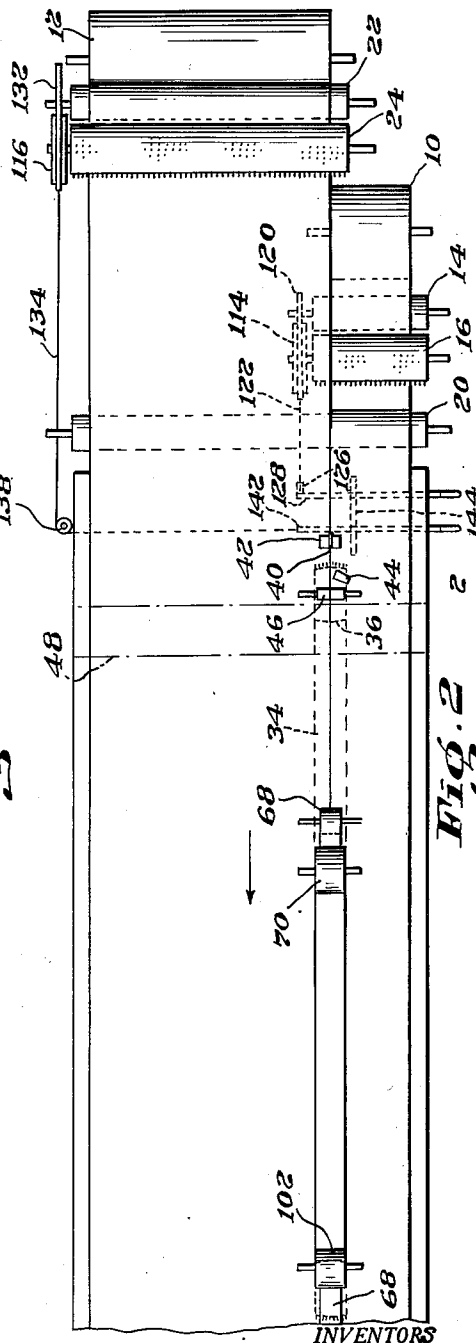


Fig. 2

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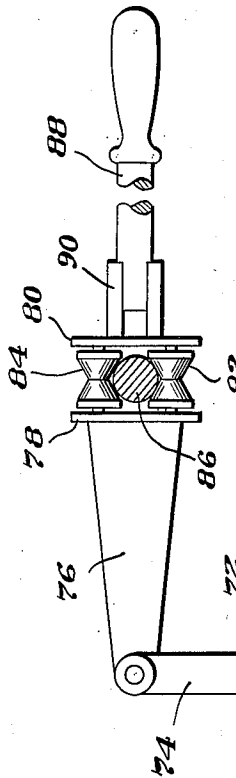
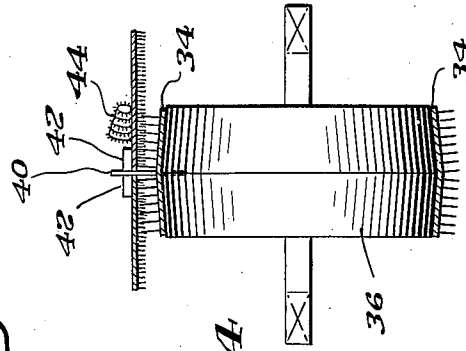
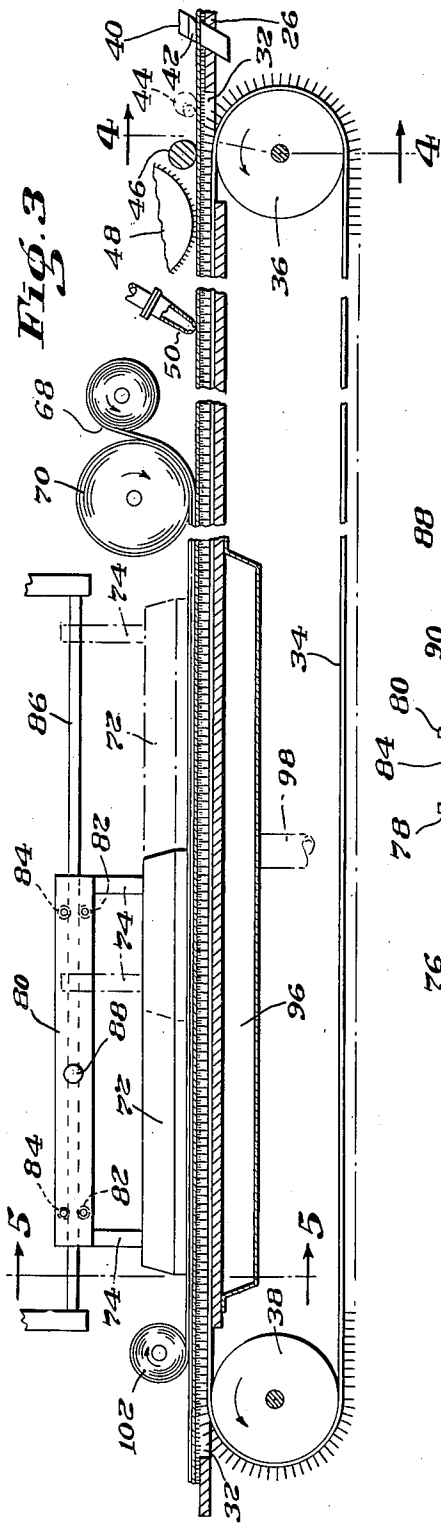


Fig. 4

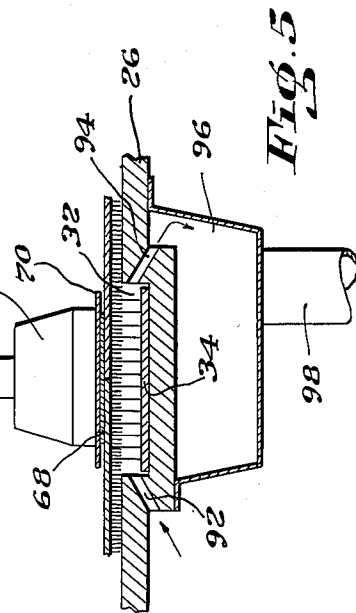


Fig. 5

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APPARATUS FOR CONTINUOUS SEAMING OF
PILE FLOOR COVERINGS

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6 Claims. (Cl. 154—42.3)

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This invention relates to seaming of pile floor coverings and in particular to a continuous means and method of automatically joining two pieces of pile floor covering on the side opposite to the pile face thereof along the seam formed by the abutting edges of said pieces.

Heretofore, the seaming of pile floor coverings has been done by hand. The pieces to be joined are usually spread on a floor or similar flat expanse, pile face down. The edges are matched and then tacked to the floor to hold them firmly against one another while adhesive, tape, heat and pressure are applied to the seam which is then allowed to set. Subsequently the joined fabric is removed from the floor.

One object of this invention is to eliminate or minimize manual operation in seaming pile floor coverings.

Another object is to lay two pieces of said covering so that their abutting edges are continuously and automatically matched and held firmly together during the seaming operation.

A further object is to continuously and automatically apply the adhesive, tape and heating device to the seam of the two pieces of floor covering.

A still further object is to automatically provide enough, but a minimum amount, of time to allow the seam to set.

A further object is to remove the finished product continuously from the seaming mechanism.

Another object is to join two pieces of pile floor covering together by seaming faster, more accurately and more economically than heretofore.

A feature of this invention is an endless spiked conveyor-belt adapted to uniformly travel with and hold in alignment and abutment two pieces of pile floor covering, pile face down and their adjacent edges abutting one another, to and past various seaming mechanisms hereinafter described. The belt also permits pressure on the backs of the pieces without crushing the pile and allows solvent and water vapors in the pieces to be exhausted through the pile face without injurious effects, such as pile discoloration.

Other objects and features will appear from the following description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a side view of the apparatus of this invention,

Fig. 2 is a plan view on line 2—2 of Fig. 1,

Fig. 3 is a detailed side view of part of the apparatus illustrated in Fig. 1 on an enlarged scale,

Fig. 4 is a cross-sectional view on line 4—4 of Fig. 3 on an enlarged scale, and

Fig. 5 is a cross-sectional view on line 5—5 of Fig. 3 on an enlarged scale.

Two pieces of pile floor covering are drawn, one from roll 10 and the other from roll 12, Figs. 1 and 2. The piece from roll 10 travels over idler roll 14, under spiked brake roll 16 and idler roll 18, and over idler roll 20. The piece from roll 12 passes over idler roll 22, under spiked brake roll 24 and over the idler roll 20, which unlike the other rolls engages both pieces of floor covering which pass thereover in nearly edge-abutting position onto table 26, which is supported by vertical members 28 and 30 and is wide enough to accommodate the combined widths of both pieces. The table has therein a longitudinal shallow trough 32, Figs. 3 and 5.

Travelling longitudinally within the trough and supported upon the bottom thereof is spiked conveyor-belt 34, Figs. 1, 2 and 3, which passes between and around pulleys 36 and 38.

Extending through a slot in the table near the roll 20 is knife blade 40, Figs. 1, 2, 3 and 4, which straightens any pile tufts which may have become folded over into the seam formed by the two pieces of floor covering, thereby clearing the adjacent edges of said tufts. The blade has on either side horizontal rigid wings 42 which ride upon the backing structure of the two pieces thereby preventing the latter from rising off the table. Beyond the blade 40 in the direction of the travel of the floor coverings is adjustable temple roll 44 having its axis set at an angle and possessing a series of graduated free moving spiked discs, Fig. 4. As these spiked discs ride on the back of one of the pieces, they force the edge of the latter into firm abutting relationship with the edge of the other piece.

The edge portions of the pieces next pass onto the belt 34 and under pressure bar 46, Figs. 1, 2 and 3, which forces the pile surface of the pieces onto the spikes on said belt. The pulley 36 which is preferably directly beneath the bar 46 is crowned, Fig. 4, thereby spreading the spikes on the belt so that they penetrate the pile surfaces at a diverging angle. After passing over the pulley 36, the belt levels out, causing the spikes of the belt to return to their normal vertical position thereby drawing the abutting edges of the two pieces tightly together.

The pulley 36 need not be crowned, but flat like pulley 38, in which case the two pieces would be forced into tightly edge-abutting relationship by the temple roll 44 alone or additional temple rolls between the blade 40 and the bar 46.

The pieces next pass under spiked idler roll 48, Figs. 1 and 3, which maintains the pieces

in uniform register from its point of contact therewith. The pieces then pass under a perforated adhesive applicator 50 on the bottom of an adhesive container 52 which is pivoted on fixture 54. The width of the applicator corresponds to the width of the seaming tape hereinafter described. Air pressure is utilized to force a controlled flow of adhesive from the container 52 onto the backing of the edge portions of the pieces by means of pipe 56, air hose 58, air control valve 60, air pressure gauge 62, regulator valve 64 and safety valve 66.

A roll of seaming tape 68, Figs. 1, 2 and 3, is suspended in a slotted fixture. The tape is fed to the adhesive coated portions of the pieces at a point directly under a weighted roll of inert masking material 70, such as cellophane, aluminum foil or the like, held in a fixture which permits the roll to turn and move in a vertical plane but prevents lateral movement thereof.

Instead of the above adhesive applicator and tape, a seaming tape to which an adhesive has been affixed may be employed. The adhesive would liquefy under heat and pressure, and the same results, hereinafter described, would be accomplished as with the separate application of adhesive and tape.

After the tape has been applied to the backing structure and after the masking material is placed over the tape, the pieces are subjected to the pressure of heating iron 72, Figs. 1 and 3. The heating iron rests upon the masking material in its rearwardmost position, as indicated in dotted lines, whence it is carried forward by the movement of the floor covering until it reaches its forwardmost position, as shown by solid lines. Then by successive steps it is raised off the masking material, carried rearwardly, and finally lowered down in its rearwardmost position upon a new, successive section of masking material, tape, adhesive and floor covering to complete the cycle. The associated parts of the heating iron consist of supporting arms 74, Figs. 1, 3 and 5, pivotally connected to lever arm 76, Fig. 5, to which two vertical carriage side plates 78 and 80 are bolted. The side plates support two pairs of grooved rollers 82 and 84, the former under and the latter over track 86 which supports the iron and its associated parts. Lever handle 88 is attached to lever arms 90 extending from the side plate 80 and may be operated by hand or by automatic means, not shown. Other heating means, of course, lend themselves to this apparatus, such as, for instance, a series of irons in an endless circular arrangement.

The sides of the trough 32, Fig. 5, are perforated the length of the iron dwell by holes 92 and 94. Air is sucked through the holes 92 across the pile face of the floor coverings through the holes 94 into exhaust hood 96, down exhaust pipe 98 and is discharged by exhaust fan 100, Fig. 1.

Positioned beyond the iron dwell is cylinder 102, Figs. 1, 2 and 3, around which is wrapped an end of the masking material and upon which the masking material is rolled, as the joined pieces pass by this point, to remove the masking material from the tape. When the cylinder has accumulated a sufficient amount of masking material, it may be removed and replaced by an empty one.

The joined pieces then proceed under spiked drive roll 104, Fig. 1, over idler rolls 106 and 108 and onto a pair of power driven rolls 110 and 112 which roll up the covering into a roll of any desired diameter.

There is not matching problem in joining solid colored fabrics, but when joining patterned fabrics, index marks, previously woven into the back of the edges of two abutting pieces at corresponding points in the pattern, are brought into alignment, as hereinafter described, so that the pattern of one piece will be perfectly matched with the pattern on the other piece.

In order to match the two adjacent edges of two patterned pieces of floor covering as they are first laid upon the table, two brake drums 114 and 116, Fig. 1, are attached to the spiked brake rolls 16 and 24, respectively. Passing under and partially around the drum 114 is brake band 115 fixed at one end and at the other end attached to one end of pivoted lever 120. To the other end of said lever is attached wire cable 122 which passes therefrom down around pulleys 124 and 126 and up to brake lever 128. Passing under and partially around the drum 116 is brake band 130 fixed at one end and at the other end attached to one end of pivoted lever 132. To the other end of said lever is attached wire cable 134 which passes therefrom down around pulleys 136 and 138, across to pulley 140 and then up to brake lever 142. Both brake levers 128 and 142 are pivoted on bar 144 and have handles at their ends opposite to these to which the wire cables 122 and 134 are attached to manipulate the brake bands 115 and 130, respectively.

In operation the two pieces of floor covering are drawn under tension from sources of supply around idler and brake rolls onto the table pile face down so that their adjacent edges are substantially or nearly abutting each other. The edges of patterned fabrics are matched by increasing or relaxing tension in either one of the pieces in relation to the other. Pile tufts are cleared from the edges which are then brought into tightly abutting relationship. The abutting edge portions of the two pieces are engaged by the spiked belt travelling in the trough in the table and carried under the adhesive dispenser which deposits adhesive upon the seam and edge portions of the pieces in a strip as wide as the seaming tape which is placed over the adhesive coated edge portions. A strip of masking material to keep the adhesive from sticking to and building up on the heating iron is placed over the tape. The heating iron is lowered upon the masking material and is carried along thereupon by the moving pieces and then is lifted to be retracted to engage another successive section of taped fabric. The masking material is removed from the tape as the joined fabric passes beyond the iron dwell. Finally the joined fabric is removed from the table.

We claim:

1. An apparatus for joining two pieces of pile floor covering at the seam thereof comprising a table, means to draw said pieces pile face down onto and over said table with an edge of one of said pieces tightly abutting the edge of the other piece, a trough extending substantially the length of said table, a pulley underneath one end of said trough, another pulley underneath the other end of said trough, an endless conveyor belt passing around said pulleys and along and upon the bottom of said trough, spikes on said belt adapted to engage the pile faces of said edge portions and maintain said edges in tightly abutting relationship with each other, means to apply an adhesively coated seaming tape to the backs of the abutting edge portions of said pieces, a heated device adapted to ride on said tape a predeter-

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mined distance and means to raise, retract and lower said heated device in relation to said tape.

2. An apparatus for joining two pieces of pile floor covering at the seam thereof comprising a table, means to draw said pieces pile face down onto and over said table with an edge of one of said pieces tightly abutting the edge of the other piece, a trough extending substantially the length of said table, a crowned pulley underneath one end of said trough, a second pulley underneath the other end of said trough, an endless conveyor belt passing around said pulleys and along and upon the bottom of said trough, spikes on said belt adapted to engage the pile faces of said edge portions and maintain said edges in tightly abutting relationship with each other, means to apply adhesive upon the backs of the abutting edge portions of said pieces, means to apply a seaming tape to the adhesively coated edge portions, a heated device adapted to ride on said tape a predetermined distance, and means to raise, retract and lower said heated device in relation to said tape.

3. An apparatus for joining two pieces of pile floor covering at the seam thereof comprising a table, means to draw said pieces pile face down onto and over said table with an edge of one of said pieces tightly abutting the edge of the other piece, a trough extending substantially the length of said table, a crowned pulley underneath one end of said trough, a second pulley underneath the other end of said trough, an endless conveyor belt passing around said pulleys and along and upon the bottom of said trough, spikes on said belt adapted to engage the pile faces of said edge portions and maintain said edges in tightly abutting relationship with each other, means to apply adhesive upon the backs of the abutting edge portions of said pieces, means to apply a seaming tape to the adhesively coated edge portions, means to overlay a masking tape upon said seaming tape, a heated device adapted to ride on said masking tape a predetermined distance, means to raise, retract and lower said heated device in relation to said masking tape, and a wind-up roll to move said masking tape from said seaming tape.

4. An apparatus for joining two pieces of pile floor covering at the seam thereof comprising two fabric-roll supports one for each of said pieces, a table, means to draw said piece pile face down onto and over said table with an edge of one of said pieces adjacent to an edge of the other piece, means to match said edges comprising braking means engaging separately each of said pieces between said roll supports and said table, a temple roll engaging the edge portion of one of said pieces to force the edge of the engaged piece into tightly abutting contact with the edge of the other piece, a trough extending substantially the length of said table, a crowned pulley underneath one end of said trough, a second pulley underneath the other end of said trough, an endless conveyor belt passing around said pulleys and along and upon the bottom of said trough, spikes on said belt, a bar above said crowned pulley adapted to press the pile face of said edge portions onto said spikes, means to apply adhesive upon the backs of said edge portions, means to apply a seaming tape to the adhesively coated edge portions, means to overlay a masking tape upon said seaming tape, a heated device adapted

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to ride on said masking tape a predetermined distance, means to raise, retract and lower said heated device in relation to said masking tape, and a wind-up roll to remove said masking tape from said seaming tape.

5. An apparatus for joining two pieces of pile floor covering at the seam thereof comprising two fabric-roll supports one for each of said pieces, a table, means to draw said pieces pile face down onto and over said table with an edge of one of said pieces adjacent to an edge of the other piece, means to match said edges comprising braking means engaging separately each of said pieces between said roll supports and said table, a vertical knife located between said edges to clear said seam of pile tufts, a temple roll engaging the edge portion of one of said pieces to force the edge of the engaged piece into tightly abutting contact with the edge of the other piece, a trough extending substantially the length of said table, a crowned pulley underneath one end of said trough, a second pulley underneath the other end of said trough, an endless conveyor belt passing around said pulleys and along and upon the bottom of said trough, spikes on said belt, a bar above said crowned pulley adapted to press the pile face of said edge portions onto said spikes, means to apply adhesive upon the backs of said edge portions, means to apply a seaming tape to the adhesively coated edge portions, means to overlay a masking tape upon said seaming tape, a heated device adapted to ride on said masking tape a predetermined distance, means to raise, retract and lower said heated device in relation to said masking tape, an exhaust chamber extending under said trough beneath said heated device, a plurality of passages leading into one side of said trough, another plurality of passages leading from the other side of said trough into said exhaust chamber, a pump to draw air through said passages and trough and out of said exhaust chamber, and a wind-up roll to remove said masking tape from said seaming tape.

6. In an apparatus for joining two pieces of pile floor covering at the seam thereof and in combination with means to draw said pieces through said apparatus, a device to match the adjacent edges of said pieces comprising two spiked brake rolls each engaging each of said pieces, two brake drums each attached to each of said rolls, two brake bands each engaging each of said drums and two brake levers each connected to each of said bands.

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