July 20, 1943. K. H. WEBER 2,324,745

METHOD OF TAPING BODIES

Filed Aug. 3, 1940 2 Sheets-Sheet 1

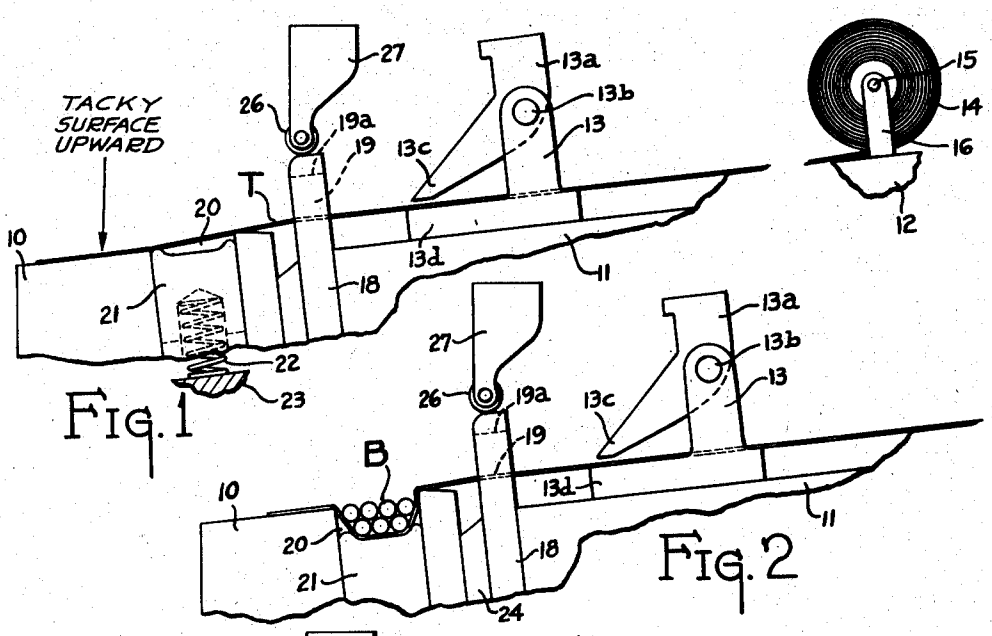

FIG. 1

FIG. 2

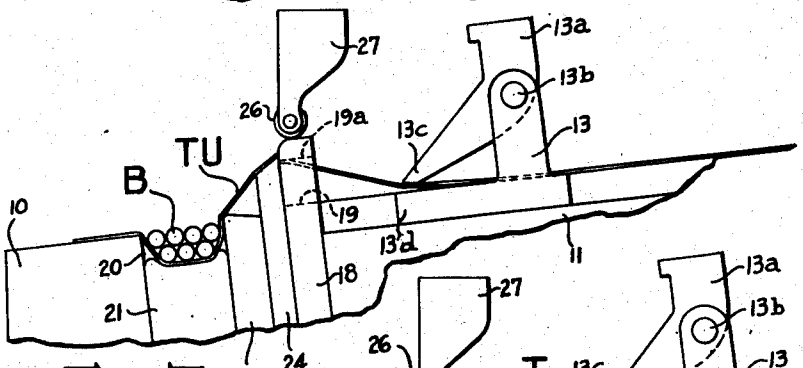

FIG. 3

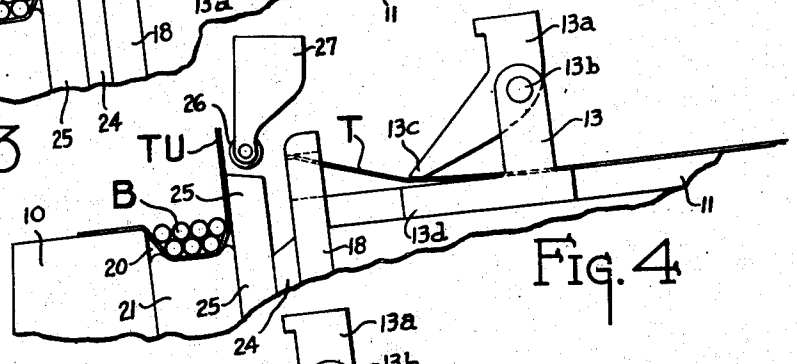

FIG. 4

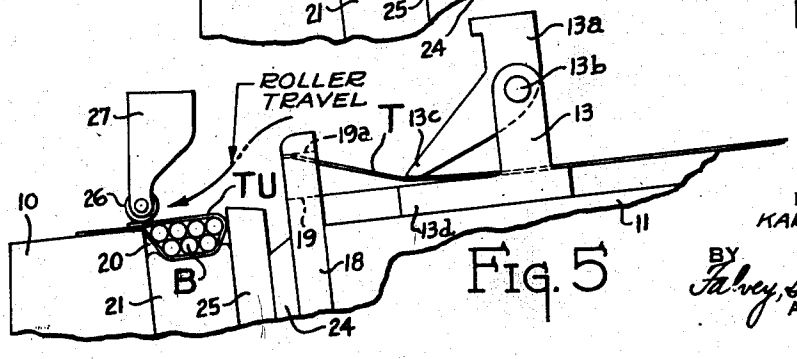

FIG. 5

INVENTOR
KARL H. WEBER

BY Talvey, Smith & Stollenberg
ATTORNEYS

July 20, 1943. K. H. WEBER 2,324,745

METHOD OF TAPING BODIES

Filed Aug. 3, 1940 2 Sheets-Sheet 2

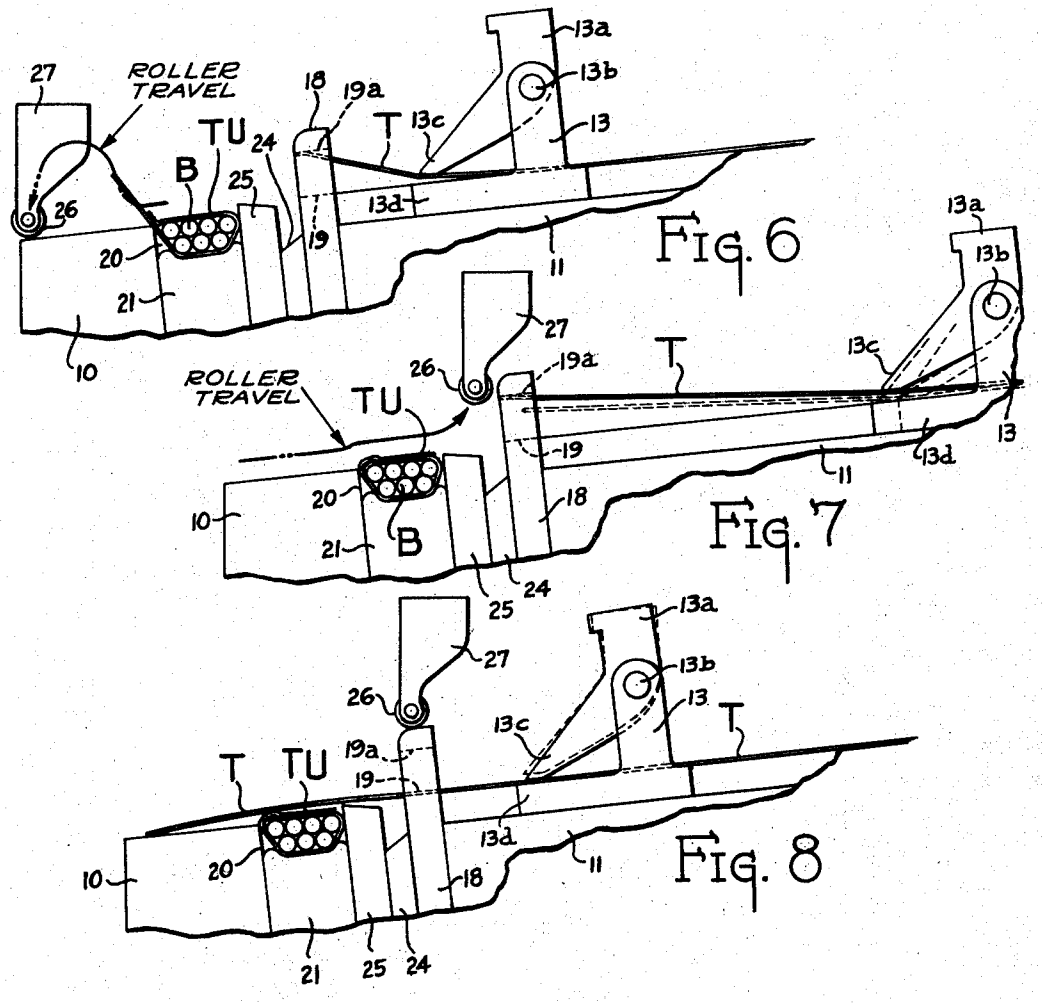

FIG. 6

FIG. 7

FIG. 8

INVENTOR
KARL H. WEBER
BY
Talbot, Souther & Stoltenberg
ATTORNEYS

Patented July 20, 1943 2,324,745

UNITED STATES PATENT OFFICE

2,324,745

METHOD OF TAPING BODIES

Karl H. Weber, Toledo, Ohio

Application August 3, 1940, Serial No. 350,588

5 Claims. (Cl. 100—31)

This invention relates to the method of applying permanently tacky tapes to loosely associated bodies for the purpose of holding these bodies in cooperative relation; particularly to the method of applying what is known as "Scotch" tape in the trade to armature coils for holding the wires forming the coil in cooperative relation until they may be permanently positioned in the slots of an armature.

In the prior art, no method has been found successful for applying tapes having one surface which is permanently tacky to bodies, particularly those which are loosely associated such as found in unmounted armature coils. It has been found impossible to apply sufficient pressure to tapes of this type, which are commonly known in the art as "Scotch" tapes, to provide an adhesive jointure which holds satisfactorily under conditions where a slight tension was placed upon the joint such as is present, as pointed out before, in unmounted armature coils. The result was that if "Scotch" tape was utilized, the joints became desengaged after a very short period of time, allowing the loosely associated bodies to become separated, defeating the purpose for which the bodies were taped.

The present invention contemplates the provision of a method of applying "Scotch" tape to loosely associated bodies whereby the tape is applied to the bodies after being compacted to a proper form in a manner so as to bring the tacky surfaces of the tape together into cooperative relation under pressure to form the holding jointure of the tape, so that the tackiness of the two surfaces will hold together in a substantially permanent manner even though subject to tension and not release the loosely associated bodies after a short period of time as has been the experience with "Scotch" tape in the prior art. The method is particularly applicable to machines wherein rollers are provided to operate in conjunction with a constricting or compacting device which brings the tacky surface of the "Scotch" tape into cooperative relation with the loosely associated bodies on three sides thereof, the roller being adapted to force one end of a short piece of the "Scotch" tape across the fourth side and also into cooperative relation with the tacky surface of the second end of the piece of the "Scotch" tape. In this manner the two tacky surfaces of the "Scotch" tape are brought into cooperation to form the holding jointure in the tape and at the same time the "Scotch" tape is adjusted to closely embrace the loosely associated bodies to hold them in the desired contour. The roller then reverses and returns to its original position and in doing so folds the "Scotch" tape back upon itself so as to form a treble thickness at the point where the two tacky sides cooperate and a double thickness at a point beyond, so that the tacky surface on the second end which projects beyond the jointure is forced into cooperative relation with the non-tacky side of the tape covering the coil side to form a smooth taping about the coil. The joint between the tacky side of the second end and the non-tacky side of the tape on the coil side does not carry any tension and is not designed for holding purposes but is rolled back to prevent loose ends from interfering with later processes such as mounting the finished coil in an armature.

It is, therefore, a principal object of this invention to provide a method of taping loosely associated bodies into cooperative relation by a piece of tape having an adhesive on one side having permanently tacky characteristics in which the holding connection in the embracing portion of the tape is obtained by placing the tacky sides of the tape into contact under pressure and at the same time compacting the bodies, so that the tape will hold the bodies in compacted form.

It is a further object of this invention to provide a method of applying tape having an adhesive on one side with permanently tacky characteristics to a body wherein the tacky surfaces of the tape are brought into cooperative relation and the tape is positioned on the body with a portion having a single thickness of tape, another portion having a double thickness of tape and another portion having a triple thickness of tape.

It is a further object of this invention to provide a method of applying tape having an adhesive on one side with permanently tacky characteristics to several loosely associated bodies for the purpose of holding them in cooperative relation from a continuous strand of tape.

It is a further object of this invention to provide a method of applying tape having an adhesive on one side with permanently tacky characteristics to several loosely associated bodies for the purpose of holding them in cooperative relation from a continuous strand of tape in which short portions of the tape are cut from the continuous strand of tape and substantially simultaneously causes the cut portions to closely embrace the loosely associated bodies to hold them firmly together by forming a holding jointure

with the tacky surfaces of the portions of tape placed into cooperation by pressure.

Other objects and advantages of this invention relating to the arrangement, operation and function of the related elements of the structure, to various details of construction, to combinations of parts and to economies of manufacture, will be apparent to those skilled in the art upon consideration of the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Figures 1 to 8 are elevational views schematically illustrating a machine operating through a series of related steps, showing the manner in which the invention is utilized.

Referring to the drawings, particularly to Figure 1, a fixed platform 10 is provided whose upper surface is inclined at a slight angle to the horizontal. The forward end or left end (Figure 1) is lower than the rear end as is clearly shown. The platform 10 may be continued rearwardly at 11 and 12, the portion 11 being adapted to allow a tape clamping member 13 to slide along its upper surface as will be described further hereinafter. The portion 12 which is mounted to the rear of the platforms 10 and 11 is adapted to mount a spool 14 holding a continuous strand of tape, one surface of which is coated with an adhesive having permanently tacky characteristics such as is known in the trade as "Scotch" tape. The roll or spool 14 is adapted to rotate about a pivotal pin 15 which is held in fixed relation to the member 12 by means of brackets 16.

The tape from the roll 14 is removed from the lower side thereof, so that the non-tacky surface of the tape comes in contact with the platform 12 and cooperates with the clamping member 13 which advances the tape forwardly to platform 10. At an intermediate position between the platforms 10 and 11, an upright member 18 is provided which is provided with a rectangular aperture 19 through which the end of the tape is threaded so as to lie upon the platform 10 with its tacky surface upward as clearly shown in Figure 1.

The lower side of the aperture is slightly above the level of the platform 10, while the upper side 19a is a substantial distance above and has a cutting function as will be described hereinafter.

The tape is advanced through the aperture 19 by the action of the clamping device 13 which has an active movable member 13a which is pivoted about a spindle 13b. The member 13a has a forwardly extended tongue 13c which cooperates with the supporting plate 13d to clamp the tape between them, so that when the complete assembly 13 is moved forward on the platform 11, the tape will be unwound from the spool 14 and thrust through the aperture 19 over the platform 10.

Immediately behind the platform 10, a slot or notch 20 is formed, the floor of which is supplied by a movable member 21 which may be thrust downwardly against the action of a resilient means 22 which acts between the member 21 and an anchor means 23, so that the movable member 21 is maintained in its normal position substantially as shown in Figure 1.

With the end of the tape T in the position shown in Figure 1, an operator thrusts a group of loosely associated bodies B, such as an armature coil or the like, on to the tape immediately above the notch 20 so as to move the movable member 21 downwardly against the resilient means 22 substantially to the position shown in Figure 2, wherein the tape adjacent the aperture 19 is held in fixed position, so that when the bodies B are thrust into the notch 20, the forward end of the tape T retreats into the notch so as to embrace the bodies substantially on three sides thereof. The tacky surface of the tape being positioned upwardly, it is clear that the bodies B will be contacted by the adhesive when they are pushed into the notch 20.

The bodies B by being manually thrust into the slot 20 are compacted together by the slot floor and sides into the desired conformation in which it is desirable to hold them with the tape. The bodies B preferably fill the slot, so that the tops thereof are substantially in the plane of the platform 10.

At this point, a cutter member 24 is advanced upwardly moving in front of the plate 18, so that the tape T is thrust upwardly by the cutter means against the upper side 19a of the aperture 19 and a cutting action takes place between the cutter member 24 and the upper side to sever a short length of tape TU from the continuous strand T positioned in part upon the roll 14 at the rear of the machine. The length of the severed portion TU is predetermined and is substantially longer than the perimeter of the bodies B as they are compacted into the notch 20 by the operator as has already been described. After the severing operation by the cutting member 24, the severed portion TU is free, while the end of the continuous strand of tape, sticks to the upper side 19a of the aperture 19 because the tacky surface of the tape will tend to adhere to the side of the aperture, primarily due to the tackiness of the surface and also to the pressure placed upon the tape during the cutting operation by the cutter 24.

The right or inner end of the severed portion TU is then thrust upwardly by a movable bar 25 which also forms the remote side of the slot 20 and remains stationary during the period of operations disclosed in Figures 1, 2, and 3. It is only after the cutting operation is complete that the bar 25 advances upwardly, while at the same time the cutter member 24 retreats substantially to its position shown in Figure 1. The purpose which the advancing bar 25 fulfills is that it moves the inner end of the severed portion of the tape TU substantially vertical with the inner-edge of the body B, so that a roller 26, which is mounted upon a bracket 27, is capable of moving behind the free end of the tape as is clearly shown in Figure 4.

The normal position of the roller, as shown in Figures 1, 2, and 3, is immediately above the plate 18. However, as the bar 25 moves upwardly to thrust the inner end of the tape portion TU upwardly into vertical position, the roller 26 advances forwardly to a position substantially above the bar 25 as is clearly shown in Figure 4. The path of the roller 26 continues obliquely downwardly following the retreat of the bar 25 and pushing before it the inner end of the tape portion TU and may contact the loosely associated bodies meanwhile positioned in the slot 20 substantially adjacent the center line of the slot to place a downward thrust upon the bodies to aid in further compacting them into the slot 20. The roller 26 then advances forward to roll the

tape into close cooperative relation with the bodies while they are in compacted form. The roller continues forward until the severed or inner end of the tape portion TU is rolled completely flat in the plane of the upper surface of the platform 10. This action, including the oblique path of the roller 26, is clearly shown in Figure 5.

At this point, the length of the severed end of the tape portion TU is sufficiently long so as to overlap the bodies B so as to bring into contact, adjacent the forward wall of the slot 20, the tacky surfaces of the ends of the tape portion TU so as to completely embrace the compacted bodies B within the slot 20.

After the roller 26 has passed over the compacted body B and folded the cut or inner end of the tape portion TU over the body B and on to the platform 10, the two tacky surfaces of the tape are brought into cooperative relation under pressure of the roller, so that a firm contact is made between the tacky parts to form a very permanent holding relation between the two loose ends of the embracing tape. This firm holding relation between the ends of the tape is brought about at a time when the body B is firmly compacted into the notch 20, so that they are firmly embraced by the tape to hold them substantially permanently in the compacted relation. The inner end of the tape portion TU preferably terminates at a short distance on the platform 10 beyond the body B, so that the roller 26 leaves the non-tacky side of the cut end and comes into contact with the tacky side of the piece which is immediately above the platform 10. There is a tendency for this tacky side to stick to the roller 26 and to cling thereto.

At this point, the roller 26 is caused to move upwardly in an oblique direction as is shown in the dotted line in Figure 6 which tends to pull the tape away from the platform 10 to extend upwardly at an angle of substantially 45 degrees with the platform 10. The roller continues in this direction for a short distance and then moves downwardly to contact the platform 10 firmly adjacent its forward end as is clearly shown in Figure 6. The direction of travel of the roller is then reversed, so that it proceeds along the platform 10, comes into contact with the loose end of the tape which is projecting at substantially an angle of 45 degrees with the platform and folds the tape back over the body portion B as is shown in Figure 7. In this manner, the tape is positioned about the body B in a permanent relation, wherein the body B has one portion thereof covered with one layer of tape and at the upper portion (Figure 7) with two layers of tape where the tacky side of the tape comes into contact with the non-tacky side and a third portion wherein three layers of tape are utilized. At this point, the two tacky sides of the tape portion are brought into contacting relation and then folded back upon itself as has already been described.

The tape portion is brought into permanent embracing relation with the body B by the cooperation between the two tacky sides inasmuch as it occurs that the portion of the tape where only a double thickness is provided occasionally releases its hold and allows the one end of the tape portion to project outwardly from the body B. However, the holding portion wherein the two tacky sides are in contacting relation forms the principal holding jointure even though the end of the tape beyond this point should release its hold.

Referring to Figure 7, the roller 26 continues in the direction of the arrow until it is substantially above the plate 25, at which time the roller begins to move obliquely in an upward direction to return to its normal position above the plate 18 as is shown in Figures 1, 2, and 3. Approximately simultaneously with the upward movement of the roller, the clamping member 13, which has already moved rearwardly to move a new tape portion on to the platform 10 grips the tape by moving the member 13c downwardly as is shown in phantom in Figure 7. After the member 13c has gripped the tape, the whole gripping assembly 13 continues its rearward motion so as to break the sticking relation between the tacky side of the tape and the upper edge or side 19a of the aperture 19 in the plate 18, to which, as has been previously pointed out, the tape is stuck during the cutting operation by the cutter 24. This releases the tape and allows it to be moved forwardly by the clamping member 13, so that it passes through the aperture 19 over the cutter 24, also over the plate 25, over the notch 20, and on to the platform 10 to substantially the position shown in Figure 1.

As shown in Figure 8, the previously wound coil is still in position in the notch 20 when the advance of the tape occurs. Inasmuch as the machine to which this method has been applied is partially automatic, the action occurs so quickly that the operator does not always have an opportunity to remove the completely taped coil from the machine. The operator then removes the taped coil from the slot 20 and inserts a new coil therein which is then in the condition as shown in Figure 2 for the beginning of a new cycle of operation.

It is to be understood that the above detailed description of the present invention is intended to disclose an embodiment thereof to those skilled in the art, but that the invention is not to be construed as limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of being practiced and carried out in various ways without departing from the spirit of the invention. The language used in the specification relating to the operation and function of the elements of the invention is employed for purposes of description and not of limitation, and it is not intended to limit the scope of the following claims beyond the requirements of the prior art.

What is claimed:

1. The method of taping loosely associated bodies with tape having one side covered with an adhesive of permanently tacky characteristics comprising holding the bodies in compacted relation on at least three sides with the tacky side of the tape by thrusting the tape and bodies into an open forming member of desired conformation and rolling the ends of the tape in one direction parallel to a fourth side whereby the tacky side on one end contacts the tacky side of the other end to form a firm holding relation and then reversing the rolling action to bring the tacky side of the second end into sticking relation with the outside of the taped portion.

2. The method of applying tape having one side covered with an adhesive of permanently tacky characteristics from a continuous strand to several loosely associated bodies for the purpose of holding them in cooperative relation, comprising

placing the tape with its tacky side upwardly, positioned transversely over a notch having substantially vertical sides, forcing the loosely associated bodies into the notch into contact with the tacky side of the tape, cutting a piece of tape of predetermined length from the continuous strand, rolling one end of the tape over the notch, so that the bodies compacted in the notch will be completely embraced by the tape, continuing the rolling to force together under pressure the two tacky surfaces of the tape to form a firm jointure with the roller then overrunning the second end of the tape, and reversing the rolling action to fold the second end back over the coil to complete the taping.

3. The method of applying tape having one side covered with an adhesive of permanently tacky nature from a continuous strand to a body, comprising advancing the tape with the tacky side upwards from the strand end a predetermined distance from a cutter, positioning the body on the tacky side of the tape, urging the tape into close cooperation with the body on at least three sides thereof, cutting the tape at the cutter, forcing at least one of the ends of the severed piece of tape upwardly, applying a roller over the non-tacky side of one end of the tape to place it into close cooperation with the body to cooperate with the other end of the tape portion so that the tacky sides are placed into contact under pressure, and releasing the end of the strand from the cutter by a slight backward movement for a new advance of the tape to begin a new cycle.

4. The method of applying tape from a continuous strand having one side covered with an adhesive of permanently tacky nature to a body consisting of several loosely associated bodies, comprising placing the tape with the tacky side upwards over an open forming member, positioning the parts of the body on the tacky side of the tape, cutting a predetermined length of tape from the continuous strand, urging the severed portion of tape into close cooperation with the body on at least three sides thereof by thrusting the parts into the forming member to place at least one of the ends in upward juxtaposition with reference to the body, rolling one end of the tape down with a roller moving in one direction to place portions of the ends of the severed piece of tape into contact by their tacky sides, momentarily lifting up the roller to raise the other end, and returning the roller to fold the raised end back over the body.

5. The method of applying tape having one side covered with an adhesive of permanently tacky nature from a continuous strand to a body consisting of several loosely associated parts comprising, placing the tape with the tacky side upwards over an open forming member of a desired contour, positioning the several parts of the body on the tacky side of the tape, urging the several parts of the body into close cooperation with each other and with the tape by thrusting them into the forming member, cutting off a tape portion of predetermined length from the continuous strand, forcing at least one end of the said tape portion upwardly and thereafter placing two portions of tacky surface of the said tape portion into contactual relation under pressure to hold the several parts of the body within the close embrace of the said tape portion.

KARL H. WEBER.