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Paccagnella

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[54] **APPARATUS FOR FOLDING AND PRESSING AN EDGE OF PLIANT MATERIAL**

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Dec. 7, 1972 Italy 41711/72

[52] **U.S. Cl.** **156/443;** 156/492

[51] **Int. Cl.²** **B29C 17/00**

[58] **Field of Search** ..... 156/443, 226, 227, 475, 156/476, 477 R, 478, 479, 480, 486, 492; 93/27, 31; 223/37, 38; 270/61 R

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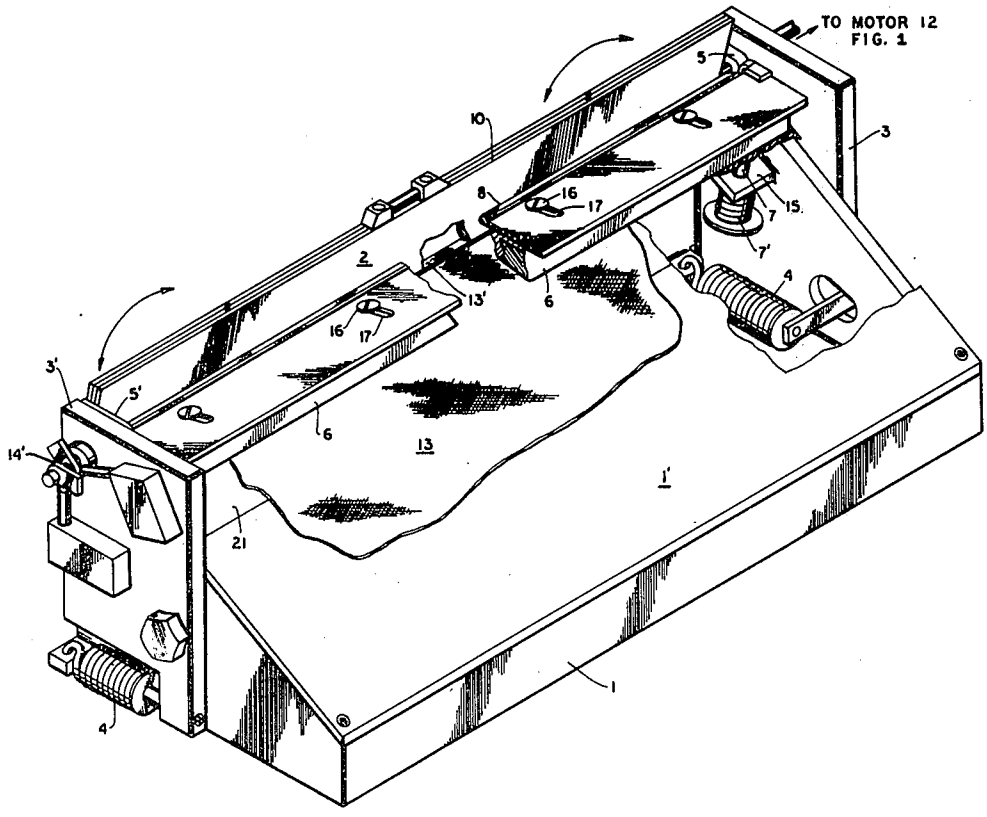
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Assistant Examiner—David A. Simmons
Attorney, Agent, or Firm—Jones, Thomas & Askew

[57] **ABSTRACT**

A machine for folding and gluing the edges of single sheets of material such as hides, cardboard, imitation leather and the like, comprising a fixed structure having a top bearing plane or board for the material to be folded; a material clamping unit movable between a raised and lowered position for clamping the material, said unit having, furthermore, a longitudinal blade for folding the material and a rotately carried body parallel with and against the edge of said blade for folding the material edge first against the blade and then on itself.

9 Claims, 7 Drawing Figures



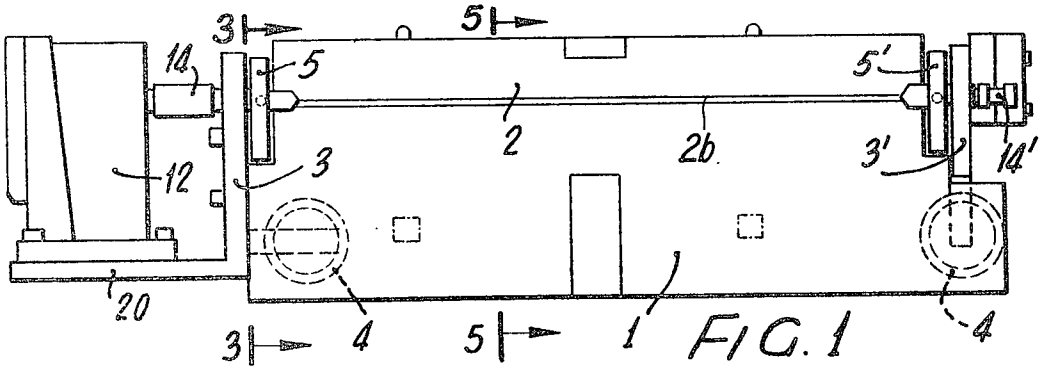


FIG. 1

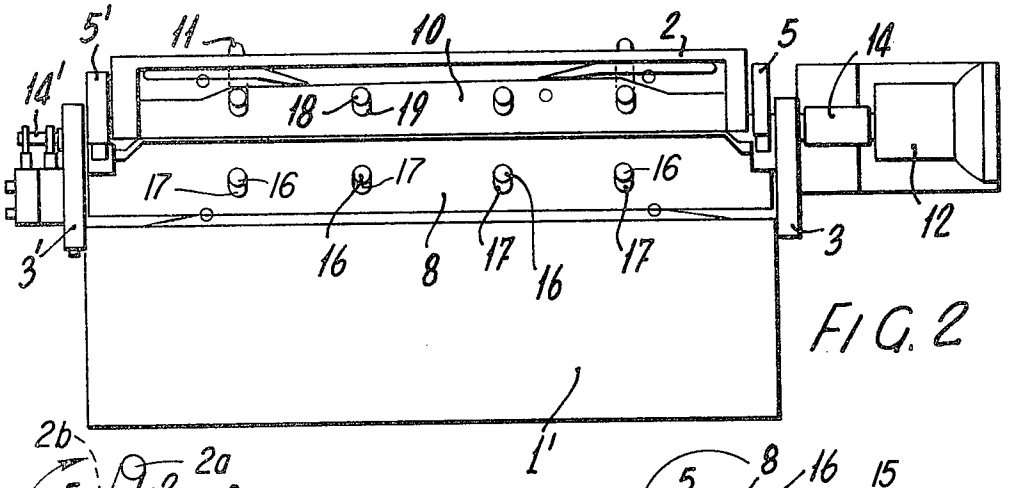


FIG. 2

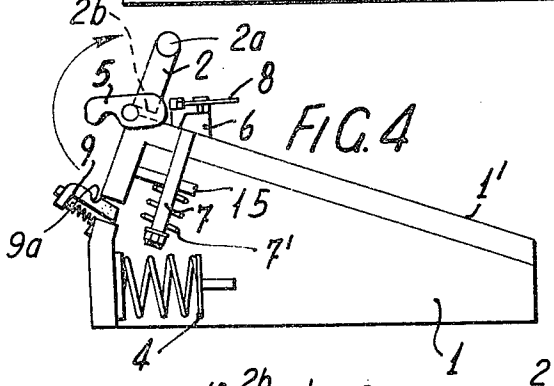


FIG. 4

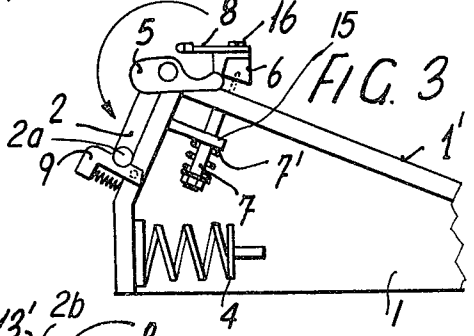


FIG. 3

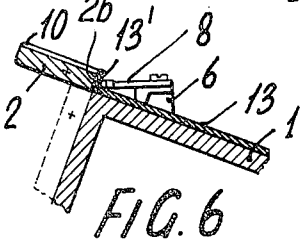


FIG. 6

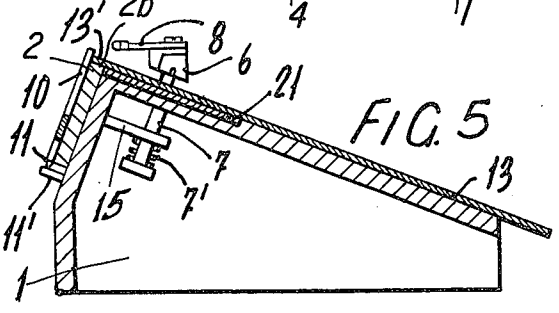
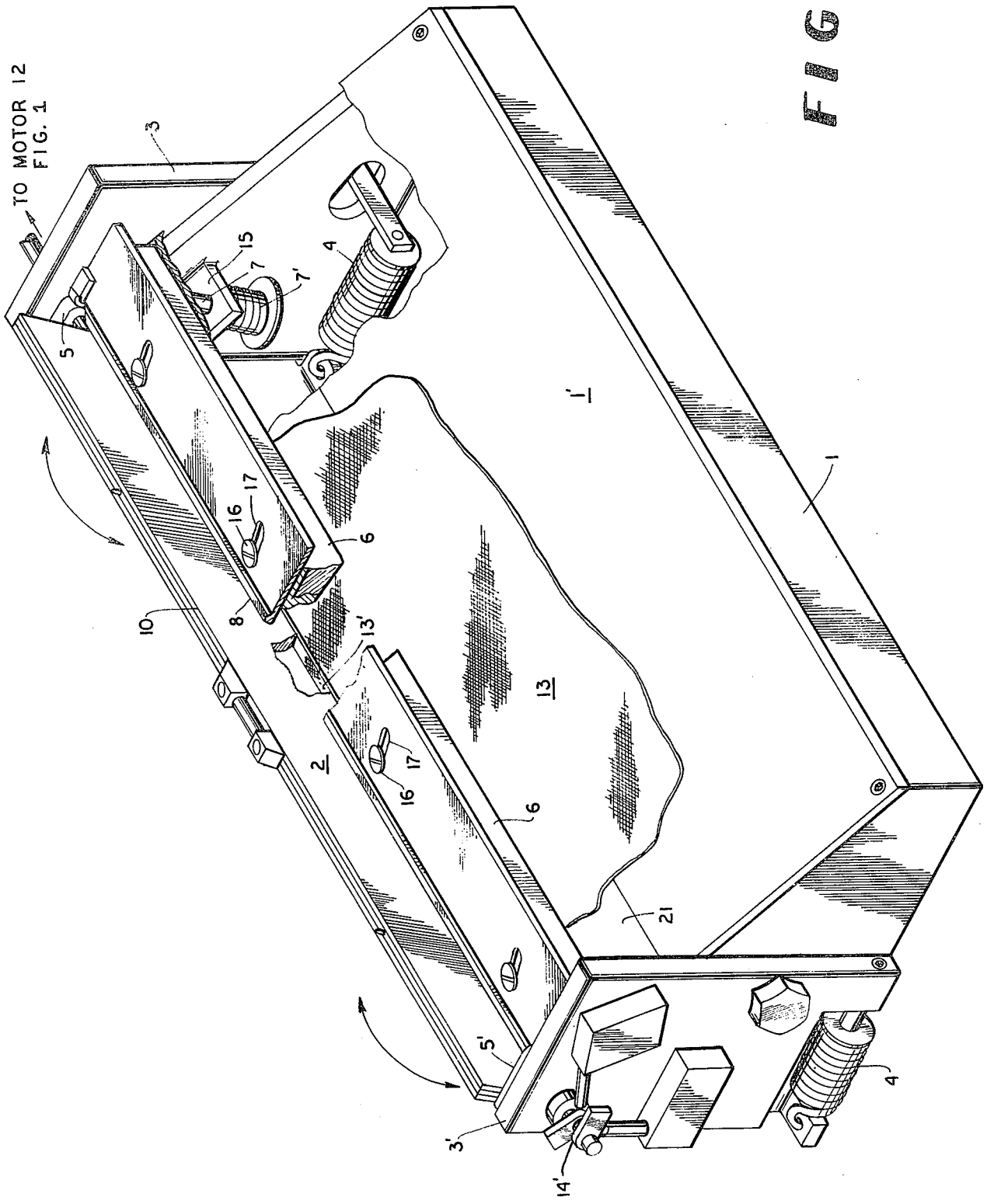


FIG. 5

FIG 7



APPARATUS FOR FOLDING AND PRESSING AN EDGE OF PLIANT MATERIAL

It is well known that when processing a single sheet of materials such as hides, cardboard, imitation leather and the like, the sheet has to be beaded by folding the edge on itself for some section and simultaneously glueing the folded length. Up to now this operation has been manually carried out by rudimentary means which adversely affect production costs.

This invention is directed to a machine completely automating all of the above mentioned operations, thus speeding up and making the process economical.

The machine is so constructed as to automatically accomodate the different thicknesses of the materials to be folded, and even a material having unequal or nonuniform thickness.

Essentially, the inventive machine consists of a table having a plane or board, the material to be folded being placed thereon. The end portion of the table is overhung by a movable clamp unit which, upon lowering, is effective to constrain the material at the folding stage; the clamp unit carries a front blade operating to provide for that line along which the material is folded on itself.

A body or mass is hinged in front of the table and forwardly has a flat strip, the material edge section to be folded bearing thereon.

Folding operation is accomplished by rotating said hinged body or mass upwardly from below the table plane or board, forcing the material against the folding blade and thereby pressing it thereagainst. Suitable devices, such as levers, cams or any other known system, will remove said folding blade at the final stage, so that the two borders of the folded edge can contact each other, providing for the gluing thereof.

Forwardly of the flat bearing strip for the edge to be folded, said hinged body or mass has a projecting blade acting as a stop, against which the edge of material to be folded has to bear in order to ensure a correct positioning thereof.

By means of suitable devices, this blade is caused to retract during the rotary motion of said mass or body, so as not to interfere in the subsequent pressing operation of the folded edge of material.

In addition to the foregoing operation concept, the inventive machine has further novel characteristics. For example, the movable equipment carrying the folding blade and overlying the table is mounted on resilient means so as to operate on materials of a different thickness and even of a varying thickness.

In order to allow for uniform adjustment of the rotating body, the rotating body is carried on the two sides by two plates which are resiliently constrained to the table, so as to enable shiftings of the axis of rotation for said body.

The movement for all of the several parts is preferably accomplished by an electric motor which is equipped with appropriate circuits for the operation thereof and appropriate safety devices in order to prevent any accident as far as possible, in a manner known to those skilled in the art.

An embodiment of the machine according to the present invention will now be described by mere way of not limiting example with reference to the accompanying drawings, in which:

FIG. 1 is a front view of the machine according to a disclosed embodiment of the invention;

FIG. 2 is a top view of the machine shown in FIG. 1;

FIG. 3 is a view taken along line 3—3 of FIG. 1, showing the folding body at end inoperative position;

FIG. 4 is a view similar to FIG. 3, but showing the folding body at end operative position;

FIG. 5 is a fragmentary sectional view taken along line 5—5 of FIG. 1, showing the body at inoperative position;

FIG. 6 is a fragmentary sectional view, similar to that of FIG. 5, but showing the body at an intermediate operative position; and

FIG. 7 is a pictorial view of the machine, partially broken away to show details.

According to the disclosed embodiment invention, a machine is provided with a table 1, at the top having an inclined bearing plane 1' for material 13 (FIG. 5), the edge of which is to be folded after being scattered beforhand with glue.

A body 2 is forwardly located and rotably carried by two shafts 14, 14' pivotally attached to plates 3, 3' which, in turn, are constrained to the structure of table 1 by resilient means, such as helical springs 4, 4' having a high degree of stiffness.

Cams 5, 5' are secured to the two ends of the pivoting axis for the rotating body 2 for operating a movable unit 6 to clamp the material placed at the top of table 1. This unit 6 is movably carried between a top or raised position (FIGS. 3 and 5) to enable the material 13 to be replaced on the machine plane 1', and a bottom or lowered position (FIGS. 4 and 6) at which the unit presses or compacts the material 13 against said plane 1' to prevent the material from moving during the edge folding operation. The mounting for unit 6 is provided by two pins 7 passing through and guided in corresponding holes of plane 1' and brackets 15 secured to the machine structure. Springs 7' as arranged about said pins are effective on the latter to draw the unit 6 downwards against the plane or board 1'.

Cams 5 and 5' have a projecting portion, such that when the rotating body 2 is at its starting position (FIG. 3), the cams urge the unit 6 upwardly against the action of the return springs 7.

As the body 2 moves, said unit 6 is released and is urged downwardly by springs 7', pressing and clamping the material 13 on said plane or board 1'.

The unit 6 has a folding blade 8 mounted to extend from the unit in a leftward direction as viewed in FIGS. 3–6, this blade being capable of transversely moving between a forward or retracted position (FIGS. 3 and 5) and a rearward or extended position (FIG. 4) as guided by spokes or screws 16 threaded in unit 6 and passing through elongated holes 17 formed in said blade 8 the blade is rearwardly urged by cams 5 and 5', as shown in FIG. 3, when body 2 has provided for folding the material and initiates its compression operation as explained hereinbelow. Suitable resilient means (not shown) insure the forward return movement of blade 8 when the latter is not engaged by the cams.

In FIGS. 3 and 4 there is also shown a resilient locking hook 9 having at the top a notch 9a for locking the rotating body 2 at starting position. Forwardly, this rotating body 2 has a blade 10, transversely guided by spokes or screws 18 threaded thereto and passing through elongated holes 19 (FIG. 2), at inoperative or starting position of body 2 this blade 10 being urged to project outwardly at the top of body 2 by followers 11 which bear on brackets 11' secured to table 1 (FIG. 5). Resilient return means (not shown) provide for retract-

ing said blade **10**, as soon as movement of body **2** causes said followers to disengage from brackets **11'**.

Finally, the machine is equipped with a motor **12** which is attached to a bracket **20** secured to a mounting plate **3** which is connected to table **1** by the spring **4**. In this case, the axis of rotation of body **2** for the support as provided by spring **4** can shift or arrange also according to a slight slope in order to accomodate the different thicknesses of material **13**.

Thus, the operation of the machine is as follows.

At starting position, the machine is as shown in FIGS. **3** and **5**.

Under such conditions, the material **13** would be laid on table **1** and the edge **13'** caused to pass beneath the unit **6** until bearing on the flat edge of body **2**, as aligned with the bearing board **1** and against the outwardly-projecting blade **10**. The edge **13'** of the material is now positioned to receive a quantity of glue as necessary to secure the folded edge of the material.

By operating the above mentioned motor **12**, the rotating body **2** is driven against the action of hook **9**.

Accordingly, the unit **6** is lowered by springs **7'** to press or compact the material **13**, the blade **10** is retracted and the rotating body **2** causes the material edge to fold against blade **8**, as shown in FIG. **6**.

Next, the blade **8** is rearwardly urged by cams **5, 5'** and the inner end **2b** of the body **2** will press the edge as folded on itself (FIG. **4**). Upon reaching the end of stroke, the machine is provided with suitable automatic means causing the motor **12** to reverse and rapidly restoring the body **2** to starting position.

As stated, since said body **2** is restrained through the supporting plates **3**, to table **1** by resilient means **4, 4'**, the machine can accomodate materials of a different thickness and even of a varying thickness.

In order to still improve this feature, the table forwardly has a section **21** covered with resilient material, thereby accomodating any faults in the material **13** to be folded.

What I claim is:

1. Apparatus for folding and pressing an edge of a soft pliable material, comprising:

a supporting surface to receive and support a material to be folded;

movable material clamping means mounted in laterally spaced apart relation to an extremity of said supporting surface, said clamping means being mounted for selective movement between a raised position relative to said support surface and a lowered position for clamping the material against said support surface;

a material folding blade carried by said clamping means and having a folding edge parallel with said supporting surface;

means mounting said folding blade on said clamping means for a limited extent of movement transversely of said clamping means between an extended position and a retracted position, said folding blade when in said extended position placing said folding edge adjacent said supporting surface extremity in fold line defining relation with the material clamped by said clamping means;

a folding body mounted for selective rotation about an axis which is substantially parallel with said supporting surface extremity, said folding body having a folding surface which forms an extension of said support surface beyond said extremity when said folding body is rotated to an initial rotational position;

means operative to rotate said folding body about said axis from said initial rotational position to a terminal rotational position placing said folding surface in substantially parallel and confronting relation with said supporting surface between said extremity and said clamping means, so that an edge portion of the material which was clamped on said folding surface is folded back onto and pressed against said clamped material;

cam means mounted for rotation concurrently with said selective rotation of said folding body;

cam engaging means operatively associated with said clamping means to be engaged by said cam means for moving said clamping means to said raised position when said folding body is in said initial rotational position; and

means operatively associated with said clamping means to lower said clamping means.

2. Apparatus as in claim **1**, wherein said means to lower said clamping means comprises resilient means operatively associated with said clamping means to urge said clamping means to said lowered position.

3. Apparatus as in claim **1**, wherein said folding surface has a flat material supporting surface which aligned with said supporting surface when said folding body is in said first rotational position.

4. Apparatus as in claim **1**, wherein:

said folding body carries a material positioning member selectively positionable either in an extended position projecting beyond said folding surface or in a retracted position; and

positioning means moving said positioning member to said extended position in response to said folding body assuming said initial position and moving said positioning member to said retracted position in response to said folding body rotating away from said initial position.

5. Apparatus as in claim **4**, wherein said positioning means comprises means resiliently urging said positioning member to said retracted position, and cam means operative to move said positioning member to said extended position in response to movement of said folding body to said initial position.

6. Apparatus for folding and pressing an edge of a soft pliable material, comprising:

a supporting surface to receive and support a material to be folded;

movable material clamping means mounted in laterally spaced apart relation to an extremity of said supporting surface, said clamping means being mounted for selective movement between a raised position relative to said support surface and a lowered position for clamping the material against said support surface;

a material folding blade carried by said clamping means and having a folding edge parallel with said supporting surface;

means mounting said folding blade on said clamping means for a limited extent of movement transversely of said clamping means between an extended position and a retracted position, said folding blade when in said extended position placing said folding edge adjacent said supporting surface extremity in fold line defining relation with the material clamped by said clamping means;

a folding body mounted for selective rotation about an axis which is substantially parallel with said supporting surface extremity, said folding body having a folding surface which forms an extension of said support surface beyond said extremity when said folding body is rotated to an initial rotational position;

means operative to rotate said folding body about said axis from said initial rotational position to a terminal rotational position placing said folding surface in substantially parallel and confronting relation with said supporting surface between said extremity and said clamping means, so that an edge portion of the material which was clamped on said folding surface is folded back onto and pressed against said clamped material; and

resilient means supporting said axis of said folding body to allow said axis and said folding body to undergo a limited extent of translational movement relative to said supporting surface as said folding body is rotated to assume said terminal position.

7. Apparatus as in claim **6,** wherein said folding body is supported for said rotation at a pair of support locations, and each of said support locations is independently supported by said resilient means for resiliently yielding movement in a direction perpendicular to said axis of rotation.

8. Apparatus as in claim **6,** wherein said rotation means is supported by said resilient means for said translational movement along with said folding body.

9. Apparatus as in claim **1,** wherein said support surface adjacent said extremity is covered with a layer of resiliently yieldable material.

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