

June 9, 1942.

M. LICHTER

2,285,447

MEANS FOR APPLYING REINFORCEMENT

Filed Dec. 13, 1939

3 Sheets-Sheet 1

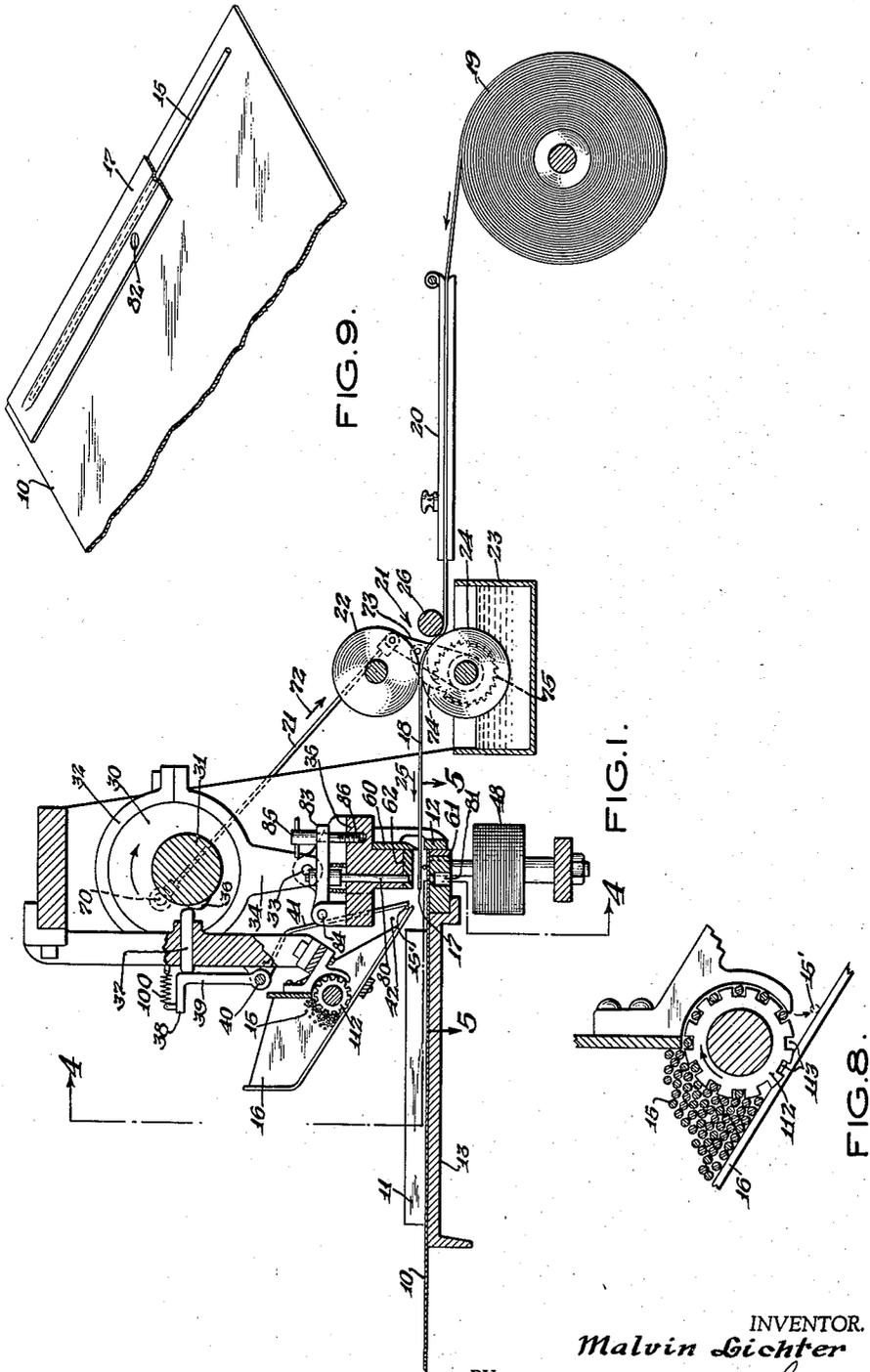


FIG. 9.

FIG. 10.

FIG. 8.

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3 Sheets-Sheet 2

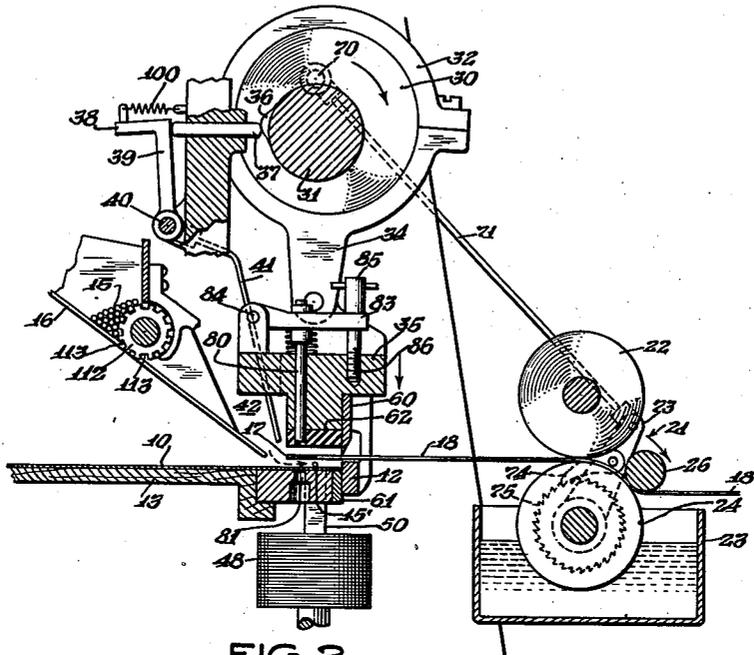


FIG. 2.

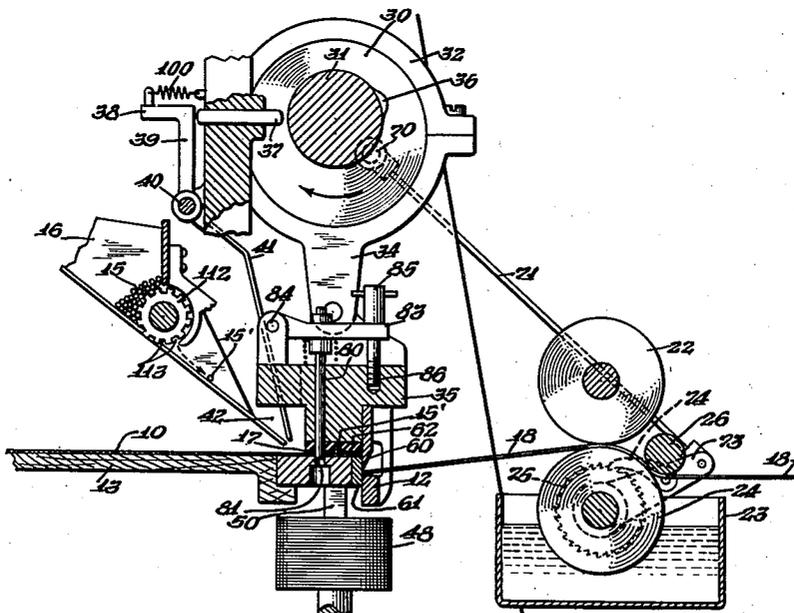


FIG. 3.

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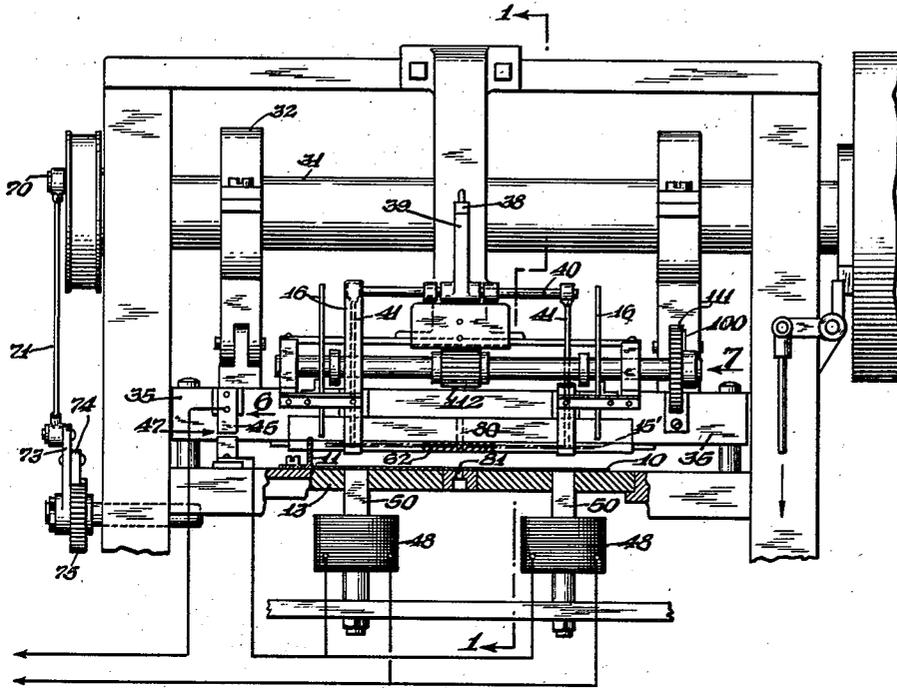


FIG. 4.

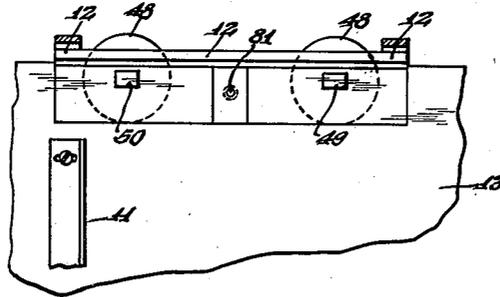


FIG. 5.

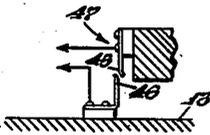


FIG. 6.

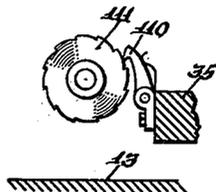


FIG. 7.

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2,285,447

MEANS FOR APPLYING REINFORCEMENTS

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Application December 13, 1939, Serial No. 309,037

13 Claims. (Cl. 154—1)

This invention relates to a means for applying reinforcement to sheet material, and more particularly to an apparatus for affixing a wire to or at the edge of a sheet in order to prevent the sheet from curling.

In the manufacture of display sheets of various kinds, as for instance in the manufacture of large size calendars from ordinary sheet material, usually a single perforation or other centrally located means is provided in order to hang the calendar or other display sheet in a suitable location. Where such a centrally located hanging device is so provided, then where the sheet has any substantial width, it tends to curl or sag about the hanging device as a center.

Accordingly, in large size calendars, it has long been customary to apply a very light gauge sheet of tin over the top and bottom edges in order to prevent the curling from occurring.

Various other means have been used in order to stiffen the horizontal edges of the hanging sheet so that it will not be wrinkled or tend to fold over. I have found that instead of applying such a tin edge facing or other types of facing or reinforcing members to the horizontal edges of the hanging calendar, that it is a far more practical expedient to apply a wire reinforcement to such edge. The use of a wire reinforcement tends to simplify the manufacture of the calendar or other display sheet and lends itself readily to the use of the improved apparatus herein described.

In general, an object of my invention is to so arrange a calendar or display sheet that when hung at its upper edge by a centrally located perforation or other hanging means, the said calendar or display sheet will not curl.

Another object of my invention is to form a simplified reinforcement comprising principally a wire and an adhesive strip affixing the wire to the sheet along the upper and, if desired, the lower edges in order to prevent the curling from taking place.

Still another object of my invention is to provide a novel, simple and economical method and machine for affixing the wire to the sheet by an adhesive strip.

Other objects of this invention are to provide in such apparatus a means whereby the wires may be continuously fed, as desired, and whereby the adhesive strip may be continuously and automatically fed for each affixing operation, and other methods and means whereby it may be entirely simplified.

Other objects and uses of this invention will

in part be apparent and in part be pointed out in the following description and drawings in which:

Figure 1 is a sectional schematic view taken on line 1—1 in Figure 4 illustrating in diagrammatic form the method and apparatus for affixing the reinforcement of the type herein described.

Figure 2 corresponds to the wire affixing portion of the device schematically illustrated in Figure 1, showing the device at the moment just after the commencement of the affixing operation.

Figure 3 corresponds to Figure 2, showing the operation immediately before the completion thereof.

Figure 4 is a front sectional view of the adhesive strip and wire reinforcement applying portion of the apparatus taken on line 4—4 of Figure 1.

Figure 5 is a plan view taken along the line 5—5 of Figure 1, looking in the direction of the arrows.

Figure 6 is an end view of the switching mechanism taken from the arrow 6 of Figure 4.

Figure 7 is an end view of the wire feeding ratchet taken from the point 7 of Figure 4.

Figure 8 is an enlarged detail of a portion of the wire feeding device of Figures 1, 2 and 3.

Figure 9 is a view in perspective partially broken away of the wire reinforced display sheet.

Referring now to Figures 1 to 4, the display sheet or calendar sheet 10 may be inserted in the machine by the operator, such insertion being guided by the side gauges 11, and the rear gauge bar 12 (see also Figure 5).

Where desired, a pair of side gauges may be used, although actually it will be seen that the rear gauge bar 12 and one side gauge 11 are sufficient to properly arrange a rectangular sheet, particularly when the two gauges are at right angles to each other. As is also obvious, the display sheet 10 is laid upon the bed 13 of the machine but the sheet itself projects beyond the bed 13 to the area where it may be operated upon by the knives and the punch as hereinafter described.

Once a sheet has been acted upon to produce a reinforced edge, it is immediately removed, another sheet is inserted in the same position, and the operation repeated.

The reinforcing wires 15 to be applied to the sheet and to be secured thereto by an adhesive strip are retained in the hopper 16. The adhesive strip 17 which affixes the wire at the edge of the sheet is drawn from the movable web 18

which, in turn, is led from the roll 19 through the guides 20 over the moistener 21 beneath the pressure and feed roll 22 to the wire applicator. The web 18 from which the strips 17 are cut preferably comprises a continuous sheet of paper having a re-moistening adhesive surface.

The moistener 21 comprises a tank 23 containing water and having a roll 24 partially immersed therein. Rotation of roller 24 will, by reason of the pressure thereon of pressure roller 22, cause the web 18 to be advanced in the direction indicated by the arrow 25. The additional guide roll 26 serves to insure contact of the web 18 with the moistening roll 24 in order that the re-moistening adhesive surface of the sheet or web 18 may be rendered adhesive.

Figure 1 illustrates the reinforcement applying apparatus just before the commencement of the operation. The eccentric 30 is mounted on the rotatable bar 31 and is keyed thereto to rotate therewith. The said eccentric 30, however, rotates within the circular member 32, the said circular member being pivotally connected at 33 to the punch and wire applicator itself.

By reason of the eccentric mounting of the member 30 upon the rotatable bar 31, rotation of the said rotatable bar 31 will cause the circular member 32 to rise and fall in accordance with the relative position of the maximum and minimum radius of the center with respect to the rotatable bar 31.

Thus in the position shown in Figure 1, the circular member 32 is at the highest point of its period of vertical oscillation and the reinforcement applicator and punch is at the point at which one operation has been completed and the display sheet 10 should be removed and a new display sheet 10 should be inserted for the next operation.

Each operation, as is hereinafter more clearly pointed out, consists of a single rotation of the bar 31 from the position indicated in Figure 1 and back to the position therein shown. In order to initiate the operation, the power drive of the bar 31 may be connected by a clutch which will be disengaged immediately upon the completion of the operation or in order to insure that the operation will come to a halt in the exact position shown in Figure 1, a brake may be automatically applied at the conclusion of the operation or a mechanical stop may be applied so that depression of a foot pedal will throw a clutch mechanism into engagement connecting the rotatable bar 31 to the power source and at the same time will momentarily throw a mechanical stop out of alignment, throwing the same mechanical stop back into position to engage the member once more upon completion of its revolution for throwing a similar member into such position, said mechanical stop also disengaging the clutch at the completion of the revolution.

The actual means which will permit the rotatable bar 31 to be rotated quickly from the position shown in Figure 1 until it returns to the same position is not itself important. Many such mechanisms are commonly known and any of them may be readily adapted to this periodic controlled rotation. The invention herein comprises, not the method by which the rotatable member 31 is caused to rotate in this manner, but the actual use which is made of such single cycle rotation.

When the sheet 10 is placed upon the bed 13 of the reinforcement applicator in the manner here-

inbefore described, and is placed against the gauge bars 11 and 12, then a single rotation of the rotatable bar 31 will result in the following operations:

The eccentric 30 will immediately be rotated and because of the variation of maximum and minimum radius within the circular member 32 will necessarily cause the said circular member 32 to drop. The circular member 32 is connected by the arm 34 to the frame 35 of the actual wire applicator and punch. In order to permit the rise and fall of these members in spite of the fact that the circular member 32 may shift periodically from the vertical plane, the connection is preferably through a pivoted member such as the pivot bar 33. The rear gauge bar 12 is mounted on the frame 35 and as the said frame 35 descends, the gauge bar 12 is carried below the plane of the bed 13.

At the moment of inception of the rotation operation of the member 31, the cam portion thereof 36 will come into contact with the pin 37. The pin 37 will press back the arm 38 of the lever 39 which is pivoted about the pivot 40. Pressing back of the arm 38 of the said lever 39 will cause a corresponding rotation of the opposite end 41 of the lever and thus will cause the subsidiary wire chamber 42 to permit the individual wires 15' to be dropped down into the position indicated by the dotted lines.

While the member 39 comprising the arms 38 and 41 has been described as a lever actually it should be noted that the member 41 will be a flat planar member extending across the subsidiary wire chamber 42 in order to hold the wire in place. The operation of the entire mechanism may well simulate that of a lever.

The arm 38 may, however, be mounted only on one side of the machine to register with the cam member 36 which is mounted upon that same side of the rotatable bar 31 (see particularly Figure 4). As seen in Figures 4 and 6, also, immediately upon the inception of the descending movement of the frame 35, contacts 45 and 46 of the switch 47 will come into contact with each other, thus simultaneously energizing the magnets 48. Thus, at the same time that the subsidiary wire chamber 42 is opened by a movement of the member 41 to permit the wire 15' to be dropped out, the energization of the magnets 48 at the two effective terminals thereof 49 and 50 (see also Figure 5) will cause the wire to be almost instantaneously aligned in the proper position.

Now the continued rotation of the rotatable member 31 and therefore of the eccentric 32 in its further causing the descent of the frame 35 causes the knife 60 on the frame to engage the stationarily mounted opposed knife blade 61 which is mounted in the plane of the bed 13 in order to shear off the strip 17 from the continuous web 18. As this shearing operation takes place, the rubber or other flexible cushion 62 in the same plane as the descending knife blade 60 presses down the adhesive strip 17 about the wire 15 and by reason of its yielding surface causes the adhesive strip to be wrapped around the wire as well as upon the paper in the manner shown in Figure 9.

At the same time, the motion or rotation of the rotatable member 31 causes the pin 70 to be rotated and during the downward motion of the adhesive applicator, the rotation of the pin 70 causes a motion of the link 71 in the direction indicated by the arrow 72, thus causing a move-

ment of the pivoted link 73 which carries the pawl 74. As will be noted, the pawl 74 in such downward movement in the direction indicated by the arrow 72, passes over the ratchet 75 in a direction which will not result in rotation thereof.

It should be here noted that the ratchet 75 is fixedly keyed to the rotatable applicator and feed roller 24. By this downward motion, preparation is made for the feeding of the continuous web 18 into the applicator during the upward stroke.

During the descent of the frame 35 it will be noted that the punch 80 in the frame 35 registers with the female die 81 to produce perforation 82 (see also Figure 9) by which the calendar or display sheet may be hung. Ordinarily, in the manufacture of the display sheet, it is necessary to apply the perforation 82 at the center of the upper edge only, it not being necessary at the lower edge. For this reason, the punch 80 is mounted on a bar 83 which is hinged at 84. The pin 85 engages the bar 83 and by means of the threads 86 at the opposite end of the said pin, which engages with the frame member 35, serves to secure the punch 80 in place. When it is desired to make a run of unperforated reinforced edges then the unscrewing of the pin 85 and the lifting thereof will remove the punch 80 from the operative position so that reinforced edges will be created without perforations.

When the reinforcement applying operation is completed at the lowest point of the stroke, that is when the maximum radius of the eccentric 32 is in the position shown in Figure 3, then the punch 80 has entered the perforation 81, creating the perforation 82 in the sheet 10, the knife 60 has cut off the strip 17 and the member 35 starts on its upward stroke.

The gauge bar 12 then lifts the cut end of the strip 18 (see Figure 3) above the plane of the bed 13. At the same time, the continued rotation of the member 31 resulting in continued rotation of the pin 70 results as hereinabove pointed out in continued movement of the link 71, causing the pawl 74 to engage the ratchet 75 in a manner causing the rotation thereof, and causing a corresponding rotation of the adhesive applying roll 24 which, by reason of the pressure of the roll 22 causes an advance of the web 18 so that another strip 17 comes into place immediately above the display sheet 10 which has already been operated upon.

Immediately after the cam portion 36 of the rotatable member 31 has passed the pin 37, thus releasing the wire 15' so that it may enter into position for being fastened to the display sheet 10 and immediately after the subsidiary wire container 42 is closed by the action of the spring 100 in pulling back the bar 38 to its original position, thus pressing down the member 41 once more, then the pawl 110 attached to the frame member 35 engages the ratchet 111 which is securely keyed to the same shaft as the grooved roll 112.

The engagement of the pawl 110 with the ratchet 111 during its momentary contact with the ratchet in the descent of the frame 35 is sufficient to cause such a rotation of the grooved roll 112 as will bring another groove 113 into position to discharge a wire into the subsidiary wire container 42 thus preparing the wire for the next operation. It will be noted that the placement of the wires 15 in the hopper 15 is such that certain of the wires will enter each of the grooves 113 in order to make this last operation

possible. For this purpose in packing the hopper 16 care should be taken to arrange the wires exactly at right angles to the sides of the hopper so that the wires may readily enter the grooves 113.

The rotation of the roller 31 ceases when it again reaches the position shown in Figure 1 at which time the reinforcement has been applied to the display sheet 10, a perforation made therein adjacent the reinforcement, if desired, an additional strip 17 has been placed in position for the next operation and an additional wire 15' has been placed in position in the subsidiary wire hopper 42 in preparation for the next operation.

It is now necessary merely to remove the display sheet 10, insert another display sheet to register with the rear gauge bar 12 and the side gauge 11, and to repeat the operation. It will be noted that the dropping down of the rear gauge bar 12 during the cutting stroke and the return thereof during the return stroke of the blade serves to support the web 18 sufficiently to permit it to be advanced and not wrinkled so that a sufficient area may project beneath and beyond the knife to form the strip 17. Likewise, during the removal and reinsertion of a new display sheet, the rear gauge bar 12 serves to support the projecting strip 17 until it is cut.

The wire reinforcement herein described, while it lends itself readily to stiffening of the edge of a calendar or any other display sheet, may be applied to any article where a wire and tape reinforcement of the type set forth herein may be used.

Although the use of a wire facilitates and simplifies the operation, other types of reinforcing members may be applied. Thus, with suitable variations in the feeding operation, strips or members of any desired shape, conformation and composition may be utilized.

Where the tape or strip is sufficient in relative strength or thickness to provide reinforcement, then the wire applying operation may be dispensed with.

Many of the uses of this article will be clear to those skilled in the art. Accordingly, I prefer to be limited, not by the specific disclosures herein, but only by the appended claims.

I claim:

1. An apparatus for applying a reinforcement comprising a tape to an end of a display sheet, said apparatus comprising a bed for said display sheet and guides therefor, means for feeding a continuous web having an adhesive surface so that an end margin thereof projects over the edge of said display sheet, and means for simultaneously cutting off said end margin of said continuous web and pressing said marginal portion on said display sheet.

2. An apparatus for applying a reinforcement comprising a tape and a wire to an end of a display sheet, said apparatus comprising a bed for said display sheet and guides therefor; means for feeding a continuous web having an adhesive surface so that the end margin thereof projects over the edge of said display sheet, means for depositing a wire beneath said tape and upon said display sheet, and means for simultaneously cutting off said end margin of said continuous web and pressing said marginal portion over said wire and on said display sheet.

3. An apparatus for applying a reinforcement comprising a tape and a wire to an end of a display sheet, said apparatus comprising a bed

for said display sheet and guides therefor; means for feeding a continuous web having an adhesive surface so that the end margin thereof projects over the edge of said display sheet, means for depositing a wire beneath said tape and upon said display sheet, solenoids for aligning said wire in predetermined position, and means for simultaneously cutting off said end margin of said continuous web and pressing said marginal portion over said wire and on said display sheet.

4. An apparatus for applying a reinforcement comprising a tape and a wire to an end of a display sheet, said apparatus comprising a bed for said display sheet and guides therefor; means for feeding a continuous web having an adhesive surface so that the end margin thereof projects over the edge of said display sheet; means for depositing a wire beneath said tape and upon said display sheet including a subsidiary hopper arranged to contain a single wire and means for releasing said wire and aligning the same upon said display sheet; and means for simultaneously cutting off said end margin of said continuous web and pressing said marginal portion over said wire and on said display sheet.

5. An apparatus for applying a reinforcement comprising a tape and a wire to an end of a display sheet, said apparatus comprising a bed for said display sheet and guides therefor; means for finding a continuous web having an adhesive surface so that the end margin thereof projects over the edge of said display sheet; means for depositing a wire beneath said tape and upon said display sheet including a subsidiary hopper arranged to contain a single wire and means for releasing said wire and aligning the same upon said display sheet; and means for automatically feeding a single wire to said subsidiary hopper during each applying operation in preparation for the succeeding operation; and means for simultaneously cutting off said end margin of said continuous web and pressing said marginal portion over said wire and on said display sheet.

6. An apparatus for applying a reinforcement comprising a tape and a wire to an end of a display sheet, said apparatus comprising a bed for said display sheet and guides therefor; means for feeding a continuous web having an adhesive surface so that the end margin thereof projects over the edge of said display sheet; means for depositing a wire beneath said tape and upon said display sheet; and means for simultaneously cutting off said end margin of said continuous web and pressing said marginal portion over said wire and on said display sheet; said means also comprising a punch registering with a female die in the plane of said bed for forming a perforation in said tape and display sheet.

7. An apparatus for applying a reinforcement comprising a tape and a wire to an end of a display sheet, said apparatus comprising a bed for said display sheet and guides therefor; means for feeding a continuous web having an adhesive surface so that the end margin thereof projects over the edge of said display sheet; means for depositing a wire beneath said tape and upon said display sheet; and means for simultaneously cutting off said end margin of said continuous web and pressing said marginal portion over said wire and on said display sheet; one of the guides comprising a gauge bar normally supporting said marginal end of said continuous web, said gauge bar being arranged with the cutting means to descend beneath the plane of said bed during the cutting operation.

8. An apparatus for applying a reinforcement comprising a tape and a wire to an end of a display sheet, said apparatus comprising a bed for said display sheet and guides therefor; means for feeding a continuous web having an adhesive surface so that the end margin thereof projects over the edge of said display sheet; means for depositing a wire beneath said tape and upon said display sheet; means for simultaneously cutting off said end margin of said continuous web and pressing said marginal portion over said wire and on said display sheet, said cutting means comprising a blade mounted on a frame and coacting with a blade on said bed; and means for causing said frame to oscillate in a vertical plane.

9. An apparatus for applying a reinforcement comprising a tape and a wire to an end of a display sheet, said apparatus comprising a bed for said display sheet and guides therefor; means for feeding a continuous web having an adhesive surface so that the end margin thereof projects over the edge of said display sheet; means for depositing a wire beneath said tape and upon said display sheet; means for simultaneously cutting off said end margin of said continuous web and pressing said marginal portion over said wire and on said display sheet, said cutting means comprising a blade mounted on a frame and coacting with a blade on said bed; and means for causing said frame to oscillate in a vertical plane; said means comprising an arm pivotally connected to said frame and eccentrically mounted with respect to a rotatable member.

10. An apparatus for applying a reinforcement comprising a tape and a wire to an end of a display sheet, said apparatus comprising a bed for said display sheet and guides therefor; means for feeding a continuous web having an adhesive surface so that the end margin thereof projects over the edge of said display sheet; means for depositing a wire beneath said tape and upon said display sheet; means for simultaneously cutting off said end margin of said continuous web and pressing said marginal portion over said wire and on said display sheet, said cutting means comprising a blade mounted on a frame and coacting with a blade on said bed; means for causing said frame to oscillate in a vertical plane; said means comprising an arm pivotally connected to said frame and connected to a cylindrical member; and a rotatable member mounted within and supporting said cylindrical member and eccentrically mounted on a rotatable shaft.

11. An apparatus for applying a reinforcement comprising a tape and a wire to an end of a display sheet, said apparatus comprising a bed for said display sheet and guides therefor; means for feeding a continuous web having an adhesive surface so that the end margin thereof projects over the edge of said display sheet; means for depositing a wire beneath said tape and upon said display sheet; means for simultaneously cutting off said end margin of said continuous web and pressing said marginal portion over said wire and on said display sheet, said cutting means comprising a blade mounted on a frame and coacting with a blade on said bed; means for causing said frame to oscillate in a vertical plane; and a punch mounted on said frame and selectively removable from operative position; and a die registering with said punch disposed in the plane of the said bed.

12. An apparatus for applying a reinforcement comprising a tape and a wire to an end of a dis-

play sheet, said apparatus comprising a bed for said display sheet and guides therefor; means for feeding a continuous web having an adhesive surface so that the end margin thereof projects over the edge of said display sheet; means for depositing a wire beneath said tape and upon said display sheet; means for simultaneously cutting off said end margin of said continuous web and pressing said marginal portion over said wire and on said display sheet, said cutting means comprising a blade mounted on a frame and cooperating with a blade on said bed; means for causing said frame to oscillate in a vertical plane; said means comprising an arm pivotally connected to said frame and connected to a cylindrical member; and a rotatable member mounted within and supporting said cylindrical member and eccentrically mounted on a rotatable shaft; and means energized by movement of said rotatable member for controlling the feed of said continuous web.

13. An apparatus for applying a reinforcement

comprising a tape and a wire to an end of a display sheet, said apparatus comprising a bed for said display sheet and guides therefor; means for feeding a continuous web having an adhesive surface so that the end margin thereof projects over the edge of said display sheet; means for depositing a wire beneath said tape and upon said display sheet; means for simultaneously cutting off said end margin of said continuous web and pressing said marginal portion over said wire and on said display sheet, said cutting means comprising a blade mounted on a frame and cooperating with a blade on said bed; means for causing said frame to oscillate in a vertical plane; said means comprising an arm pivotally connected to said frame and connected to a cylindrical member; and a rotatable member mounted within and supporting said cylindrical member and eccentrically mounted on a rotatable shaft; and means energized by movement of said frame for aligning said wire in selected position.

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