Dec. 18, 1962 R. H. NICKUM 3,068,482

MACHINE FOR APPLYING METAL CORNER STAYS

Filed Feb. 8, 1960 7 Sheets-Sheet 1

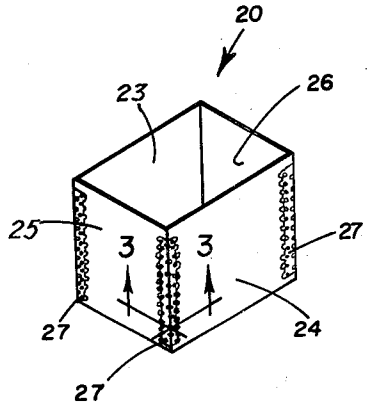


FIG. 1

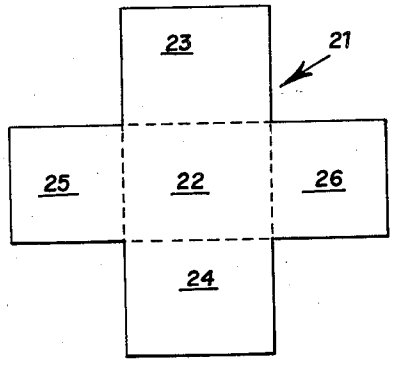


FIG. 2

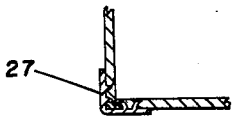


FIG. 3

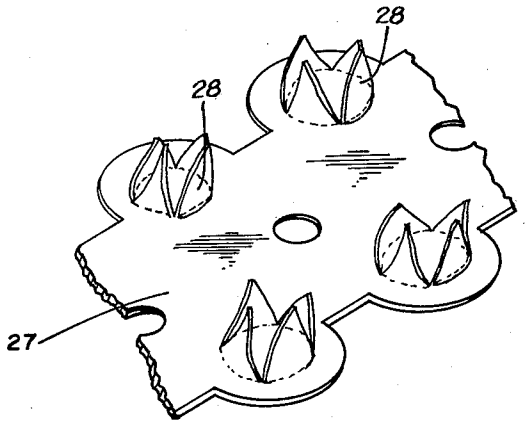


FIG. 4

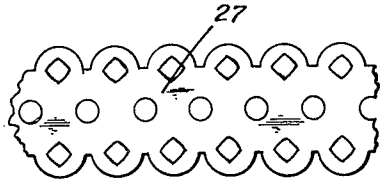


FIG. 5

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MACHINE FOR APPLYING METAL CORNER STAYS

Filed Feb. 8, 1960 7 Sheets-Sheet 2

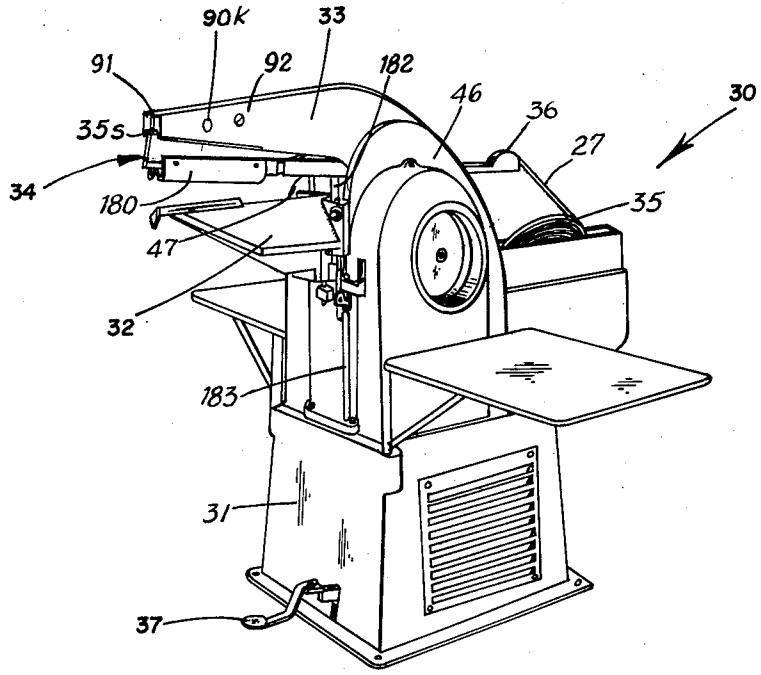


FIG. 6

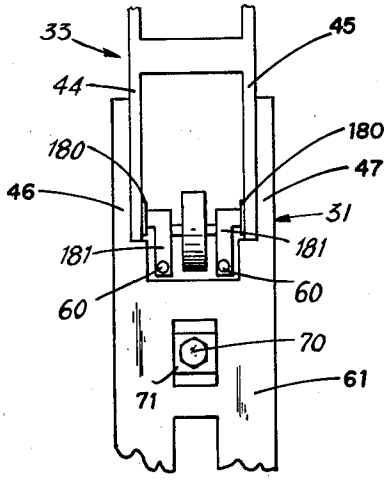


FIG. 8

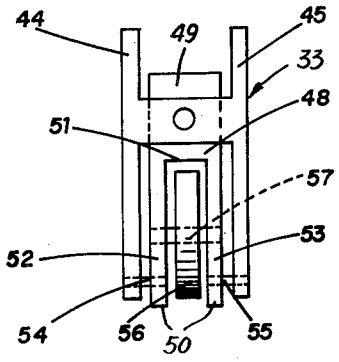


FIG. 9

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Dec. 18, 1962 R. H. NICKUM 3,068,482

MACHINE FOR APPLYING METAL CORNER STAYS

Filed Feb. 8, 1960 7 Sheets-Sheet 3

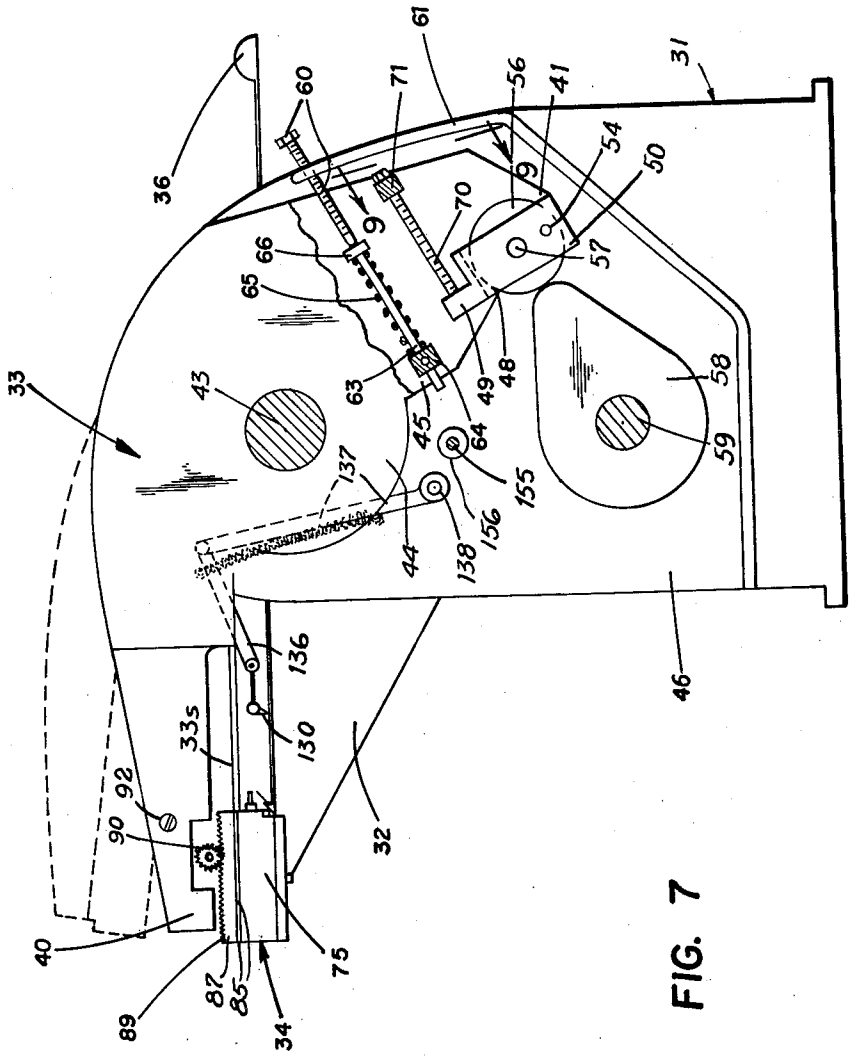


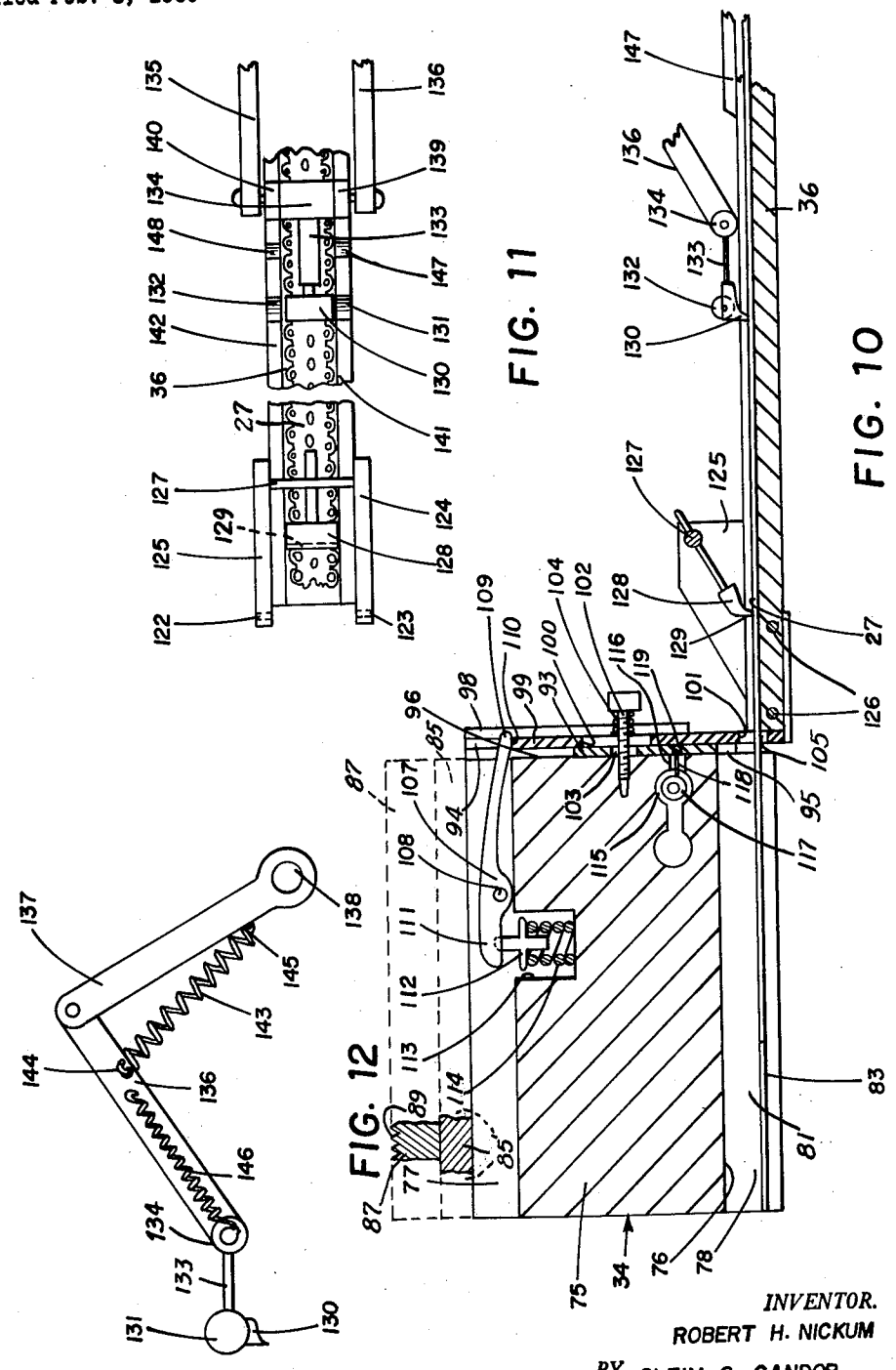
FIG. 7

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Dec. 18, 1962 R. H. NICKUM 3,068,482

MACHINE FOR APPLYING METAL CORNER STAYS

Filed Feb. 8, 1960 7 Sheets-Sheet 4



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MACHINE FOR APPLYING METAL CORNER STAYS

Filed Feb. 8, 1960 7 Sheets-Sheet 5

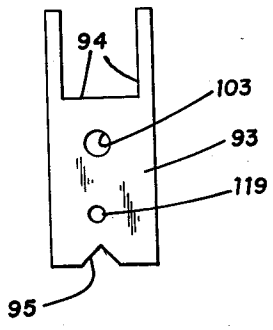


FIG. 13

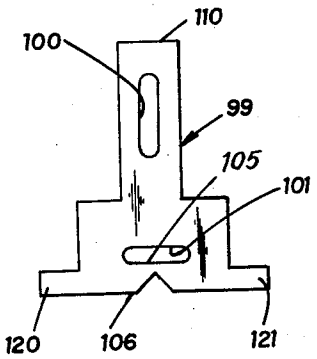


FIG. 14

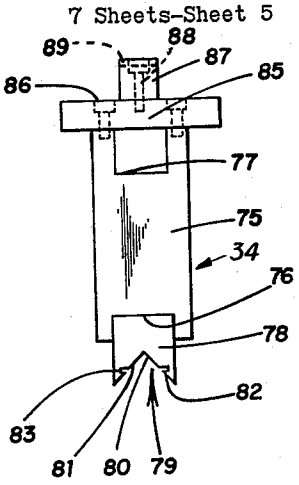


FIG. 15

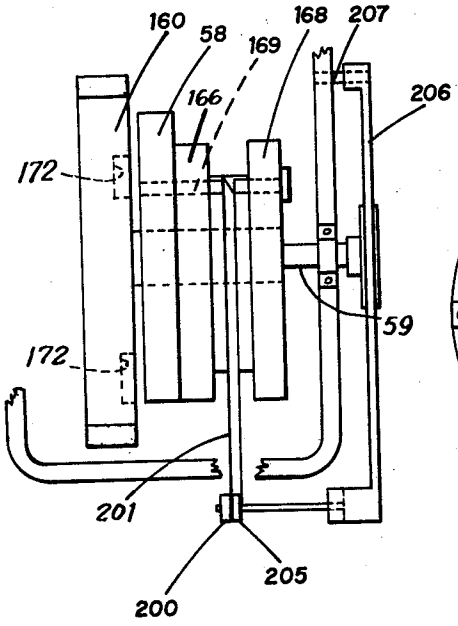


FIG. 18

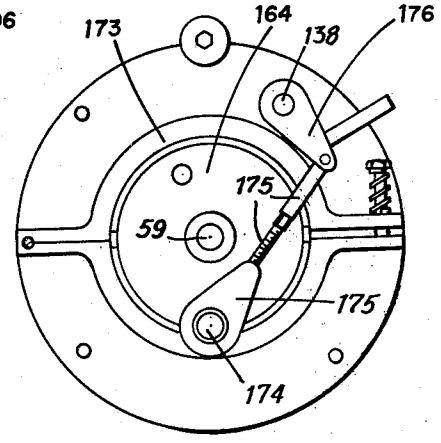


FIG. 19

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MACHINE FOR APPLYING METAL CORNER STAYS

Filed Feb. 8, 1960 7 Sheets-Sheet 6

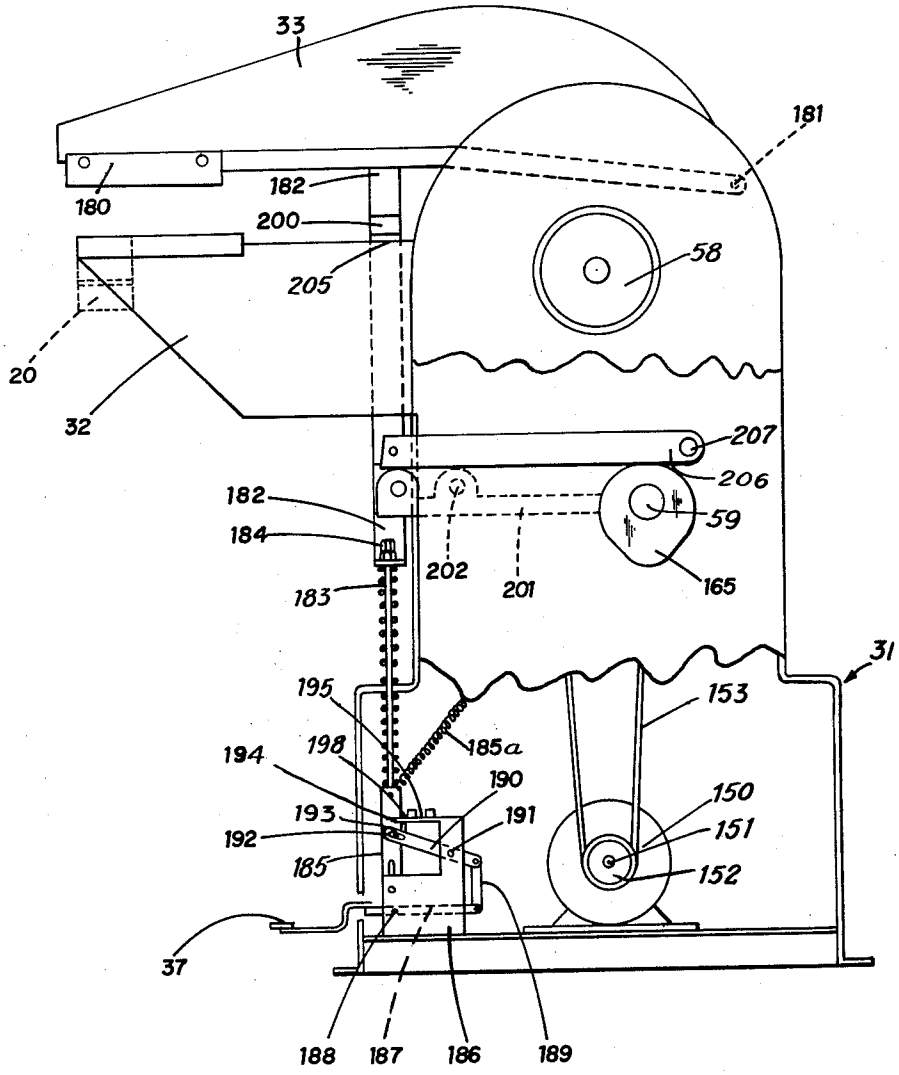


FIG. 17

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MACHINE FOR APPLYING METAL CORNER STAYS

Filed Feb. 8, 1960 7 Sheets-Sheet 7

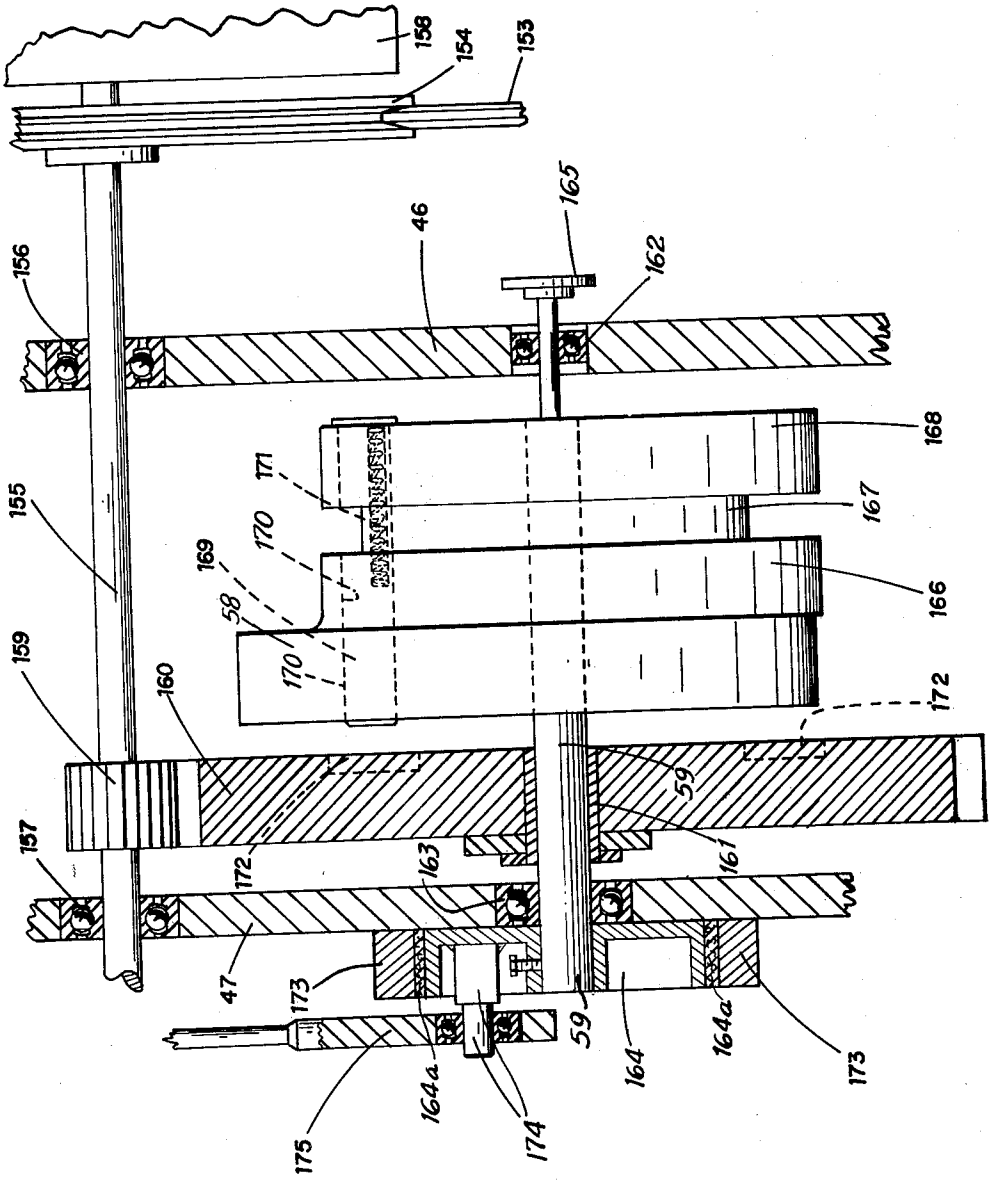


FIG. 16

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3,068,482

MACHINE FOR APPLYING METAL CORNER STAYS

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Filed Feb. 8, 1960, Ser. No. 7,418
7 Claims. (Cl. 1—117)

This invention relates to an improved machine for securing a predetermined length of metal corner stay material to adjacent sides of a carton to fasten the sides at angles to each other.

It is well known in the art to fasten adjacent sides of a carton together by a metal corner stay which has been bent into a desired cross-sectional configuration and has parallel rows of tangs or prongs projecting outwardly therefrom which respectively are imbedded in adjacent sides of a carton to secure the sides at desired angles relative to each other.

Accordingly, it is an object of this invention to provide an improved machine for applying such corner stay material to adjacent sides of a carton or the like to fasten the adjacent sides together.

It is another object of this invention to provide an improved machine having each and/or every novel feature hereinafter shown or described.

Other objects, uses and advantages of this invention will become apparent upon a reading of the following specification taken in conjunction with the accompanying drawings forming a part thereof and wherein:

FIGURE 1 is a perspective view of a carton having metal corner stays secured thereto by the apparatus of this invention;

FIGURE 2 is a plan view of a carton blank from which the carton of FIGURE 1 is assembled;

FIGURE 3 is a fragmentary, cross-sectional view of the carton illustrated in FIGURE 1 and is taken on line 3—3 thereof;

FIGURE 4 is a perspective view of a strip of metal corner stay material;

FIGURE 5 is a plan view of the corner stay material of FIGURE 4;

FIGURE 6 is a perspective view of the improved machine of this invention;

FIGURE 7 is an enlarged fragmentary, broken away view of the upper portion of the machine illustrated in FIGURE 6;

FIGURE 8 is an end view of a portion of the machine illustrated in FIGURE 7;

FIGURE 9 is a fragmentary end view of the portion of the machine illustrated in FIGURE 7 and is taken approximately on line 9—9 thereof;

FIGURE 10 is a fragmentary, vertical-sectional view of the driver and guide means of the machine illustrated in FIGURE 6;

FIGURE 11 is a plan view of the guide means;

FIGURE 12 is a fragmentary side view of the metal corner stay material feeding means of the machine of this invention;

FIGURE 13 is an end view of the fixed knife of this invention;

FIGURE 14 is an end view of the movable knife of this invention;

FIGURE 15 is an end view of the driver illustrated in FIGURE 7;

FIGURE 16 is a fragmentary, schematic view illustrating the operating mechanism of the machine illustrated in FIGURE 6;

FIGURE 17 is a side view of the machine of FIGURE 6 and is partially broken away to illustrate other operating parts of the machine;

FIGURE 18 is a fragmentary, schematic view illustrating still other operating parts of the machine of this invention; and,

FIGURE 19 is a fragmentary end view of the structure illustrated in FIGURE 16.

Reference is now made to the accompanying drawings wherein like reference numerals are utilized throughout the various figures thereof to designate like parts where appropriate, and particular reference is made to FIGURE 1 illustrating a carton 20.

While the particular structure of the carton 20 and the corner stay material do not form a part of this invention, it is believed necessary to set forth sufficient details of the same in order to better understand the operation of the machine of this invention.

In particular, carton 20 is formed from carton blank 21, FIGURE 2, that has been suitably cut and scored to define a bottom wall 22, a pair of side walls 23 and 24 respectively foldably connected to side edges of the bottom wall 22, and a pair of end walls 25 and 26 respectively foldably connected to the other end edges of the bottom wall 22.

Side walls 23 and 24 and end walls 25 and 26 are bent at right angles to the bottom wall 22 whereby the opposed side edges of the walls 23—26 are respectively disposed adjacent the side edges of adjacent walls 23—26. A predetermined length of metal corner stay material 27, FIGURES 4 and 5, having a pair of parallel rows of outwardly projecting sets of tangs 28, is folded along the longitudinal center line thereof to form a substantially L-shaped cross-sectional configuration. Subsequently, each row of tangs 28 is respectively imbedded into and interlocked to an adjacent wall 23—26 in the manner illustrated in FIGURES 1 and 3. In this manner, the four walls 23—26 are secured at right angles to each other by corner stays 27 at the corners thereof and form a completed box-like carton 20 as illustrated in FIGURE 1.

The machine 30, FIGURE 6, for applying the corner stays 27 to the carton 20 comprises a frame means 31, a mandrel or anvil 32 carried by frame means 31 for receiving and positioning carton blank 21 of FIGURE 2, a movable arm 33 pivotally carried by frame means 31 and having a driver 34 for applying a predetermined length of corner stay material to the blank 21 to form carton 20 illustrated in FIGURE 1, a coiled supply 35 of corner stay material 27 carried by frame means 31, and guide means 36 for feeding corner stay material 27 to driver 34 of machine 30.

The general operation of the machine 30 will now be described. The operator takes carton blank 21 and folds the walls 23—26 at right angles to bottom wall 22. Subsequently, he places two of the adjacent walls 23—26 over mandrel 32 with the corner or seam thereof projecting upwardly. By depressing a pedal 37 carried by machine 30, the arm 33 is moved downwardly toward mandrel 32 whereby driver 34 cuts a predetermined length of corner stay material 27 from supply 35 and applies the same to adjacent side walls of the carton in the manner illustrated in FIGURE 3. After driver 34 has applied a predetermined length of corner stay material 27 to carton 20, the machine 30 raises the arm 33 whereby the carton can be manually moved on mandrel 32 to bring another series of adjacent side walls into position on the mandrel 32.

The particular details of the machine 30 will now be described, and reference is made to FIGURE 7 illustrating the upper portion of machine 30. The arm 33 has a pair of opposed ends 40 and 41 and is pivotally secured to frame means 31 intermediate its ends 40 and 41 by a pair of outwardly projecting trunnions 43 (only one thereof appearing in FIGURE 7) respectively pivotally secur-

ing adjacent spaced side portions 44 and 45 of arm 33 to upright spaced frame portions 46 and 47 of frame means 31. In this manner, arm 33 is adapted to be pivoted from its up position illustrated in dotted lines in FIGURE 7 to the down position against the mandrel 32 as illustrated in full lines in FIGURE 7.

To pivot the arm 33, a bracket 48 having a pair of opposed ends 49 and 50 is pivotally secured to end 41 of arm 33 at end 50 thereof. In particular, bracket 48 is disposed between sides 44 and 45 of arm 33 and is bifurcated at 51, FIGURE 9, to define two parallel sides 52 and 53 respectively pivotally secured to sides 44 and 45 of arm 33 by pivot pins 54 and 55. A cylindrical roller 56 is disposed between and is rotatably secured to sides 52 and 53 of bracket 48 by a central roller pin 57.

The roller 56 is disposed in rolling contact with a cam 58 carried by drive shaft 59 operated in a manner later to be described. In order to maintain roller 56 in rolling contact with cam 58 during rotation of cam 58, an adjusting screw 60, FIGURE 7, is carried by a frame portion 61 of frame means 31 and engages a rod 63 telescopically and slidably received in a cross-piece 64 interconnected between sides 44 and 45 of arm 33. A spring 65 is interposed between cross-piece 64 and an enlarged head 66 of rod 63. In this manner, spring 65 is, in effect, pushing against cross-piece 64 at one end thereof and against the frame means 31 at the other end thereof. Thus, spring 65 tends to maintain roller 56 against cam 58 regardless of the rotational position to cam 58.

In order to adjust the amount of force with which the arm 33 forces driver 34 against mandrel 32, an adjusting screw 70, FIGURE 7, is carried by a cross-piece 71 secured between sides 44 and 45 of arm 33, the end of screw 70 abutting the end 49 (see FIGURES 7 and 9) of bracket 48. By adjusting screw 70, the bracket 48 can be forced toward or away from cam 58. When bracket 48 is forced toward cam 58 by screw 70, the end 50 of bracket 48 is moved toward frame portion 61 as roller 56 is in engagement with cam 58. Since end 50 of the bracket 48 is secured to the end 41 of arm 33 by pins 54 and 55, (see FIGURES 7 and 9) the arm 33 is pivoted down toward mandrel 32 by this adjustment of screw 70. However, since cam 58 moves arm 33 through a predetermined arc regardless of the position of arm 33 in its outermost position, the driver 34 is thus moved into engagement with mandrel 32 with a greater force when the screw 70 is in an inner position than when adjusting screw 70 is in an outer position.

As shown in FIGURES 7, 10 and 15, driver 34 includes a block 75 having channel 76 formed in the lower end thereof and a similar channel 77 formed in the upper end thereof. A holding or insert driver member 78 is secured in the channel 76 of block 75 and has a longitudinal slot 79 formed in the lower end thereof, slot 79 defining a pair of surfaces 80 and 81 disposed at right angles relative to each other and respectively having longitudinal grooves 82 and 83 formed along the lower edge thereof. Grooves 82 and 83 in member 78 are so aligned relative to metal stay guide 36 that metal stay material 27 is adapted to feed along the guide 36 into the grooves 82 and 83 of driver 34 as illustrated in FIGURE 10.

The surfaces 80 and 81 of driver 34 are adapted to cooperate with and engage similarly disposed outer surfaces on mandrel or anvil 32 when arm 33 is lowered to the position illustrated in FIGURE 7, whereby a predetermined length of corner stay material 27 is adapted to be applied by driver 34 to adjacent side walls of carton 20 placed on mandrel 32.

A member 85, FIGURE 15, is secured to the upper end of block 75 by bolts 86 and carries an upwardly extending member 87 bolted thereto by bolts 88 and having longitudinally disposed gear teeth 89, FIGURE 7, adapted to cooperate with a pinion 90, FIGURE 7, rotatably carried by the end 40 of arm 33. The pinion 90 is rotatable by

any suitable means, such as a conventional knob 90*k* fixed to an extended end of its mounting shaft 90*s*. The member 85 has the outer side edges thereof slidably received in complementary slots 33*s* (FIGS. 6 and 7) formed in the end 40 of arm 33 whereby driver 34 is carried by arm 33 and is adapted to be longitudinally moved in the opposed slots 33*s* thereof by movably rotating the pinion 90. By adjusting the position of driver 34 relative to the end 40 of arm 33, the length of corner stay material 27 to be applied by driver 34 can be varied in a manner more fully set forth hereinafter.

In order to maintain driver 34 in a predetermined longitudinal position relative to the end 40 of arm 33, the end 40 of arm 33 is split at 91, FIGURE 6, and a transversely disposed adjusting screw 92 interconnects the split ends of arm 33. By merely tightening the screw 92, the bifurcated ends of arm 33 are forced together to hold driver 34 in a desired longitudinal position.

A fixed knife 93, FIGURES 10 and 13, having slot 94 in the upper end thereof and a cutting edge 95 at the lower end thereof is secured to an end 96 of driver 34 between a pair of outwardly extending flanges 98, only the far one thereof showing in the sectional view of FIGURE 10. A movable knife 99, FIGURES 10 and 14, having an elongated slot 100 in the upper end thereof and a transversely disposed elongated slot 101 at the other end thereof, is also carried by end 96 of driver 34 by a pin 102 passing respectively through slot 100 of movable knife 99 and an enlarged aperture 103 formed in fixed knife 93. The end of pin 102 is disposed in threaded engagement with driver 34. A compression spring 104 is disposed between the enlarged head of screw 102 and the movable knife 99 whereby the force of spring 104 maintains movable knife 99 and fixed knife 93 is stacked relation against the end 96 of the driver 34.

The lower surface 105 of slot 101 defines a cutting edge of movable knife 99 when the movable knife 99 is moved upwardly relative to driver 34 upon engagement of the movable knife 99 with the mandrel 32 at end 106 thereof.

Thus, when a portion of the corner stay material 27 has been fed into driver 34 through slot 101 in movable knife 99, the cutting surface 105 of movable knife 99 cooperates with cutting surface 95 of fixed knife 93 to sever the corner stay material 27 as driver 34 moves downwardly toward mandrel 32 and movable knife 99 engages mandrel 32. In this manner, driver 34 carries the corner stay material 27 across the cutting edge 105 of movable knife 99 to sever the material 27.

In order to normally maintain the movable knife 99 in the position illustrated in FIGURE 10, arm 107 is pivotally secured in channel 77 of block 75 by a pin 108 and has one end 109 thereof projecting through slot 94 of fixed knife 93 and engaging the upper end 110 of movable knife 99. The other end 111 of the arm 107 is engaged by a retainer 112 disposed in a bore 113 formed in driver 34, the retainer 112 being urged upwardly against the end 111 of arm 107 by a compression spring 114. In this manner, spring 114 tends to pivot the arm 107 in a direction to urge knife 99 downwardly into the position illustrated in FIGURE 10. However, when driver 34 is moved downwardly toward mandrel 32, the end 106 of movable knife 99 engages the mandrel 32 and is thus forced upwardly relative to fixed knife 93 in opposition to the force of spring 114 whereby the corner stay material 27 fed along the guide 36 into slots 82 and 83 of member 78 of driver 34 is sheared by the surfaces 105 and 95 of the respective knives 99 and 93.

To adjust the position of fixed knife 93 relative to driver 34, a bore 115 (see FIGURE 10) is formed transversely through driver 34 adjacent the end 96 thereof and is interconnected with a longitudinal bore 116 formed in the end 96 of driver 34. A threaded pin 117 is disposed in bore 115 and carries an arm 118 projecting through bore 116 whereby arm 118 is received in an aperture 119

(see FIGURE 13) formed in fixed knife 93. By adjusting the rotational position of the pin 117 relative to driver 34, the arm 118 is pivoted upwardly or downwardly and thus carries fixed knife 93 therewith. Thus, as the cutting surface 95 of fixed knife 93 becomes dull or ground away, the position of the fixed knife 93 can be adjusted to the desired position relative to driver 34 by merely adjusting the pin 117 in the manner previously described.

By maintaining the lower edge 95 of fixed knife 93 slightly below the surfaces 80 and 81 of driver insert 78, the fixed knife 93 is adapted to embed the terminal edge of the corner stay material 27 into the side walls of the carton 20 when applying the stay thereto. Thus, the chance of a sharp exposed edge on the fastening stay 27 is eliminated.

The movable knife 99 has a pair of opposed trunnions 120 and 121, FIGURE 14, formed at the lower end thereof which are adapted to be respectively received in bores 122 and 123, FIGURE 11, formed respectively in plates 124 and 125 secured to guide rail 36 by bolts 126, FIGURE 10.

In this manner, guide rail 36 is secured to driver 34, and when driver 34 is detached from arm 33, the driver 34 and guide rail 36 can be removed from the machine 30 as a unit. Thus, another size driver 34 and guide rail unit 36 can be substituted therefor whereby the machine 30 is adapted to apply metal stay material 27 of various widths as desired.

The plates 124 and 125 rotatably support a rod 127 therebetween, the rod 127 carrying a pawl 128 having downwardly projecting tangs 129, FIGURE 10, that are adapted to be received in the outer rows of apertures formed in the metal stay material in the manner illustrated in FIGURE 11. In this manner, the pawl 128 permits corner stay material 27 to be advanced to the left as viewed in FIGURES 10 and 11, but prevents the same from being pulled to the right.

In order to feed the corner stay material 27 along the guide rail 36 into driver 34 from the supply 35, a second pawl 130 having rollers 131 and 132 at the outer ends thereof, is carried by an arm 133 secured to a rotatable shaft 134 carried by links 135 and 136, the links 135 and 136 being suitably interconnected. The links 135 and 136 are, in turn, respectively pivotally secured to one end of a pair of links 137 (see FIGURES 7 and 12) secured at the other end thereof to a rotatable shaft 138, the shaft 138 oscillating through a predetermined arc in a manner later to be described. In order to maintain rod 134 and its associated rollers 139 and 140 on upper edges 141 and 142 of the guide rail 36, springs 143 are secured to links 135 and 136 at 144 and to the pair of links 137 at the other end thereof at 145. Thus, regardless of the position of links 135, 136 and 137, the springs 143 tend to maintain rod 134 and its rollers 139 and 140 against the sides 141 and 142 of the guide rail 36.

To maintain the pawl 130 in engagement with the adjacent rows of apertures of corner stay material 27, rod 134 is normally rotated in a direction to permit the arm 133 to force the pawl 130 downwardly toward the corner stay material 27 by springs 146 respectively secured to rod 134 and to links 135 and 136 at the other end thereof.

When shaft 138 is rotated counterclockwise through a predetermined arc as viewed in FIGURES 7 and 12, the links 137 and 135, 136 are moved to the left to cause pawl 130 to move to the left through a predetermined distance to push a length of corner stay material 27 into the driver 34 equal to that distance. Means are provided to select the amount of the corner stay material 27 that is actually fed into the driver 34 when the pawl 130 is moved through its predetermined distance to the left, In particular, a pair of cam tracks 147 and 148 are respectively secured on top of sides 141 and 142 of guide rail 36 whereby the pawl 130 is lifted above the corner stay material 27 and out of driving engagement therewith when rollers 131 and 132 ride on the cam rails 147 and 148. Thus, the position of driver 34 relative to the end 40 of arm 33 determines the position during the travel of pawl 130 to the left that the pawl 130 runs off the cam rails 147 and 148 into driving relation with corner stay material and pushes the same into the driver 34. Accordingly, by adjusting the longitudinal position of the driver 34 relative to the arm 33 by the pinion arrangement 90, the length of corner stay material 27 fed to the driver can be predetermined.

As shown in FIGURE 17, a suitable electric motor 150 is secured to frame means 31 and has an output shaft 151 provided with a suitable pulley 152 for driving a belt 153, the belt 153 passing over a pulley 154, FIGURE 16, to drive a shaft 155 journalled in suitable bearings 156 and 157 carried respectively by frame portions 46 and 47 of frame means 31. A suitable fly-wheel 158 is carried on the end of the drive shaft 155 and a drive gear 159 is carried by shaft 155 intermediate the ends thereof, the drive gear 159 meshing with a gear 160 rotatably carried on shaft 59 of frame means 31 by a sleeve bearing 161.

The shaft 59 is journalled in frame portions 46 and 47 of the frame means 31 by suitable bearings 162 and 163, the shaft 59 carrying a brake drum 164 at one end thereof on the outer side of frame portion 47 and a cam 165 at the other end thereof on the outer side of frame portion 46. The drum is provided with the usual liner 164*a*.

In order to interconnect the drive shaft 155 to shaft 59 to rotate shaft 59, the cam 58 and a series of interconnected plates 166, 167 and 168 are secured to shaft 59 and carry a movable dog 169 disposed in a suitable bore 170 formed in members 58, 166, 167 and 168. The dog 169 is normally urged to the left as viewed in FIGURE 16 by a compression spring 171. When the dog 170 is moved to the left by spring 171, the same is adapted to enter one of a plurality of radially disposed slots 172 formed in the side face of the gear 160 whereby rotation of gear 160 causes rotation of shaft 59 through the interconnection of the dog 169 and a slot 172 of gear 160. To discontinue rotation of shaft 59, the dog 169 is moved to the right out of engagement with a slot 172 of the gear 160 to the position illustrated in full lines in FIGURE 16 whereby rotation of shaft 59 is stopped by brake shoes 173 acting on the brake drum 164 and its liner 164*a*.

For each cycle of rotation of the brake drum 164, the brake drum 164 causes shaft 174, FIGURES 16 and 19, carried thereby to be rotated through an arc of 360°. A link 175 rotatably carried by shaft 174 is interconnected to an arm 176 secured to shaft 138 which actuates the feeding mechanism 136, 137 illustrated in FIGURES 7 and 12.

Thus, for each cycle of rotation of shaft 59, the cam 58 is rotated through 360° to raise and lower the arm 33 carrying the driver 34, and the feeding mechanism 136, 137 is operated to push a length of corner stay material 27 into driver 34, the feeding mechanism 136, 137 moving to the right when the arm 33 is being lowered and moving to the left when the arm 33 is being raised.

As illustrated in FIGURES 8 and 17, a U-shaped safety guide 180 is pivotally carried by frame means 31 in the following manner. The ends of the legs of the guide means 180 are respectively pivotally secured to frame means 31 at 181 at the rear of the machine 30. The front or U-shaped portion of safety guide 180 is normally disposed against and around driver 34 when the arm 33 is in the raised position as illustrated in FIGURES 6 and 17. However, when it is desired to operate the machine 30, the safety guide 180 must be disposed around the sides and bottom of the mandrel 32 before the arm 33 moves downwardly and applies the predetermined length of corner stay material 27. In this manner, the safety guide 180 prevents the operator from getting his fingers in the way of the arm 33 and driver 34 when same is descending.

The safety guide 180 is normally held in the position

illustrated in FIGURE 17 by a slidable lever 182 abutting thereagainst, lever 182 being interconnected to a rod 183 by nuts 184. The rod 183 is, in turn, interconnected to a lever 185 slidably carried by an L-shaped bracket 186 secured to frame means 31. The foot pedal 37 is interconnected to a pair of links 187 pivoted to the L-shaped bracket 186 by a pivot pin 188. Downward movement of pedal 37 causes the links 187 to pivot about the point 188 and raise a lever 189 pivotally secured to the right ends of links 187. Lever 189 is, in turn, pivotally secured to a pair of levers 190 pivotally secured to the L-shaped bracket 186 at 191. The left ends of the levers 190 are respectively provided with longitudinally disposed slots 192 receiving a pin 193 secured to lever 185. The lever 185 is provided with a notch or slot 194 normally receiving a retainer 195 secured to the L-shaped bracket 186 to hold the lever 182 in the raised position as illustrated in FIGURE 17.

In order to lower the safety guide 180, the operator depresses the pedal 37 and causes the levers 190 to move counterclockwise, whereby lever 185 can by-pass the retainer 195 and move downwardly by the downward movement of pivoted levers 190. Thus, the guide member 180 is adapted to descend by gravity. If nothing is in the way of the safety guide 180, such as fingers and the like, the guide member 180 descends around the mandrel 32 and engages a lever 200 pushing the same downwardly therewith.

The lever 200 is interconnected to an arm 201, FIGURES 17 and 18, pivotally secured to frame means 31 intermediate its ends at 202. The lever 201, when in the position illustrated in FIGURE 17, normally maintains the dog 169 out of engagement with gear 160 whereby shaft 59 is disconnected from drive shaft 155. However, upon downward movement of lever 200 by guide 180, the right end of arm 201 is raised and permits the dog 169 to move to the left by spring 171 to engage a slot 172 of gear 160 and thus interconnect the drive shaft 155 with shaft 59 whereby the machine 30 begins its cycle of operation.

As the shaft 59 rotates, cam 58 causes arm 33 to descend and apply a predetermined length of corner stay material 27 in the manner previously described. After arm 33 has been raised to its original upward position, the operator can take his foot off pedal 37 whereby arm or lever 182 will be raised by spring 185*a*, FIGURE 17, to raise guide 180 away from lever 200. Thus, the lever 200 will also be raised by and permit arm 201 to disengage the dog 169 from gear 160. In this manner, the cycle of operation of machine 30 will terminate.

However, it may be desired to fasten the four corners of the carton 20 in a sequence without requiring the raising or lowering of pedal 37 for each corner. Therefore, when pedal 37 has been lowered and arm 33 has functioned in the manner previously described, the safety guide 180 is not raised by lever 182 but by another lever 205, FIGURE 17, carried by machine 30. In particular, lever 205 is interconnected at its lower end to an arm 206 pivotally secured to the machine 30 at 207 and engaging the cam 165 previously described. For each cycle of rotation of the shaft 59, the cam 165 is also rotated and causes the arm 206 to be pivoted about point 207 whereby the lever 205 is sequentially raised and lowered, the lever 205 raising the safety guide means 180 when arm 33 is raised and permitting the carton 20 to be turned on mandrel 32 to its next desired position. As the guide means 180 is raised by lever 205, the lever 200 is also raised permitting the clutch arm 201 to descend. However, the cam 165 is so constructed and arranged that the lever 205 raises the safety 180 when the dog 169 is in a position where the clutch arm 201 will not disengage the same. Thus, the shafts 59 and 155 remain interconnected by the dog 169 when safety 180 is raised by lever 205, and lever 205 is again lowered by cam 165 before the dog 169 is rotated into position to be disengaged by clutch arm 201. Accordingly, when safety 180 is lowered by lever 205, the safety engages lever 200 and again raises clutch arm 201 out of disengaging position and cam 58 again lowers arm 33 to apply another length of corner stay material.

Therefore, as long as pedal 37 is depressed, arm 33 will be continuously lowered and raised with safety 180 being temporarily raised after each downward movement of arm 33 whereby carton 20 can be indexed to a new position on mandrel 32 without requiring the stopping of the machine 30.

The operation of machine 30 will now be described. After motor 150 has been turned on and after operator has manually adjusted the driver 34 relative to arm 33 to determine the predetermined length of corner stay material 27, which driver 34 is to apply, operator places carton 20 about mandrel 32 in the manner illustrated in dotted lines in FIGURE 17 and depresses pedal 37. Subsequently, safety guide 180 is lowered because lever 182 is lowered by pedal 37 in the manner previously described. As safety guide means 180 descends about mandrel 32 the same trips lever 200 causing arm 201 to release the dog 169 and thus interconnect shaft 155 with shaft 59 to cycle machine 30. As shaft 59 rotates, cam 58 is rotated thereby and causes arm 33 to pivot downwardly whereby the movable knife 99, cooperating with fixed knife 93, cuts off the corner stay material 27 in driver 34 from supply 35 and driver 34 applies the same to adjacent side edges of carton 20.

After driver 34 has applied one length of corner stay material 27, the arm 33 is advanced upwardly and shaft 174 is rotated by brake drum 164 in such a manner that the pawl 130 advances another length of corner stay material 27 to driver 34. Also, when foot pedal 37 remains depressed, lever 205 is raised by cam 165 and thus temporarily raises the safety guide 180 whereby carton 20 can be moved to another position on mandrel 32 without disconnecting the shafts 59 and 155 and arm 33 is again lowered to apply another length of corner stay material 27 to the carton 20.

Therefore, it can be seen that there has been described an improved corner stay applying machine which has many novel features as presented above not present in prior known machines.

While the foregoing presents a preferred embodiment of the present invention, it is to be understood that modifications and/or equivalents may be made without departing from the scope of the invention, which is defined in the appended claims.

What is claimed is:

1. A machine for securing a predetermined length of corner stay material to adjacent sides of a carton to fasten the sides at angles to each other and comprising frame means, a mandrel carried by said frame means, an arm pivotally mounted to said frame means and carrying a driver for applying said predetermined length of corner stay material to said sides of said carton placed on said mandrel, a safety guard pivotally carried by said frame means, a first means carried by said frame means for normally holding said guard away from said mandrel, means for actuating said first means to permit said safety guard to drop around said mandrel, a second means carried by said frame means for actuating said arm to move said driver toward said mandrel, said second means only being actuated when said guard is dropped around said mandrel, and a third means carried by said frame means for moving said safety away from said mandrel after each cycle of operation of said machine.

2. A machine as set forth in claim 1 wherein said guard actuates said second means by engaging the same.

3. A machine for securing a predetermined length of corner stay material to adjacent sides of a carton to fasten the sides at angles to each other and comprising frame means, a mandrel carried by said frame means, an arm pivotally mounted to said frame means and carrying a

driver for applying said predetermined length of corner stay material to said sides of said carton placed on said mandrel, a safety guard pivotally carried by said frame means, a first means carried by said frame means for normally holding said guard away from said mandrel, a second means carried by said frame means and being adapted when actuated to cause said arm to pivot toward said mandrel and apply said stay material, said second means being actuated when said guard is dropped around said mandrel, and foot operated means for moving said first means away from said guard to permit said guard to drop around said mandrel and actuate said second means.

4. A combination as set forth in claim 3 wherein said foot operated means releases said first means to drop away from said guard.

5. A machine for securing a predetermined length of corner stay material to adjacent sides of a carton to fasten the sides at angles to each other and comprising frame means, a mandrel carried by said frame means, a movable arm carried by said frame means, said arm carrying a driver for applying said predetermined length of corner stay material to said sides of said carton placed on said mandrel, means carried by said frame means for feeding corner stay material to said driver, means carried by said driver for cutting a predetermined length of said corner stay material, a movable safety guard carried by said frame means, means operatively interconnected to said arm to move said driver toward said mandrel to apply said corner stay material, said last-named means being actuated when said safety guard is moved around said mandrel, and means for moving said safety guard around said mandrel.

6. A machine as set forth in claim 5 wherein said safety guard moving means includes a foot operated pedal.

7. A machine as set forth in claim 5 wherein a first lever normally maintains said safety away from said mandrel, said means for moving said safety guard moves said first lever away from said safety guard, and a second lever for moving said safety guard away from said mandrel after each cycle of said machine while said first lever is away from said safety guard.

References Cited in the file of this patent

UNITED STATES PATENTS

793,549	Stokes	June 27, 1905
1,044,257	Saur	Nov. 12, 1912
1,192,201	Jackson	July 25, 1916
2,009,421	Walz	July 30, 1935
2,070,767	Wismer	Feb. 16, 1937
2,330,756	Stanger	Sept. 28, 1943
2,332,644	Junkin	Oct. 26, 1943
2,838,757	Holtkamp	June 17, 1958