MACHINE FOR MAKING COVERS OF CASES OF BOOKS

INVENTOR

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By His Attorney
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This invention relates to machines for making blanks of a desired shape such as covers of book cases and is herein illustrated as embodied in a machine for making such blanks from a strip or web of flexible material and delivering them to the glue mechanism of a case making machine.

Case making machines of the type commonly known as Smyth machines are shown, for example, in United States Letters Patent No. 1,838,464 granted December 30, 1930 upon an application filed in the name of Walter Steinharm and in application Serial No. 532,196 filed July 21, 1931 in the name of Perley R. Glass. In machines of this type, rectangular covers are fed one by one to the grippers of a rotary drum which presents each cover to the periphery of a glue roll where it receives a coat of glue. The coated cover is transferred to the platen of a folding mechanism where two boards are placed upon its coated surface.

Thereafter the projecting margins of the covers are folded over upon the margins of the boards and pressed into place to form a case for a book. These covers, which may be of cloth, imitation leather, or other suitable material, may be made from a strip or web of a width equal to the desired height of the covers by severing the strip by cuts spaced apart a distance equal to the desired length of the covers; and, if covers having beveled corners are desired, such covers may be formed from such a strip by forming V-shaped notches at opposite points on the edge of the strip and severing the strip by cuts which extend through the apices of these notches.

Hitherto it has been customary to employ considerable hand labor in making these covers; and, having built them into a stack, to take the stack to the case making machine and feed the covers one by one to the glue mechanism of that machine. In order to avoid all manual handling of the covers during their manufacture and presentation to the case making machine, there is provided, according to one feature of the present invention, severing mechanism adjacent to the gripper of the glue drum of a case making machine, notching mechanism, and means for feeding a strip of suitable cover material intermittently past said mechanisms. In the illustrated construction the strip is fed first to the notching mechanism where two V-shaped notches are cut at opposite localities on the edges thereof, and is then fed to the severing mechanism where a cut is made across the strip through the apices of the notches, the finished cover being presented to the grippers of the blue drum of the case making machine and fed into that machine in the usual manner. A cover having beveled corners is thus produced during the pause which follows each intermittent feed movement of the strip and is immediately presented to the case making machine.

In making covers from a strip of flexible material it is desirable to be able to make covers of different lengths, and to this end and in accordance with another feature of the invention the severing mechanism and the notching mechanism are relatively adjustable toward and from each other along the path of movement of the strip. In the illustrated machine the path of the strip is substantially vertical at the notching mechanism and substantially horizontal at the severing mechanism, the notching mechanism being adjustable vertically and the severing mechanism being adjustable horizontally, provision being made for operating said mechanisms irrespective of the positions which they occupy.

These and other features of the invention including certain details of construction and combinations of parts will be described as embodied in an illustrated machine and pointed out in the appended claims.

Referring to the accompanying drawings,

Fig. 1 is a perspective of a machine in which the present invention is embodied, the glue drum of a case making machine being shown in dotted lines;

Fig. 2 is a central longitudinal section of the machine through the line II—II of Fig. 6, a strip of sheet material being shown in the position it occupies in the machine;

Fig. 3 is a detail in section upon the line III—III of Fig. 5 showing more particularly the mounting of one of the triangular notching punches;

Fig. 4 is a detail in section showing more particularly the one-way Horton clutch for driving the feed roll;

Fig. 5 is a perspective of the notching mechanism;

Fig. 6 is a rear elevation of the machine showing that end which is adapted to be attached to a case making machine; and

Fig. 7 is a perspective of a portion of a strip of sheet material showing how this strip is notched and severed to form a cover.

The general purpose of this machine is to make book covers from a sheet of paper, cloth or similar material, said covers being of a generally rectangular shape with corners which are beveled, and to present these covers to a case making machine. Referring more particularly to Fig. 7 a strip of suitable material 100 is fed first to a notching mechanism which makes two
notches 9 in opposite edges of the strip. The strip is then fed in the direction indicated by the arrow until the notches 9 are in the positions occupied by the previously-formed notches 11 whereupon the sheet is severed by a straight cut which extends through the apices of the notches. As this procedure is repeated there are thus formed from the strip a plurality of rectangular pieces having cut-off corners which are then delivered to the gluing mechanism of a case making machine.

Referring to Fig. 1 a general description of the mode of operation of the machine will be given. The strip of sheet material 100 is led from a reel 15 between guide bars 17 past two notching mechanisms indicated as a whole at A where the strip is notched. It then passes between guide rods 19 and 20 and between feed rolls 21, 23 to a severing mechanism indicated as a whole at 13. The severed cover now lies upon a table 25 with its forward edge in operative relation to the grippers, one of which is shown at 270 in Fig. 2, of a drum 27 which is part of the gluing mechanism of a case making machine, such, for example, as that shown in the application referred to above. The present machine is adapted to be hinged by means of bolts which pass through lugs 29 and 31 and through corresponding lugs on the machine of the application, said last-named lugs being shown in the left-hand portion of Fig. 6 on said application. The present machine can thus be swung toward from the case making machine when desired, and is held in operative position close to said machine by a catch which engages a hook on the machine of the application, said hook being shown in the lower right-hand portion of Fig. 15 of said application. This catch (Fig. 6) comprises a bolt 33 hinged about a vertical axis and having a nut 35 threaded on the outer end thereof which may be tightened to clamp the present machine to the hook of the case making machine. In the operation of the present machine the strip 100 is fed intermittently first to the notching mechanism A, and then to the severing mechanism B where the cover is severed from the strip and its forward end presented to the grippers of the drum 27 of the case making machine.

In order to produce covers of different lengths and to handle them properly it is necessary to be able to vary the distance between the notching mechanism and the severing mechanism, as well as between the severing mechanism and the gluing mechanism of the case making machine. To this end both the notching mechanism and the severing mechanism are mounted for adjustment lengthwise of the path of movement of the strip 100.

Referring to Fig. 5, the notching mechanism supported on a base in the form of a vertical plate 37 which is adjustable in a dove-tailed vertical guideway formed in a stationary member 39 and may be locked in adjusted position by a cam (not shown) having a handle 41 by which the same may be manipulated. Horizontally slideable on a plate 43 which is integral with the plate 37 are the bases 45, 47 of two die members 49, 51 having in their outer end bent triangular die openings 53, 55. A rod 57 slidably mounted in hubs in machine plates 9 are the two set screws 58 furnish means for holding the two die members in adjusted position with respect to each other; and a long adjusting screw 62, held from longitudinal movement and having threaded engagement with the bases 45, 47, provides means for making such adjustment after the set screws 58 have been loosened. The die members are triangular punches one of which is shown at 59 and the other at 60 (Fig. 2). The punch member 59 (Fig. 3) is slideable horizontally in a dove-tailed guideway formed in the die member 51 and has fast to it a slotted base 61, the corresponding punch member with the other die member 49 and having a slotted base 63, the long slots in the members 61, 63 extending parallel to the edges of the strip, respectively, through the rectangular slots in the bases 61, 63 are two vertical square actuating rods 67, 69 pivotally mounted in yokes 69, 71 which are part of a casting having a rearwardly-extending plate 73. The casting and the plate are provided on their under side with a guide-way to receive horizontal guide lugs 74, 76 formed on a stationary member 75 which is part of the frame of the machine. In order to provide means for readily raising and lowering the notching mechanism, the base plate 57 (Fig. 3) carries a rack 77 with which a pinion 79 meshes, said pinion being fast to a shaft 81 one end of which (not shown) protrudes from one side of the machine and is adapted to be engaged by a crank or similar member. Returning now to Fig. 5 it will be seen that the whole notching mechanism may be adjusted toward and from each other by loosening the set screws 59 and turning the long adjusting screw 62. It will further be clear that the slotted bases 61, 63 of the two punch members of the notching units permit these adjustments to be made without disturbing the vertical bars 65, 67 by which, as will presently appear, the two punches are reciprocated.

Referring now to Fig. 2, the plate 73 which carries the two actuator bars 65, 67 has fastened to its rear end by means of a bolt 83 a depending lug 85 pivoted to the upper end of an arm 87 the hub of which is fast to a rock shaft 90. The lower end of the arm 90 the hub of which is also fast to this rock shaft has at its lower end a roller (shown at 92 in Fig. 6) which runs in a groove in a cam 91 (Fig. 2) fast to a continuously rotating drive shaft 93 to which power may be applied in any suitable manner. It will be clear, therefore, that rotation of this shaft will cause horizontal reciprocation of the two punches of the notching mechanism.

The shaft of the upper feed roll 21 (Fig. 1) is rotatably mounted in a yoke 95 the arms of which are pivoted about aligned pivots 97. The rolls may be rubber covered, and the force with which they grip the strip 100 may be varied by loosening a nut 99 which clamps the yoke 95 in adjusted position, pushing the roll 21 down more or less against the roll 23, and tightening the nut again. The shaft 95 of the lower roll (Fig. 4) is the roll cage or inner member 107 of a one-way clutch, and the small rolls of this clutch being shown at 109. The outer member of this one-way clutch is a hollow gear 111, the construction being such that when this gear is rotated in one direction the feed rolls are rotated to feed the strip of ma-
terial but that when the gear 111 is rotated in the other direction, no movement is imparted to the feed rolls. Any suitable one-way driving connection between the gear 111 and the shaft 105 may be employed; but the details of the present connection will not be described further in detail.

This gear 111 is driven by a large gear 113 (Fig. 3) fast to a short rotary shaft 115 to which is also fast a small gear 117. Meshing with the small gear is a segmental rack 119 the lower end of the stem of which is pivoted in the frame of the machine at 121. Pivoted to a lug on the stem of the rack 119 at 123 is one end of a link 125 the other end of which is pivoted to a block slideable in an inclined guideway 127 formed in a lever 129. This lever is pivoted to the frame at 131 and has at its lower end a roll 132 (Fig. 6) which runs in a track formed in the periphery of a cam 133. Rotation of the cam thus swings the segmental rack 119 back and forth about its pivot 121 and imparts intermittent movements of rotation to the feed rolls 21, 23. The block to which the upper end of the lever 129 is pivoted has threaded through it a screw 135 carried by the lever 129 and held from longitudinal movement with respect to said lever. Turning the screw thus changes the location of the pivotal connection between the link 125 and the lever 129 and thus changes the extent of the swinging movements of the segment 119 and hence the extent of intermittent rotation of the feed rolls and the extent of the intermittent feed movements of the strip 100.

The severing knife 137 (Fig. 6) is adjustably fastened by cap screws 139 to a lever 141 having a segmental rack 143 at its outer end and being pivoted at its inner end at 145 to a base 147. The base has on its underside a dove-tailed guideway to receive a dove-tailed guide formed on the frame of the machine so that the base, together with the knife, may be adjusted forward and back and in the direction of extent of the strip 100 toward and from the drum 27 of the case making machine. To facilitate such adjustment a depending lug may be removably pivoted through the base 147 and hinged at its lower end to a small pinion 149. This pinion is fast to a stem 153 (Fig. 2) having a slotted head by which it may readily be turned. This pinion meshes with a stationary rack 151 so that turning of the pinion 149 adjusts the severing mechanism.

The lever 141 (Fig. 3) to which the knife 137 is swung up and down by an elongated rack 155 (shown also in Fig. 2) which remains at all times in mesh with the rack 143 in all the positions to which the severing mechanism may be adjusted. This rack 155 is carried by a lever 157 pivoted at its middle at 159 to the frame of the machine and at its outer end 161 to the upper end of an extensible link 163, the lower end of which is pivoted at 165 to the outer end of a horizontal lever 169 pivoted at 169 to the frame of the machine and having a roll 171 which travels in a cam-way cut in the side of the cam 133. While the strip is being severed, it is desirable to clamp it upon the table 35 (Fig. 1) and to this end a presser foot 173 is provided. The stem of the presser foot is pivoted at 175 to the frame of the machine and has a tail (Fig. 6) which is perforated to receive the upper end of a rod 177, said tail extending between a nut 179 threaded on the rod and a coiled spring 181 supported by a nut 183 also threaded on the rod. The lower end of the rod is pivoted at 185 to the bifurcated outer end of a short arm 187 the hub of which is fast to the rock shaft 89 by the rocking of which the notching mechanism is operated. This mechanism is so timed that the presser foot 173 clamps the strip 100 to the table during the severing operation, the spring 181 permitting considerable upward movement of the rod 177 to take place if necessary after the presser foot has descended.

The distance from the severing knife to the grippers of the drum 27 is always substantially the same as that from the severing knife to the notching mechanism, although these two distances will, of course, be greater when short covers are being made and shorter when short covers are being made. In adjusting the machine for the making of covers which are, for example, 12 inches long, the severing knife will be adjusted by means of the rack 131 and pinion 149 (Fig. 2) until the distance from the grippers of the drum 27 to the knife is substantially 12 inches. The notching mechanism will be adjusted vertically by means of the rack 77 and pinion 79 (Fig. 2) until the distance from the apices of the notching dies, measured along the path of the strip to the knife, is 12 inches. Then the adjusting screw 135 (Fig. 2) will be turned until the feed rolls at each intermittent movement of rotation will feed the strip 12 inches. The two notching units (Fig. 5) will then be adjusted toward or from each other according to the width of the strip to be notched and severed, by turning the long screw 82. When these adjustments have been made and the machine put into operation, the strip will be fed intermittently and, during each pause between the feed movements, the notching mechanism will make two notches such as the notches 9 in Fig. 7, and the knife will sever the strip through the apices of the notches such as the notches 11 which were just previously made. Each severing operation will thus produce a finished cover which is delivered to the grippers of the drum 27 of the case making machine. Although the invention has been set forth as embodied in a particular machine adapted to be attached to a case making machine, it should be understood that the invention is not limited in the scope of its application to any particular machine which has been shown and described.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A machine for making covers or book cases from a strip of sheet material having, in combination, a table for receiving finished covers, mechanism spaced from the table for notching opposite edges of the strip, mechanism located adjacent to the table for severing the strip by a cut which passes through said notches, and means for attaching said machine to a case making machine with the glue mechanism of said last-named machine adjacent to the table in position to receive the severed covers.

2. A machine for making covers of book cases from a strip of sheet material having, in combination, a table for receiving finished covers, mechanism spaced from the table for notching opposite edges of the strip, mechanism located adjacent to the table for severing the strip by a cut which passes through said notches, and means for attaching said machine to a case making machine with the glue mechanism of said last-named machine adjacent to the table in position to receive the severed covers, said notching mechanism being mounted for adjustment toward and from said severing mechanism, and said severing mecha-
nism being mounted for adjustment toward and from said glue mechanism.

3. A machine for making covers of book cases from a strip of flexible material, the machine having, in combination, severing mechanism spaced from the glue mechanism notching mechanism spaced from the severing mechanism a distance equal to a multiple of the length of the strip, cover, and means for feeding the strip intermittently past said mechanisms, and means for operating said severing mechanism being mounted for adjustment toward and from each other along the path of movement of the strip to provide for making covers of different lengths and delivering them to the glue mechanism.

4. A notching and severing machine having, in combination, notching mechanism, severing mechanism, and means for feeding a strip of sheet material intermittently past said mechanisms, said notching mechanism being mounted for adjustment sidewise of the strip and along the path of movement of the strip.

5. A notching and severing machine having, in combination, notching mechanism, severing mechanism, and means for feeding a strip of sheet material intermittently past said mechanisms, the severing mechanism being mounted for adjustment along the path of movement of the strip toward and from the notching mechanism.

6. A notching and severing machine having, in combination, notching mechanism, severing mechanism, and means for feeding a strip of sheet material intermittently past said mechanisms, said mechanisms being mounted for adjustment along the path of movement of the strip toward and from each other.

7. A notching and severing machine having, in combination, notching mechanism, severing mechanism spaced from the notching mechanism, and means for feeding the strip intermittently past said mechanisms, said mechanisms being mounted for adjustment along the path of movement of the strip toward and from each other, and means for varying the extent of the intermittent feed movements.

8. A notching and severing machine having, in combination, notching mechanism, severing mechanism spaced from the notching mechanism, means for feeding a strip of sheet material intermittently past said mechanisms, means for operating said mechanisms, a support for the strip adjacent to the severing mechanism, and means for clamping the strip upon the support and for holding it so clamped during the severing operation.

9. A notching and severing machine having, in combination, means for feeding a strip of sheet material through the machine, notching mechanism and severing mechanism past which the strip is fed, said notching mechanism being mounted for adjustment as a whole in the path of movement of the strip and comprising two units mounted for adjustment toward and from each other widthwise of the strip, and means for operating said notching mechanism constructed and arranged to remain in operative relation thereto irrespective of said adjustments.

10. A notching and severing machine having, in combination, means for feeding a strip of sheet material through the machine, notching mechanism and severing mechanism past which the strip is fed, said notching mechanism being mounted for adjustment in the path of movement of the strip, and means for operating said severing mechanism constructed and arranged to remain in operative relation thereto irrespective of such adjustment.

11. A notching and severing machine having, in combination, means for feeding a strip of sheet material intermittently, notching mechanism, and severing mechanism spaced from the notching mechanism, said notching mechanism comprising means for adjustment along the path of movement of the strip, two notching units mounted for adjustment on the base toward and from each other widthwise of the strip each unit comprising a die member and a punch, and means for producing relative movement between the die and punch in any positions to which the base or the units may be adjusted.

12. A notching and severing machine having, in combination, means for feeding a strip of sheet material, severing mechanism, notching mechanism, said notching mechanism comprising two units each having a movable member and a stationary member, the movable members having bases provided with slots which extend parallel to the edges of the strip, and means for operating said movable members comprising rods which extend through slots transverse to the plane of the strip whereby the units of the notching mechanism may be adjusted toward and from each other as well as in unison along the path of movement of the strip.

13. A notching and severing machine having, in combination, means for feeding a strip of sheet material through the machine, severing mechanism, notching mechanism, said severing mechanism being mounted for adjustment along the path of movement of the strip and comprising a toothed member having teeth extending parallel to the strip at the locality in which the strip passes through the severing mechanism, an elongated toothed member meshing with said first-named toothed member, and means for operating the elongated member.

14. A notching and severing machine having, in combination, means for feeding a strip of sheet material intermittently first in one direction and then in another direction, notching mechanism including a notching member movable in a path transverse to the first direction of movement, severing mechanism having from the notching mechanism means for operating said mechanisms in a path transverse to the second direction of movement, and means for operating said mechanisms during pauses in the intermittent feed movements of the strip.

15. A machine for notching the edges of a strip of flexible material and for severing the strip by a cut which passes through the notches having, in combination, notching mechanism, severing mechanism, and means for feeding the strip of material past said mechanisms, one at least of said mechanisms being mounted for adjustment toward and from the other along the path of movement of the strip to provide for cutting from the strip bevel-cornered pieces of different lengths.

16. A machine for notching the edges of a strip of flexible material and for severing the strip by a cut which passes through the notches having, in combination, a reel for a coiled strip of material, mechanism for feeding the strip, notching mechanism located to operate upon the strip between the reel and the feeding mechanism, severing mechanism located on the delivery side of the feed mechanism and means for operating the feed mechanism to feed the strip intermittently always through a distance equal to the distance.
along the strip from the notching mechanism to
the severing mechanism.

17. A machine for notching the edges of a strip
of flexible material and for severing the strip by
a cut which passes through the notches having,
in combination, a reel for the coiled strip, notch-
ing mechanism, severing mechanism, a pair of
feed rolls located between said mechanisms and
adapted to draw the strip past the notching mech-
anism and feed it to the severing mechanism, and
means for rotating said rolls intermittently to feed
the strip at each step through a distance equal to
the distance along the strip from the notching
mechanism to the severing mechanism.

18. A notching and severing machine having,
in combination, means for feeding a strip of sheet
material intermittently, notching mechanism, sev-
ering mechanism spaced from the notching mech-
anism, said notching mechanism comprising a
base mounted for adjustment along the path of
movement of the strip, a notching unit mounted
for adjustment on the base widthwise of the strip,
said unit comprising a die member and a punch,
and means for producing relative movement be-
tween the die member and the punch in any po-
sition to which the base or unit may be adjusted.

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