June 26, 1928. 1,675,247

W. W. BRUST

BOX CUTTING MACHINE

Filed Jan. 28, 1927 4 Sheets-Sheet 1

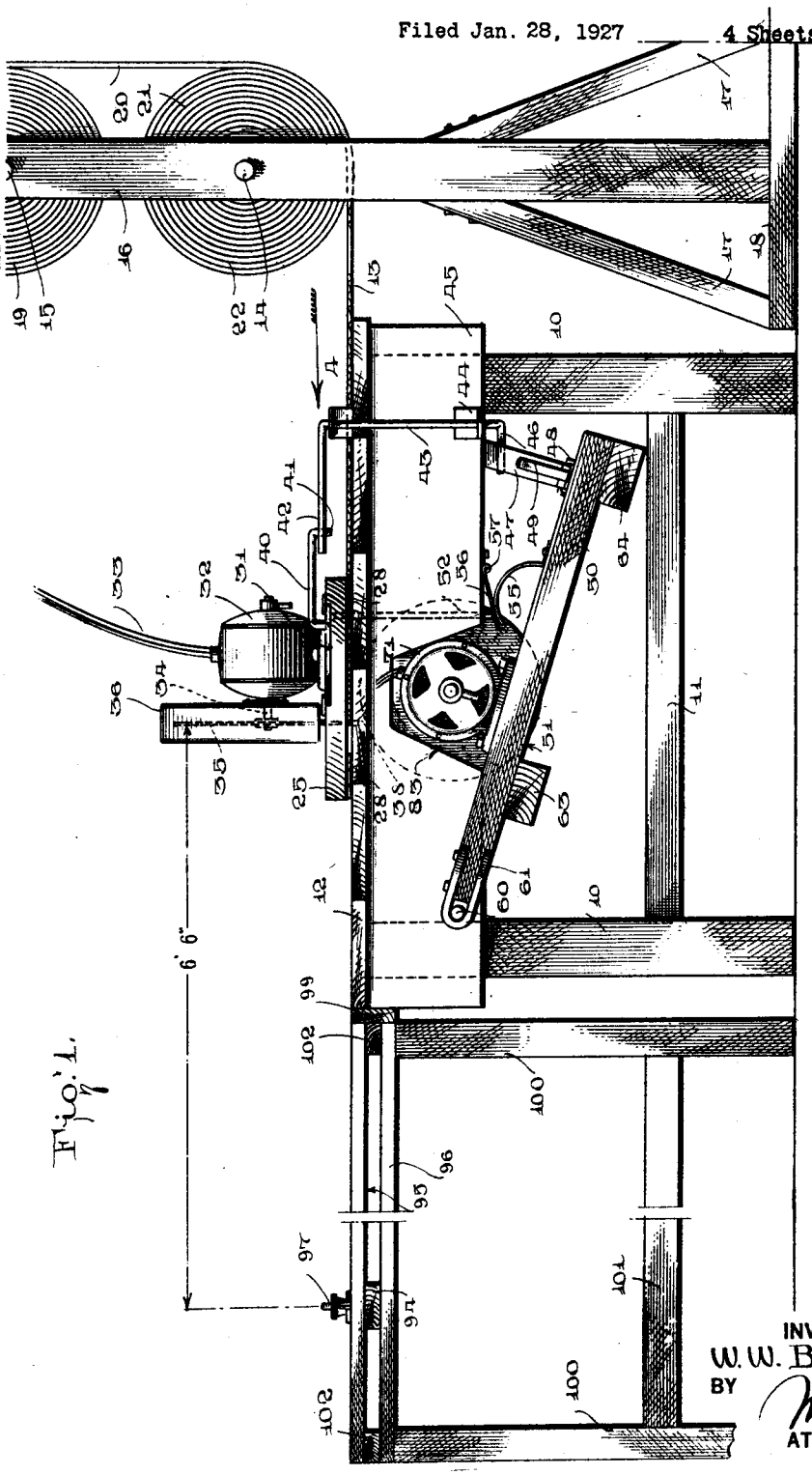


Fig. 1.

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Filed Jan. 28, 1927 4 Sheets-Sheet 2

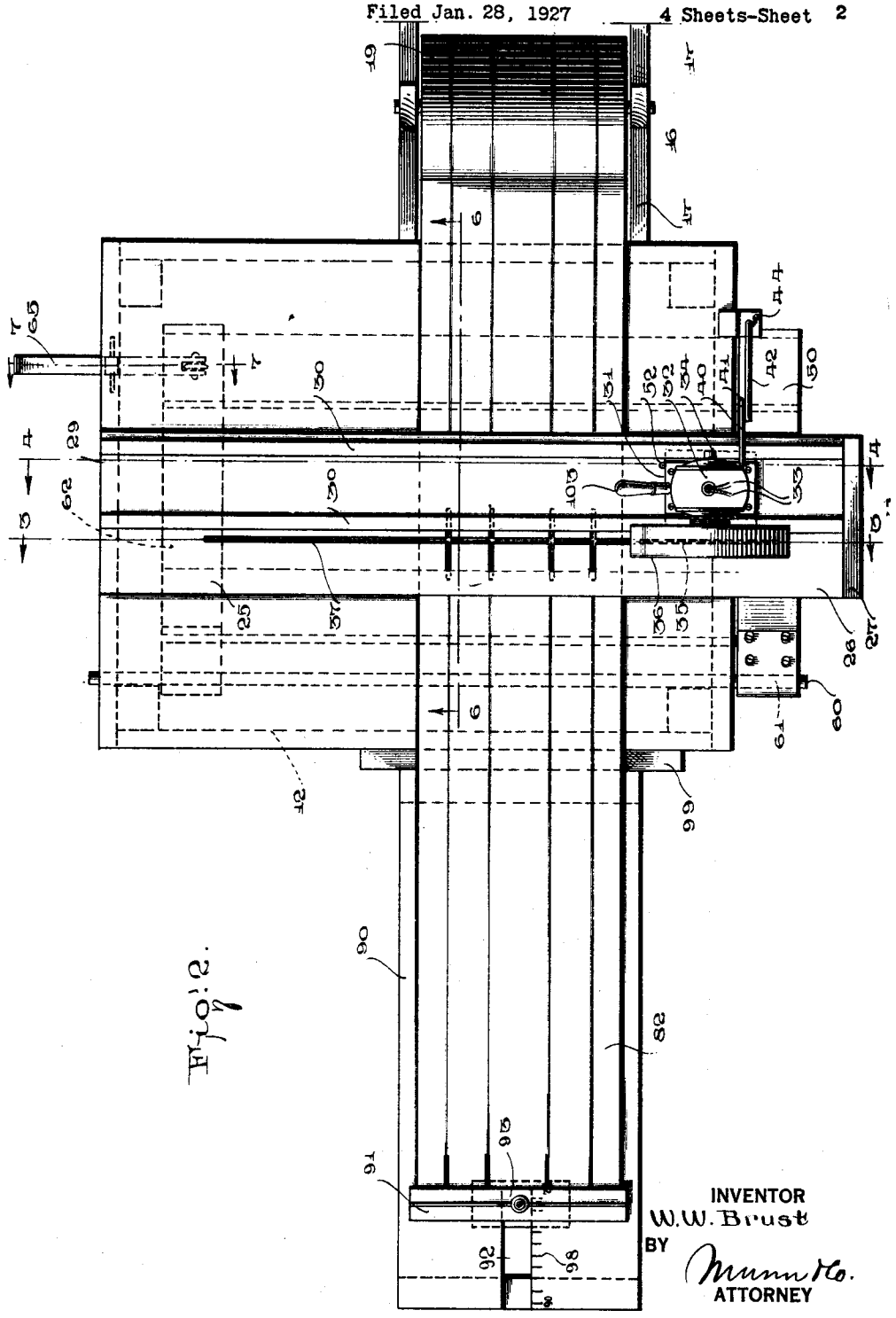


Fig. 2.

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BOX CUTTING MACHINE

Filed Jan. 28, 1927 4 Sheets-Sheet 3

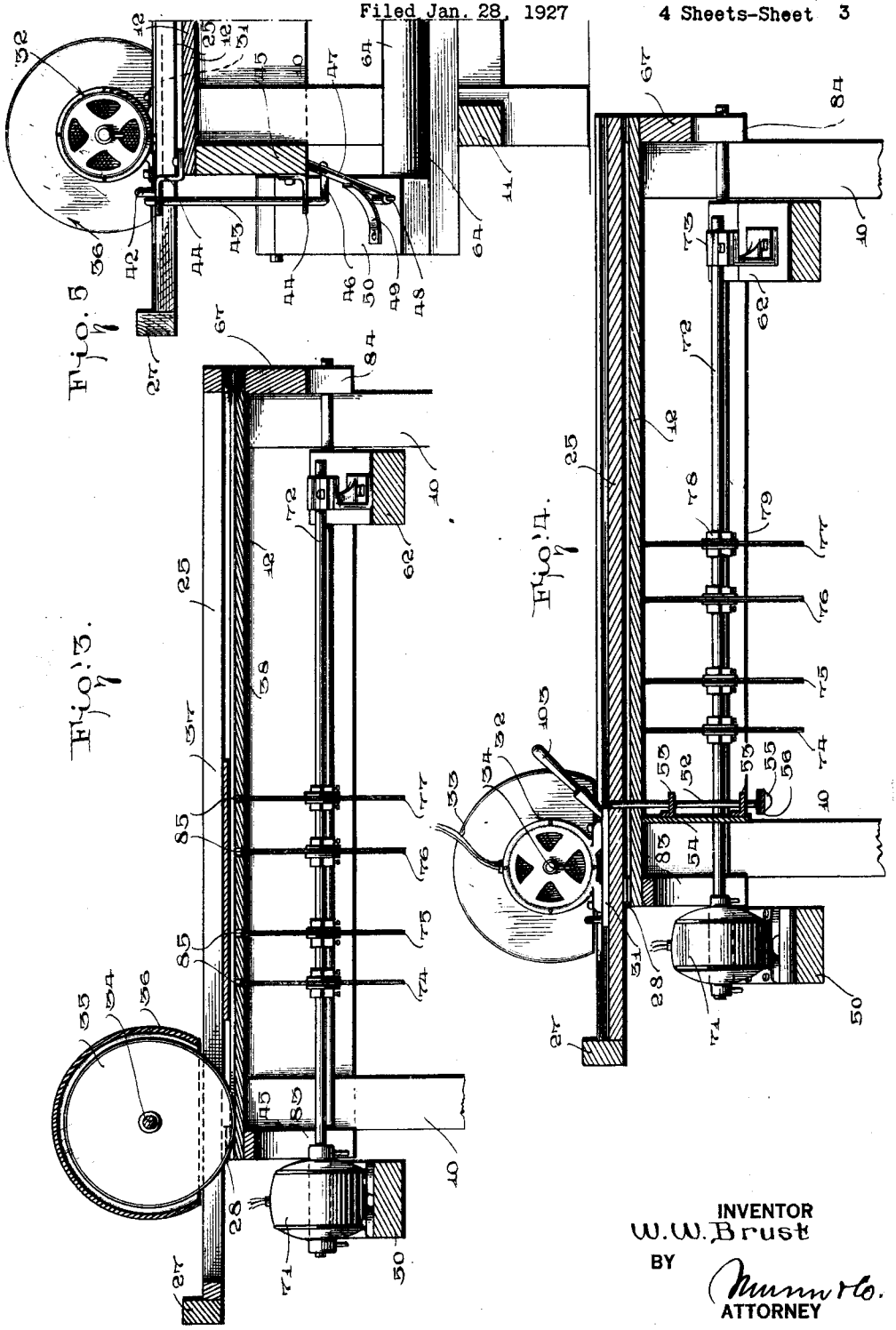


Fig. 5.

Fig. 3.

Fig. 4.

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Fig. 6.

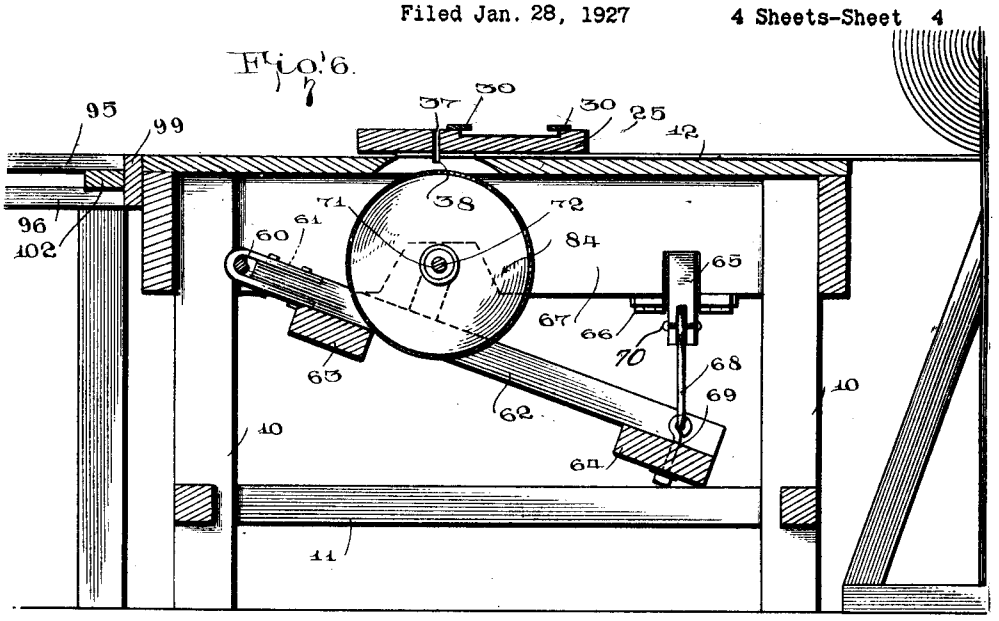


Fig. 7.

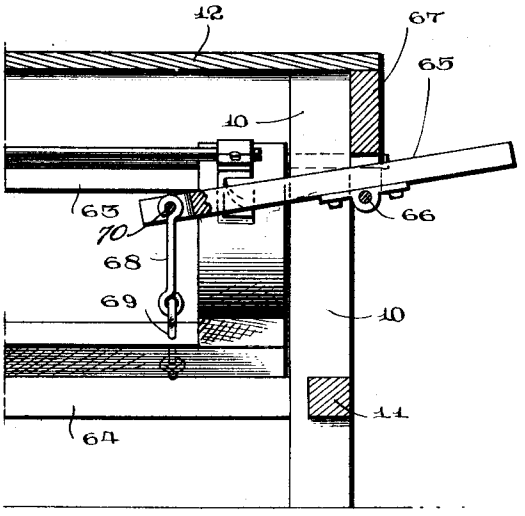


Fig. 8.

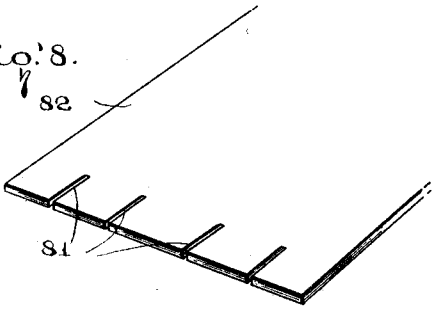
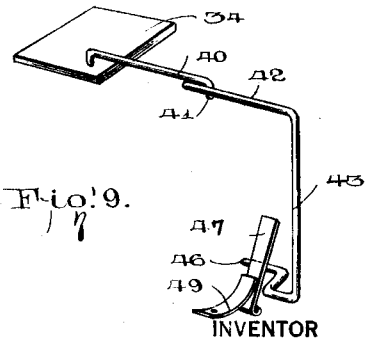


Fig. 9.



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Patented June 26, 1928. 1,675,247

UNITED STATES PATENT OFFICE.

WALTER W. BRUST, OF WESTON, WEST VIRGINIA.

BOX-CUTTING MACHINE.

Application filed January 28, 1927. Serial No. 164,296.

This invention relates to a device for slotting the ends of blanks which are adapted to be formed into boxes. The blanks from which paper boxes are formed are made up in the shape of single-faced corrugated paper or cardboard which is purchased in rolls and which may be scored to form longitudinal divisions of the cardboard for indicating the places where the card board should be and permitting it to be bent to produce the bottom, side walls and top of the box. This paper may be indented, scored or creased when purchased, or it may be marked indented, scored or creased along longitudinal lines after the card board has been received at the factory where the boxes are made.

It has been proposed to provide flap-ends on each blank by means of knives which produce a slit so that when it is attempted to fold the flaps into position to close the box not sufficient space has been provided between the edges of the flaps to permit a neat fitting of the closure.

It is an object of the present invention to provide a device which will not only shear the roll of paper transversely to produce blanks of suitable length, but to provide a mechanism for slotting the ends of the blanks to form flaps and in which the slots are of sufficient width to establish a neat fitting of the edges of the flaps when said flaps are folded into position.

Another object of the invention is the provision of a device for sawing the card board or paper into blanks of predetermined lengths while also sawing slots into the ends of blanks to form flaps, the sawing mechanism being held against movement, ordinarily, when the slotting device is brought into operation and vice versa to prevent injury to the saws and to the workmen.

A further object of the invention is the provision of a device for cutting predetermined lengths of blanks from a sheet of card board, plain or otherwise, and in which a saw mounted on a movable table is adapted to be moved transversely of the path of the cardboard, the saw being held against transverse movement when a flap producing device is moved into operative engagement with the blank, the last mentioned device being retained in an inoperative position during the transverse movement of the blank cutter.

This invention will be best understood from a consideration of the following detailed description in view of the accompanying drawing forming a part of the specification; nevertheless it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications which shall define no material departure from the salient features of the invention as expressed in the appended claims.

Figure 1 is a rear side view in elevation and partly in section of the device constructed according to the principles of my invention,

Figure 2 is a plan view of the same,

Figure 3 is a transverse vertical section taken along the line 3—3 of Figure 2,

Figure 4 is a transverse vertical section taken along the line 4—4 of Figure 2,

Figure 5 is a fragmentary end view showing the automatic locking means,

Figure 6 is a longitudinal vertical section of the cutting machine taken along the line 6—6 of Figure 2,

Figure 7 is a transverse fragmentary vertical section taken along the line 7—7 of Figure 2,

Figure 8 is a view in perspective of an end of a blank slotted to form flaps,

Figure 9 is a view in perspective showing the automatic locking means to prevent movement of the blank cutting device.

Referring more particularly to the drawings, 10 designates legs which are reinforced longitudinally with brace bars 11. Upon the legs is supported a top or table 12 over which the card board 13 is adapted to be drawn for cutting blanks of predetermined lengths and for slotting the ends of the blanks to provide flaps. This paper is purchased in rolls and mounted upon axles 14 and 15 carried by a rack 16 which are braced by stays 17 secured to a base member 18. The lower end of the rack is likewise secured or supported by the base member 18. The upper roll 19 is unwound with the sheet 20 of card board of the roll 22 so that both sheets are alined and drawn across the table 12 whereby two blanks are cut in lengths and slotted simultaneously in order to provide for a more economical operation of the cutting machine. Any number of racks and therefore any number of rolls of card board may be employed as will be practical for the purpose.

A second table 25 is disposed transversely

of the table 12 with its rear end 26 projected beyond the rear end of the table 12 and has an upstanding stop 27 secured to the extended end. This table is hingedly connected intermediate its ends as shown at 28 to the rear side of the table 12 so that the forward or working end 29 may be elevated at an acute angle to the table 12 for a purpose to be presently described. This oscillatory table is provided with tracks 30 which are adapted to receive the edges of a carriage 31 and guide said carriage transversely of the table 12 and longitudinally of the table 25 whereby said carriage may be moved along a predetermined path across the movement of the alined sheets of card board 20 and 21.

Secured to the carriage 31 is a motor 32 having wires 33 connected with the usual house current and carrying a rotary saw 35, the saw being covered by a housing 36 and bracing the upper portion of the saw to prevent injury to the operator of the machine. This saw is adapted to be rotated and is movable through a slot 37 in the oscillatory table 25 and through a slot 38 in the main table 12, so that as the rotating saw is moved transversely of the table 25, it will cross the path of movement of the card board 20 and transversely shear the sheet of card board. For economy two or more sheets of card board 20 and 21 may be alined, drawn over the table 12 and simultaneously cut.

An arm 40 is secured to the carriage 31 and projects laterally therefrom and has a finger 41 depending from the arm 40 adapted to engage an arm 42 formed integrally at the upper end of a vertical rock shaft 43 mounted in bearings 44 which are secured to one face of a board 45. Said board is secured to the rear legs 10 of the table. The lower end of the shaft 43 is provided with a finger 46 adapted to be engaged by a leaf 47 pivotally mounted at 48. This leaf is maintained in engagement with the finger 46 by means of a spring 49 carried by a transverse bar 50 of the swinging frame generally designated by the numeral 51.

An automatic stop for the carriage 31 includes a vertical rod 52 mounted in bearings 53 which is secured to the inner face of a board 54 connecting in any approved manner to the rear legs 10. The upper end of the rod 52 is maintained in a predetermined horizontal plane and slidably below the face of the carriage 31 by means of a spring member 55 and a leaf 56 pivoted at 57 to the bottom of the board 45. Said stop rod 52 is adapted to be moved upwardly and into close association with the front end of the carriage 31 to prevent transverse movement of the carriage at a certain period of operation of the device as will be presently explained.

The swinging frame 51 is hingedly mounted as shown at 60 by means of straps 61 secured to the end bars 50 and 62 and has a pair of spaced transverse bars 63 and 64 adapted to connect the end bars together. The swinging frame is adapted to be oscillated by means of a lever 65 pivoted at 66 to the lower edge of a front plate 67 secured to the front legs 10. The inner end of the lever is connected by means of a link 68 with the transverse bar 64 through an eye bolt 69. The upper end of the link, is connected at 70 on a bolt carried by the inner end of the lever 65.

A motor 71 is rigidly secured to the upper face of the end bar 50 and is provided with a shaft 72 extending transversely of the table with the forward end of the shaft being mounted in bearings 73 carried by the front end bar 62. On the shaft 72 at spaced intervals is placed a plurality of saws 74, 75, 76 and 77. Each saw is provided with a hub portion 78 adapted to be secured by a set screw 79 to the shaft. This provides for an adjustment of the saws for varying the spacing of the slots 81 in the ends of the blanks 82. The end board 45 is cut out as shown at 83 so that when the frame 51 is operated, the shaft 72 may be conveniently carried upwardly, and likewise the saws. The table is provided with longitudinal slots 85 running transversely and at right angles to the slots 37 and 38 so that when the frame is oscillated the saws 74 to 77 inclusive may be moved simultaneously through the slots for cutting the slots 81 in the end of the blanks 82. The frame 51 is retained in an inoperative position by means of the bar 64 resting upon the brace bar 11.

An auxiliary table 90 extends longitudinally of the path of the moving sheets of card board 20 and 21, and is adapted to receive the card board before the card board is sheared transversely and slotted longitudinally. This table has a movable stop 91 adapted to abut the ends of the blanks 82 and is also adapted to determine the length of each blank. It will be noted that the table has a central longitudinal slot 92 in which is movable a block 93. This block is secured to a transverse block 94 guided longitudinally of the auxiliary table by means of tracks 95 and 96. A set screw 97 is adapted to secure the stop 91 to the table 90 when the proper length of the blanks has been determined through the scale 98. The auxiliary table at its inner end abuts the inner end of the table 12 and is secured in place by means of a board 99 which is secured to both the auxiliary table and the table 12 in any approved manner. The auxiliary table is carried by legs 100 and is braced by transverse bars 101 and 102.

The carriage 31 has a handle 103 which is adapted to be grasped by the operator whereby the carriage may be moved longi-

tudinally of the oscillatory table or pivoted leaf 25.

The operation of my device is as follows: Two sheets 20 and 21 from the rolls of card board are placed in alinement and drawn transversely of the table 12 until the rough edges of the card board are properly positioned beyond the slot 37 of the oscillatory table 25. The swinging frame 51 being in its lowered position, the carriage 31 is moved longitudinally of the oscillatory table 25. The saw 35 being set in operation through proper electrical connection of the motor 32 will cut off the rough edges of the alined sheets of card board as the saw is moved transversely of the alined sheets. The carriage 31 is then moved back into its normal inoperative position and beyond the upper end of the stop 52 in order that the swinging frame 51 may be oscillated for forming slots in the free end of the sheets of card board. When the carriage has been moved to its inoperative position the arm 40 engages the finger 42 oscillating the same, rocking the shaft, and oscillating the finger 46 which being in engagement with the leaf or stop 47 moves the stop outwardly from engagement beneath the board 45, thereby permitting the swinging frame to be moved upwardly. It will be appreciated that the stop 47 normally rests beneath the lower edge of the board 45 so that it is impossible to elevate or oscillate the frame 51 when the carriage 31 is being moved longitudinally of the oscillatory table 25 and transversely of the sheets of card board. The spring member 49 tends always to move the leaf 47 into position where the upper end of said leaf will be engaged beneath the lower edge of the board 45. This leaf is only released from engagement from the board 45 when the carriage 31 has been moved to its inoperative position as shown in Figure 2 because of the fact that the arm 41 causes rocking of the shaft 43 and outward oscillation of the leaf 47 against the tension of the spring 49.

In view of the position of the stop 47 the swinging frame may be oscillated when the lever 65 is rocked to cause elevation of the said frame. With a consequent upward movement of the saws 74 to 77 inclusive which are moved through the slots 85, the longitudinal slots are formed in the paper. The saws are moved upwardly a sufficient distance to provide for the proper length of the slots so that when the saw 35 is moved transversely and centrally of the length of the slots, the blanks will be formed having both ends slotted providing for the required lengths of slots so that when the flaps are bent inwardly they will form a complete closure for each end of the box.

As has been stated that after the longitudinal slots are produced, the carriage 31 is moved longitudinally of the table 25 for severing the blanks from the alined sheets of card board and for cutting the card board transversely intermediate the ends of the longitudinal slots to produce the closure flaps. When the carriage 31 is moved longitudinally of the table 25 the arm 42 is released as is the shaft 43 and finger 46 thereby permitting the spring 49 to move the leaf or stop 47 to such a position that the upper free end of said stop will be engaged beneath the board 45 thus absolutely preventing any one from moving the swinging frame upwardly and likewise the saws 74 to 77 inclusive into operative position or into the path of the saw 35 when the saw 35 is in cutting position with the card board.

When the carriage 31 has been moved to an inoperative position, the leaf 47 is moved out of engagement with the board 45 so that the swinging frame may be oscillated for bringing the saws 74 to 77 inclusive into cutting relation with the card board. As the swinging frame is oscillated and its respective saws are moved into position, the spring 55 being moved upwardly forces the leaf 56 upwardly and likewise the rod or stop 52 causing the upper end of said stop to be projected across the path of the carriage 31 thus preventing the operator of the machine or any unauthorized person from moving the carriage and likewise the saw 35 transversely of the path of the saws 74 to 77 inclusive and thus preventing the saw 35 from being forced into engagement with the teeth of the saws 74 to 77 inclusive.

It will be seen by this construction that only one cutting mechanism can be brought into operative relation with the card board at one time so that the stop 52 is moved into operative position when the swinging frame is operated to prevent movement of the saw 35 or stop 47 is moved into operative position beneath the board 45 to prevent oscillation of the frame 51 when the carriage 31 and likewise the saw 35 are being moved into cutting relation with the paper.

The stock employed in the manufacture of boxes may be the single-faced corrugated paper or box board or the stock may be what is termed cardboard or box board or solid fiber box board.

I claim:

1. A device of the character described comprising a table over which a sheet of card board is adapted to be moved, means movable over the table for cutting the card board transversely and means adapted to be moved into engagement with the card board for providing a plurality of longitudinal slots in the card board in a predetermined spaced relation, and means for preventing movement of the transverse cutting means when the longitudinal slotting means is brought into operation.

2. A device of the character described comprising a table over which a sheet of card board is adapted to be moved, means movable over the table for cutting the card board transversely, means adapted to be moved into engagement with the card board for providing a plurality of longitudinal slots in the card board in a predetermined spaced relation, and means for preventing the longitudinal slotting means from being brought into operation when the transverse cutting means is in operative relation with the card board.

3. A device of the character described comprising a table over which a sheet of card board is adapted to be moved, means movable over the table for cutting the card board transversely, means adapted to be moved into engagement with the card board for providing a plurality of longitudinal slots in the card board in a predetermined spaced relation, and means adapted to be actuated by the longitudinal slotting means to prevent movement of the transverse cutting means.

4. A device of the character described comprising a table over which a sheet of card board is adapted to be moved, means movable over the table for cutting the card board transversely, means adapted to be moved into engagement with the card board for providing a plurality of longitudinal slots in the card board in a predetermined spaced relation, means for preventing movement of the longitudinal slotting means, and means associated with the transverse cutting means adapted to release the means for preventing operation of the longitudinal slotting means when the transverse cutting means is placed in an inoperative position.

5. A device of the character described comprising a table over which a sheet of card board is adapted to be moved, means movable over the table for cutting the card board transversely, means adapted to be moved into engagement with the card board for providing a plurality of longitudinal slots in the card board in a predetermined spaced relation, and a stop means adapted to prevent movement of the transverse cutting means, means actuated by the movable slotting means to be brought into operative engagement with the cutting means to prevent movement of the cutting means when the slotting means is brought into operative relation with the card board.

6. A device of the character described comprising a table adapted to receive card board to be formed into boxes, a saw means for rotating the saw, means for moving the saw transversely of the card board for forming blanks, a pivotally mounted frame, a plurality of saws carried by the frame, means for simultaneously rotating the saws on the frame, means for oscillating the frame for moving the last mentioned saws into operative engagement with the card board for producing longitudinal slots in the same, means adapted to be moved by the oscillating frame to prevent movement of the cutting saw transversely of the paper when said frame is oscillated, and means adapted to be actuated by the movable cutting saw for preventing oscillation of the frame when the cutting saw is moved into operative relation with the paper.

7. A device of the character described comprising a table over which a sheet of card board is adapted to be moved, a frame swingably mounted below the table, a shaft carried by the frame, a plurality of spaced saws rigid with the shaft, means for rotating the shaft and saws, said table being provided with an opening through which the saws are adapted to be projected when the frame is raised, and means for raising said frame whereby the saws will provide a plurality of longitudinal slots in the card board.

8. A device of the character described comprising a table over which a sheet of card board is adapted to be moved, a frame swingably mounted below the table, a shaft carried by the frame, a plurality of spaced saws rigid with the shaft, means for rotating the shaft and saws, said table being provided with an opening through which the saws are adapted to be projected when the frame is raised, means for raising said frame whereby the saws will provide a plurality of longitudinal slots in the card board, and means for producing a transverse slot in the card board and intermediate the ends of the longitudinal slots.

9. A device of the character described comprising a table over which a sheet of card board is adapted to be moved, a frame swingably mounted below the table, a shaft carried by the frame, a plurality of spaced saws rigid with the shaft, means for rotating the shaft and saws, said table being provided with an opening through which the saws are adapted to be projected when the frame is raised, means for raising said frame whereby the saws will provide a plurality of longitudinal slots in the card board, a saw mounted on the table, and means for guiding the saw transversely of the path of the card board for cutting the card board transversely intermediate the ends of the longitudinal slots.

10. A device of the character described comprising a table over which a sheet of card board is adapted to be moved, a frame swingably mounted below the table, a shaft carried by the frame, a plurality of spaced saws rigid with the shaft, means for rotating the shaft and saws, said table being provided with an opening through which the saws are adapted to be projected when the frame is raised, means for raising said

frame whereby the saws will provide a plurality of longitudinal slots in the card board, a saw mounted on the table, means for guiding the saw transversely of the path of the card board for cutting the card board transversely intermediate the ends of the longitudinal slots, and means for retaining the second mentioned saw in an inoperative position when the frame is moved for placing the first mentioned saws in cutting relation with the card board.

11. A device of the character described comprising a table over which a sheet of card board is adapted to be moved a frame swingably mounted below the table, a shaft carried by the frame, a plurality of spaced saws rigid with the shaft, means for rotating the shaft and saws, said table being provided with an opening through which the saws are adapted to be projected when the frame is raised, means for raising said frame whereby the saws will provide a plurality of longitudinal slots in the card board, a saw mounted on the table, means for guiding the saw transversely of the path of the card board for cutting the card board transversely intermediate the ends of the longitudinal slots, and a rod mounted for vertical movement adapted to be projected into the path of the second mentioned saw to maintain said saw in an inoperative position when the frame is swung to an operative position.

12. A device of the character described comprising a table over which a sheet of card board is adapted to be moved, a frame swingably mounted below the table, a shaft carried by the frame, a plurality of spaced saws rigid with the shaft, means for rotating the shaft and saws, said table being provided with an opening through which the saws are adapted to be projected when the frame is raised, means for raising said frame whereby the saws will provide a plurality of longitudinal slots in the card board, a saw mounted on the table, means for guiding the saw transversely of the path of the card board for cutting the card board transversely intermediate the ends of the longitudinal slots, a vertical rod slidably mounted on the table, a carriage for supporting the second mentioned saw, and means carried by the frame for forcing the rod across the path of the carriage to prevent movement of said carriage when the frame is swung upwardly for positioning the first mentioned saw in cutting relation with the card board.

13. A device of the character described comprising a table over which a sheet of card board is adapted to be moved, a frame swingably mounted below the table, a shaft carried by the frame, a plurality of spaced saws rigid with the shaft, means for rotating the shaft and saws, said table being provided with an opening through which the saws are adapted to be projected when the frame is raised, means for raising said frame whereby the saws will provide a plurality of longitudinal slots in the card board, a saw mounted on the table, means for guiding the saw transversely of the path of the card board for cutting the card board transversely intermediate the ends of the longitudinal slots, a rod rockably mounted on the table and provided with an arm, a carriage for movably supporting the second mentioned saw and provided with a finger adapted to be engaged by the arm on the rod, a stop carried by the frame to limit the upward movement of said frame and adapted to engage beneath the table, a spring for forcing said stop into position to prevent upward movement of the frame, and a second arm carried by the rod and adapted to force the stop out of engagement with the table to permit upward movement of the frame, said rod and arm adapted to be actuated when the carriage is moved to an inoperative position.

14. A device of the character described comprising a table over which a sheet of card board is adapted to be moved, a frame swingably mounted below the table, a shaft carried by the frame, a plurality of spaced saws rigid with the shaft, means for rotating the shaft and saws, said table being provided with an opening through which the saws are adapted to be projected when the frame is raised, means for raising said frame whereby the saws will provide a plurality of longitudinal slots in the card board, a saw mounted on the table, means for guiding the saw transversely of the path of the card board for cutting the card board transversely intermediate the ends of the longitudinal slots, a rod rockably mounted on the table and provided with an arm, a carriage for movably supporting the second mentioned saw and provided with a finger adapted to be engaged by the arm on the rod, a stop carried by the frame to limit the upward movement of said frame and adapted to engage beneath the table, a spring for forcing said stop into position to prevent upward movement of the frame, a second arm carried by the rod and adapted to force the stop out of engagement with the table to permit upward movement of the frame, said rod and arm adapted to be actuated when the carriage is moved to an inoperative position, and means actuated by the upward movement of the frame to prevent movement of the carriage so that said carriage and saw will not be moved across the card board when the first mentioned saws are in operative relation with the card board.

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