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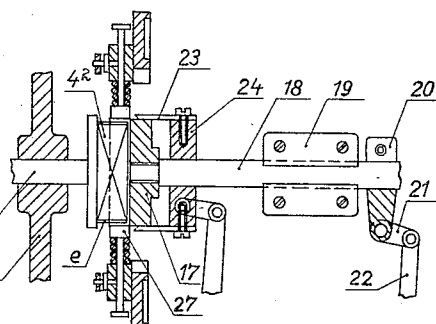
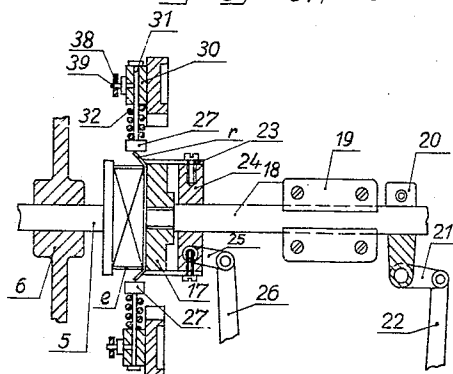
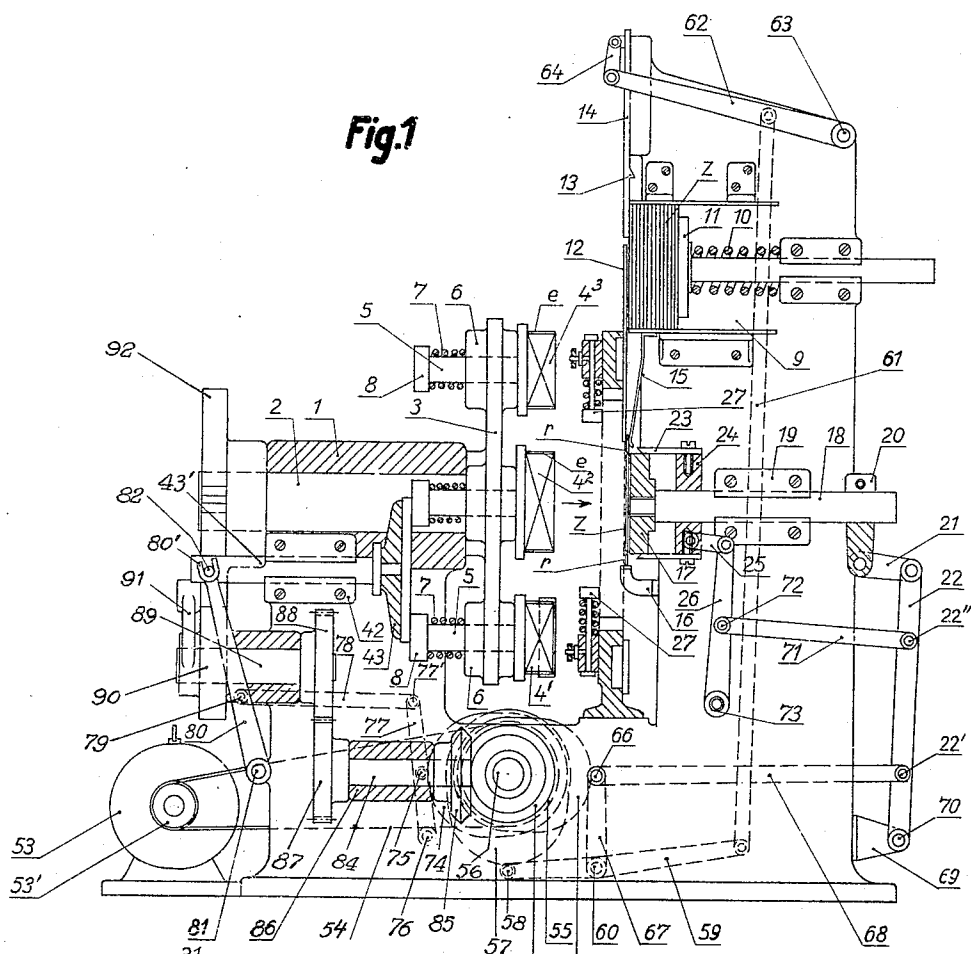
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1,886,054

DEVICE FOR PRODUCING BOX PARTS WITH INSERTED EDGE LINING

Filed June 12, 1929

3 Sheets-Sheet 1



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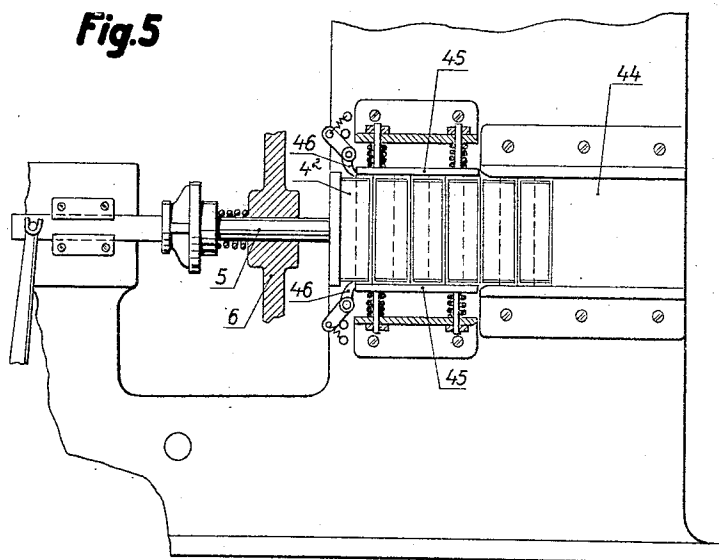
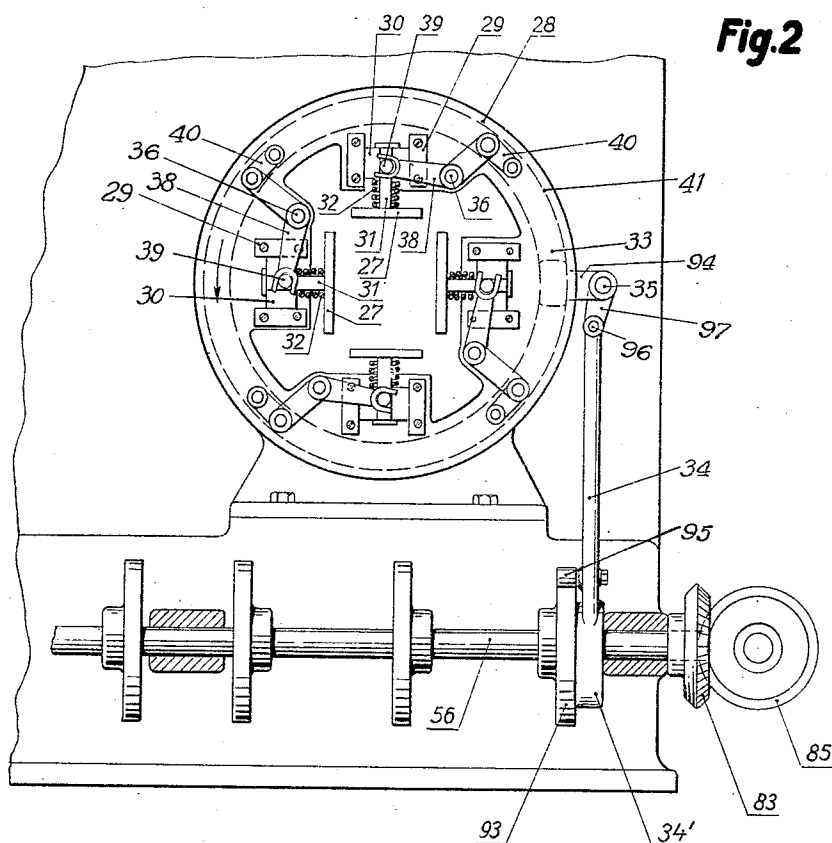
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DEVICE FOR PRODUCING BOX PARTS WITH INSERTED EDGE LINING

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3 Sheets-Sheet 2



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Fig. 6

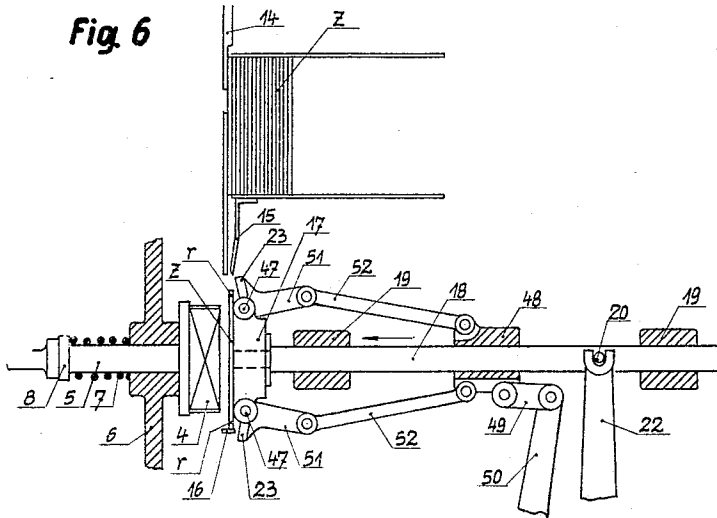


Fig. 7

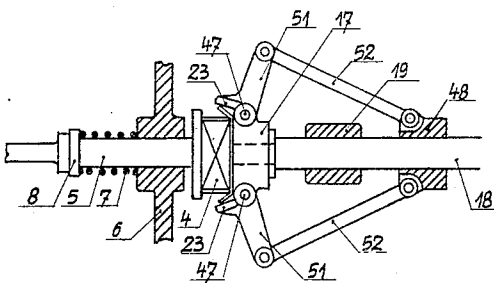


Fig. 9

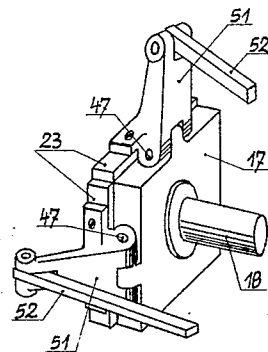
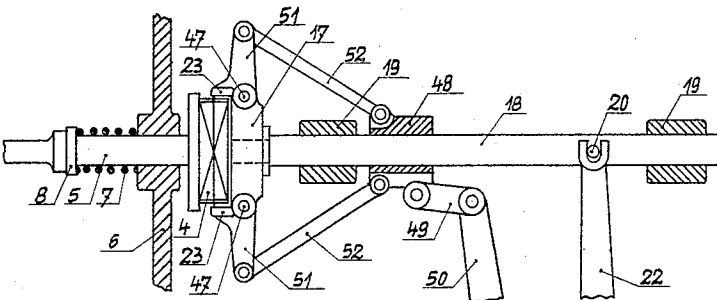


Fig. 8



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UNITED STATES PATENT OFFICE

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DEVICE FOR PRODUCING BOX PARTS WITH INSERTED EDGE LINING

Application filed June 12, 1929, Serial No. 370,367, and in Germany June 16, 1928.

The present invention relates to a device for the production of box parts with inserted edge lining or neck.

The prior art knows of various attempts made to combine in the manufacture of cardboard boxes the various steps of forming a part of the box from a cutting and of attaching the inserted edge lining or neck in one operation by plunging the upper die carrying the edge lining to be inserted into a drawing shaft in which the work is formed and, simultaneously, the walls of the box part are pressed against the gummed edge lining or neck. However, it is impossible to insure a lasting and firm connection of the various parts concerned even if the walls of the drawing shaft are made elastic and the work on being combined with the neck is subjected to the spring-actuated pressure of the walls of the drawing shaft. Moreover, the output is unfavorably affected in so far as a new neck can be attached only after the drawing step has been finished.

In one known device a composite upper die which is divided into two parts is employed. One part of said die serves for forming the edge lining or neck which after being formed is moved to the second part of said die and thereafter conveyed on said second part into the drawing shaft. This composite die entails a complex arrangement for its control since the work has to be moved on the said die before it is in proper position for the drawing step.

The present invention offers a solution of the problem by placing the neck to be inserted in the known manner on an upper die or forming it thereon and leaving it in its original position, the upper die coacting with a lower die which receives the cutting.

According to the invention, the cooperation of the two dies causes the part of the box forming the bottom to be held between them under pressure, whereupon the laterally overlapping edges of the cutting are caught by laterally engaging bending fingers and the like and then folded and pressed against the inserted neck; if necessary, special pressers may be used for this step.

Several upper dies may be arranged on a

common turret in such a manner that during the combination of neck and the box portion to be formed the neck may be placed on another die or formed thereon while still another die conveys the finished work to a discharge shaft.

Several embodiments of the invention are illustrated in the accompanying drawings, in which Figures 1 to 5, inclusive, represent a modification of the device with bending fingers and pressers, Figs. 6 to 9, inclusive, a modification employing levers which serve simultaneously as bending fingers and pressers, and in which Figure 1 is a side view, partly in vertical section; Fig. 2, a special view of the presser control; Figs. 3 and 4 represent the working dies and the parts relating thereto in two different positions and in vertical section; Fig. 5 is a vertical sectional view of that part of the device where the finished work is delivered to the discharge shaft or channel; Figs. 6 to 8 are vertical longitudinal sections and partial side views of a modification, the working dies with the parts relating thereto being shown in three different positions; and Fig. 9 is a diagram of the lower die with the bending or pressing levers arranged thereon.

Referring to the drawings, the shaft 2, moves intermittently in any desired manner, runs in the bearing 1 and carries at its end the turret 3 within which the four, axially sliding dies 4, 4¹, 4², and 4³ are arranged, the bolts 5 being positioned in the guides 6 which do not permit any twisting. The springs 7 hug the shoulder 8 of the bolts 5 and also the turret and tend to draw the dies 4 in a direction opposite to the direction of the arrow in Fig. 1.

The gummed neck portion *e* is placed by any suitable device on one of the dies 4, the device being not shown as it does not form a feature of the invention.

The receptacle 9 contains the box cuttings *z* which are continually pressed against the slotted wall 12 by means of the spiral spring 10 and the plate 11. In the slot a slide 14 provided with a nose 13 is moved to and fro and removes at each stroke a box cutting from the receptacle. The cutting thus re-

moved is guided by the plate 15 up to the stop 16 so as to be in front of the die 17.

At this moment the ram 43, influenced by suitable controlling means which are not shown, moves in its guide 42 in the direction of the arrow in Fig. 1 so that the dies 4¹ and 4² are moved forward against the action of the springs 7. Simultaneously, the die 17 whose supporting rod 18 is arranged in the guide 19 and controlled by the rods 20, 21, 22 moves towards the die 4² so that the cutting 2 is pressed in between the dies 17 and 4². Then the bending fingers 23 on the sleeve 24 are moved forward a certain distance by the rods 25 and 26 to bend the edge pieces 7, the extreme edges of which are now within reach of the pressers 27 which move forward concentrically and press the edge pieces on to the gummed neck to be inserted. Before the pressers have completed their path, the bending fingers 23 must of course be drawn back.

In the modification shown, the control of pressers is arranged as follows: The fixed ring 28 is provided with four straight guides 29 in which the carriages 30 slide. The carriages are provided with guides in which the rods 31 can be displaced which carry the pressers 27. Between the carriage 30 and the pressers 27 the springs 32 are arranged. The fixed ring 28 has an annular groove 41 in which a ring 33 can be twisted or moved to and fro by a rod 34 articulated at 35. At 36 the toggles 38 are arranged, one arm of which is forked to surround the pins 39 of the carriages 30 while the other arm is connected by the member 40 with the movable ring 33, so that at each movement of the ring 33 in the direction of the arrow in Fig. 2 the pressers are elastically pressed against the die 4² and the box cutting is united with the neck portion to be inserted.

After the pressers have moved back the ram 43 releases the ends of the bolts 5 which together with the dies 4 are also moved back under the influence of the springs 7. Simultaneously, the die 17 is returned to clear the path for the next box cutting, and the turret is moved one space.

If the ram 43 and thus two of the dies 4 move again in the direction of the arrow in Fig. 1, a new box cutting is formed into shape by the two dies 17 and 4², the pressers 27 and the bending fingers 23, and the finished box portion arranged on the die 4² is pressed into the discharge channel 44 by the preceding die, the opening of the channel being formed by the spring-actuated plates 45. Moreover, the spring-actuated means 46 hug the work under pressure and hold it while the die moves back.

The modification shown in Figs. 6 to 9 functions like the one just described with the difference, however, that the pressers 27 and their driving mechanism have been dis-

pensed with and the bending fingers 23 have taken over the function of pressing the overlapping edges on to the neck portion to be inserted. The bending fingers are constructed as toggles 51 and articulated to the die 17 at 47. On the rod 18 a sliding piece 48 is positioned and controlled by the rods 49, 50. The toggles 51 are connected with the sliding piece 48 by the rods 52 so that, when the sliding piece moves in the direction of the arrow in Fig. 6, the fingers bend the edge pieces of the cuttings (Fig. 7) and press them on to the inserted neck portion. (Fig. 8.)

The driving mechanism of the apparatus shown in Figs. 1-5 may comprise an electric motor or other prime mover 53. A driving pulley 53' on the driving shaft of the motor is connected by means of a belt 54 with a pulley 55 which is mounted on the main driving shaft 56 of the machine. Mounted on said driving shaft is a cam 57 on which roller 58 tracks. The said roller 58 is connected to one end of a lever 59 which latter is pivoted intermediate its ends at 60. Its free end of said lever 59 is connected to a rotatable lever 62 by a link 61 which is pivotally connected to both levers 59 and 62. The said swinging lever 62 is pivotally mounted at 63 to a portion of the machine frame. A link 64 joins swing lever 62 with slide 14. By use of said above described lever and linkage mechanism slide 14 may be reciprocally moved by means of cam 58 on shaft 56.

A second cam 65 is also mounted on the main machine shaft 56 and a roller 66 mounted on a lever 67 tracks the said cam. Said lever 67 is pivoted at the same point 60 at which lever 59 is pivoted. A link 68 rotatably connected to lever 67 is also rotatably connected at 22' to rod 22 intermediate its end. Rod 22 is pivotally mounted to a portion 69 of the machine frame at 70. In this manner supporting rod 18 of die 17 may be reciprocated.

A link 71 is pivotally joined to rod 22 at 22'' and also to rod 26 at 72. Rod 26 which through link 25 is connected to sleeve 24 is pivotally attached to the machine frame at 73. By provision of link 71 sleeve 24 is therefore given reciprocal motion by means of cam 65 which also operates supporting rod 18.

A further cam 74 is mounted on the main machine drive shaft 56 and a roller 75, rotatably mounted intermediate the ends of a lever 77, which latter is pivotally mounted to the machine at 76, tracks said cam. Lever 77 is connected to lever 80, which latter is pivoted at 81 to the machine frame through a link 78 connected pivotally at 77' and 79' respectively to lever 77 and 80. Lever 80 at its upper end 80' is forked to engage a bolt or pin 82 which is mounted on supporting rod 43' of the ram 43. Reciprocal mo-

tion of ram 43 is thereby effected from shaft 56 by means of cam 74.

Also mounted on the main machine drive shaft 56 is a bevel gear 83, which latter meshes with a corresponding bevel gear 85. The latter is supported or mounted to a shaft 84 which in turn is supported in bearing 86 attached to or forming part of the machine frame. Shaft 84 has mounted thereon a spur gear 87 which latter meshes with a spur gear 88. The latter is supported on a shaft 89 suitably journaled to the machine frame. Shaft 89 has elements 90, 91 thereon which are adapted to cooperate with a Maltese cross 92 which latter is fixedly mounted to shaft 2. In this manner the turret 3 is driven step by step from shaft 56.

The rod 34 (Fig. 2), which through link 97 is connected to a projection 94 from ring 33, is actuated from shaft 56 by means of a cam 93 connected on said shaft. A roller 95 rotatably borne on rod 34 tracks said cam. Rod 34 is forked at its lower end and opposite arms 34' project on opposite sides of shaft 56 serving as guides and preventing roller 95 from leaving cam 93. With the above named mechanism the pressers 27 are manipulated as described by periodic rotation of ring 33 through actuation of rod 34 by cam 93.

In the case of the mechanism of the modification shown in Figs. 6-9, the drive means for the presser 22, of course, is eliminated because the latter themselves are eliminated. The rod 50 which serves to manipulate the sliding base 48 of the pressing fingers 51 is driven from the main shaft 56 from a cam mounted thereon by means of lever and linkage mechanism similar to that described for elements of the machine of Fig. 1. The other driving elements for other parts of the machine remain the same as in Fig. 1.

The particular shapes of the cams form no part of the present invention and are mere matter of design. They must be so shaped and positioned on shaft 56 as to afford proper timing of the various elements of the machine.

I claim:

1. Apparatus for producing box parts having inserted edge linings comprising a support, a die mounted thereon to which said edge linings are mountable, a counter die adapted to cooperate with said first named die serving to clamp therebetween a box cutting and bending means adapted to engage laterally overlapping edges of said clamped cutting and fold them against the inserted edge lining on said first named die and auxiliary independently movable presser means adapted to press said bent over edges against said edge lining.

2. Apparatus for producing box parts having inserted edge linings comprising a support, a die mounted thereon to which said

edge linings are mountable, a counter die adapted to cooperate with said first named die serving to clamp therebetween a box cutting, bending means comprising pivoted presser arms mounted on said counter die and adapted to engage the laterally overlapping edges of said clamped cutting and fold them against the edge lining carried on the cooperating first named die and means for actuating said presser arms.

3. The combination, in a device for producing box parts, with inserted edge lining, of a die carrying the gummed edge lining and a lower die on which a box cutting which is adapted to be carried by the said lower die and held between the said two dies, fingers adapted to move longitudinally relative to the said lower die by moving back at first from the said cutting on the lower die and forward again when said cutting is held between the said two dies and to bend the overlapping edge portions of the said cutting, and laterally engaging, spring-actuated and controlled pressers adapted to catch the said bent overlapping edge portions and to press them fully against the said inserted edge lining after the said fingers have moved back.

4. The combination, in a device for producing box parts with inserted edge lining, a turret, upper dies arranged on the said turret, die carriers arranged on the said turret and adapted to slide longitudinally, a ram adapted to put two dies at a time into acting position, and a discharge channel adapted to receive the finished work, one of the said dies carrying the edge lining to be inserted, another one serving for uniting the said lining with a box cutting, and a third one for delivering the finished work to the said discharge channel.

5. Apparatus for producing box parts having inserted edge linings comprising a rotary support, a plurality of dies mounted thereon to which said edge linings are mountable, a counter die adapted to cooperate in turn with each of said first named dies serving to clamp therebetween each time a box cutting and bending means adapted to engage laterally overlapping edges of said clamped cutting and fold them against the inserted edge lining on the cooperating first named die and auxiliary presser means adapted to press said bent over edges against said edge lining.

6. In a device as per claim 5, in which said bending means comprise fingers slidable relative to said counter die along the side walls of said die, means for reciprocating said fingers in said direction, and means for actuating said presser means after said bending fingers have bent the said edges and receded therefrom.

7. Apparatus for producing box parts having inserted edge lining comprising a rotary support, a plurality of dies mounted thereon

to which said edge linings are mountable, a
counter die adapted to cooperate in turn with
each of said first named dies serving to clamp
therebetween each time a box cutting bending
means comprising pivoted presser arms
5 mounted on said counter die and adapted to
engage the laterally overlapping edges of
said clamped cutting and fold them against
the edge lining carried on the cooperating first
named die, and means for actuating said
10 presser arms.

In testimony whereof I affix my signature.
ALFRED JOHANNES SCHMIEDEL.

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