Sept. 13, 1949. F. C. H. MÜLLER ET AL 2,481,862

BOX HINGE ATTACHING MEANS AND METHOD

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FIG-1-

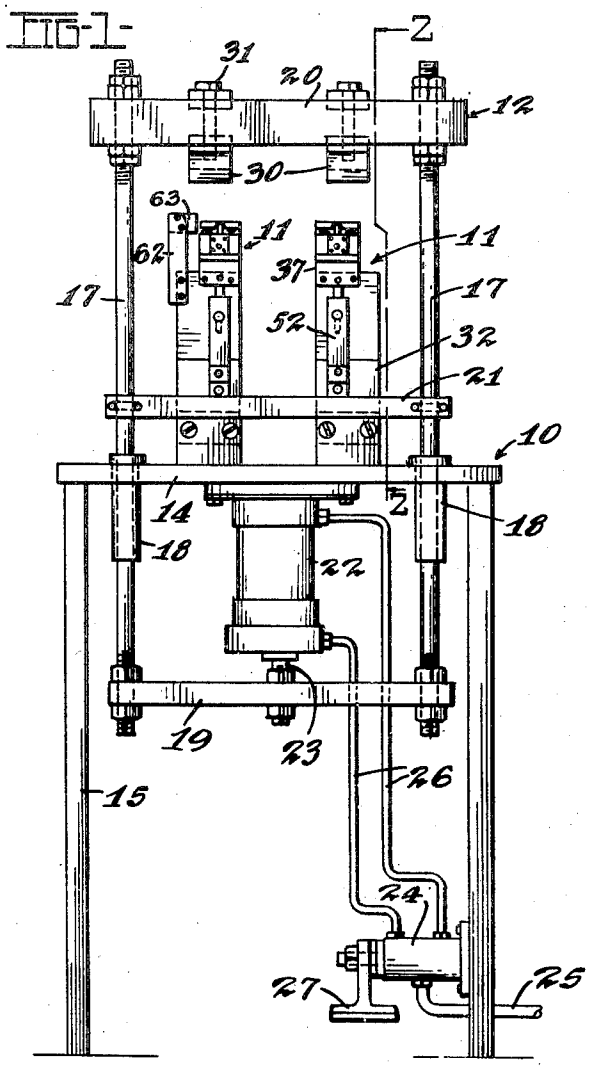


FIG-2-

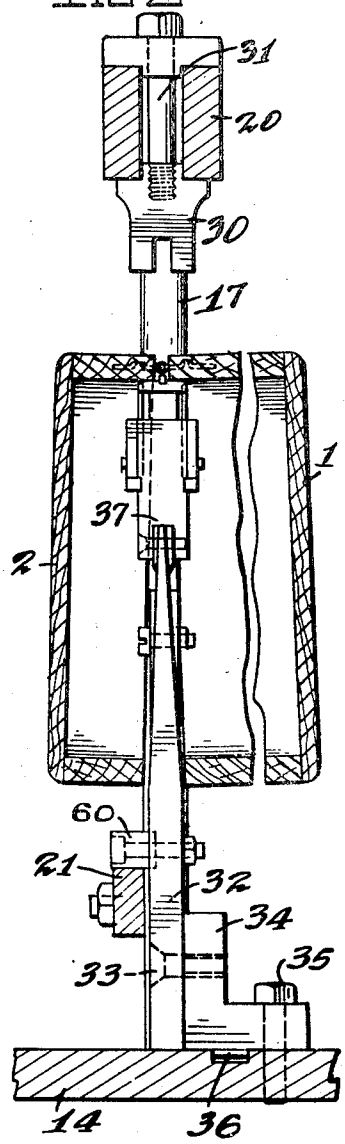
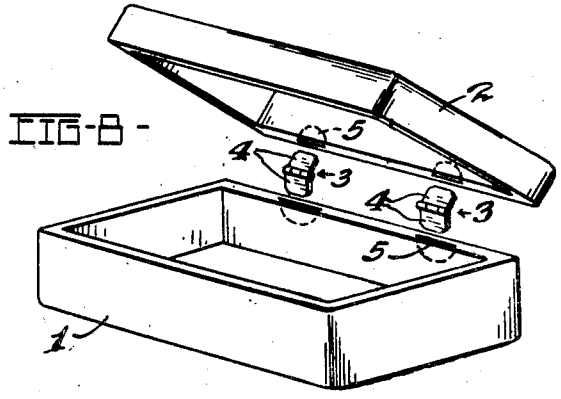


FIG-8-



INVENTORS

FERDINAND C. H. MÜLLER

THOMAS J. PILLIOD

BY Owen & Owen

Attorneys

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BOX HINGE ATTACHING MEANS AND METHOD

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FIG-3-

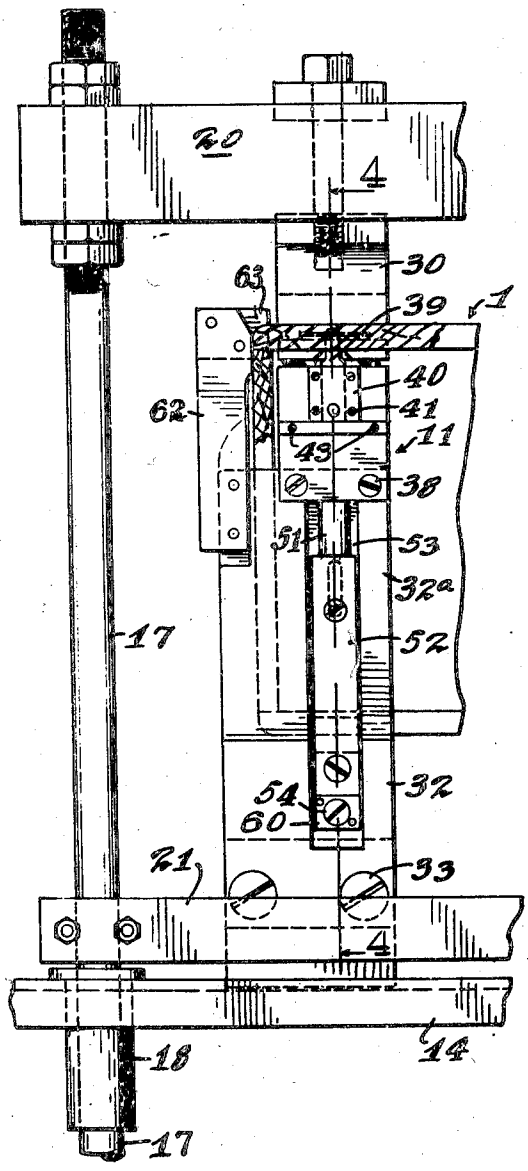
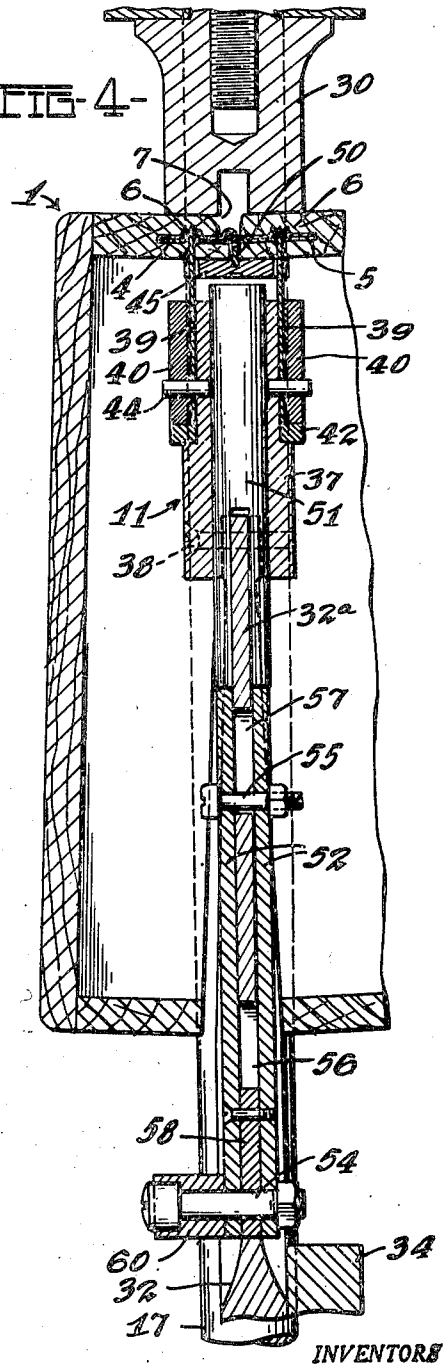


FIG-4-



INVENTORS
FERDINAND C. H. MÜLLER
THOMAS J. PILLIOD
By Owen & Owen.
Attys.

Sept. 13, 1949. F. C. H. MÜLLER ET AL 2,481,862

BOX HINGE ATTACHING MEANS AND METHOD

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FIG-5-

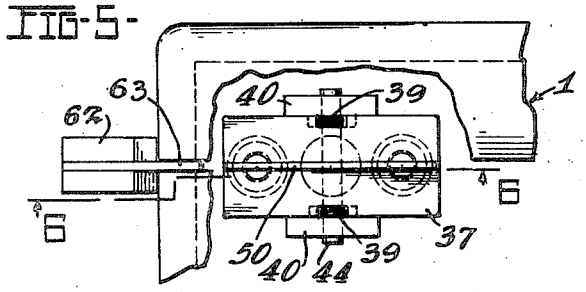


FIG-6-

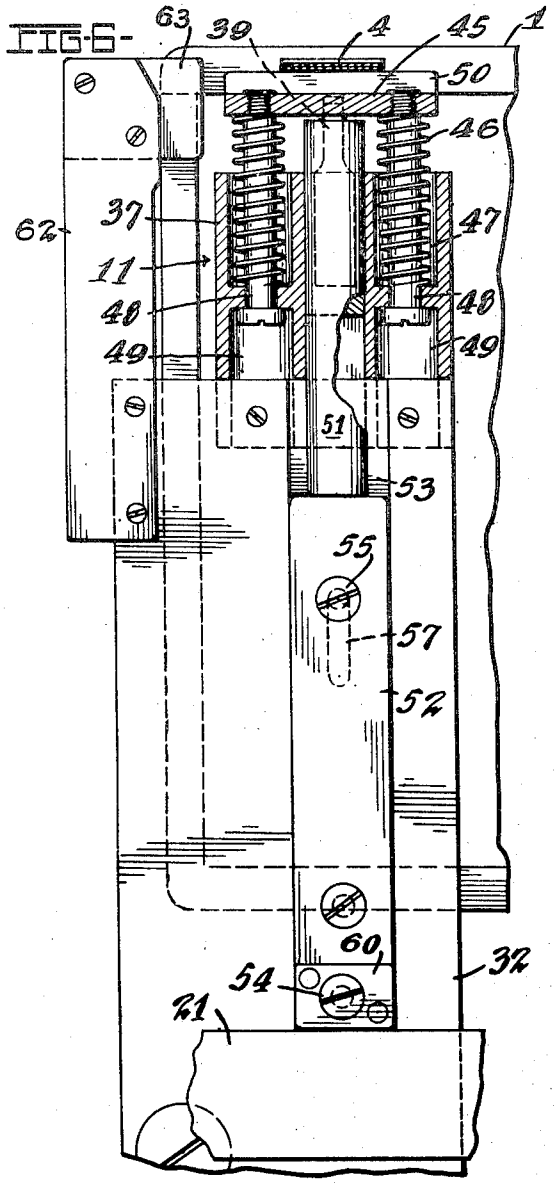
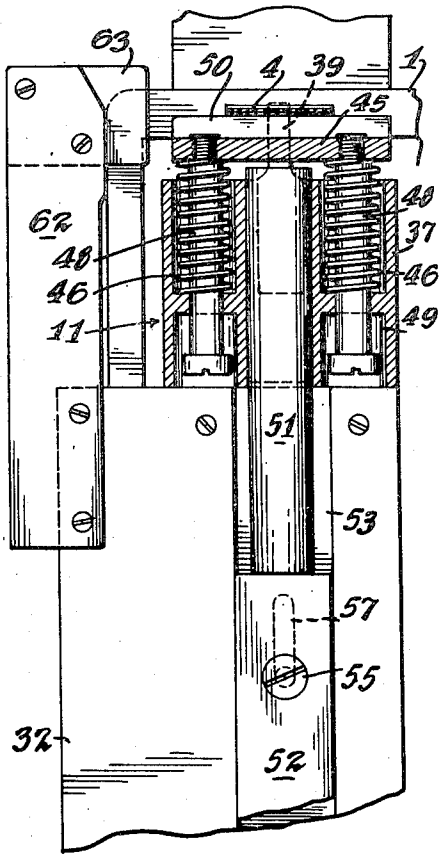


FIG-7-



INVENTORS

FERDINAND C.H. MÜLLER

THOMAS J. PILLIOD

By Owen & Owen, Attys.

Sept. 13, 1949. F. C. H. MÜLLER ET AL 2,481,862

BOX HINGE ATTACHING MEANS AND METHOD

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FIG-9-

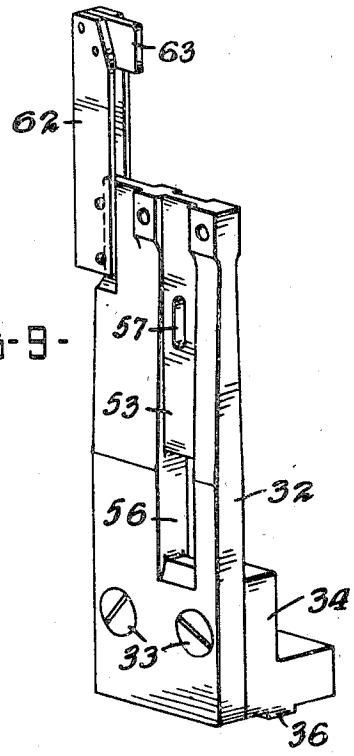


FIG-10-

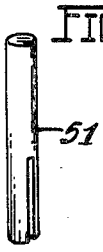


FIG-11-

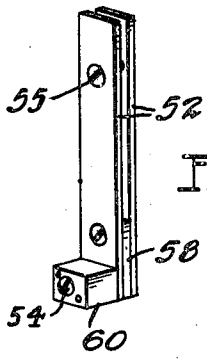
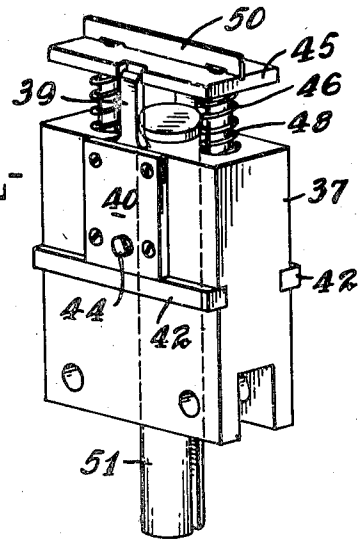


FIG-12-



INVENTORS

FERDINAND C.H.MÜLLER.

THOMAS J.PILLION

By Owen & Owen

Attys.

Patented Sept. 13, 1949 2,481,862

UNITED STATES PATENT OFFICE

2,481,862

BOX HINGE ATTACHING MEANS AND METHOD

Ferdinand C. H. Müller and Thomas J. Pilliod, Swanton, Ohio, assignors to The Pilliod Cabinet Company, Swanton, Ohio, a corporation of Ohio

Application May 18, 1946, Serial No. 670,797

3 Claims. (Cl. 153—2)

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This invention relates particularly to a means and method for attaching hinge flaps in a blind manner to box bodies and their lids, whereby such flaps, when inserted in recesses in the respective hinged members, are securely held therein by a punching and flap material upsetting operation.

In the making of small boxes, such as used for holding toilet articles, table silverware, or the like, and which are usually made of wood, the sides of the body and lid that are to be hinge connected have their adjacent meeting edges provided with registering incuts or slits into which the hinge flaps are respectively inserted and which, so far as we are aware, have heretofore been anchored therein by small brads driven through such side portions and the hinge flaps, usually from the outside, and leaving portions of the brads exposed. After attaching the hinges, these boxes are subjected to a sanding operation to smooth the material and remove any projecting portions of said brads. This manner of anchoring the hinge flaps is found to not only ordinarily require more sanding than would be necessary if the box material alone was exposed to the sanding action, but to be very destructive to the sanding material, due to the contact of the brads with the abrasive coating of the material. This necessitates frequent replacing of the sanding belt or material, which materially increases the finishing expense of the boxes.

An object of the invention is to eliminate the use of brads, or other means separate from the hinge flaps for attaching them to the box members, and also to eliminate any anchoring means for the hinges which is exposed externally of the box sides.

Another object of the invention is the provision of means for attaching hinge flaps to box members in a manner which will cause a punching of the hinge material to provide a burr thereon which imbeds itself in the box material to securely anchor the hinge flaps therein without exposing any metal to the exterior of the box for contact with the sanding material.

Another object of the invention is the provision of a simple, efficient and easily operated means for quickly and cheaply attaching hinge flaps to the box members by a punching operation.

The invention is fully described in the following specification, and one embodiment thereof illustrated in the accompanying drawings, in which—

Fig. 1 is a front elevation of a machine embodying the invention, with the plunger in raised position; Fig. 2 is an enlarged sectional view thereof on the line 2—2 in Fig. 1, with a box in position thereon preparatory to attaching the hinge thereto and with the box in vertical section; Fig. 3 is an enlarged fragmentary view of

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Fig. 1, showing one of the hinge attaching units, with the plunger of the machine in full lowered position and the punches in hinge-leaf puncturing position; Fig. 4 is an enlarged section thereof on the line 4—4 in Fig. 3; Fig. 5 is a plan view of one of the box supporting and punch units of the machine, with a box fragmentarily shown in mounting position thereover; Fig. 6 is an enlarged side elevation of such unit and associated box, with parts in section on the line 6—6 in Fig. 5 and with the stripper plate in raised position; Fig. 7 is a similar view, with the stripper plate lowered and the punches in hinge-leaf puncturing position; Fig. 8 is a perspective view of a box, with the cover and body members separated and the hinges in position preparatory to having their leaves inserted into the receiving slots of said members; Figs. 9, 10 and 11 are perspective views of the standard, the strip pin and the strip pin raising finger, respectively, of the punch unit, and Fig. 12 is a perspective view of the punch unit head assembly.

In the drawings, 1 designates the body member and 2 the cover of a box, and 3, 3 the hinges for connecting such members together. These hinges are of the flap type with the flaps or leaves 4 thereof projected into respective slots or recesses 5 in the opposing or adjacent edge portions of the rear sides of the box members, as shown in separated form in Fig. 8 and in assembled form in Fig. 4. The flaps fit more or less snugly in the recesses 5 and are firmly secured therein against withdrawal by burrs 6 or protuberant portions formed integral on the flaps at one side thereof by a puncturing operation. The puncturing force causes the burrs 6 to be forced into one side wall of the respective recess 5, as best shown in Fig. 4. The hinge sections are preferably each formed by doubling a strip of sheet metal upon itself with the inner or doubled over edge formed into eyes for receiving the pintle member and notched to form the alternating interengaging knuckle portions of the hinge.

The means for puncturing the hinge flaps to form the burrs 6 thereon and to secure the hinges in assembled relation to the body and lid members of a box with their flaps inserted into respective recesses 5, comprises a stationary frame part 10, one or more box supporting and hinge punching units 11 and a movable plunger unit 12, which is movable to effect the punching and stripping operations.

The frame 10 comprises a table or top part 14 supported by legs 15. The punch units 11 are mounted on the top of the table 14 and are of suitable number and spacing to suit the number and spacing of the hinges in a box 1 to be operated on.

The movable plunger unit 12 comprises a pair of laterally spaced vertically movable guide-bars

17, 17, projecting through guide sleeves 18 in the table 14 and rigidly connected together at their lower ends by a cross-bar 19, at their upper ends by a cross-bar 20, and intermediate said bars and above the table 14 by a cross-bar 21. Suspended from the under side of the table 14 above the bar 19 is a fluid pressure cylinder 22 having a plunger operating therein and connected by rod 23 to the lower cross-bar 19 whereby fluid under pressure admitted to the cylinder at one side or the other of the plunger will cause a raising or lowering of the plunger unit 12. The fluid pressure is admitted to a valve box 24 through a line 25 and this box has communication with opposite ends of the cylinder through a pair of pipes 26. The box 24 contains a valve (not shown), which is operated, in the present instance, by a foot treadle 27, and which, when the treadle is lowered, releases pressure from the lower end of the cylinder 22 and admits pressure to the upper end thereof to effect a lowering of the plunger assembly, and when the treadle is raised to its normal position releases pressure from the upper end of the cylinder and admits pressure to the lower end thereof to raise the plunger assembly in an obvious manner.

The top cross-bar 20 carries a plunger or pressure foot 30 over each punch unit 11 to operate in conjunction therewith, as hereinafter described, to cause a punching operation of the associated unit 11 when the plunger unit 12 is lowered. The members 30 are relatively adjustable lengthwise of the bar 20 and are secured in adjusted position by screws 31. The cross-bar 21 is connected to and operates the stripper pin of each punch assembly when the plunger unit 12 is raised and lowered, as hereinafter described.

Each punch unit 11 includes a rigid standard 32 firmly attached at its lower end by screws 33 to an L-shaped bracket 34 mounted on the table 14 and rigidly clamped thereto by screws 35. These brackets are adjustable lengthwise of the table 14 and are guided in such adjustment by ribs on the brackets engaging in a groove 36 provided in the top surface of the table lengthwise thereof. The standards 32 are of substantially rectangular form in cross-section, being narrow in a dimension transverse to the table 14 and plunger unit bar 19 and relatively broad in the dimension thereof which is lengthwise of said table and bar. The upper end portion of the bar 32 is thinned, as indicated at 32^a, in its narrow dimension and rigidly carries at its upper end a punch head or block 37.

The block 37 is of rectangular form in cross-section and is vertically slotted at its lower end to receive the upper end of the standard 32 to which it is attached by screws 38. The broad dimension of the block parallels that of the standard, and fixedly attached to each side of the block and projecting a distance upwardly therefrom is a punch member 39. Each punch, in the present instance, seats at its inner end portion within a side recess in the block and is held therein by a clamp cap 40 secured to the block by screws 41. The inner end of each punch 39 has its inward thrust against a rest strip 42 held to the block by screws 43. Matrix pins 44 project outward from the respective sides of the block 37 through registering openings in the inner end portions of the punches 39 and clamp caps 40.

A stripper plate 45 is mounted over the upper end of each punch head 37, being normally held in yieldingly spaced relation thereto by a pair of

coiled expansion springs 46 extending down into and seating at the bottoms of respective recesses 47 in the head, and having its outward movement under spring action limited by stop pins 48. These pins extend from the stripper plate down through the springs 46 and through openings in the bottoms of the recesses 47 with their shouldered lower ends disposed in bottom recesses 49 in the block. The punch members 39 project through registering openings in the plate 45 and when the plate is depressed relative to the head block 37, the punches project above the plate and into the respective body and lid members of a box 1 resting on the plate, as hereinafter described. The stripper plate 47 has a thin knife-like rib or feather 50 projecting from its top lengthwise of the plate for the purpose of entering between the adjacent edges of the rear side walls of a box to serve as a centering means for a box on the plate and to hold such edge walls in slightly spaced relation while the hinges are being attached thereto.

Each punch head 37 has a strip pin 51 extending centrally through an opening therein and is vertically movable in the head by means hereinafter described to raise the stripper plate 45 when in lowered position and effect a raising therewith of the box 1, so as to effect a withdrawal of the stationary punch members 39 therefrom after a hinge has been punched and anchored in the box members. The lower end of the pin 51 is slotted so as to straddle the upper thin end edge portion of the standard 32. A pin raising finger 52 is mounted in vertical position in a recess 53 in each side of the standards 32, the fingers being tied together at their lower ends by a screw 54, and their upper ends tied together by a screw 55. The standard 32 is provided with vertically extending slots 56 and 57 through which said screws, respectively, extend, and mounted in the slot 56 and serving as a spacer for the lower ends of the fingers 52 and held thereto by screws, or in any other suitable manner, is a strip 58. These fingers 52 have vertical sliding movements together on the standard part 32^a and are limited in such movements by the ends of at least one of the slots 56, 57. In Fig. 6 the fingers are shown as raised and in Figs. 3, 4 and 7 as lowered. The fingers 52 are raised with the plunger unit 12, through engagement of the cross-bar 21 of such unit with a lug 60 on the fingers, and when raised engage and raise the pin 51 and its stripper plate 45 therewith to force a supported box up to effect withdrawal of the punch members 39 therefrom after a hinge anchoring operation. A lowering of the pin 51 in the next attaching operation forces the fingers down.

Preparatory to attaching the hinges to a box, the hinges are assembled with the body and lid members thereof by inserting the flaps of the hinges into the respective slots 5, and the box in open form is placed over the stripper or supporting plates 45 with such plates bearing upwardly against the sides of the box body and lid with which the hinges are assembled, as best shown in Fig. 2. The box is positioned so that upon a lowering of the box and plate 45 by pressure of the plunger 30, the punch pins will enter the box material and punch out anchoring burrs in the hinge flaps.

To facilitate proper positioning of a box on the supports 45, one of the standards 32 is provided at its upper outer edge with a stop gauge 62 which has a tongue 63 projecting from its upper end and entering the space between the hinged edges

of the box body and lid. The standards 32 are of thin form below the heads 37, so that a box when placed over the punch units 11 will be held open to only a slight extent by the standard.

In the operation of the machine, a box, assembled with its hinges but not anchored thereto, is placed over the punch units 11 in stop engagement with the gauge 62 and with the feathers 50 of the plates 45 fitting into the spaces between the adjacent hinged sides of the box body and lid members, such sides being held against the feather by manual inward pressure on the hinged side portions of the box members. The operator then effects a lowering of the plunger unit 12, in the present instance, by a lowering of the foot treadle 23, which admits air pressure to the upper end of the cylinder 22 and relieves pressure from its lower end. As the plunger lowers, it first contacts the outer hinged side of the box and by its continuing movement forces the box and stripper plate 45 down against the tension of the springs 46, whereby the rigid punch pins 39 are caused to penetrate the registering side portions of the box and to punch and force burrs 6 outward from the respective hinge flaps with the burrs entering the upper side walls of the hinge-receiving recesses 5 and thus securely anchor the hinges to the box members. This action also causes a distortion of the hinge flaps sufficient to snugly fit the recesses 5, should there be any play of the flaps therein before the punching operation. Upon release of the foot treadle, the plunger unit 12 is caused to raise by admission, in the present instance, of fluid pressure to the lower end of the cylinder 22, and during this raising action the cross-piece 21, which is fixedly attached to the side bars 17, raises therewith from the position shown in Fig. 3 to the position shown in Fig. 6, and during such movement engages the stud 60 on the slide fingers 52 to raise such slide and with it the stripper pin 51 and attached stripper plate 45. This action of the stripper plate causes a raising of the box to withdraw it from the punch pins 39. The hinges are now firmly anchored in the box members without the use of nailing brads or other externally exposed means, and the box may then be removed from the supporting units 11.

This provides an economical and highly efficient anchoring of the hinges to the box members with the hinge flaps and the anchoring means therefor disposed entirely within the respective side portions of the box without danger of splitting the material of the box sides. The anchoring means, therefore, is of a blind nature so that there are no projecting metal parts which may injure or cause rapid wear of the sanding material during an external dressing-up operation of the box by sanding action.

We wish it understood that our invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claims.

Having thus described our invention, what we claim as new and desire to secure by United States Letters Patent is:

1. In the art of attaching covers to wooden containers and the like by means of concealed hinges, the steps comprising inserting a hinge flap in a recess formed in an edge of a container so that all but the pintle is concealed, inserting a companion hinge flap in a recess in the cover in like manner, blindly passing a punch through each of the hinge flaps located in the container and the cover, respectively, to provide burrs on the hinge flaps sufficient to hold them in place, and withdrawing the punch so as to leave the burr intact.

2. In the art of providing concealed hinges for wooden articles, the steps comprising inserting a sheet metal hinge flap into a recess within a part to be hinged so that only the pintle remains unconcealed, passing a punch through one side of the part and through the hinge flap to provide a burr of sufficient size to hold the hinge flap in place, and withdrawing the punch leaving the burr intact and without deforming the other side of the part to be hinged.

3. In an apparatus for attaching hinges to a box wherein the hinge flaps are inserted into recesses in the sides of the box, a stationary base, an elongated standard attached to the base, a head mounted upon the standard, a punch affixed to the side of the head, a stripper plate adapted to position the work so that a central portion of the hinge flap is directly over the punch, resilient means mounted in the head for resiliently positioning the stripper plate normally above the upper end of the punch, a plunger positioned above the stripper plate so as to clamp the work therebetween, means for moving the plunger downwardly against the work positioned on the stripper plate until the punch has passed through one side of the box and through the hinge flaps to form a burr thereon, said moving means also retracting said plunger to its original position, a pin slidably mounted in the head in a vertical direction so as to engage the under side of the stripper plate, a slide member slidably positioned upon the standard in vertical alignment with the pin, a nub formed on the slide member, and a member carried by said plunger moving means so positioned as to contact the nub in the upward movement of the plunger so as to actuate the stripping mechanism and thus strip the work from the punch.

FERDINAND C. H. MÜLLER.
THOMAS J. PILLIOD.

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