No. 698,482. Patented Apr. 29, 1902.

H. ERICKSON.

BOX ASSEMBLING MACHINE.

(Application filed Mar. 15, 1901.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

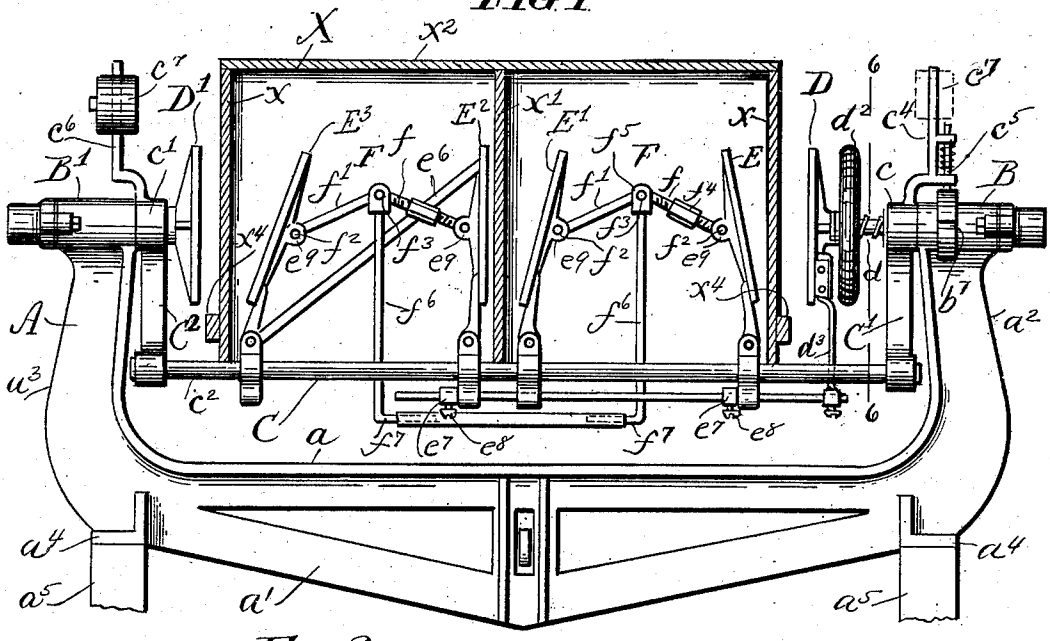


FIG. 2.

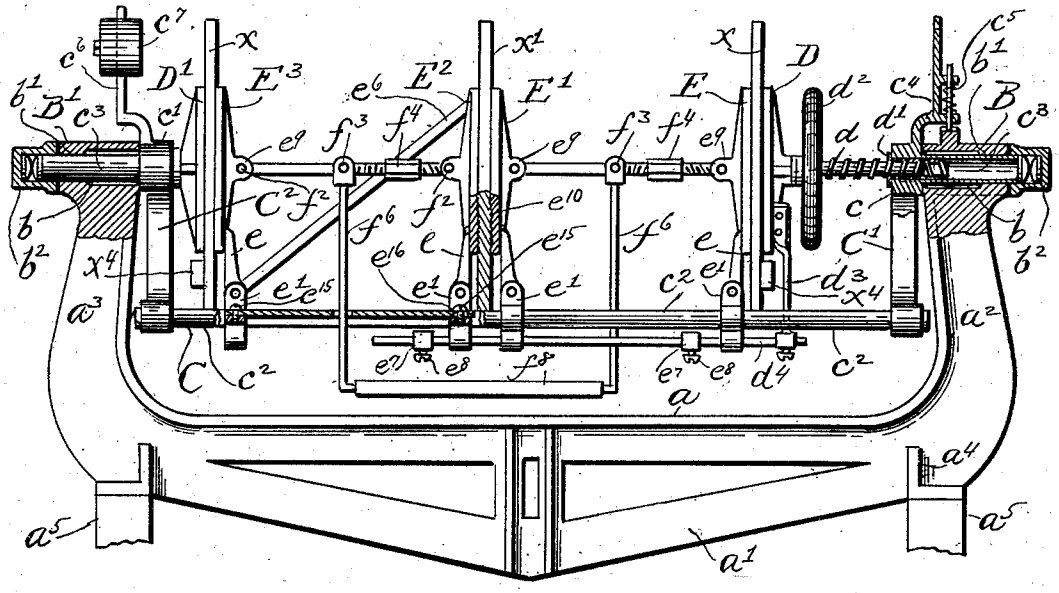
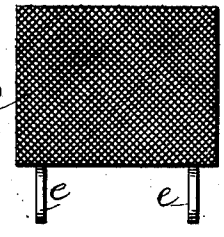


FIG. 5.



Witnesses:

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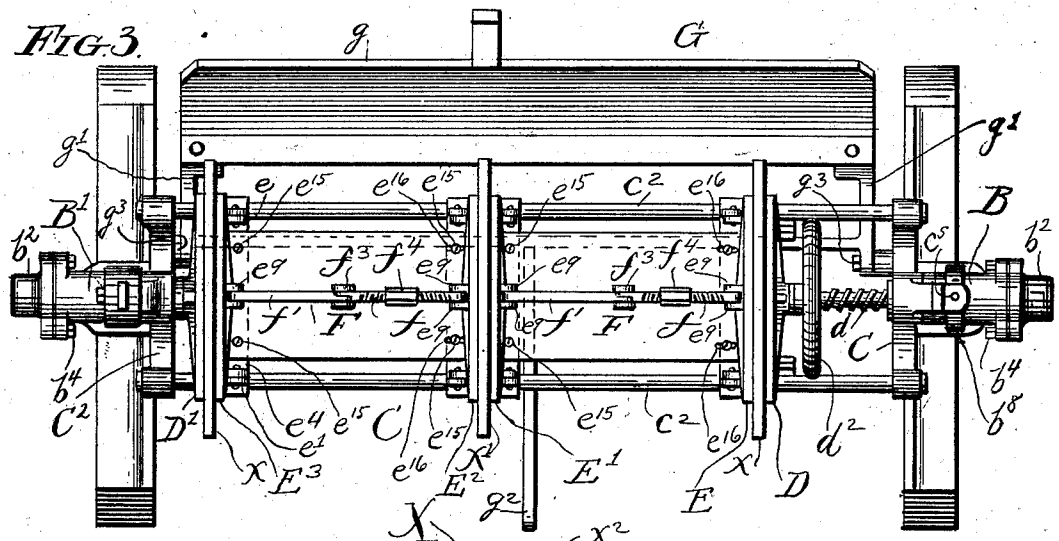
H. ERICKSON.

BOX ASSEMBLING MACHINE.

(Application filed Mar. 15, 1901.)

(No Model.) 2 Sheets—Sheet 2.

FIG. 3.



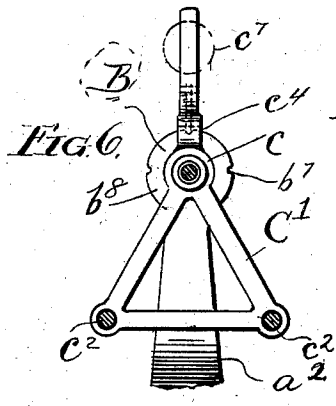
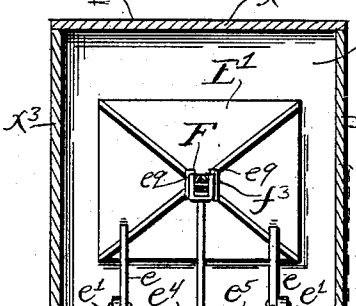


FIG. 6.



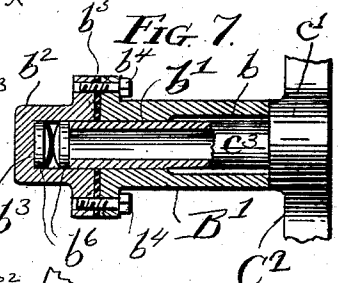


FIG. 7.

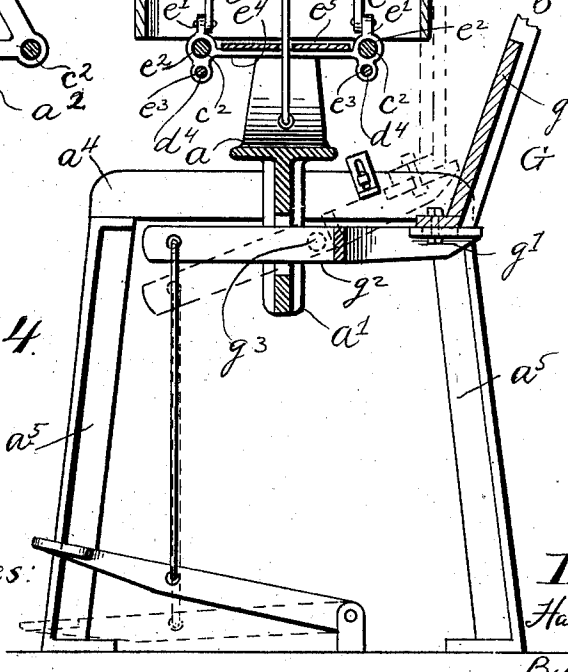


FIG. 4.

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UNITED STATES PATENT OFFICE.

HARTVIG ERICKSON, OF CHICAGO, ILLINOIS.

BOX-ASSEMBLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 698,482, dated April 29, 1902.

Application filed March 15, 1901. Serial No. 51,399. (No model.)

To all whom it may concern:

Be it known that I, HARTVIG ERICKSON, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Box-Assembling Machines, of which the following is a specification.

The present invention relates to a machine for holding some of the parts of a box in a proper position while the remaining parts of the box are nailed or attached thereto.

An especial application of the machine is for the manufacture of egg-cases, and in carrying out the invention some novel features will be found in its construction. Notably among them are the clamping devices for quickly grasping and holding in a vertical position the three cross-pieces of the egg-case and holding them rigidly while the bottom and sides of case are nailed to the cross-pieces.

Another feature is the means for quickly releasing a completed box from the machine.

These features and other details are illustrated in the drawings and will hereinafter be fully described.

In the drawings are the following views: Figure 1 is a side elevation of a machine embodying features of my invention, the clamping devices being shown in an open position and a completed box in section ready to be removed. Fig. 2 is a sectional elevation of the same with the three cross-pieces of an egg-case clamped in a position ready to receive the bottom and sides of case. Fig. 3 is a plan view of the machine. Fig. 4 is a vertical cross-section of the machine, taken on the line 4 4 of Fig. 2, the sides and bottom being shown attached to the cross-pieces. Fig. 5 is a face view of one of the clamps. Fig. 6 is a sectional detail taken on line 6 6 of Fig. 1, and Fig. 7 is an enlarged detail of one of the heads and bearing in same.

A refers as a whole to a stationary metal frame for supporting a movable cradle. This stationary frame is preferably of U shape, consisting of a horizontal part a, having a truss-like under portion a' and two uprights a^2 a^3, provided at their tops with heads B B', which have bearings for supporting the journals or trunnions of the cradle. The uprights a^2 a^3 and the base a are preferably made integral, as this adds to the rigidity or stiffness of the frame as a whole.

a^4 designates flanged cross-pieces having legs a^5.

C refers to the oscillating cradle as a whole, which consists of two triangular end pieces C' and C², having hubs c c', respectively, and held together by longitudinal members, preferably two rods c^2, which are connected to the lower corners of the end frames or pieces. Viewed from the side the cradle thus constructed is of U shape. The rods c^2 form a support or bed for the cross parts of a box when arranged on the cradle. The hub of each of the end frames or pieces C' C² has trunnions or pivots c^3, which are preferably made hollow. These trunnions enter tubular sockets b in the heads B B' and have bearings at b' in same.

To take up the longitudinal thrust developed during the operation of clamping, I provide the following means: Each head is made with a removable portion b^2, having a cup-like socket b^3. b^4 are machine-bolts for coupling the part b^2 to the head, a washer b^5 being placed between them when necessary to secure the proper length of bearing. At the end of each trunnion and in the cup-socket are placed two steel plates or washers b^6, which have rounded contact-faces.

To retain the cradle in different positions when turned on its axis, I provide an arm c^4 on the end hub c, and this arm has a spring-catch c^5, which engages notches b^7 on a segment b^8 on the head B. The cradle may be oscillated or shifted readily on its axis by hand and given, for instance, a quarter-turn (ninety degrees) to one side or to the other, when the spring-catch will engage a notch at one of those points and retain the cradle in that position while the box is being nailed. The cradle is counterweighted by having an arm c^6 projecting from the hub C'. This arm is provided with a weight c^7. The arm c^4 may also be employed to carry a counterweight.

To clamp the ends of a box, and, in making egg-cases, a middle partition, I employ the following means, the end cross-pieces being referred to by x, the middle one by x', the bottom of box x^2, sides x^3, end cleats x^4, and the box as a whole by X.

D' is a vertical plate secured to one end of the cradle, and D is a movable plate at the opposite end. This movable plate is mounted on a screw d, which enters a screw-threaded

socket d' in the hub C of cradle and its trunnion.

d^2 is a hand-wheel for operating the screw.

To prevent the plate D from turning when the screw is operated, I provide said plate with pendants or arms d^3, secured to small slide-rods d^4, below the rods c^2.

E E′ and E² E³ are clamping-plates. The plates E E′ E³ are capable of tilting, and these plates have lugs e, which are pivoted to brackets e', mounted on the rods c^2, by having apertures e^2, through which the rods pass. The brackets have projections below the rods c^2, and these projections have bores e^3, through which the slide-rods d^4 run. Between each bracket is a cross-piece e^4, and between these cross-pieces, so as to keep the plates—viz., E E′ and E² E³—at a respective distance between the members of each pair, are horizontal plates or connections e^5, secured by screws or other suitable means to said cross-pieces e^4. The plate E² is secured to the cradle by means which are similar to those employed in securing the other plates, and to prevent the plate E² from tilting a brace E⁶ runs obliquely from top of plate to one of the brackets beneath the plate E³. The object of not tilting this plate is so that it will form a vertical guide for placing a board or cross part of box between the two middle plates of the cradle. On the rods d^4 are placed collars e^7, secured by set-screws e^8. These collars engage the brackets e' when the slide-rods are in a certain position, as shown in Fig. 1, the object being that when the plate D has been moved away from the box about an inch the collars on the slide-rods will engage the brackets and move the two pairs of plates (E E′ and E² E³) a short distance, so that the box X may be removed from the cradle without the cleats x^4 catching against parts of the cradle. The clamping-plates are cross-scored, so as to provide a multiplicity of points or small projections e^{10} for engaging the boards and holding them securely during the operation of nailing the box; otherwise if placed between smooth plates they would likely slip out of position.

Each pair of plates E E′ and E² E³ are connected by toggle devices F. Each device F consists of two small levers or joints $f f'$, pivoted to the backs of the plates at f^2, lugs e^9 being provided for the purpose. The levers $f f'$ are pivoted together at f^3. Each lever f is made in two parts and screw-threaded and provided with a connecting nut or sleeve f^4 for adjusting the length of the lever. Pendent from the lever at f^3 is a clip f^5, having a rod f^6 extending down through the cradle, with a projection or foot f^7 extending toward the opposite rod f^6. These rods are connected by a tube or cross-piece f^8. By making one lever of each toggle-joint adjustable, as shown at f^4, Fig. 2, the clamping-plates may readily be adjusted to suitably clamp various thicknesses of boards employed in the construction of the boxes. By connecting the two toggle devices with the pendants f^6 and cross parts f^7 f^8 I am enabled to knock the two toggle devices out of their binding or clamping position by simply striking the cross part f^8 when the cradle is tilted. To further loosen the parts, the hand-wheel d^2 is revolved, thus retreating the clamping-plate D into a position shown in Fig. 1, the arms d^3 also pulling the slide-rods d^4, which after moving a certain distance have the stops e^7 engage the brackets e of each series or pair of intermediate clamping-plates, thus pulling them along sufficiently to allow the completed box to be removed without the end cleat x^4 engaging the stationary plate D′. This method of connection between the movable end plate and intermediate plates is not absolutely essential, as the intermediate plates could be moved by hand after the plate D has been moved away from the end of the box. The horizontal plate e^5, connecting the brackets of each set of clamping-plates, serves as a base for adjusting the brackets and keeping them in a proper position relative to each other.

G is a device for alining the boards or cross parts of a box when placed on the cradle. This device preferably consists of a movable and receding gage g, mounted on arms g', which project from the lever g^2, pivoted to frame at g^3. The lever g^2 is provided with a connection to a foot-lever, so that the gage may be raised by foot into a suitable position, as indicated by the dotted lines in Fig. 4.

The operation of the machine is as follows: When the clamping-plates are in an open position, as shown in Fig. 1, the cross parts x x and x' of a box are arranged across the rods c^2. The toggle devices F are then pressed down until the joints are in a horizontal position and the tilting plates are in an upright position. The hand-wheel d^2 is then turned, so as to move the screw outwardly and move the vertical plate D′ against one of the cross parts and shove the plates along until the plate D also engages the opposite end of box. The parts will then be in the position as shown in Fig. 2. The toggle-levers when closed have their axis or longitudinal center coincident with the axis of the pivots or trunnions of the cradle, the screw d' being moved until all the boards are clamped tightly. The sides of the box may now be nailed on and the bottom nailed on, the cradle being oscillated or turned on its axis for each side, the catch c^5 engaging one of the notches b^7, and thus holding the cradle in a suitable position while operation of nailing the box together is being performed. On the box being completed the toggle devices are first shoved up by means of the part f^8. The hand-wheel d^2 is then turned, causing the plate D to recede and the other plates to separate from opposite end of box. All the parts will then be in the position shown in Fig. 1 and the box may be removed.

It will thus be seen that my invention provides a comparatively simple and effective machine for assembling and holding the cross

parts of a wooden box while the sides and bottom are being nailed on. It is also especially adapted for the making of egg-cases where the sides and bottom are in one piece—for instance, made of a strip of wood-pulp secured to cross parts of wood.

What I claim is—

1. A box-assembling machine provided with a U-shaped stationary frame having heads on its uprights, a cradle having trunnions mounted in said heads and provided with end clamping-plates, means for adjusting said plates relatively to each other and two series of intermediate clamping-plates, the plates of each series being connected by toggle-levers, as set forth.

2. In a box-assembling machine, a cradle, means for holding parts of a box on the cradle, a frame for supporting the cradle, the said frame consisting of a horizontal part a, uprights a^2, a^3, integral with the part a, and provided at their tops with heads having bearings for trunnions on the cradle, the part a of frame being provided with a pendent under portion a', as set forth.

3. In a box-assembling machine, an oscillating cradle provided with clamping-plates two pairs of said plates being connected with toggle-joints, said joints being in the axial line of the cradle when the plates are set in a closed position, as set forth.

4. In a box-assembling machine, a movable cradle provided with means for holding parts of a box, the said cradle consisting of two triangular end pieces C' C^2 connected by rods C, and the said end pieces being provided with trunnions, as set forth.

5. In a box-assembling machine, a cradle having a horizontal bed for supporting a box, vertical end pieces connected to the bed and having trunnions which are mounted in a stationary frame, one of said trunnions having a screw-threaded socket in which is mounted a screw for adjusting one of the clamping-plates of the machine, as set forth.

6. In a box-assembling machine, a cradle, the ends of which have trunnions mounted in the heads of a stationary frame, the said cradle being provided at its ends with projecting arms, one of which carries a counterweight and another a spring-catch which engages notches in a segment on one of the heads of the stationary frame, as set forth.

7. In a box-assembling machine having plates for clamping the ends of the box, plates for clamping a middle partition in the box, and toggle devices for closing said plates, the said devices being connected together with means for throwing them out of their clamping position, as set forth.

8. In a box-assembling machine, plates for clamping opposite parts of the box with toggle-levers connecting two of the plates so as to set both plates at once, as set forth.

9. In a box-assembling machine, plates which clamp two opposite parts of a box, the said plates being connected by toggle levers or joints and one of said levers being provided with means for adjusting same, as set forth.

10. In a box-assembling machine a stationary frame, provided with heads which have bearings for the trunnions of a movable cradle, said bearings being provided with end-thrust cups or parts having friction-disks, as set forth.

11. In a box-assembling machine, sliding brackets on which are mounted plates for clamping the box interiorly, end plates for clamping box exteriorly, one of said exterior plates being movable, and provided with means for disengaging the interior plates, from parts of the box when the exterior plate is moved longitudinally.

12. A box-assembling machine, comprising a stationary frame, a cradle provided with two end parts, having trunnions mounted in the stationary frame, a clamping-plate attached to one of said end parts of cradle, a movable clamping-plate having a screw entering the other end part, a wheel for rotating said screw, intermediate clamping-plates having toggle connections, said plates being mounted on brackets which slide on rods of cradle, and connections for engaging the brackets and moving the intermediate plates after one of the end plates has been released from its clamping position, as set forth.

13. A machine of class described, having an oscillating cradle, means for retaining cradle in a set position, and a longitudinal pivoted gage provided with means for bringing the gage into a position along the side of cradle, so that the parts of a box placed on the cradle may be alined, as set forth.

In testimony whereof I have hereunto set my signature this 2d day of March, 1901.

HARTVIG ERICKSON.

In presence of—
CHAS. L. OHLSEN,
J. B. HALPENNY.