

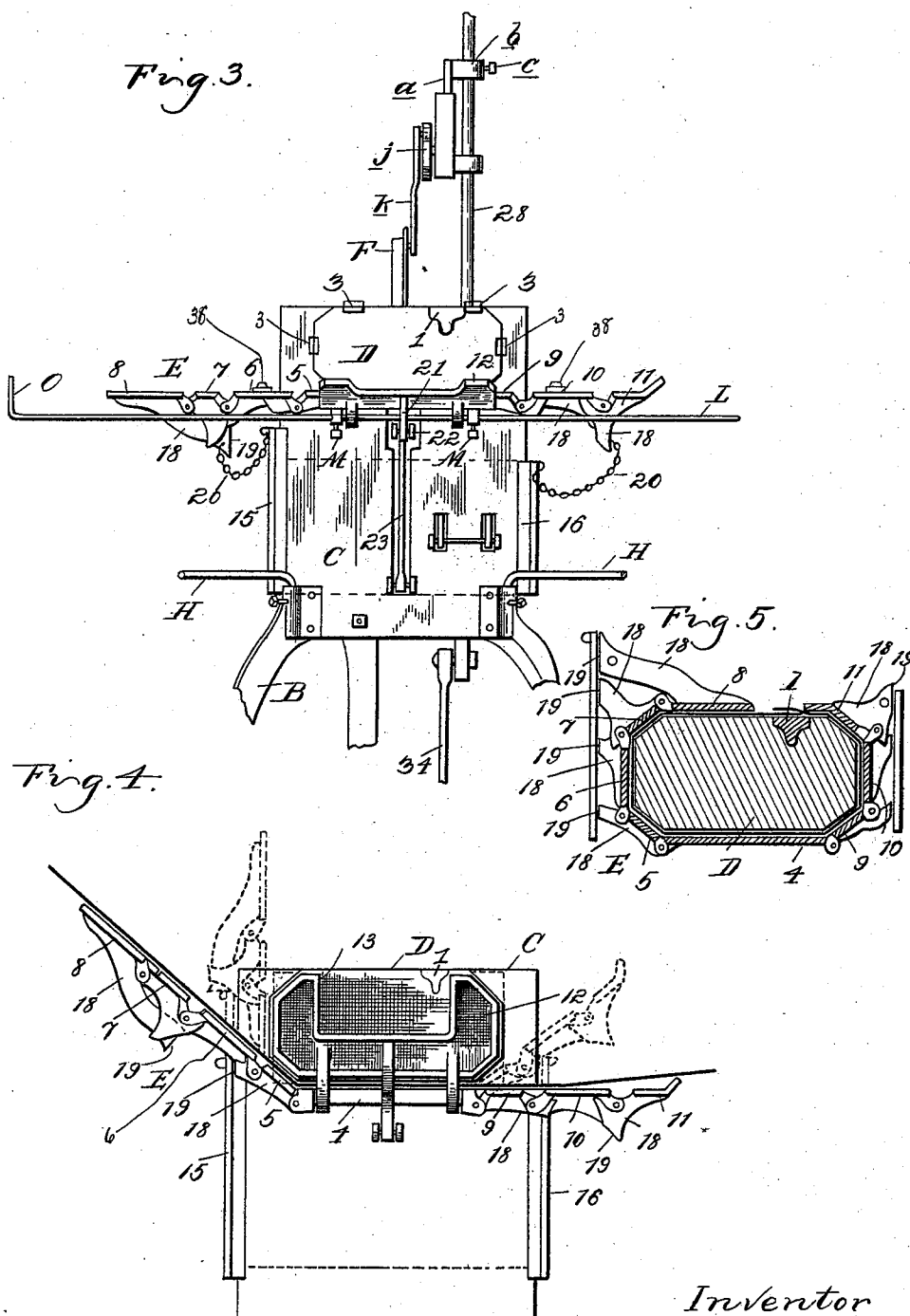
(No Model.)

5 Sheets—Sheet 2.

J. F. ADAMS.
BOX MACHINE.

No. 536,450.

Patented Mar. 26, 1895.



Witnesses
A. L. Kassar
M. B. O'Gherly

Inventor
Joseph F. Adams
By M. Sprague Esq.
Atty's.

(No Model.)

5 Sheets—Sheet 3.

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Fig. 6.

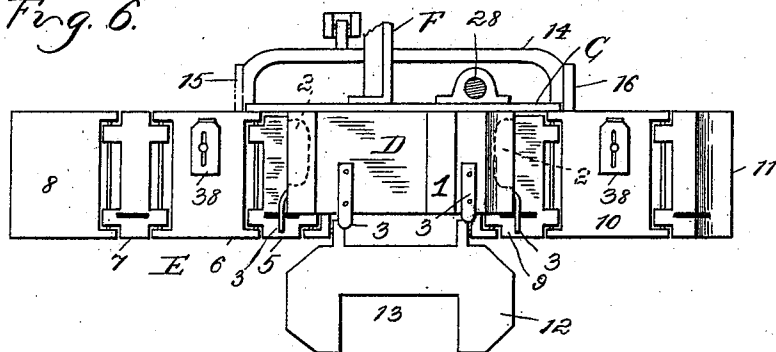


Fig. 7.

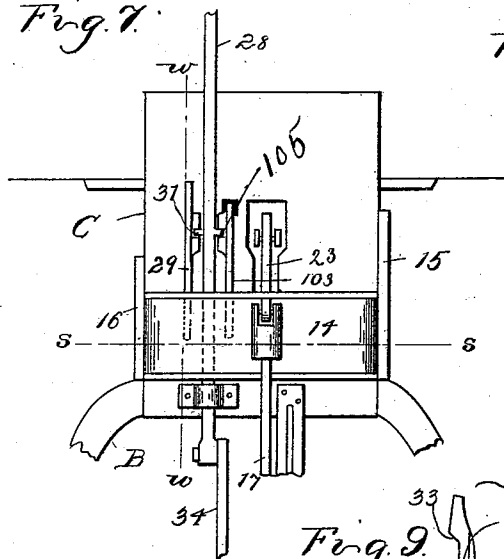


Fig. 8.

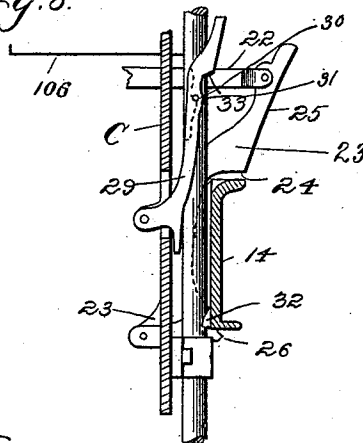
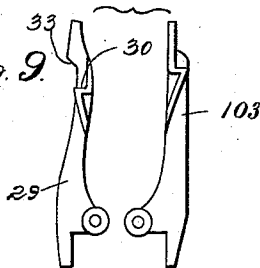


Fig. 9.



Witnesses
A. L. Kobbie
M. B. O'Gherly

Inventor
Joseph F. Adams
By M. Sprague, Jr.,
Attys.

J. F. ADAMS.
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Fig. 12.

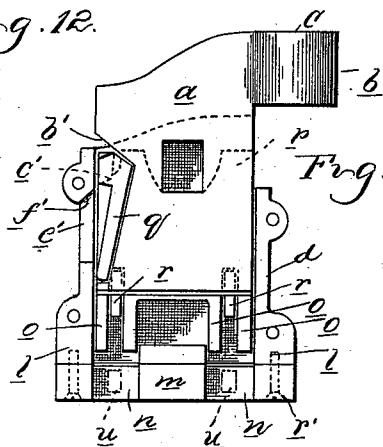


Fig. 13.

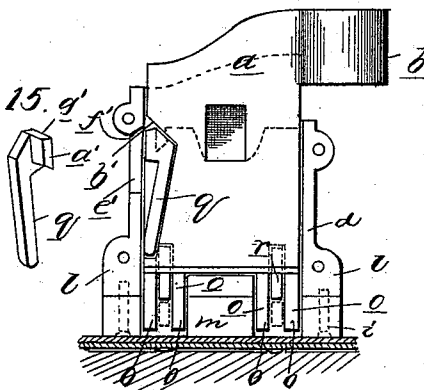


Fig. 15.

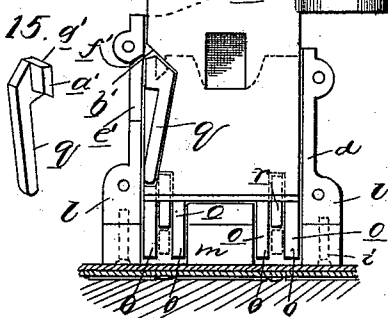


Fig. 14.

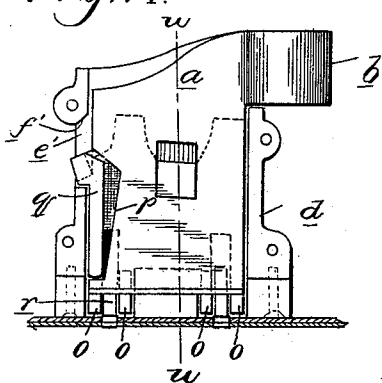


Fig. 16.

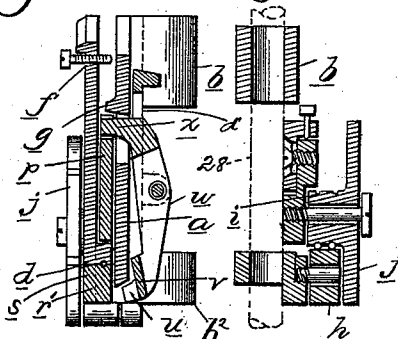


Fig. 17.

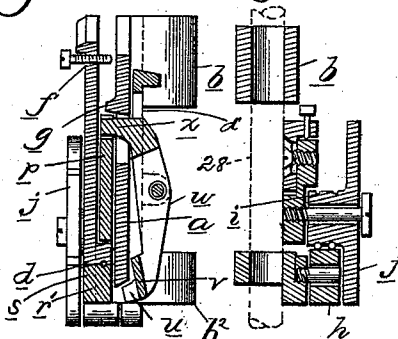


Fig. 11.

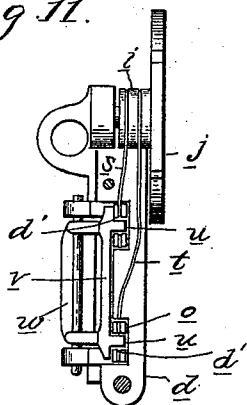
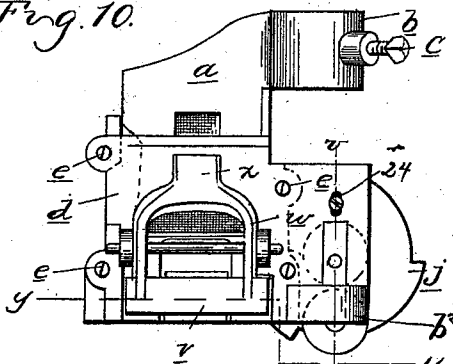


Fig. 10.



Inventor

Joseph F. Adams

By *Wm. Spraguet* Son
Attys.

Witnesses
A. L. Kofor
M. B. Gallagher

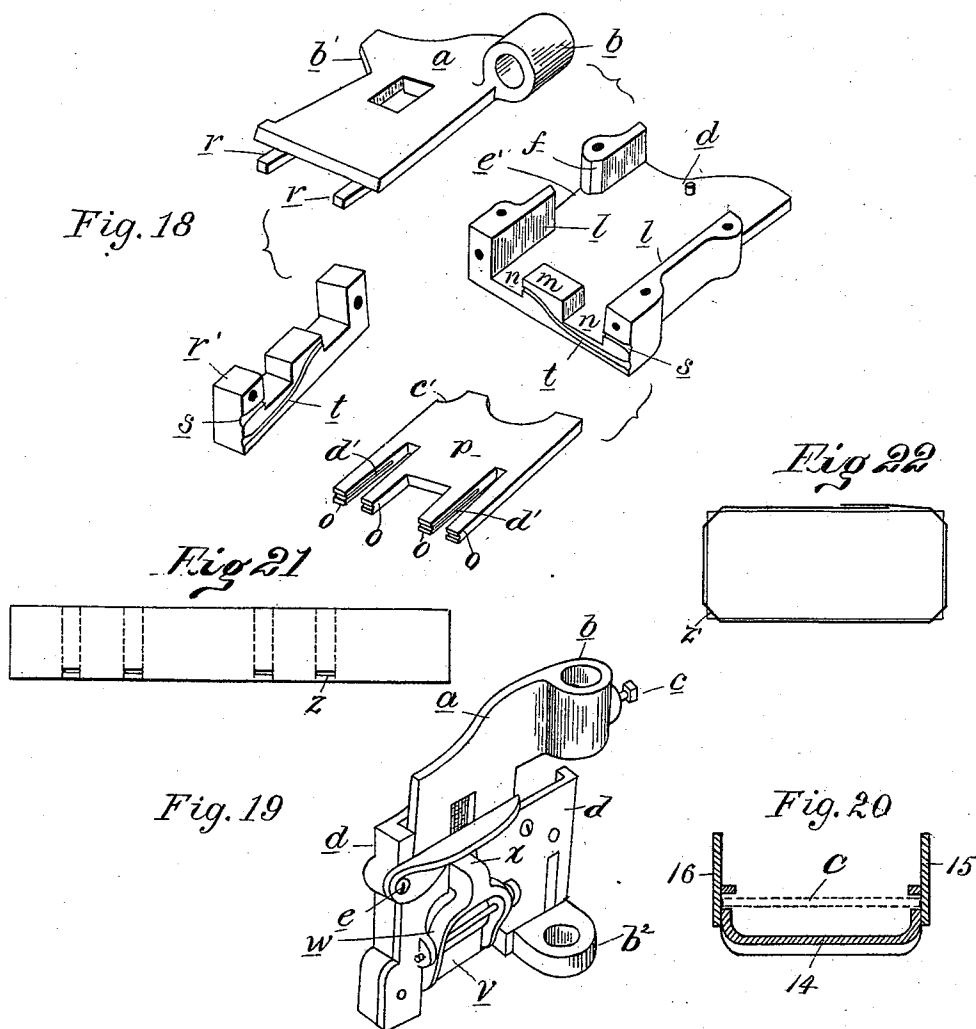
(No Model.)

5 Sheets—Sheet 5.

J. F. ADAMS.
BOX MACHINE.

No. 536,450.

Patented Mar. 26, 1895.



Witnesses:
Otto F. Barthel,
Wm. D. Ogilvie

Inventor:
Joseph F. Adams
By *Thos. S. Spang*
Attys

UNITED STATES PATENT OFFICE.

JOSEPH F. ADAMS, OF VAN BUREN, ARKANSAS.

BOX-MACHINE.

SPECIFICATION forming part of Letters Patent No. 536,450, dated March 26, 1895.

Application filed January 23, 1892. Serial No. 419,067. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH F. ADAMS, a citizen of the United States, residing at Van Buren, in the county of Crawford and State of Arkansas, have invented certain new and useful Improvements in Box-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to new and useful improvements in box machines, and to that class of machines in which a flexible sheet, such as veneer, straw board, &c., is folded or formed into the shape to form the sides of the box, as in fruit boxes, &c.

The invention consists in the peculiar construction, arrangement and combination, first, of a folding device or former and a tacking or stapling mechanism; second, in the peculiar construction of each of these mechanisms; third, in the peculiar construction of the operating mechanism for each part, and fourth, in the peculiar construction, arrangement and combination of the various parts, all as more fully hereinafter described.

In the drawings, Figure 1 is a side elevation of my machine, constructed as used in the manufacture of octagonal berry-boxes, showing the parts in their operated positions; Fig. 2, a vertical, central section showing the parts in position to be operated. Fig. 3 is a front elevation of the upper part of the device, showing parts in the position shown in Fig. 2. Fig. 4 is a similar elevation of the form and former showing the different positions of the parts during operation. Fig. 5 is a vertical, central section on the line $z-z$ of Fig. 1, through the form and former showing the flexible sheet clamped upon the form. Fig. 6 is a horizontal section on line $x-x$ Fig. 2. Fig. 7 is a rear elevation of the head of the machine showing the actuating cross-head, &c. Fig. 8 is a sectional elevation of the trigger mechanism for the bottom clamp and staple mechanism, taken on the line $w-w$ of Fig. 7. Fig. 9 shows detail elevations of the triggers for the stapling mechanism. Fig. 10 is a side elevation of the stapling head. Fig. 11, is a detail bottom plan view of the stapling head with the cap removed. Figs. 12, 13 and 14 are elevations of the stapling head with the front of the casing removed, showing the

parts in different positions. Fig. 15 is a detached perspective view of a pawl. Fig. 16 is a vertical central section on the line $u-u$ of Fig. 13 through the stapling head showing the parts in position. Fig. 17 is a vertical section through the feed rollers taken on the line $v-v$ of Fig. 10; Fig. 18, a detached perspective view of the stapling mechanism. Fig. 19 is a detail perspective view of the stapling mechanism with the parts united, and Fig. 20 is a cross-section through the cross head, 14 on the line $s-s$ Fig. 7. Fig. 21 is a detail view of a blank for the sides and Fig. 22 is a bottom plan view of a box showing the projecting corners of the bottom.

A is the base.

B is the three-legged frame supporting a head C, which is a substantially rectangular plate as shown in Fig. 3. This head supports the form D, the former E and the trigger mechanisms. It is also provided with a rearwardly extending arm F on which is pivoted the reel G for holding the wire for the stapling mechanism. H are forwardly extending arms also secured to this head for supporting the veneer, and if desired a table I may be secured thereon.

The form in this machine is an octagonal block adapted to form an octagonal box from veneer, paper or other thin flexible sheet. Other shapes may be employed if desired. This form is of wood and is secured to the head C in any desired manner, having an anvil 1 against which the staples are clinched, and recesses 2 (shown in dotted lines Fig. 6) for the gages on the former to enter; and at the forward edge with spring guide fingers 3 which serve to guide the bottom and hold it firmly in position while the sides are being formed around it.

The former consists of the stationary plate 4 (Fig. 5) secured to the head C underneath the form and corresponding in length to one side thereof. To each end of this plate are hinged articulated end sections, each member of said section corresponding to a side of the box or form. The section to the left consists of the members 5, 6, 7, 8 and the section to the right consists of the members 9, 10 and 11, the end member of this section being an angular member and comprising two sides of the box. The object of this is simply to avoid

one joint. This last member can however be made if desired to correspond to the other sections. The section to the left is slightly longer than the section to the right and the total length of the former is less than the total circumference of the box, leaving a space between the ends of the former when clamped upon the box or form, in which the stapling mechanism may work, as will be more fully hereinafter described. These articulated end sections are normally arranged in a horizontal position parallel with the plate 4 and forming a table or support upon which the veneer or flexible strip may be placed. These sections are supported upon a cross-bar L, adjustably secured by means of the set screws M to the under side of the plate 4, and having a stop O at one end forming end gages for the material. This cross-bar L I preferably make of spring metal to prevent damage to the former in returning to its initial position the same acting as a cushion.

12 is a bottom clamping plate hinged to the front edge of the plate 4, and of a shape substantially corresponding with the shape of the bottom of the box. I preferably cut away the upper central portion of this plate as shown at 13, so that the operator may insert his finger if desired to hold the bottom in position.

The articulated sections when used in connection with the box, in which the ends are adapted to be overlapped and stapled should operate one in advance of the other. The mechanism for operating them consists of the following parts: 14 is a cross-head having suitable ways engaged with the edges of the head C and provided on each side with the flanges 15 and 16 respectively, extending forwardly beside the form, as plainly shown in Fig 1 the former being higher than the latter. This cross-head is supported at the upper end of the shaft 17 pivoted thereto, and at the lower end pivoted to the lower end of the foot lever 48 which is supported on suitable trunnions in the base A. Each of the members of the articulated sections is provided with a rib or actuating cam 18 arranged in line of the flanges 15 and 16 and each rib or cam is provided at its end with flat shoulders 19. The ribs or cams 18 are as shown of varying sizes and shapes so that as the vertically moving flanges 15—16 are forced up they will engage the same and force the articulation directly onto the different sides of the form.

20 are chains connecting the outer members of the end section with the cross-head, this connection preferably being made with the cams on the outer members, as plainly shown in Fig. 3.

21 is a curved arm extending downward and rearward from the bottom clamp 12 and connected to a link 22 which in turn is pivotally connected to the actuating arm 23, having the shoulder 24 arranged above the cross-head and the holding face 25 adapted to be moved into line with the front face of the

cross-head to hold the clamping plate in position during the upward movement of the cross-head. It is also provided with the inclined bearing 26 adapted to be struck by the lower end of the cross-head to positively withdraw the clamping plate 12 in the downward movement of said crosshead.

In Figs. 2 and 3 the parts are shown in their initial position. The veneer being laid upon the former beneath the form and the bottom on the clamping plate, the operator presses downward on the foot lever which raises the cross-head. The first movement of the cross-head striking the shoulder 24 on the actuating arm 23 throws the bottom clamping plate 12 up against the bottom between the guides 3, the corners of the bottom projecting upward from the incline or chamfered portions of the form, as shown in dotted lines in Fig. 4. As soon as the cross-head has moved the bottom clamping plate in position it bears against the holding face 25 and tightly holds that plate in its actuated position during the forward movement of the crosshead. As soon as the bottom is in position the flange 15 strikes the cam upon the member 5 of the left hand section and clamps that member against the form, as shown in Fig. 4. As soon as it reaches the end of that cam it strikes the holding shoulder 19 and moves that member in. While it takes its upward movement striking successively the cams upon the members 6, 7 and 8 moving them into position to clamp upon the form, and striking the holding shoulders 19 thereon to hold them in their clamped position, the same operation is performed upon the section at the other end of the box, said section, being moved slightly behind the movement of the left hand section, so that one end of the veneer will overlap the other at the top.

In using wood veneer I preferably employ such stuff as has been scored at the point where the bend is to be around the corner. This prevents the breaking of the material. The parts are held in this position until the stapling is effected either by hand or mechanically as hereinafter described. Then the operator releasing his hold and pressing on the step 27 on the opposite side of the fulcrum of the foot lever 18 withdraws the cross-head and returns the parts to the initial position as shown in Figs. 2 and 3. The chains draw the articulations down as the cross-head lowers.

38 are adjustable gages on the former to gage the position of the veneer strip.

The stapling mechanism consists of a head supported at the upper end of the shaft 28 which is slidably secured in suitable bearings on the rear of the head C of the machine, being held in its upper position by means of a trigger 29, having the shoulder 30, with which the pin 31 on the shaft 28 is adapted to engage, this trigger being released by means of the lug 32 on the cross-head striking the inclined shoulder 33 upon the upper end of the

trigger. The lower end of this shaft pivotally connects with the connecting bar 34, which is pivoted to the outer end of a lever 35 journaled upon a pivot 36 at the front edge of the base.

The stapling mechanism is shown in detail in Figs. 10 to 16 inclusive and comprises a mechanism in which a staple is made from the wire and driven in the downward movement of the stapling head, and new wire is fed in to form the next staple upon the upward movement thereof; and it will be seen that the stapling head is released (whereby it may drop by gravity) by the movement of the actuating mechanism for the former, being returned in the return of the lever 18, by the engagement of the finger 102 over said lever 18.

The plate *a* having apertured lugs *b*² secured by means of a set screw *c* to the shaft 28, supports the stapling mechanism and forms the driving part thereof, and I shall refer to it as the driving plate.

d is a casing, preferably made in two parts secured together by clamping bolts or screws *e*, and slidably suspended from the plate *a* by a set screw *f* (Fig. 16) which rests upon a lug *g*. These two parts form a hollow casing in which the plate *a* has a limited sliding movement.

At one side of the casing are two grooved feed rollers *h* *i*, the roller *i* being adjustable its holding screw *i*³ moving in the slot *i*⁴ so that the wires may be readily inserted in the guide ways. I have shown them provided with two grooves with a notched drive wheel *j* adapted to be turned in its upward movement to feed the wire, by the hook or pawl, *k* pivoted to the arm *F*, Figs. 1 and 2.

In the drawings I have shown a device adapted to make and drive two staples simultaneously. The two halves however being alike, it is obvious that a single staple may be driven if desired.

Between the side flanges *l* and a central lug *m* on the casing, are formed two guide ways *n* in which the staple forming tongues *o* move. These tongues are separated a distance equal to the width of the legs of the staple and are secured to or formed integral with the lower edge of a forming plate *p* which plate lies between the casing and the driving plate *a*, as shown in Fig. 16. This forming plate is supported on the driving plate in its upper position, by means of a clutch device, which I have shown formed by a cam shaped pawl *q*, which causes the forming plate to be carried downward therewith a proper distance to form the staple, and then is disengaged and permits the independent movement of the driving plate to drive the staple, as will be more fully hereinafter described.

On the side of plate *a* adjacent to plate *p* are formed downwardly extending lugs or hammers *r* the upper ends of which terminate a short distance above and the lower ends below the edge of plate *a*. These lugs fit in the space between tongues *o* and their upper ends

engage the lower edge of plate *p*, at the end of the space between the tongues, as indicated in dotted lines Fig. 12.

The lower end of the casing is preferably provided with the cap *r'* between which and the casing are formed the wire guide ways *s* leading from the feed rollers across the two ways *n*. (See Fig. 11.)

u are two forming blocks secured to the cross-bar *v* of the frame *w* pivoted upon the casing, as plainly shown in Figs. 11 and 15. This frame is so constructed that the blocks *u* are normally held in the ways and are located in such relation to the forming tongue *o* that in the downward movement of said tongues they pass upon each side of said blocks. The frame *w* extends above its pivotal point and is provided with the forward extending finger *x* shown in Fig. 16.

The parts being thus constructed operate as follows: Fig. 12 shows them in their initial position with the wires extending across the ways *n*. In this position the lugs *a'* on the cam shaped pawl *q* engages beneath the inclined shoulder *b'* on the plate *a* and above the inclined shoulder *c'* on the forming plate *p* and the upper ends of hammers *r* engaging the lower edge of plate *p* thus holding these two plates in fixed relation to each other, while the casing is suspended at its lowest position, by means of the set screw *f* engaging on the lug *g*. The blocks *u* are also in line with the space between the two, forming tongues *o*, and are held from movement by the engagement of the finger *x* upon the outer face of the plate *a*. The support for the stapling head being released it falls until the lower edge of the casing strikes against the box and arrests the downward movement of the casing, the plate *a* and the plate *p* being coupled thereto continuing their downward movement, the tongue *o* shearing off the wire and bending it into the usual U-shaped staple around the blocks *u*. The parts being then in the position shown in Fig. 13 and the staples formed over the block *u*, I preferably form slight grooves *d'* on the inner faces of the tongues *o* to hold the wire in the tongues after it has been formed while being driven. The farther downward movement of the head *a* would be prevented by the lug *a'* unless that lug were disengaged from the position shown in Fig. 12, and this is done by providing a slot or aperture *e'* in the side of the casing at a point which will allow of the disengagement of that lug from between the plates *a* and *p*. When the parts have reached the position shown in Fig. 13 the inclined face *b'* forces the lug out from between the two and allows the plate *a* to continue downward to enable the hammer *r* to drive the staple. In its continued downward movement the beveled lower edge of the plate *a* strikes upon the upper edge of the cross-bar *v* and rocks the frame *w* withdrawing the forming block *u* from between the tongues *o* clearing the way for the hammer *r* moving the parts into

the position shown in Fig. 14. In the upward movement of the head, the plate *a* is first withdrawn. The finger *x* engages over the plate *p* and prevents it being carried with the plate *a* until that plate has been withdrawn the proper distance to carry the upper ends of the hammers *r* into engagement with plate *p*. The finger *x* is withdrawn by the movement of the frame *W*. Plate *p* is next moved, it being coupled to the plate *a* by the engagement of the hammers with the lower edge of the plate *p*. The continued movement of the plate *a* causes the re-engagement of the lug *a'* between the two plates. The movement of lug *a'* is accomplished by the inclined face *g'* thereon, striking the inclined face *f'* on the casing, as shown in Fig. 13, which forces the lug into its initial position causing the plate *p* to move down and be rigidly held with the plate *a*. As plate *a* is forced down the plate *p* will be held rigid therewith, through the first part of the movement, and the lugs *o* will be extended below the hammers for the purpose of forming the staples before the hammers reach the same, so that as plate *a* is forced down the plate *p* will through the first part of the movement of plate *a* be held rigid therewith with the lugs *o* below the hammers, whereby the staples may be formed by the lugs. The upward movement of plate *a* is continued until the set screw *f* strikes the lug *g* when the casing is likewise moved with the other parts and carried to its upper position. In this upward movement of the head, the pawl *k* engages on the notched feed wheel *j* as shown in Fig. 2, which revolves the feed rollers *h i* feeding the wire inward across the ways *n* ready for another operation.

It is desired sometimes to hold the stapling mechanism from operation by the cross head and to control its movement independently. This I accomplish by employing a trigger 103, a duplicate of trigger 29, adapted to engage a pin 105 on the rod 28, as shown in Fig. 7. This trigger may be withdrawn by a rod 106, out of operative position; or when moved into operative position, it will hold the rod 28, and the stapling mechanism from operation, until it is withdrawn by the operator.

The bottom of the box is secured in position by placing it against the end of the form beneath guides 3 and as the clamps 12 are moved up the bottom is held in position. As the veneer is being forced around the form, the corners of the bottom enter in and project through the openings *z* in the inclined portions *z'* of the veneer. By this means the bottom of the box is held in place as soon as the ends of the veneer are secured.

What I claim as my invention is—

1. In a box machine, the combination, with a form, of a former consisting of pluralities of articulations arranged on opposite sides of the former, a series of varying shaped projections respectively on the articulations, and mechanism for engaging the projections and

forcing the articulations on the former, substantially as described.

2. The combination with the form, and an articulated former, of a reciprocating cross head adapted in its upward movement to press the former upon the form, and a flexible connection between the cross-head and former adapted to withdraw the former in the downward movement of the cross head, substantially as described.

3. The combination with the form, of an articulated former adjacent thereto, composed of a plurality of articulations of cam shaped ribs of varying size upon the respective articulations and a reciprocating cross head adapted to strike said ribs in its upward movement to press the former upon the form, substantially as described.

4. The combination with the form, of an articulated former adjacent thereto, cam shaped ribs upon the former having holding shoulders at the end, and a reciprocating cross head adapted to strike said ribs to press the former upon the form in its upward movement and to bear against the holding shoulders, to maintain the sections of the former in their adjusted positions, substantially as described.

5. In a box making machine, the combination of a form, a bottom clamp, a former, and a cross head adapted to successively actuate the bottom clamp and the former, substantially as described.

6. In a box making machine, the combination of a form, a bottom clamp, a former, a reciprocating cross head adapted to successively press the bottom clamp and former upon the form and of shoulders against which the head bears for holding the clamp and former in their actuated position, substantially as described.

7. In a box making machine, a form of a configuration corresponding with the interior of the box, a clamp for the bottom, and guides extending out from the edge of the form within which the bottom is clamped, substantially as described.

8. In a box making machine, the combination of a form, a plate stationarily secured below the form, of articulated sections hinged to said plate, of supports for holding said sections in a plane with the plate to form a table for the veneer strip, a bottom clamp hinged to the forward edge of said plate, and actuating mechanism for the end sections and clamp, substantially as described.

9. In a box making machine, the combination with the form, the plate 4 beneath the form, the articulated end sections hinged to said plate, the actuating mechanism therefor, a bar *L* forming a support for said sections, adjustably secured in position, and the extension *O*, on said bar forming a gage for the veneer, substantially as described.

10. In a box making machine, the combination of the form, forming mechanism adapted to hold a flexible sheet about the form and overlap the ends, a gravity acting stapling

mechanism, and means for actuating said mechanism successively, substantially as described.

11. In a box making machine, the combination with a form of a bottom plate for clamping the bottom upon the form, formers for folding a flexible sheet about the form with overlapping ends a stapling mechanism, and means for actuating the parts in succession, substantially as described.

12. In a box making machine, the combination of the form, the former and a stapling mechanism, a trigger for holding the stapling mechanism and a cross head for actuating the former, and releasing said trigger, and a lever for actuating the cross head, substantially as described.

13. In a box making machine, the combination of the form, the former, and a stapling device, of a shaft for supporting the stapling device, a trigger for supporting said stapling device in its elevated position above the form, a cross head for actuating the former and for releasing said trigger, a lever for actuating said cross head, and a connection between said lever and the stapling device, whereby the latter is elevated in the return of the lever to its initial position, substantially as described.

14. In a box machine, the combination with a former, of a reciprocating supporting shaft, a casing carried by the shaft, a stapling mechanism in the casing comprising a wire feed, means for normally retaining the casing in an elevated position and a trip for releasing the casing, substantially as described.

15. In a box machine, the combination of a support for the box, a stapling mechanism comprising a casing having vertical guides formed near the lower end, a head from which said casing is suspended and upon which it has a limited sliding movement, of a driving hammer on said head, and an intermediate plate also suspended from the head, having forming tongues *o* and a retractible forming block below and between said tongues, the

parts operating as and for the purpose described.

16. In a box machine, the combination of a support for the box, a stapling mechanism, consisting of the shaft 28, the head *a* secured thereto and having the driving hammer formed at the lower end thereof, of the casing *d* suspended therefrom and having guide ways *n* formed therein, of the forming plate *p* between the casing and the plate *a*, of the forming tongues *o* formed at the lower end of said plate, the frame *w* pivoted to the casing, forming blocks *u* secured to the lower edge of said frame, a wire feed, means for forcing the stapling mechanism upon the box and for causing the forming and driving plates to operate successively, substantially as described.

17. In a box machine, the combination with the box support of a stapling mechanism comprising the plate *a*, the casing *d* suspended therefrom, the forming plate *p*, the retractible forming blocks *u*, the pawl *q* having the lug *a'* upon its inner face adapted to engage between the shoulder *c'* on the forming plate and the shoulder *b'* upon the driving plate, of the inclined bearing *f* upon the casing formed at the upper edge of the aperture *e'*, the parts arranged and operated, substantially as and for the purposes described.

18. In a box making machine, the combination with the box support, of a stapling mechanism comprising a vertically reciprocating casing, a forming plate, a driving plate, and forming blocks, of means for actuating the forming plate and driving plate successively, means actuated by a plate for moving the blocks in and of means for retracting the forming block in advance of the driving plate, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH F. ADAMS.

Witnesses:

M. B. O'DOHERTY,
N. L. LINDOP.