July 31, 1923. 1,463,727

J. SHELLENBERGER

MACHINE FOR MAKING BOXES AND CRATES

Original Filed Feb. 21, 1919 4 Sheets-Sheet 1

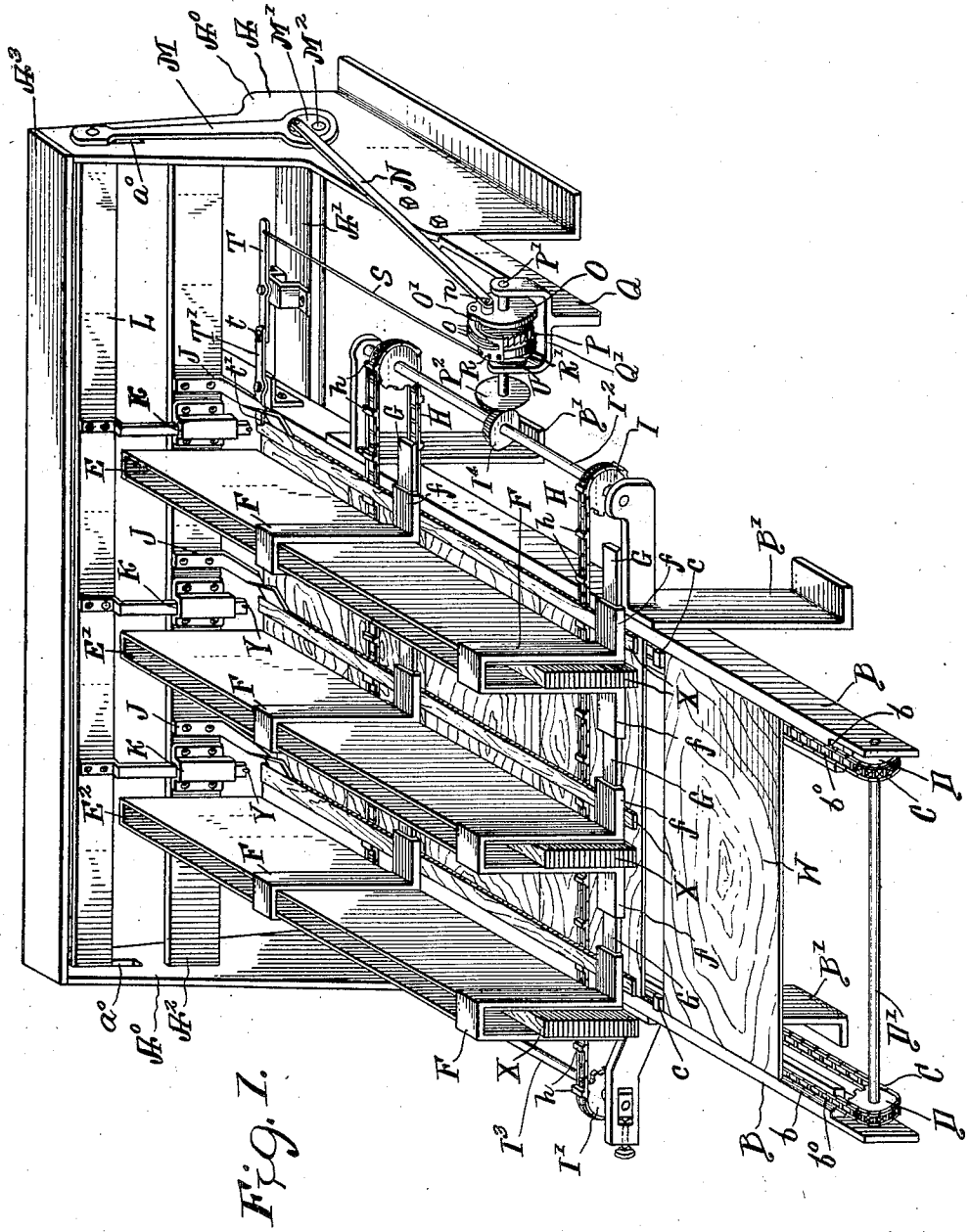


Fig. 1.

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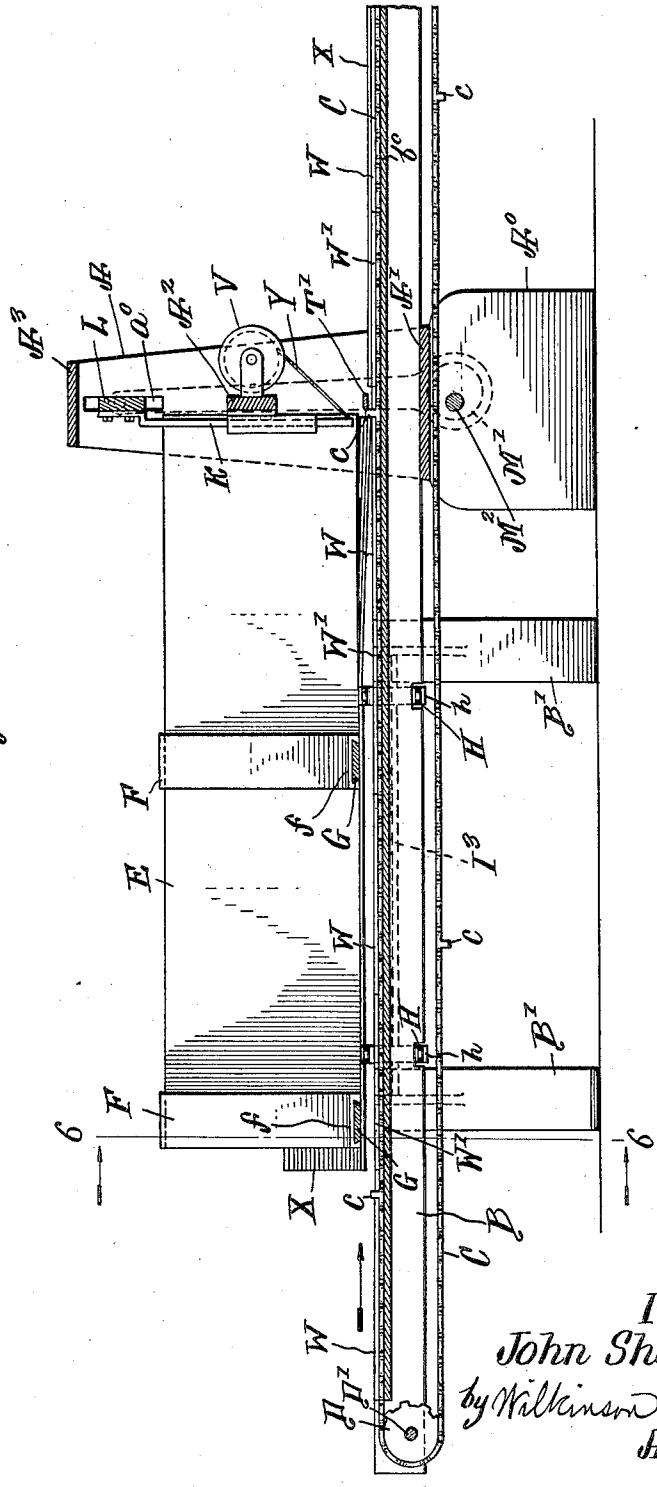


Fig. 2.

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MACHINE FOR MAKING BOXES AND CRATES

Original Filed Feb. 21, 1919 4 Sheets-Sheet 3

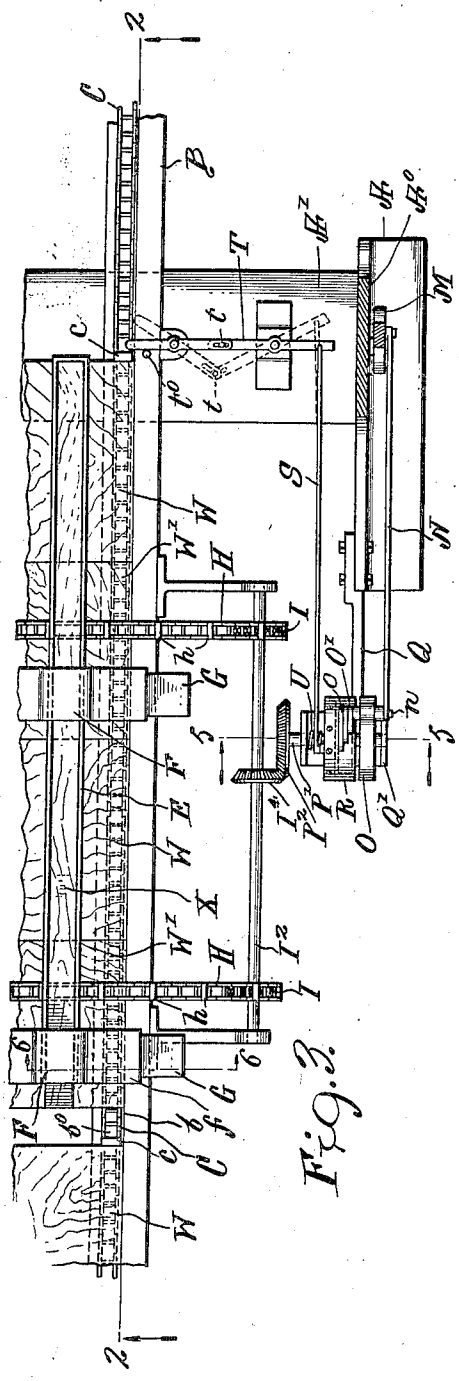


Fig. 3.

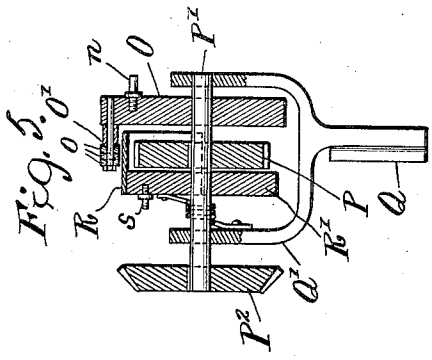


Fig. 5.

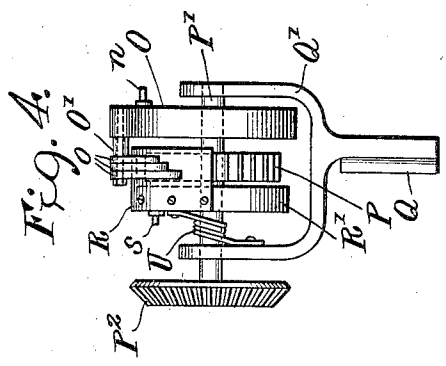


Fig. 4.

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MACHINE FOR MAKING BOXES AND CRATES

Original Filed Feb. 21, 1919 4 Sheets-Sheet 4

Fig. 6.

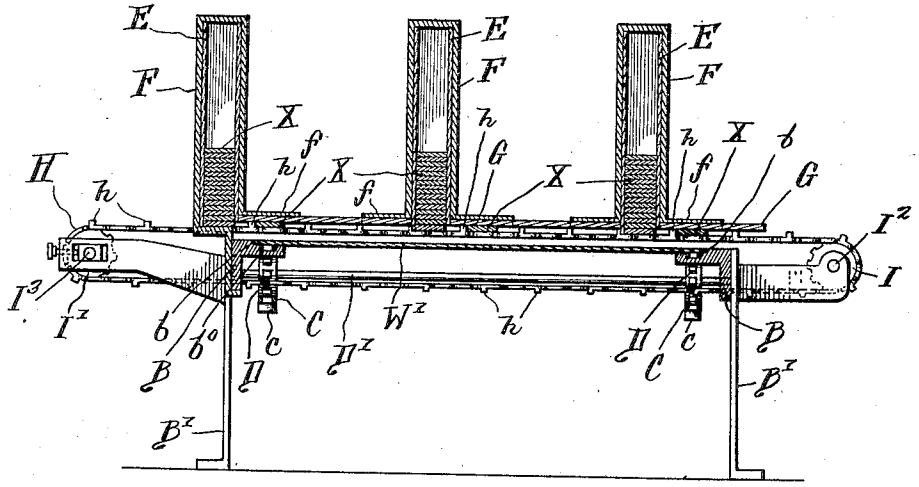


Fig. 7.

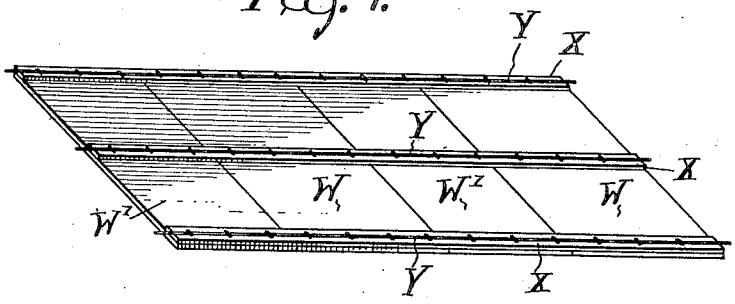
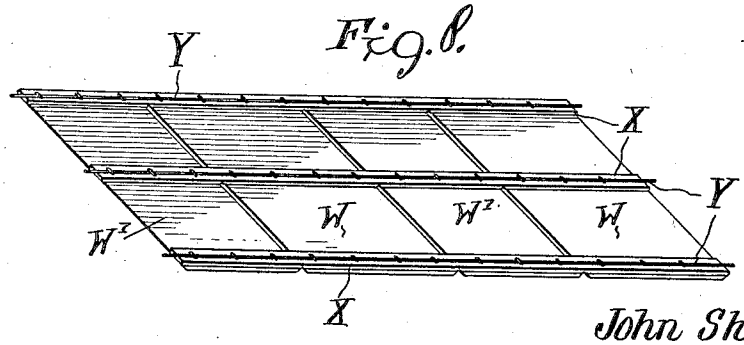


Fig. 8.



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Patented July 31, 1923. 1,463,727

UNITED STATES PATENT OFFICE.

JOHN SHELLENBERGER, OF ROME, GEORGIA, ASSIGNOR TO SEALED CASE COMPANY, A CORPORATION OF NEW YORK.

MACHINE FOR MAKING BOXES AND CRATES.

Application filed February 21, 1919, Serial No. 273,363. Renewed June 9, 1921. Serial No. 476,337.

To all whom it may concern:

Be it known that I, JOHN SHELLENBERGER, a citizen of the United States, residing at Rome, in the county of Floyd and State of Georgia, have invented certain new and useful Improvements in Machines for Making Boxes and Crates; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to improvements in machines for making boxes, crates, box or crate blanks and the like, in which it is desired to attach a series of strips or battens across the face of the box boards or sheets of side material.

In the manufacture of box and crate blanks, and the like, and more especially in the manufacture of that line of wire bound boxes which have reinforcing battens under the binding wires, one of the most difficult parts of the process of making the box blanks is the placing of the battens without delaying the process.

Attempts have been made to feed the battens automatically from holders or hoppers, by placing them directly in front of the staplers and providing fingers, lugs or catches to engage the rear end of the lowest batten under the pile of battens in the holders, and push it forward under the staplers; but as the battens are generally quite thin, being ordinarily not over $\frac{3}{16}$ or $\frac{1}{4}$ of an inch in thickness, the hold on the thin material often pulls out, or the catches lose their grip on account of the battens being warped, or because of the friction caused by having a stock of battens superposed over the lower batten that is being moved. It will be obvious that if one batten of the series of battens on a box blank is not fed properly, that box blank is ruined. Where the battens are short and flat, machines feeding the battens from the rear end work fairly well; but where the battens are long enough to pass around even small boxes, feeding the battens from the rear end becomes impracticable; and where the battens are very long, feeding them from the rear end becomes impossible.

For these reasons, battens for box blanks have heretofore been fed entirely by hand.

My present invention consists of an attachment that can be made and applied to any of the box and crate making machines that are now in common use, which attachment will automatically feed the battens from holders or hoppers placed to one side of the staplers on a suitable machine. I arrange these hoppers so that the forward end of the tier of battens in the hopper will be in line with the front edge of a box blank to which these battens are to be attached, and I provide means for pushing or pulling the lower batten of each tier laterally from the side of the hopper to the proper place under the stapler; and I provide means for stopping the feeding mechanism for the battens after one set of battens has been positioned until said set of battens has been stapled all along the box blank.

I also provide means for automatically starting the batten feed when the next box blank is in position to receive the battens, thus repeating the operation indefinitely.

It will be seen that the length of the battens is immaterial when they are pulled or pushed from the sides of the hoppers, since it will only take a short movement to move the batten entirely from the hopper; but it requires an altogether different mechanism from the rear end feed arrangement hereinbefore referred to.

My invention will be more fully understood after reference to the accompanying drawings, in which like parts are indicated by similar reference symbols throughout the several views, and in which:

Figure 1 is a perspective view of the feeding end of the apparatus showing the operation of applying the battens and stapling the same to the box boards.

Figure 2 shows a longitudinal section through the apparatus shown in Figure 1, the said section being taken along the line 2—2 of Figure 3 and looking in the direction of the arrows.

Figure 3 is a plan view of the right hand side of the apparatus shown in Figure 1, the remaining parts shown in Figure 1 being mere duplication are not shown in Figure 3.

Figure 4 is an end view of the mechanism for intermittently driving the batten feed, the parts being shown on a larger scale than in Figures 1 and 3.

Figure 5 shows a section through the same parts as are indicated in Figure 4, the

section being along the line 5—5 of Figure 3 and looking in the direction of the arrows, and parts being shown in elevation.

Figure 6 shows a section along the line 6—6 of Figures 2 and 3, and looking in the direction of the arrows.

Figure 7 is a perspective view of one of the box blanks after the battens have been attached thereto, but before the edges of the blank are cut away and the battens weakened; while

Figure 8 is a similar view but shows the edges of the blanks cut away and the battens weakened so that the blank can be bent or broken around the corners of the box heading when the blank is being nailed thereon.

This invention is intended more especially to manufacture a blank comprising the top, bottom and sides of the box, the ends or heads being assembled and secured in the blank in the usual way.

A represents the main frame which is shown as comprising two plates A^0 connected together by the cross pieces or plates A′, A^2 and A^3.

B represents the side beams of the worktable on which the conveyor chains C travel. These beams are supported on the cross piece A′ and on the legs B′. These beams B are preferably L-shaped in cross section as shown in Figure 6, and are shouldered as at *b* to register with the ends of the box boards and are grooved as at b^0 to receive the conveyor chains C.

These conveyor chains C are provided with pusher lugs *c*, spaced apart slightly farther than the length of the box blank to which the battens are to be stapled, and these lugs push the box blanks forward as the chains move in the forward direction. These chains are mounted on suitable sprocket wheel D mounted on the shafts D′, and these sprocket wheels are driven in any convenient way, as is well known in the art. The driving means, being well understood, are not shown in the drawings.

Mounted above the box blank are a series of hoppers E, E′, and E^2 parallel to the chains C, which hoppers are open at the end to permit the insertion of the batten strips X, and are open at one side of the bottom so as to permit the ejection laterally from the hopper of the lowest batten of the tier in the hopper. These hoppers may be supported on the body frame in any convenient way, as by means of the brackets F, which are provided at their base with laterally projecting shoes *f*, provided with a dove-tailed recess transversely therein to receive the dove-tailed strips or plates G, and with this construction the hoppers may be spaced at any desired distance apart.

I have shown three of these batten hoppers in the drawings, but it will be obvious that the number of hoppers may be increased or decreased as desired, provided, of course, that the staplers are also adjusted to operate on the battens when ejected from the hoppers, as will be hereinafter described.

In order to simultaneously eject the lowest batten from each of the hoppers, I provide a transverse batten feed arrangement comprising conveyor chains H, provided with a series of push lugs *h* spaced apart the desired distance through which each batten is to be moved from the hopper in order to place it in line with the corresponding stapler.

These chains H pass over sprocket wheels I and I′ on the corresponding shafts I^2 and I^3, and the shaft I^2 is provided with a bevel gear wheel I^4 through which intermittent motion is transmitted to the batten feed chains H as will be hereinafter described.

When the lowest battens are ejected from each hopper the movement is regulated by the ratchet P so as to stop when in line with the stapler head K. The various stapler heads K are connected to a cross head L whose ends reciprocate within slots a^0 in the side plates A^0. Reciprocating motion is imparted to this cross head L by means of the pitman M which engages the eccentric M′ mounted on the shaft M^2. This shaft M^2 is continuously rotated during the operation of the machine by suitable driving mechanism not shown. Thus, the operation of the staplers continues while the conveyor chains C are in motion conveying the box blank beneath the staplers, the arrangement being such that the conveyer chains advance during the upper half of the cycle of operation of the staplers and remain stationary during staple driving operations.

When one box blank is completed, and the boards or sheets of side material for the next box blank have been put in place on conveyor chains C in the usual way, the lower batten from each hopper is fed on top of the box boards or sheets of side material W and W′, while the staplers are moving through the upper half of their cycle of operation, as will now be described.

N represents a connecting rod pivoted at one end on an adjustable stud on the crank wheel and at the other end to the pin *n* carried by the disk O, which disk is loose on the shaft P′ carrying the ratchet wheel P. The end of this shaft P′ carries the bevel gear P^2, meshing with the bevel gear I^4 on the shaft I^2. The disk O carries a pawl arrangement O′ preferably composed of a series of pawls *o* of varying length, three of such pawls being shown in Figures 4 and 5. By having pawls of varying lengths, the adjustment of the required distance of the ratches P can be made very accurately.

The ratchet wheel P is fast on the shaft P′, and loose on this shaft is a second disk R′ carrying the curved shield R, which is adapted to be swung between the pawl arrangement O′ and the ratchet wheel P, and to throw these pawls out of engagement with said ratchet wheel, except for a brief interval periodically when it is desired to move the chains H of the batten feed.

This disk R′ is provided with a pin *s* to which is pivoted the rod S, the other end of the rod being connected to the lever T. The lever T is connected, by a pin *t* engaging in a slot, to a second lever T′, the free end *t′* of which second lever normally projects in the path of one of the chains C, as shown in Figure 3, and is adapted to be struck by one of the lugs *c* on said chains, when the new box blank is fed forward to the position for beginning the stapling of the batten thereto, see Figure 3.

As these chains C move forward, the lug *c* in front of the adjacent box blank will strike the arm *t′* of the lever T′ and will rock the levers T′ and T to the position shown in dotted lines in Figure 3. This will cause the rod S to swing the shield R clear of the pawls *o* and the pawls will engage the ratchet wheel P′, causing the eccentric M′ to rotate the shaft P′ through a sufficient angle to turn the gear wheels P^2 and I^4 far enough to cause the batten feed chains H to feed the bottom batten from each tier to the top of the box blank. This movement is effected in the brief moment that the staplers are clear of the battens. When the lug *c* is moved a slight distance forward, it will pass clear of the free end *t′* of the lever T′, and the levers will be restored to the initial position, shown in full lines in Figure 3, by means of the coil spring U, whose ends are secured, respectively, to the disk R′ and to the yoke Q′ of the bracket Q, which bracket Q is secured to the main frame A, as shown in Figures 1 and 3.

In order to prevent the free end *t′* of the lever T′ from swinging back too far, a suitable stop t^0 may be provided, as shown in Figure 3.

The wire Y is fed to the staplers from a suitable coil V, see Figure 2.

The construction and operation of the staplers is well known in the art, and therefore need not be further described herein; suitable staplers being shown, for example, in the patent to Thompson No. 1,258,625 of March 5, 1918, which are adapted at each operation to form and drive a staple over binding wire into box parts.

The operation of the complete device is as follows:—

The first set of boards W and W′, which constitute the side material of the box blank, are placed on the conveyor chains C by hand in the usual way, and the chains are moved until the box boards project beneath the hoppers E, E′ and E^2. The battens X are then placed endwise in the batten hoppers and are arranged in tiers, as shown in Figure 1. Each hopper has an opening beneath one side thereof, of sufficient depth to permit the ejection through that side of the lowest batten of the tier. The lowest batten rests on the chains H between adjacent lugs *h*. These lugs project above the top of the chain slightly less than the thickness of the batten, so that the lugs may push the bottom batten laterally, but will not touch the next batten above the bottom one in the tier.

In order to have these lugs *h* properly located on the chains H, and also to have the lugs *c* properly located on the chains C, the links on these chains may be made adjustable in any convenient way, but such adjustment will be obvious to those skilled in the art and will not be further described herein.

After the battens are placed in the hoppers, as the chains C are fed forward, when the front edge of the box blank registers with the stapler, one of the lugs *c* on the corresponding chain C will strike the free arm *t′* of the lever T′ and will set the batten feed mechansim in operation, causing the lugs *h* on the chains H to push out the lowest batten of each tier from the hopper to the position shown in Figure 1, in which position the battens will register with the stapler heads K. This feeding action of the battens will only last for an instant, or until the forward movement of the lug *c* causes it to clear the arm *t′* of the lever T′ and then the spring U will snap the shield R back to the position shown in Figure 4, disengaging the pawls *o* from the ratchet wheel P, and throwing the batten feed mechanism out of operation.

When this batten feed is out of operation the continuous movement of the crank wheel will simply rock the disk O, causing the pawls *o* to drag backwards and forwards over the shield R, but without turning the ratchet wheel P. Thus, the intermittent action of the batten feed mechansim will take place only during the brief instant that each lug *c* engages the arm *t′* of the lever T′. These lugs *c* are spaced apart on the chains C slightly further than the entire length of the box blank to which the battens are to be attached, as shown in Figures 1 and 3.

It will be noted that it will take a very short travel of the chains H to push the lowest batten of each tier laterally from the bottom of the hopper, so that the friction occasioned by the weight of the superposed battens in the tier will only be exercised for a very brief moment, and the positive lateral

feed of the battens will in no way be dependent upon the staplers.

Should by any possibility a single batten jam, all of the batten feed would fail to operate and the box blank about to be operated upon would not be injured in any way. Such accidents, however, would be practically impossible, nor would there be any possible danger of the batten not being fed properly to the staplers when released from the bottom of the hoppers by the intermittent operating feed mechanism hereinbefore described.

After the battens have been attached to the box boards by the staplers, the box blank is removed from the machine and the adjacent edges of the box boards preferably are cut away and the battens weakened, as shown in Figure 8, and the box blank may then be bent to the proper shape and the heads or ends inserted and nailed in place in the usual way.

It will be obvious that various modifications might be made in the construction, combination and arrangement of parts which could be used without departing from the spirit of my invention, and I do not mean to limit the invention to such details except as particularly pointed out in the claims.

Having thus described my invention what I claim and desire to secure by Letters Patent of the United States is:—

1. Apparatus of the character described comprising an endless conveyor for box or crate blanks, a series of hoppers for battens arranged above said conveyor and parallel to the movement of said conveyor, each hopper being provided with an opening at one side of its base of sufficient depth to permit the ejection of a single batten laterally therethrough, and feed chains movable transversely of the conveyor for simultaneously and laterally ejecting the lowest batten from each of said hoppers, substantially as described.

2. Apparatus of the character described comprising an endless conveyor for box or crate blanks, a series of hoppers for battens arranged above said conveyor and parallel to the movement of said conveyor, each hopper being provided with an opening at one side of its base of sufficient depth to permit the ejection of a single batten laterally therethrough, and feed chains movable transversely of the conveyor automatically controlled by the movement of said conveyor for simultaneously and laterally ejecting the lowest batten from each of said hoppers, substantially as described.

3. Apparatus of the character described, comprising an endless conveyor for box or crate blanks, a series of hoppers for battens arranged above said conveyor and parallel to the movement of said conveyor, each hopper being provided with an opening at one side of its base of sufficient depth to permit the ejection of a single batten laterally therethrough, and means for simultaneously and laterally ejecting the lowest batten from each of said hoppers, comprising feed chains movable transversely of said conveyor and supporting the lowest batten in each hopper, said chains being provided with pusher lugs adapted to engage the lowest batten in each hopper, and mechanism controlled by the movement of said endless conveyor for intermittently moving said feed chains, substantially as described.

4. Apparatus of the character described, comprising an endless conveyor for box or crate blanks, a series of stapling devices arranged transversely of said conveyor, a series of hoppers for battens arranged above said conveyor and parallel to the movement of said conveyor, and all equidistant laterally from the corresponding staplers, each hopper being provided with an opening at one side of its base of sufficient depth to permit the ejection of a single batten laterally therethrough, and intermittently operated mechanism automatically controlled by the movement of said conveyor for simultaneously and laterally ejecting the lowest batten from each of said hoppers, and placing it in front of the corresponding stapler, substantially as described.

5. Apparatus of the character described, comprising an endless conveyor for box or crate blanks, a series of stapling devices arranged transversely of said conveyor, a series of hoppers for battens arranged above said conveyor and parallel to the movement of said conveyor, and all equidistant laterally from the corresponding staples, each hopper being provided with an opening at one side of its base of sufficient depth to permit the ejection of a single batten laterally therethrough, and means for simultaneously and laterally ejecting the lowest batten from each of said hoppers, comprising feed chains movable transversely of said conveyor and supporting the lowest batten in each hopper, said chains being provided with pusher lugs adapted to engage the lowest batten in each hopper, and mechanism controlled by the movement of said endless conveyor for intermittently moving said feed chains, substantially as described.

6. Apparatus of the character described, comprising an endless conveyor for box or crate blanks, a series of hoppers for battens arranged above said conveyor and parallel to the movement of said conveyor, each hopper being provided with an opening at one side of its base of sufficient depth to permit the ejection of a single batten laterally therethrough, and means for simultaneously and laterally ejecting the lowest batten from each of said hoppers, comprising feed chains

movable transversely of said conveyor and supporting the lowest batten in each hopper, said chains being provided with pusher lugs adapted to engage the lowest batten in each hopper, a driven shaft, and a ratchet and pawl arrangement driven thereby and controlled by the movement of said endless conveyor for intermittently moving said feed chains, substantially as described.

7. Apparatus of the character described, comprising an endless conveyor for box or crate blanks, a series of hoppers for battens arranged above said conveyor and parallel to the movement of said conveyor, each hopper being provided with an opening at one side of its base of sufficient depth to permit the ejection of a single batten laterally therethrough, and means for simultaneously and laterally ejecting the lowest batten from each of said hoppers, comprising feed chains movable transversely of said conveyor and supporting the lowest batten in each hopper, said chains being provided with pusher lugs adapted to engage the lowest batten in each hopper, and mechanism for intermittently moving said feed chains, comprising a driven shaft, a ratchet and pawl arrangement driven thereby, gearing adapted to be driven by said ratchet and pawl arrangement, mechanism for normally holding said ratchet and pawl arrangement out of operation, and means controlled by the movement of said conveyor for intermittently throwing said ratchet and pawl arrangement into operation, substantially as described.

8. Apparatus of the character described, comprising an endless conveyor for box or crate blanks, a series of hoppers for battens arranged above said conveyor and parallel to the movement of said conveyor, each hopper being provided with an opening at one side of its base of sufficient depth to permit the ejection of a single batten laterally therethrough, and means for simultaneously and laterally ejecting the lowest batten from each of said hoppers, comprising feed chains movable transversely of said conveyor and supporting the lowest batten in each hopper, said chains being provided with pusher lugs adapted to engage the lowest batten in each hopper, and mechanism for intermittently moving said feed chains, comprising a driven shaft, a ratchet and pawl arrangement driven thereby, gearing adapted to be driven by said ratchet and pawl arrangement, means for normally holding said pawl out of engagement with said ratchet, a system of levers, and a series of lugs carried by said conveyor and spaced apart thereon, said lugs being adapted to intermittently rock said system of levers, and means controlled by said levers for temporarily effecting the engagement of said pawl with said ratchet, substantially as described.

9. Apparatus of the character described, comprising an endless conveyor for box or crate blanks, a series of hoppers for battens arranged above said conveyor and parallel to the movement of said conveyor, each hopper being provided with an opening at one side of its base of sufficient depth to permit the ejection of a single batten laterally therethrough, and means for simultaneously and laterally ejecting the lowest batten from each of said hoppers, comprising feed chains movable transversely of said conveyor and supporting the lowest batten in each hopper, said chains being provided with pusher lugs adapted to engage the lowest batten in each hopper, and mechanism for intermittently moving said feed chains, comprising a driven shaft, a ratchet and pawl arrangement driven thereby, gearing adapted to be driven by said ratchet and pawl arrangement, means for normally holding said pawl out of engagement with said ratchet, a system of levers, and a series of lugs carried by said conveyor and spaced apart thereon, said lugs being adapted to intermittently rock said system of levers, and means controlled by said levers for temporarily effecting the engagement of said pawl with said ratchet, with a spring for restoring said levers to the initial position when said lugs pass out of engagement therewith, substantially as described.

10. Apparatus of the character described, comprising an endless conveyor for box or crate blanks, a series of stapling devices arranged transversely of said conveyor, a driven shaft for driving said staplers, a series of hoppers for battens arranged above said conveyor and parallel to the movement of said conveyor, and all equidistant laterally from the corresponding staplers, each hopper being provided with an opening at one side of its base of sufficient depth to permit the ejection of a single batten laterally therethrough, and means for simultaneously and laterally ejecting the lowest batten from each of said hoppers, comprising feed chains movable transversely of said conveyor and supporting the lowest batten in each hopper, said chains being provided with pusher lugs adapted to engage the lowest batten in each hopper, and mechanism controlled by the movement of said endless conveyor for intermittently moving said feed chains, comprising a driven shaft, a ratchet and pawl arrangement driven by said driven shaft, gearing adapted to be driven by said ratchet and pawl arrangement, mechanism for normally holding said ratchet and pawl arrangement out of operation, and means controlled by the movement of said conveyor for intermittently throwing said ratchet and pawl arrangement into operation, substantially as described.

11. Apparatus of the character described, comprising an endless conveyor for box or crate blanks, a series of stapling devices arranged transversely of said conveyor, a driven shaft for driving said staples, a series of hoppers for battens arranged above said conveyor and parallel to the movement of said conveyor, and all equidistant laterally from the corresponding staplers, each hopper being provided with an opening at one side of its base of sufficient depth to permit the ejection of a single batten laterally therethrough, and means for simultaneously and laterally ejecting the lowest batten from each of said hoppers, comprising feed chains movable transversely of said conveyor and supporting the lowest batten in each hopper, said chains being provided with pusher lugs adapted to engage the lowest batten in each hopper, and mechanism controlled by the movement of said endless conveyor for intermittently moving said feed chains, comprising a driven shaft, a ratchet and pawl arrangement driven by said driven shaft, gearing adapted to be driven by said ratchet and pawl arrangement, means for normally holding said pawl out of engagement with said ratchet, a system of levers, and a series of lugs carried by said conveyor and spaced apart thereon, said lugs being adapted to intermittently rock said system of levers, and means controlled by said levers for temporarily effecting the engagement of said pawl with said ratchet, substantially as described.

12. Apparatus of the character described, comprising an endless conveyor for box or crate blanks, a series of stapling devices arranged transversely of said conveyor, a driven shaft for driving said staples, a series of hoppers for battens arranged above said conveyor and parallel to the movement of said conveyor, and all equidistant laterally from the corresponding staplers, each hopper being provided with an opening at one side of its base of sufficient depth to permit the ejection of a single batten laterally therethrough, and means for simultaneously and laterally ejecting the lowest batten from each of said hoppers, comprising feed chains movable transversely of said conveyor and supporting the lowest batten in each hopper, said chains being provided with pusher lugs adapted to engage the lowest batten in each hopper, and mechanism controlled by the movement of said endless conveyor for intermittently moving said feed chains, comprising a driven shaft, a ratchet and pawl arrangement driven by said driven shaft, gearing adapted to be driven by said ratchet and pawl arrangement, means for normally holding said pawl out of engagement with said ratchet, a system of levers, and a series of lugs carried by said conveyor and spaced apart thereon, said lugs being adapted to intermittently rock said system of levers, and means controlled by said levers for temporarily effecting the engagement of said pawl with said ratchet, with a spring for restoring said levers to the initial position when said lugs pass out of engagement therewith, substantially as described.

13. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means to feed side material and battens to said mechanism; and means to feed battens laterally and horizontlly to said work-forwarding means.

14. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means to feed side material and battens to said mechanism; and means to feed battens laterally and horizontally and position them on the work-forwarding means.

15. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means to feed side material and battens to said mechanism; and means to feed battens laterally and horizontally and position them relative to side material on the work-forwarding means.

16. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means to feed side material and battens to said mechanism; and means to feed a plurality of battens laterally and horizontally and position them relative to each other on the work-forwarding means.

17. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means to feed side material and battens to said mechanism; and means to feed a plurality of battens laterally and horizontally and position them relative to each other and side material on the work-forwarding means.

18. A machine for use in making boxes or crates comprising, in combination, binding-wire-applying mechanism; work-forwarding means to feed side material and battens to said mechanism; and means to feed battens laterally and horizontally to said work-forwarding means.

19. A machine for use in making boxes or crates comprising, in combination, binding-wire-applying mechanism; work-forwarding means to feed side material and battens to said mechanism; and means to feed battens laterally to said work-forwarding means at selected times.

20. A machine for use in making boxes or crates comprising, in combination, binding-wire-applying mechanism; work-forwarding means to feed side material and battens

to said mechanism; and means controlled by the work-forwarding means to feed battens laterally to said work-forwarding means.

21. A machine for use in making boxes or crates comprising, in combination, binding-wire-applying mechanism; work-forwarding means to feed side material and battens to said mechanism; and means controlled in accordance with the feed of the work to feed battens laterally to said work-forwarding means.

22. A machine for use in making boxes or crates comprising, in combination, a work support; fastener-setting mechanism; means to cause relative progression between said mechanism and the work; and means to feed battens laterally and horizontally on to sheets of side material on said work support.

23. A machine for use in making boxes or crates comprising, in combination, a work support; binding-wire-applying mechanism; means to cause relative progression between said mechanism and the work; and means to feed battens laterally and horizontally and position them relative to sheets of side material on said work support.

24. A machine for use in making boxes or crates comprising, in combination, a work support; binding-wire-applying mechanism; means to cause relative progression between said mechanism and the work; and means controlled by said relative progression to feed battens laterally and horizontally and position them on said work support in binding-wire-receiving position.

25. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means to feed side material and battens to said mechanism; hoppers for said battens; and separate means for ejecting said battens from said hoppers in a direction transverse to the movement of the work-forwarding means.

26. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means to feed side material and battens to said mechanism; hoppers for said battens; and separate means for ejecting battens from said hoppers in a direction transverse to the movement of the work-forwarding means and positioning the same on the work-forwarding means.

27. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means to feed box parts to said mechanism; hoppers for box materials; and means independent of but controlled by the work-forwarding means for ejecting box materials from said hoppers in a direction transverse to the movement of the work-forwarding means.

28. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means to position and feed box parts in a horizontal plane to said mechanism; hoppers for box materials; and separate means movable transversely of the work-forwarding means for ejecting box materials from said hoppers and superimposing said materials in the same plane on the box parts on said work-forwarding means.

29. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means to position and feed box parts in a horizontal plane to said mechanism; hoppers for box materials; and separate means movable transversely of the work-forwarding means for ejecting box materials from said hoppers and positioning the same on box parts on said work-forwarding means.

30. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means to position and feed box parts in a horizontal plane to said mechanism; hoppers for box materials; separate means for ejecting box materials from said hoppers in a direction transverse to the movement of the work-forwarding means; and means automatically to control the operation of said ejecting means to position box materials in predetermined cross relationship on box parts on said work-forwarding means.

31. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means to feed box parts to said mechanism; hoppers for box materials; separate means for ejecting box materials from said hoppers in a direction transverse to the movement of the work-forwarding means and positioning the same on the work-forwarding means; and means controlled by said work-forwarding means for actuating said ejecting means.

32. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means; a hopper for battens arranged above said work-forwarding means and parallel to the movement thereof, said hopper being provided at one side of its base with an opening to permit the ejection of a batten laterally therethrough; and means movable transversely the work-forwarding means for ejecting a batten from said hopper.

33. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means; a plurality of hoppers for battens arranged above said work-forwarding means parallel to the movement thereof, each hopper being provided at one side of its base with an opening to permit the ejec-

tion of a batten laterally therethrough; and means movable transversely the work-forwarding means for simultaneously ejecting a batten from each of said hoppers.

34. A machine for use in making boxes or crates comprising, in combination, fastener-setting mechanism; work-forwarding means; a plurality of hoppers for battens arranged above said work-forwarding means and parallel to the movement thereof, each hopper being provided at one side of its base with an opening to permit the ejection of a batten laterally therethrough; means movable transversely the work-forwarding means for simultaneously ejecting a batten from each of said hoppers; and means automatically to control said ejecting means.

35. A machine for use in making boxes comprising, in combination, fastener-setting mechanism; work-forwarding means for progressively subjecting box parts to the action of said fastener-setting mechanism; a plurality of hoppers for box parts; and a controllable, independent common feeding means for simultaneously ejecting box parts from said hoppers in a direction transverse to the movement of the work-forwarding means and positioning the same in desired relationship on said work-forwarding means at selected times.

36. A machine for making box or crate blanks or sections to be subsequently folded or otherwise assembled into box form comprising, in combination, a work-support; fastener-setting mechanism; means to position a plurality of box parts in the same plane on said work-support; means to cause relative progression between said mechanism and the box parts; and means to feed other box parts in a direction transverse to the direction of said relative progression and position them in the same plane on said first mentioned box parts.

37. A machine for making box or crate blanks or sections to be subsequently folded or otherwise assembled into box form comprising, in combination, fastener-setting mechanism; work-forwarding means to position a plurality of box parts in the same plane and feed them to said fastener-setting mechanism; and means to feed other box parts in a direction transverse to the direction of movement of said work-forwarding means and position them in the same plane on said first mentioned box parts.

38. A machine for use in making boxes or crates comprising, in combination, a work-support; binding-wire-applying mechanism; means to cause relative progression between said mechanism and the work; and means to feed box or crate parts laterally and horizontally to said work-support.

39. A machine for use in making boxes or crates comprising, in combination, binding-wire-applying mechanism; work-forwarding means; and means to feed box or crate parts laterally and horizontally to said work-forwarding means.

40. A machine for making box or crate blanks or sections to be subsequently folded or otherwise assembled into box form comprising, in combination, a work-support; fastener-setting mechanism; means to position a plurality of box parts in the same plane on said work-support; means to cause relative progression between said mechanism and the box parts; hoppers for other box parts; and means to free said other box parts from said hoppers in a direction transverse to the direction of said relative progression and position them in the same plane on said first mentioned box parts.

41. A machine for making box or crate blanks or sections to be subsequently folded or otherwise assembled into box form comprising, in combination, fastener-setting mechanism; work-forwarding means to position a plurality of box parts in the same plane and feed them to the fastener-setting mechanism; hoppers for other box parts; and means to feed said other other box parts from said hoppers in a direction transverse to the direction of movement of said work-forwarding means and position them in the same plane on said first mentioned box parts.

42. A machine for use in making boxes or crates comprising, in combination, a work-support; fastener-setting mechanism; means to cause relative progression between said mechanism and the work; a plurality of hoppers for box or crate parts; and means to feed box or crate parts from said plurality of hoppers simultaneously to said work-support in a direction transverse to the direction of said relative progression.

43. A machine for making box or crate blanks or sections to be subsequently folded or otherwise assembled into box form comprising, in combination, fastener-setting mechanism; work-forwarding means to position a plurality of box parts in the same plane and feed said box parts to said fastener-setting mechanism; a plurality of hoppers for other box parts; and means to feed said other box parts from said plurality of hoppers simultaneously in a direction transverse to the direction of movement of said work-forwarding means and position them in the same plane on said first mentioned box parts.

44. A machine for making box or crate blanks or sections to be subsequently folded or otherwise assembled into box form comprising, in combination, a work-support; fastener-setting mechanism; means to position a plurality of box parts in the same plane on said work-support; means to cause relative progression between said mecha-

nism and the box parts; and means to feed other box parts in a direction transverse to the direction of said relative progression and position them in the same plane on said first mentioned box parts comprising an endless conveyer movable transversely the direction of said relative progression.

45. A machine for making box or crate blanks or sections to be subsequently folded or otherwise assembled into box form comprising, in combination, fastener-setting mechanism; work-forwarding means to position a plurality of box parts in the same plane and feed them to said fastener-setting mechanism; and means to feed other box parts in a direction transverse to the direction of movement of said work-forwarding means and position them in the same plane on said first mentioned box parts comprising an endless conveyer movable transversely the work-forwarding means.

46. A machine for making box or crate blanks or sections to be subsequently folded or otherwise assembled into box form comprising, in combination, a work-support; fastener-setting mechanism; means to position a plurality of box parts in the same plane on said work-support; means to cause relative progression between said mechanism and the box parts; means to feed other box parts in a direction transverse to the direction of said relative progression and position them in the same plane on said first mentioned box parts; and means to control the operation of said feeding means.

47. A machine for making box or crate blanks or sections to be subsequently folded or otherwise assembled into box form comprising, in combination, a work-support; fastener-setting mechanism; means to position a plurality of box parts in the same plane on said work-support; means to cause relative progression between said mechanism and the box parts; means to feed other box parts in a direction transverse to the direction of said relative progression and position them in the same plane on said first mentioned box parts; and means to control the operation of said last mentioned feeding means.

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