(No Model.) 2 Sheets—Sheet 1.

G. W. STRONG & G. A. WILLIAMS.

BOX MAKING MACHINE.

No. 455,242. Patented June 30, 1891.

Fig. 1.

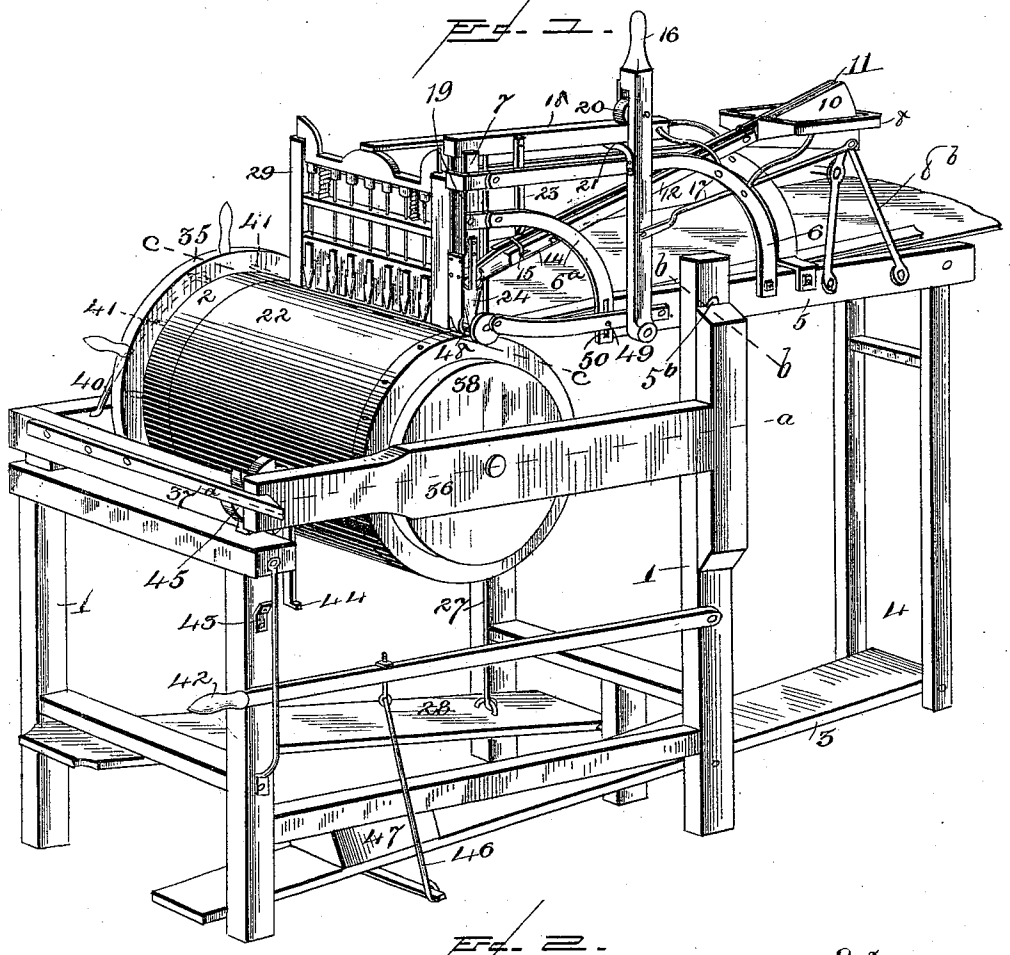


Fig. 2.

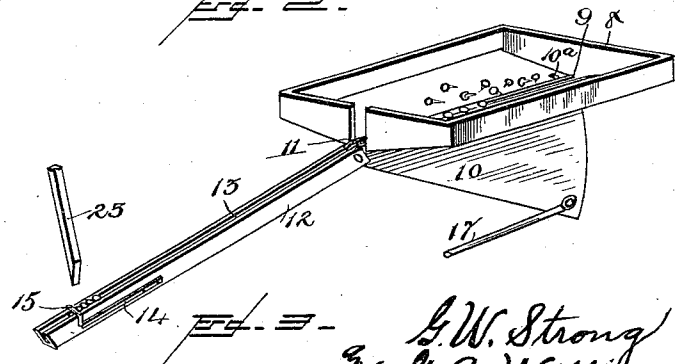
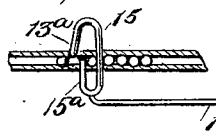


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

G. W. STRONG & G. A. WILLIAMS.

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Fig. 4.

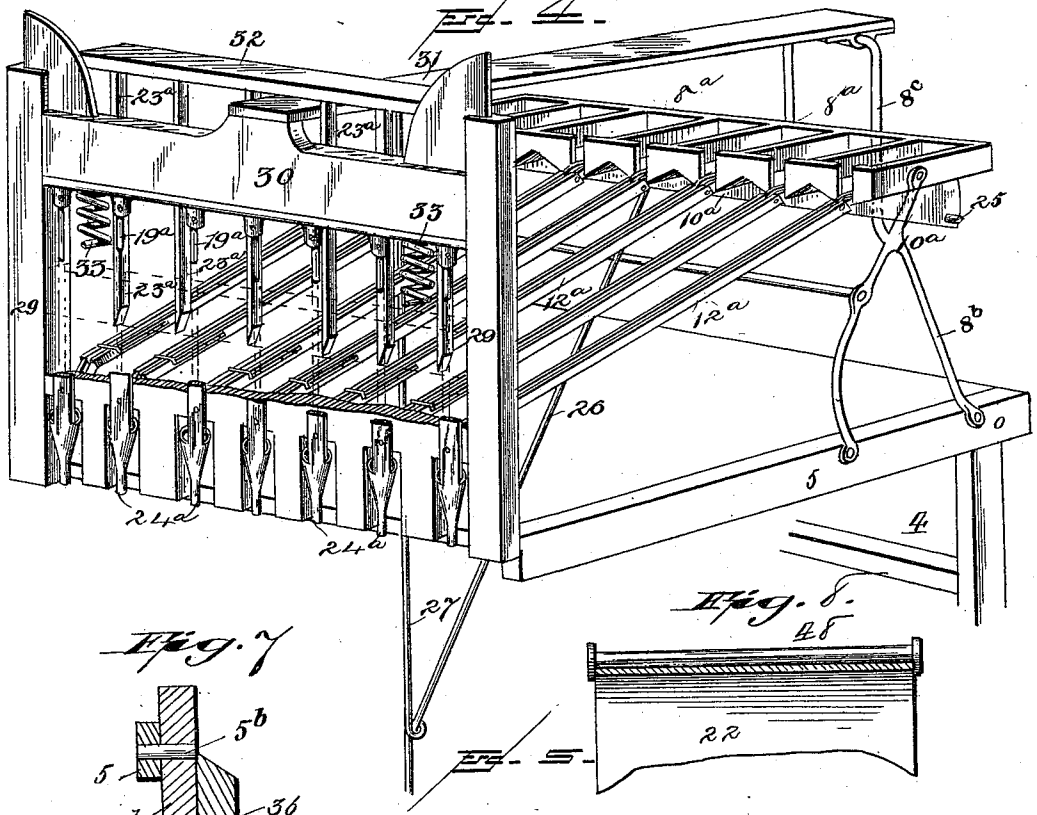


Fig. 7.

Fig. 8.

Fig. 5.

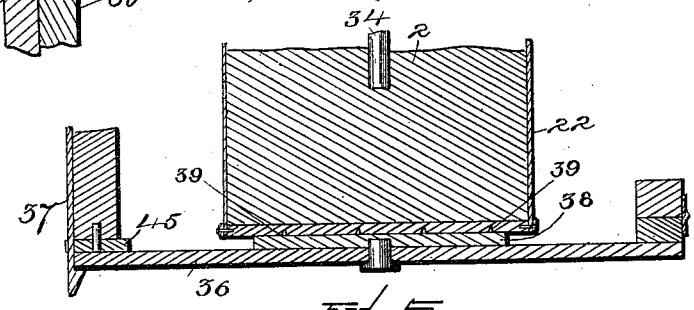
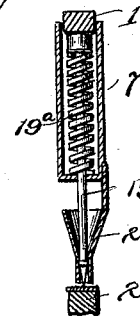


Fig. 6.



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UNITED STATES PATENT OFFICE.

GEORGE W. STRONG AND GIDEON A. WILLIAMS, OF SARDINIA, NEW YORK.

BOX-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 455,242, dated June 30, 1891.

Application filed August 7, 1890. Serial No. 361,317. (No model.)

To all whom it may concern:

Be it known that we, GEORGE W. STRONG and GIDEON A. WILLIAMS, citizens of the United States, residing at Sardinia, in the county of Erie and State of New York, have invented certain new and useful Improvements in Box-Making Machines; and we 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.

Our invention consists in the new and improved construction, arrangement, and combination of parts of a box-nailing machine, which will be hereinafter fully described and claimed.

Referring to the accompanying drawings, Figure 1 is a perspective view of our new and improved box-nailing machine with the nail-boxes 8^a and their slides 12^a omitted in order to render the said view less complicated. Fig. 2 illustrates in detail the nail-feeding apparatus for the end hammer. Fig. 3 illustrates in detail the feed-fingers 15. Fig. 4 is a perspective detail view of the nail-feeding apparatus for the series of hammers which nail across the end of the wide hoop to finish the box. Fig. 5 is a sectional view taken on line *a a*, Fig. 1. Fig. 6 is a vertical sectional view of the end feed-sleeve 7. Fig. 7 is a sectional detail view taken on line *b b*, Fig. 1. Fig. 8 is a sectional detail view taken on line *c c*, Fig. 1.

The same numerals of reference indicate corresponding parts in all the figures.

Referring to the several parts by their designating-numerals, 1 indicates a supporting-frame, in the upper part of which is supported a drum 2, as will be hereinafter more fully described, this drum carrying upon it the box to be made or nailed together. In the bottom of the supporting-frame is centrally pivoted a treadle-board 3, the outer end of which is pivotally connected by a frame or bar 4 with the outer end of the table 5, this table being pivotally secured by pivot-bolts 5^b near its center between the rear uprights of the frame 1, as shown in the sectional detail view, Fig. 7. At the inner end of the table 5 is supported by curved brace-frames 6 6^a a hollow sleeve 7, in which the end hammer plays. At the rear of the frames 6 6^a is supported the nail-receptacle 8, which is formed with the bottom slot 9, and in this slot works the segmental feed-board 10. This board is shaped like the segment of a circle, and is pivoted at its end to the upper end of the inclined slide 12. The upper edge of this board is formed with a longitudinal slot 11, so that when the board drops to its lowest position, where it is held by the pin 10^a, the nails will slide down the inclined bottom of the box 8 and into the slotted upper edge of the feed-board, with their heads resting on the upper edge of the board, as shown.

The slide 12 is formed with the longitudinal slot 13, and to one side of its lower end is secured a spring-arm 14, having at its lower end the feed-fingers 15. These curved fingers are arranged, as shown, so that they extend in through slots 13^a from opposite sides of the lower end of the slide 12, the points of the fingers extending one behind the other and a sufficient space being left between them for the reception of a tack or nail.

16 indicates the hand-lever for operating the hammer, this lever being pivoted at its lower end to the inner end of the table 5 and pivotally connected by a rod 17 with the rear lower end of the feed-board 10. To the frame 6 is also pivotally secured the rear end of the hammer-bar 18, the forward end of which rests upon the upper end of the hammer-rod 19, a coiled spring 19^a being arranged around the hammer-rod, as shown, to return or raise it when the hammer-bar is raised, as hereinafter described. A small roller 20 is pivoted to the side of the hand-lever 16 and runs upon the top of the hammer-bar 18, so that when this lever is drawn forward toward the operator the inner end of the bar 18 will be swung down, while a finger 21 projects from the lever under the hammer-bar and will raise the same when the lever is pushed back.

It will now be seen that in operation, the box 22—a cheese-box, for example—being arranged on the drum 2, as the hand-lever 16 is drawn forward the segmental feed-board 10 will be drawn down by the connecting-rod 17, so that its upper edge will be flush with the bottom of the nail-receiver, when the nails

will fall into it, and as the hand-lever is pressed back, raising the feed-board, the nails will run down in the slot 11 of the board and continue down the slotted slide 12 until they reach the fingers 15, resting against the upper point of the fingers. As the hand-lever is pulled forward the lower wedge-shaped end of a downwardly-projecting bar 23, which is secured at its upper end to the side of the hammer-bar 18, is pressed between the lower free end of the spring-arm 14 and the side of the slide 12, and is withdrawn when the hand-lever is pushed back. The feed-fingers 15 when at rest stand with the point of the upper finger 15^a extending entirely across the feed-slot 13, while the point of the lower finger 15^b rests at the left-hand side of the slot, but does not project across the same. When the bar 23 is pressed down to move the spring-arm 14 to one side, the finger 15^a is moved to the right and the nail slides down, passing the end of this finger, the feed-slot being then clear at that point until it comes in contact with the lower finger 15^b. As the bar 23 is raised, the spring-arm 14 moves back into its original position, sliding the lower finger 15^b to the left out of the way of the nail and projecting the point of the upper finger 15^a across the slot. The nail which has passed the points of the two fingers continues down the feed-slot and drops into the curved receiver 24, which is secured to the lower end of the sleeve 7 and is formed somewhat like an inverted cone with a slot in one side. This operation is repeated each time that the hand-lever is moved, and the nails are thus fed to the hammer one by one. When the vibration of the spring-arm 14 ceases, the feed-fingers 15 rest with their points at the center of the slot 13, down which the nails slide. As the hammer is forced down by drawing the lever forward it strikes the nail thus held and drives it through the narrow outside hoop and the wide hoop forming the side of the box into the edge of the bottom of the box, as will be readily seen. The box 22 is turned, as hereinafter described, while thus nailing in the bottom, and when this is completed we nail the end of the wide hoop forming the side of the box at one blow by the following apparatus:

Above the table 5 are arranged the series of slotted nail-receptacles 8^a, which are supported on metal arms or brackets 8^b, which extend up from the table 5. These nail-receptacles have the pivoted slotted feed-boards 10^a, the inclined slotted slides 12^a, and the fingers 15^b, all similar in construction to the corresponding parts of the nail-feeding apparatus for the end hammer. The lower corners of the feed-boards 10^a are all connected by a rod 25, which is in turn pivotally connected by a rod 26 with the rod 27, running up from a foot-treadle 28.

A vertical frame 29 is supported from the inner end of the table 5, having at its lower end a series of the conical nail-receivers 24^a, into which the nails from the series of slides 12^a pass. A series of hammer-rods 19^a work, as shown, in the frame 29, being secured at their upper ends in a sliding cross-head 30.

31 indicates a bar, which is pivoted at its rear end on an extension 8^c of the brackets 8^b, with its forward end resting upon the top of the vertically-sliding cross-head 30, the upper end of the rod 27 being pivotally secured to this bar. A cross-piece 32 is secured on the bar 31 and provided with a series of depending bars 23^a, having beveled lower ends, and it will be seen that when the foot-treadle 28 is pressed down the sliding cross-head 30 will be forced down, driving down the hammer-rods 19^a, and thus at one blow drive the series of nails into the wide end of the hoop forming the sides of the box. The nails or tacks will be fed in precisely the same manner as they are fed to the end hammer, while springs 33 raise the sliding cross-head 30 as soon as the foot-treadle is released from the pressure of the foot.

The drum 2 is mounted on the end of a shaft 34, which turns in bearings on the supporting-frame 1, the drum being provided at one end with a hand-wheel 35.

To the right-hand side of the supporting-frame is pivoted the forward end of a gate 36, a spring-catch 37 engaging with its free end to hold it in its closed position. On the inner side of this gate is centrally pivoted a wooden disk 38, the inner side of which may be provided with points or projections 39, which will enter the wood of the box-bottom and thus hold it firmly in position.

In making a box the head or end of the box is placed against the right-hand end of the cylinder or drum and the gate 36 closed, when the revolving disk will press and hold the box-bottom tightly against the end of the drum. The drum is then turned by its hand-wheel to drive the several nails, and as it is moved from point to point is held by a spring-pawl 40 at the point to which it is turned, the pawl engaging with pins 41 on the left-hand end of the drum. When the box is completed, the operator pulls up the lever 42 until it is supported by the catch 43. As this lever is raised, it strikes and forces up a sliding rod 44, the upper end of which strikes against the straight face of one of the inclined teeth of a ratchet-wheel 45, thus turning the said wheel, when the end of one of the opposite wheel-teeth will press outward the free end of the spring-catch 37, thus releasing the free end of the hinged gate 36 to permit of the finished box being removed from the drum. At the same time the upward movement of the lever 42 raises the inner end of the treadle-board 3, to which it is pivotally connected by the rod 46, thus, through the frame 4, drawing down the rear end of the pivoted table 5 and raising its forward end, with the series of hammers, &c., up clear of the box and drum, so that the finished box can be easily removed. A weight 47 normally holds the inner end of the treadle-board 3 pressed down.

48 indicates a guide-roller, which runs across the top of the box, as shown, the wide and narrow hoops passing under this roller as they come from the table to the drum.

The sleeve 7 and the frame 29 are pivotally secured between the ends of the upper and lower curved brace-frames 6 6^a, and the lower braces 6^a are slotted at their lower ends, and set-screws 49 pass through these slots 50, so that the inclination of the sleeve and frame in which the hammers work can be adjusted as may be required.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a box-nailing machine, the combination of the rotatable drum adapted to carry the box, the nail-receptacle 8, having the slotted bottom, the slotted slide 12, the pivoted feed-board longitudinally slotted in its upper edge, a means for feeding the nails one by one from the lower end of the slide 12, the sleeve 7, the conical slotted receiver 24, secured to the lower end of the sleeve, the hammer-rod with its return-spring, the pivoted hammer-bar 18, and the pivoted hand-lever having the roller 20 and the finger 21 and connected by a rod 17 with the feed-board, substantially as set forth.

2. The combination of the rotatable drum adapted to carry the box, the nail-receptacle 8, having the slotted bottom, the slotted slide 12, the pivoted feed-board having the longitudinal slot in its upper edge, the feed-fingers 15, secured to the free end of a spring-arm 14, the sleeve 7, the conical slotted receiver 24, secured to the lower end of the sleeve, the hammer-rod with its return-spring, the pivoted hammer-bar 18, having secured to its side the bar 23, formed with the wedge-shaped lower end, and the pivoted hand-lever having the roller 20 and the finger 21 and connected by a rod 17 with the feed-board, substantially as set forth.

3. The combination, in a box-nailing machine, of the rotatable drum adapted to carry the box, the series of nail-receptacles having the slotted bottoms, the slotted slides 12^a, the pivoted feed-boards 10^a, having the longitudinal slots in their upper edges and connected together by the rod 25, the feed-fingers 15^b, secured to the spring-arms 14^a, the upright frame 29, having the series of receivers 24^a, the sliding cross-head 30 and the series of hammer-rods secured thereto, the return-springs 33, the pivoted hammer-bar 31, connected by a rod 27 with a foot-treadle 28, the cross-bar 32, secured on the hammer-bar and having the depending bars 23^a formed with the beveled lower ends, and the rod 26, pivotally connecting the feed-boards with the rod 27, substantially as set forth.

4. The combination of the drum 2, mounted on a revolving shaft and having the end hand-wheel, the gate 36, hinged at one end, the disk 38, centrally pivoted to the inner side of the hinged gate, the spring-catch 37, arranged as shown, the ratchet-wheel 45, the sliding rod 44, and the pivoted lever 42, adapted to engage the lower end of the rod 44 when raised, substantially as set forth.

5. The combination of the supporting-frame, the rotatable drum carrying the box, the centrally-pivoted table carrying at its inner end the series of hammers and the feed and operating mechanism, the centrally-pivoted treadle-board 3, pivotally connected at its outer end to the outer end of the pivoted table, and the lever 42, pivotally connected to the inner end of the treadle-board, substantially as and for the purpose set forth.

6. In a box-nailing machine, the combination of the rotatable drum carrying the box, the pivoted table carrying at its inner end the adjustable sleeve 7 and upright frame 29, and the series of hammers and feed-operating mechanism, and the guide-roller 48, extending above the top of the drum 2, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE W. STRONG.
GIDEON A. WILLIAMS.

Witnesses:
R. J. TILTON,
J. M. WITHERIL.