No. 776,943. PATENTED DEC. 6, 1904.

G. H. RICE.

BOX MACHINE.

APPLICATION FILED JUNE 7, 1904.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

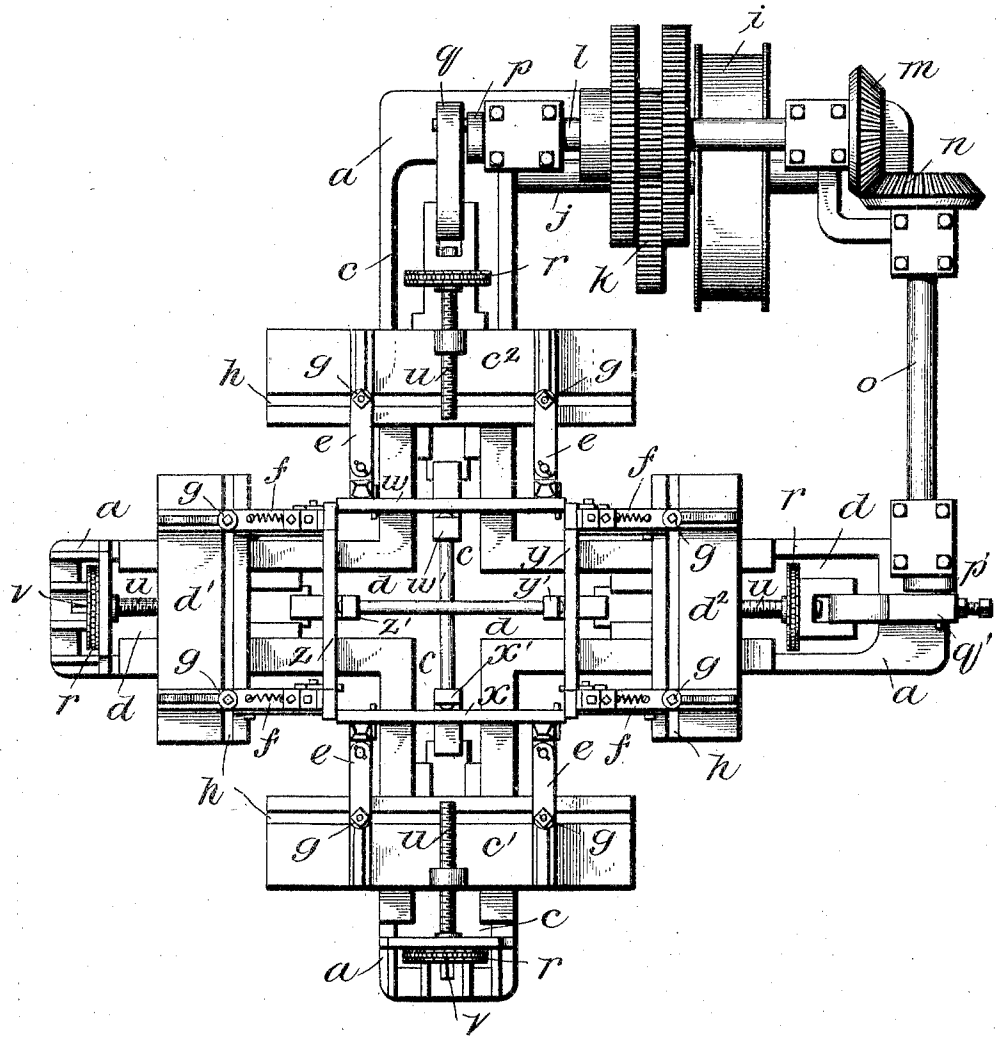


Fig. 5.

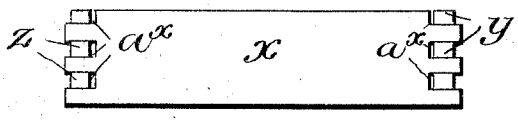
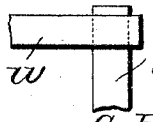


Fig. 6.



Witnesses

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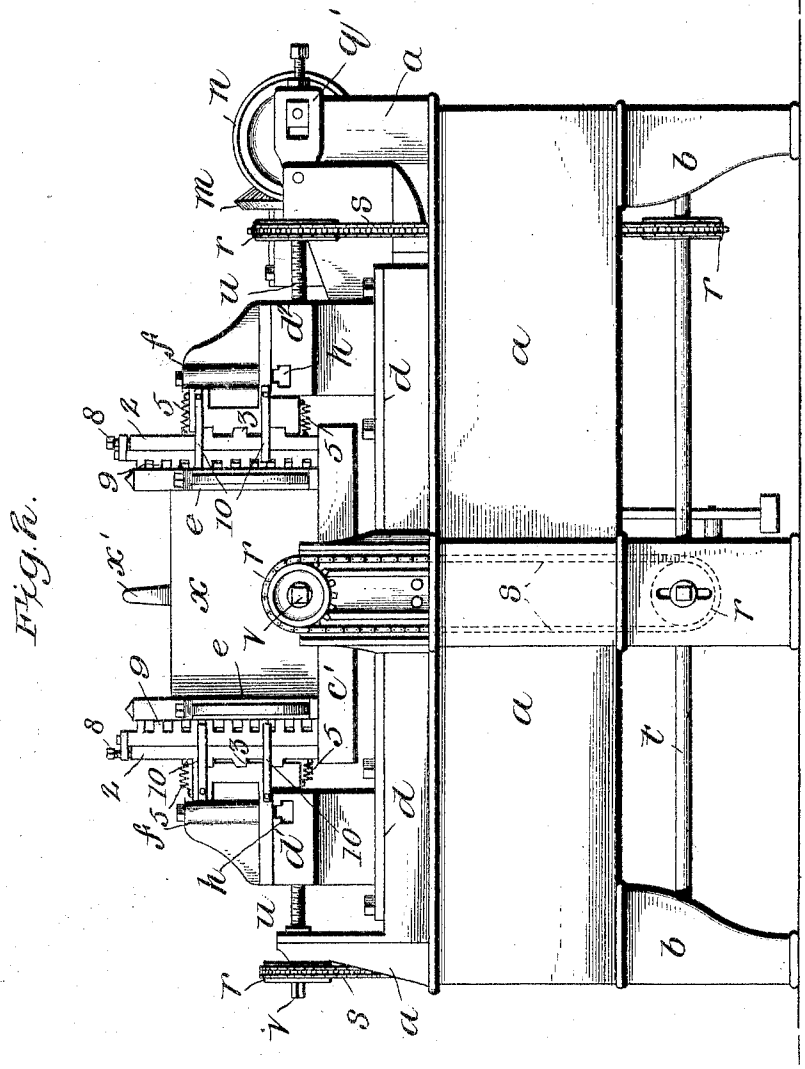
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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.



Witnesses

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PHOTO-LITHOGRAPHED BY SACHETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 3.

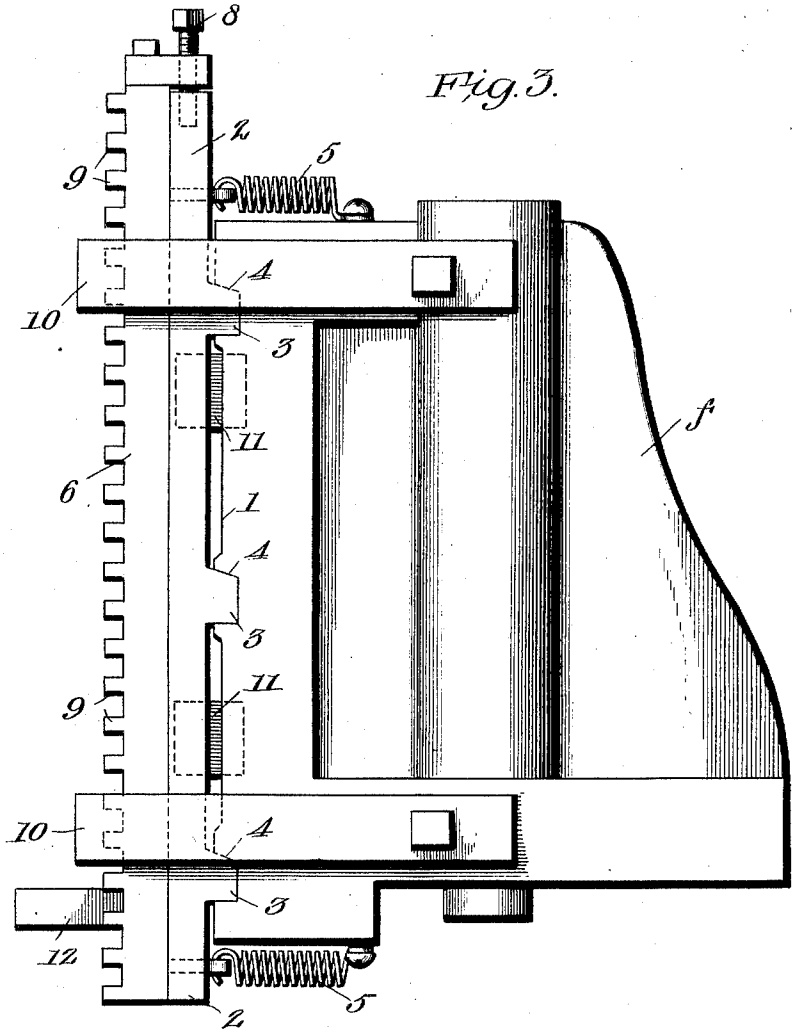
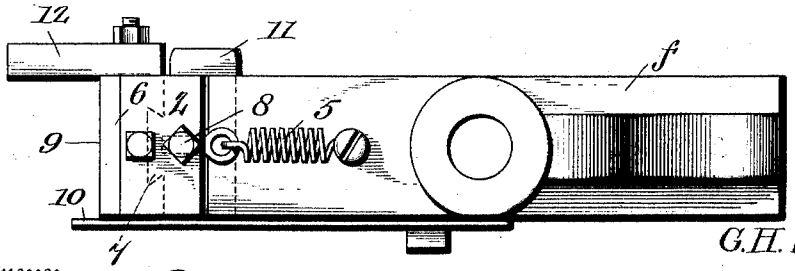


Fig. 4.



Witnesses
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No. 776,943. Patented December 6, 1904.

UNITED STATES PATENT OFFICE.

GEORGE H. RICE, OF GREENBAY, WISCONSIN.

BOX-MACHINE.

SPECIFICATION forming part of Letters Patent No. 776,943, dated December 6, 1904.

Application filed June 7, 1904. Serial No. 211,544. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. RICE, a citizen of the United States, residing at Greenbay, in the county of Brown and State of Wisconsin, have invented certain new and useful Improvements in Box-Machines; 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.

This invention relates to machines for making boxes, more particularly to an improvement in machines for readily assembling the parts of that class of boxes in which the sides and ends are secured together by interlocking tongues and grooves; and the objects of the invention are to improve the construction of such mechanisms and increase their efficiency of operation and to afford provision for ready adjustability as may be desired.

Further objects of the invention are to provide means which will cause the interlocking tongues on the boards or strips to be entered accurately and positively secured without injury, especially on cross-grain or other defective timber, and more particularly to improve the construction of the movable jaws for forcing said tongues into place.

To the accomplishment of these objects and such others as may hereinafter appear the invention consists of a box-making machine embodying the features of construction, combinations of elements, and arrangement of parts hereinafter described, and particularly pointed out in the appended claims, reference being had to the accompanying drawings, forming a part hereof.

While the machine may be readily adapted for entering and firmly securing together tongued boards or strips for use in any connection, still the preferred embodiment thereof is illustrated in the accompanying drawings, showing the same adapted to frame up the sides and ends of boxes, in which drawings the same reference characters designate like parts throughout the several views, and in which—

Figure 1 shows a plan view of the entire machine. Fig. 2 shows a front elevational view of Fig. 1. Fig. 3 shows an enlarged detail view, in side elevation, of one of the combined adjustable board-carriers and presser-plates. Fig. 4 shows a plan view of Fig. 3. Fig. 5 shows an elevational view of one side of a box after having been forced into the ends, and Fig. 6 shows one of the completely-formed box-corners before being trimmed.

Referring to the drawings, the parts of the machine are mounted on a main frame a, suitably supported at a convenient height, as by legs b. This main frame is provided in its top with ways c and d, extending at substantially right angles to each other and crossing at the center of the machine, Fig. 1, in which operate suitable carriages c' c^2 and d' d^2, a pair in each way c and d, the several carriages of which pairs are movable, preferably simultaneously, toward and from each other.

In the operation of the machine in framing up the box, carriages c' and d' are preferably kept stationary and carriages c^2 and d^2 are the only movable parts. On each of the four carriages mentioned above are mounted (preferably a pair on each) slides or abutments constructed to carry the side and end pieces of the box to be framed up and to press the tongues of the end pieces into their corresponding grooves in the side pieces. These pairs of slides for the carriages c' c^2 are designated by the reference character e and for the carriages d' d^2 by f. Each pair of slides are adjustable transversely of the carriage on which they are mounted by means of headed bolts g, sliding in T-grooves h in the carriage, whereby the distance between them may be varied to operate correctly on different-sized boxes.

The preferred details of construction and general mode of operation of the machine, except with respect to the slides f, operating on the sides of the box, whose construction and operation constitute the particular improvement covered herein, are fully set forth and illustrated in Patent No. 496,431, granted to Harry W. Morgan, of Rochester, New York, under date of May 2, 1893, and therefore said construction and operation need only be referred to here generally, as follows: Power is supplied through a driving-pulley i, mounted on a shaft j, which is connected by suitable

gearing k to a second shaft l, carrying on one end a bevel-gear m, meshing with another bevel-gear n, mounted on a third shaft o. On the free ends of shafts l and o are mounted cranks p and p', engaging with operating pitmen q and q', which are in turn connected to the movable carriages c^2 and d^2 and impart a reciprocatory movement thereto. The proper adjustment of the movable carriages, on which the slides and their board-carriers are mounted, to suit different-sized boxes is obtained through sets of sprocket-wheels r, connected by chains s and shafts t and operating screw-shafts u, engaging with said carriages. This adjustment is preferably performed by hand, the free ends of screw-shafts u being squared, as at v, to receive a removable operating-handle. (Not shown.)

In operating the machine the slides on which are mounted the board-carriers having been adjusted to the proper distance apart for the size of the box to be framed up the ends w and x and the sides y and z are placed thereon and clamped in place by suitable adjustable standards w' x' y' z'. Power is then imparted from the driving-pulley i to the pitman q', which actuates carriage d^2 and forces the tongues on the sides y and z home into their corresponding grooves in the ends w and x, leaving small openings $a^\times$, as shown by Fig. 5, at which time carriage c^2 is actuated and said holes are closed up, forcing the tongues on ends w and x home into their corresponding grooves in sides y and z, leaving the box-corner, as shown by Fig. 6, having projecting tongues which are afterward trimmed off, leaving a smooth clean corner.

Referring now more particularly to Figs. 3 and 4, the improvement herein will be particularly described. It has been found in actual practice that the improvement need only be used on the presser-plates of the board-carriers mounted on the slides used for forcing the tongues on the sides into their corresponding grooves in the ends, owing to the fact that the ends are thick and much stronger than the sides, and the improvement is therefore only shown on supporting-slides marked f, the carriers and pressers mounted on slides e being preferably formed in all respects similar and operating the same as those shown and described in the patent to Morgan, No. 496,431, above. As the improvement is the same on each slide, it is necessary to describe the construction of but one. On the face 1 of the abutment forming the slide f is mounted a board-carrier having a base-piece 2, provided with projecting lugs 3 on its rear face, which are constructed to fit in recesses 4, formed in the face 1, and form an open frictional bearing. This term "open frictional bearing" is used particularly to distinguish from a frictional bearing between two members formed by means of a dovetail tenon on one fitting into a dovetail groove on the other, the members being held together by overlapping edges of the groove. In the construction here shown the recesses 4 are distinctly "open"—that is, the base-piece 2 can be readily fitted therein from a position in front thereof. The base-piece 2 is further held to the slide f and the lugs 3 held in the recesses 4 under all conditions of use by springs or other suitable flexible means 5. On the base-piece 2 of the board-carrier is mounted a presser-plate 6, preferably by means of a dovetail joint 7, on which it may be vertically adjusted or removed by manipulation of a screw 8. The face of this presser-plate is provided with serrations or teeth 9, which are made deep enough and spaced apart in such manner as to fit between the tongues on the ends w and x and into the grooves in said ends, bearing on the tongues of the sides y and z and forcing them into place. Presser-plate 6 is made wide enough to cover the whole length of the tongues on the ends w and x, so that when pressure is applied it is evenly distributed and danger of breakage is greatly eliminated. By leaving the tongues slightly longer than is necessary a much neater corner can be formed by afterward trimming smoothly, and unless a toothed presser-plate were used allowing the projecting tongues to enter between the teeth thereof power could not be applied directly on the tongues, and a waste of material would ensue from breaking the tongues on the boards, especially upon thin side boards or where the material was cross-grained or otherwise defective. After the side tongues have been pressed home the carriage c^2 moves forward with presser-plates mounted on its slide e to press the end tongues home into their corresponding grooves in the sides. This movement is a very slight one, owing to the machine having been previously properly adjusted, and undue friction on the lumber is taken care of by allowing the presser-plates 6 to move with the side of the box. This is accomplished by means of the sliding bearing formed by the lugs 3 and recesses 4. As the carriage c^2 advances it carries with it the sides y and z and the presser and base plates 6 and 2, sliding in the bearings, as above described, and pressing against springs 10, suitably secured to slide f. When the carriage c^2 is retracted, springs 10 force plates 2 and 6 back into position against lugs or stops 11, formed on the slide f. Presser-plate 6 is supplied with the usual adjustable lug or projecting member 12 for supporting the boards, as described in patent to Morgan above.

While the invention has been described with particular reference to the details of construction, it should be understood that it is not limited thereto, as many and various changes, alterations, and substitutions may be made therein and still fall within its scope and spirit; but

What I do claim, and desire to secure by Letters Patent, is—

1. In a machine of the class described provided with relatively movable coöperating slides adapted to force together interlocking tongues and grooves on boards or strips, the combination with one of said slides, of a board-carrier mounted thereon comprising a base-plate having an open frictional bearing in said slide, flexible means for retaining said base-plate in its bearing, and an adjustable presser-plate mounted on said base-plate, substantially as described.

2. In a machine of the class described provided with relatively movable coöperating slides adapted to force together interlocking tongues and grooves on boards or strips, the combination with one of said slides, of a board-carrier mounted thereon comprising a base-plate having an open frictional bearing in said slide constructed to afford a motion at substantially right angles to that of the opposing slide, flexible means for retaining said base-plate in its bearing, and a presser-plate mounted on said base-plate, means for forcing said carrier back to normal position when moved therefrom and means against which the same is adapted to abut when forced back, substantially as described.

3. In a machine of the class described provided with relatively movable coöperating slides adapted to force together interlocking tongues and grooves on boards or strips, the combination with one of said slides, of a board-carrier mounted thereon comprising a base-plate having an open frictional bearing in said slide constructed to afford a motion at substantially right angles to that of the opposing slide, springs for retaining said base-plate in its bearing and a presser-plate adjustably mounted on said base-plate, and a spring and a lug on said slide adapted respectively to force said board-carrier back to normal position when moved therefrom and to hold the same in position when forced back, substantially as described.

4. In a machine of the class described having a pair of ways at substantially right angles to each other and carriages mounted to slide thereon, the combination with one of said carriages of a vertically-arranged abutment provided with a horizontally-arranged recess in its forward surface having an unrestricted orifice, a board-carrier therefor having a toothed presser-surface and a projecting lug on its rear face adapted to enter and rest in said recess, whereby said carrier is afforded a motion at substantially right angles to that of the carriage on which it is mounted, substantially as described.

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

GEORGE H. RICE.

Witnesses:
H. W. GOSSELIN,
ANNETTE CLEMETSON.