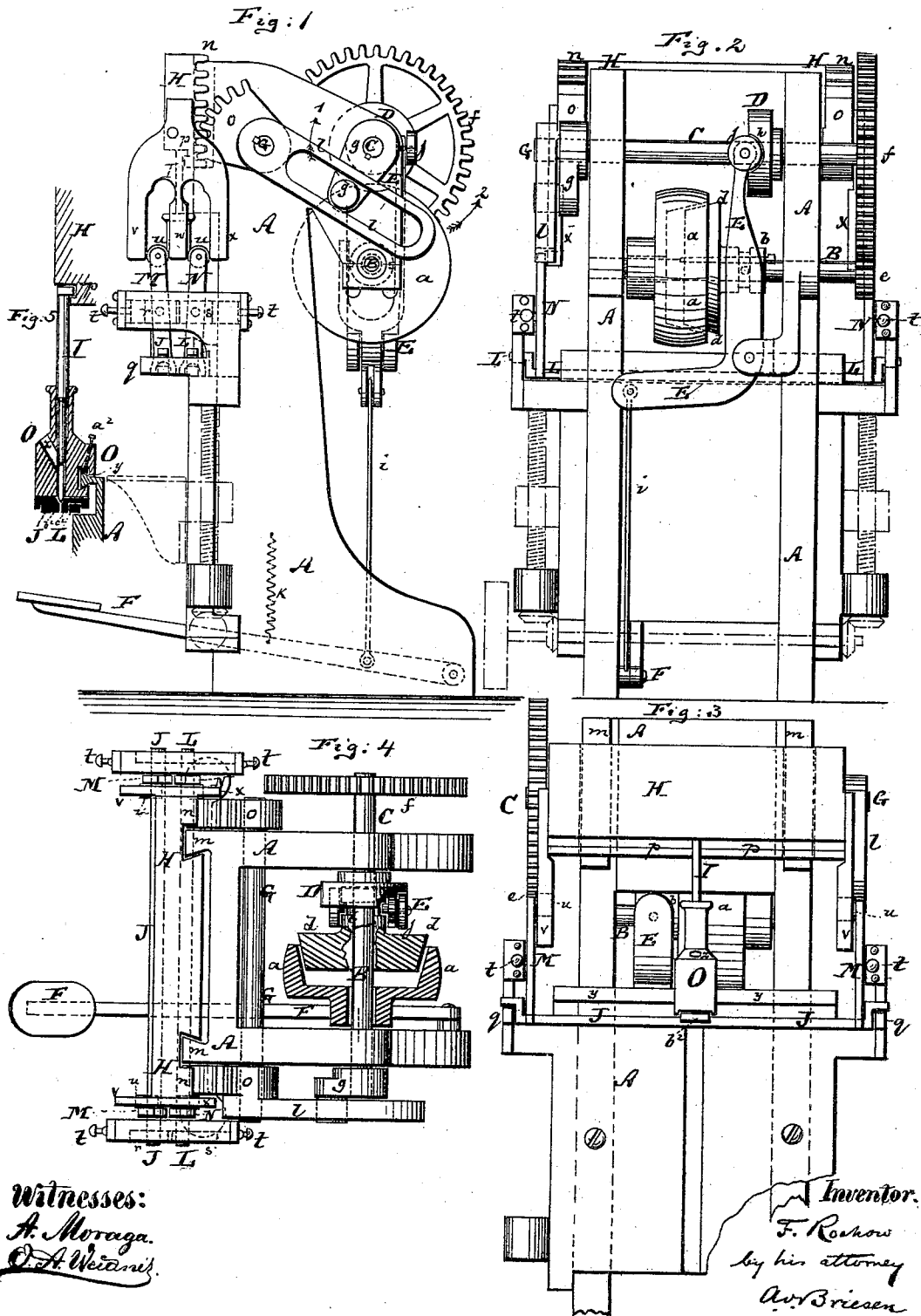


F. ROCHOW.
BOX-NAILING MACHINE.

No. 179,135.

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UNITED STATES PATENT OFFICE.

FERDINAND ROCHOW, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN BOX-NAILING MACHINES.

Specification forming part of Letters Patent No. **179,135**, dated June 27, 1876; application filed April 11, 1876.

To all whom it may concern:

Be it known that I, FERDINAND ROCHOW, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Box-Nailing Machines, of which the following is a specification:

Figure 1 is a side elevation of my improved box-nailing machine. Fig. 2 is a rear elevation; Fig. 3, a partial front elevation, and Fig. 4 a top view, partly in section, of the same. Fig. 5 is a detail vertical section of the nail-guide and plunger.

Similar letters of reference indicate corresponding parts in all the figures.

This invention relates to several improvements in the operating mechanism and construction of box-nailing machines; and consists in a new automatic unshipping device, a novel variable throw of the plungers, new arrangement of continuous jaws, and adjustable nail-guides, and other features of improvement hereinafter more fully described.

In the accompanying drawing, the letter A represents the frame of my improved box-nailing machine. In this frame is hung a shaft, B, which carries a loose pulley, *a*, and a sliding clutch, *b*, that bears a cone-pulley, *d*, of a size to fit a corresponding cavity of the loose pulley *a*, so that when, by moving the clutch, the cone-pulley *d* is borne against the pulley *a*, the shaft B will be revolved; otherwise not. In place of the cone-pulley *d*, any other style of clutching device may be used. A pinion, *e*, on the shaft B, gears into a toothed wheel, *f*, that is mounted upon another shaft, C, as shown. This shaft C carries the crank or cranks *g*, by which the nailing-plungers are moved up and down, each revolution of the shaft C serving to impart one reciprocating movement to said plungers. The shaft C also carries a wheel, D, which has a depression or notch, *h*, at one side, or at its edge. The shipping-lever E, which serves to move the clutch *b*, and which, by a rod or rods, *i*, connects with a suitable treadle or handle, F, carries at its upper part a friction-roller, *j*, which is by a spring, *k*, constantly held in contact with the notched face or edge of the wheel D. Whenever, after a descent, the nailing-plungers have been raised, the notch *h* will be exactly in line

with the friction-roller *j*; and the latter will, by the spring *k*, be drawn into said notch, as in Fig. 2.

The movement thus imparted to the lever E causes it to withdraw the clutch from the loose driving-pulley *a*, and thereby to arrest the rotation of the shafts B and C and the operation of the machine. Thus the machine is always automatically stopped after its nailing-plungers have ascended from a nailing operation, and the attendant has ample time to adjust the boards or pieces for a new nailing process.

A touch of the treadle or handle will suffice to set the clutch against the loose pulley, and to withdraw the roller *j* from the notch *h*, and to thus permit a fresh rotation of the shaft C.

The wrist-pin of the crank *g* on the shaft C extends through the slot of a crank, *l*, that projects from a rock-shaft, G, which is hung horizontally in the upper part of the frame A, a short distance behind the vertically-reciprocating cross-head H. The said cross-head, which carries the nailing-plungers in the manner hereinafter more fully described, is guided in its upright movements on rails *m m*, which are formed on the frame A, as indicated in Fig. 4.

At or near each end the cross-head H is provided with toothed racks *n n*, that gear into toothed segments *o o*, projecting from the rock-shaft G. When, by the rotation of the shaft C, the crank *g* is caused to oscillate the shaft G, the latter will, by its segments *o o*, cause the cross-head to move up and down in the desired manner. The cross-head, being at both ends positively connected with the moving mechanism, is thus guarded against all danger of tilting, and guides the plungers in the proper manner.

In place of the racks *n n*, equivalent moving devices may be employed.

It will be observed that, as the slotted crank *l* projects throughout its length from one side of the shaft G, a variable throw is imparted to said shaft—that is to say, if the shaft C is rotated in the direction of the arrow 2, Fig. 1, its crank will work in the extended end of the slot in the crank *l* while causing the cross-

head to descend, and the descent will therefore be slow and powerful—a desideratum when long or thick nails are to be driven, or hard wood is to be nailed; but the ascent will be more rapid. If, however, the nailing is to be more rapid, and the ascent slow, it is only necessary to reverse the motion of the shaft C, so that its crank will cause the descent of the cross-head while moving in that part of the slotted crank *l* which is nearest the shaft *g*—i. e., in the direction of the arrow 1.

The vertically-reciprocating cross-head H has at its lower part a horizontal groove, *p*, in which the upper ends of the nailing-plungers I are held, as in Fig. 5, and wherein said plungers can be moved and adjusted in horizontal direction in any manner desired. A suitable number of such plungers may be applied to said cross-head, and made adjustable thereon.

The nail-clamping jaws of the machine are formed by two parallel horizontal cross-bars, J and L, whose ends are supported on lugs *q q* that project from the front of the frame A, on which lugs said cross-bars are horizontally movable toward and away from each other. Between these two bars is formed a narrow opening or slot, which is continuous from one side of the frame A to the other, between the two lugs *q q* thereof. When these bars are brought near together they constitute jaws for clamping or holding the nails, but when they are drawn apart they furnish no obstacle to the further descent of the nails. The ends of the cross-bars J and L are connected with upright levers M and N, respectively, which levers are pivoted in boxes *r s*, that are supported in the frame A, and rendered adjustable as to their distances apart, by set-screws *t t*, indicated in Fig. 1. The upper ends of the levers M N carry friction-rollers *u u*, and enter into guide-slots that are formed by three pendent arms *v, w*, and *x*, at each end of the cross-head H. The upper ends of these guide-slots are curved toward each other, so that when the cross-head H descends, the levers M and N will, upon entering the curved ends of said slots, be spread apart at their lower ends, serving thereby to spread the cross-bars J L. The plungers I are thereby enabled to push the nail-heads through the space formed between said cross-bars into the wood to be nailed. The lower part of each plunger I is always inserted in a vertical aperture of a nail-guide, O, which is a perforated block, supported on a rail, *y*, of the frame A, (see Fig. 5,) and laterally adjustable thereon. This nail-guide has an inclined aperture, *z*, which leads into the vertical bore, and serves to receive the nail to be driven. On the rail *y*, the guide O may be clamped in suitable position by a set-screw, *a*². The lower end of each nail-guide O is but a short distance above the cross-bars J L, as seen in Figs. 3 and 5, and between it and said cross-bars may be introduced two blocks, *b*² and *c*², which rest on said cross-bars, respectively, and constitute when used the virtual nail-jaws. These blocks

may reach into a groove in the under side of the guide O, as in Fig. 3, so that they will follow the same during its adjustment on the bars J and L.

A suitable table, indicated by dotted lines in Fig. 1, is applied to the front of the frame A, below the cross-bars J and L, and is rendered vertically adjustable by suitable means in accordance with the height of the upright board to be nailed. Before the process of nailing is commenced the nail-guides O O are adjusted on the rail *y*, the requisite distance apart, and with them the blocks *b*² and *c*², and the plungers I I, which follow the movements of the said nail-guides. A nail is next, by suitable means inserted in the aperture *z* of each nail-guide. During these arrangements the cross-head H, with its plungers, is elevated to its highest extent, the blocks *b*² *c*², or cross-bars J and L, being closed together, so that the nails introduced in the guides cannot fall through.

The boards to be nailed being next properly placed against each other on the table, the treadle F is depressed and the machine thereby set in motion, so that the cross-head H, with its plungers I I, are forced down, the plungers pushing the nails downward with them in the nail-guides. As the cross-head H is about to reach its lower position, the levers M and N are vibrated to separate the cross-bars J and L, and with them the blocks *b*² and *c*², whereby the plungers will be enabled to drive the nails freely down past the bars J L into the wood. The further rotation of the shaft C causes the cross-head with its plungers to be elevated, and then the machine is arrested by the notched wheel D, in manner already described. The attendant may then remove the nailed boards, adjust new boards to be nailed, and restart the machine in like manner. But one plunger I and nail-guide O are shown in the drawing, but it is evident that any suitable number may be employed to permit the simultaneous driving of any suitable number of nails.

I claim as my invention—

1. The combination of the shipping-lever E, which actuates the clutch *b*, with the notched wheel D, which serves to automatically stop the machine, substantially as specified.

2. In combination with the notched wheel D, friction-roller *j*, and lever E, the rod or pin *i*, treadle or handle F, and spring *k*, all arranged to operate substantially as herein shown and described.

3. The combination of the operating cross-head H of a box-nailing machine, provided with racks *n n*, and operating the nailing-plungers I, with the segments *o o*, and rock-shaft G, substantially as herein shown and described.

4. The combination of the vertically-reciprocating cross-head H, which has the horizontal groove *p*, with the plunger I, having a head resting in said groove and adjustable therein, substantially as specified.

5. The combination of the frame A of a box-nailing machine, and lugs *g*, with the laterally-adjustable cross-bars J and L, which are supported and adjustable on said lugs *g*, and form between them a continuous nail-passage, and also constitute the nail-holder, as specified.

6. The combination of the cross-bars J L with the levers M and N, and the reciprocating cross-head H, which actuates said levers, substantially as herein shown and described.

7. The cross-head H, provided with the arms *v*, *w*, and *x*, and combined with the levers M and N, and bars J and L to actuate the same, substantially as herein shown and described.

8. The tubular nail-guide O, supported on

the rail *y*, and combined with the reciprocating plunger I, and adjustable bars J and L, substantially in the manner herein shown and described.

9. In combination with the nail-guide O, the sliding block *b² c²*, and cross-bars J and L, substantially as specified.

10. The adjustable boxes *r s*, combined with the levers M N, and cross-bars J L, substantially as herein shown and described.

The foregoing description of my invention, signed by me this 8th day of April, A. D. 1876.

F. ROCHOW.

Witnesses:

ERNEST C. WEBB,

OTTO A. WEIDNER.