

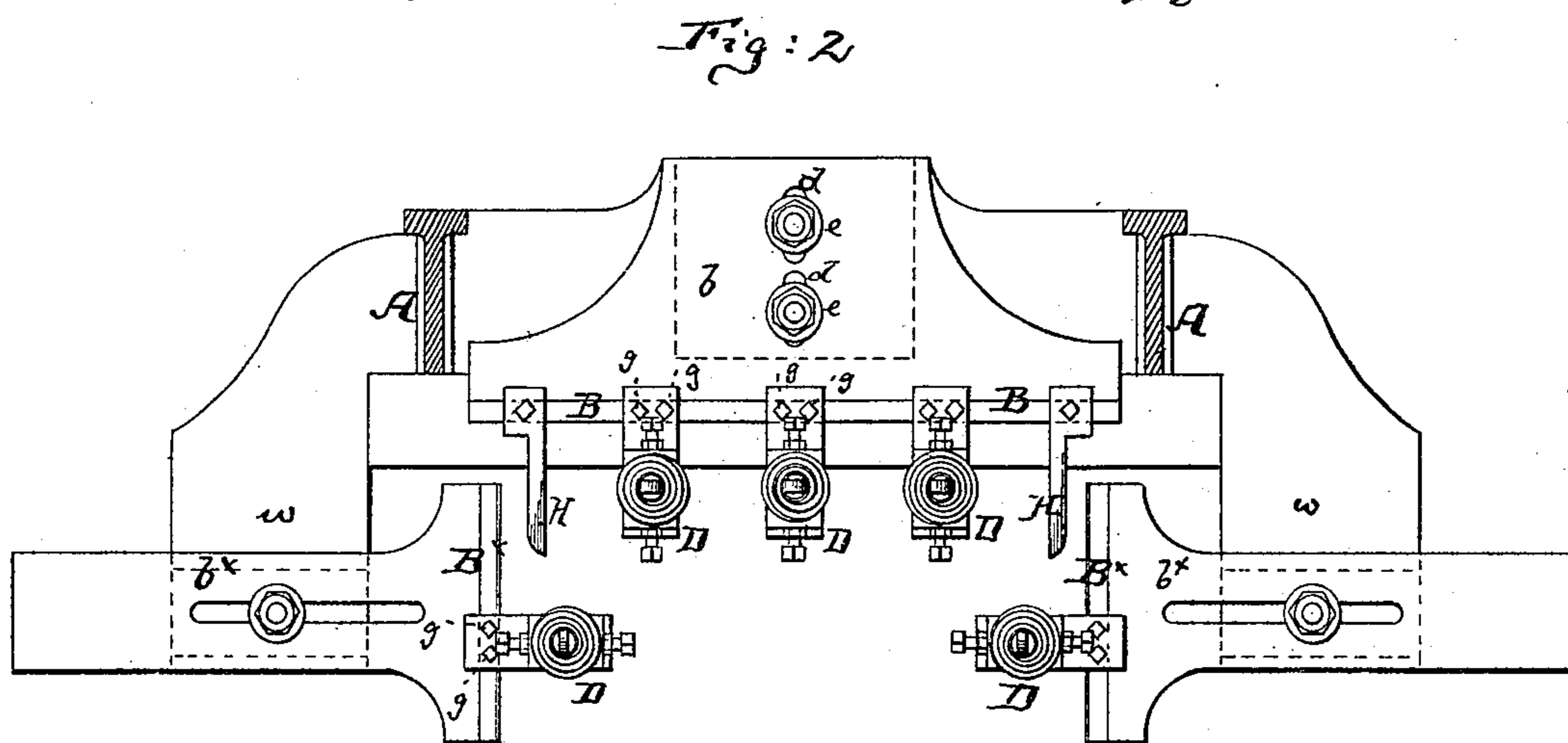
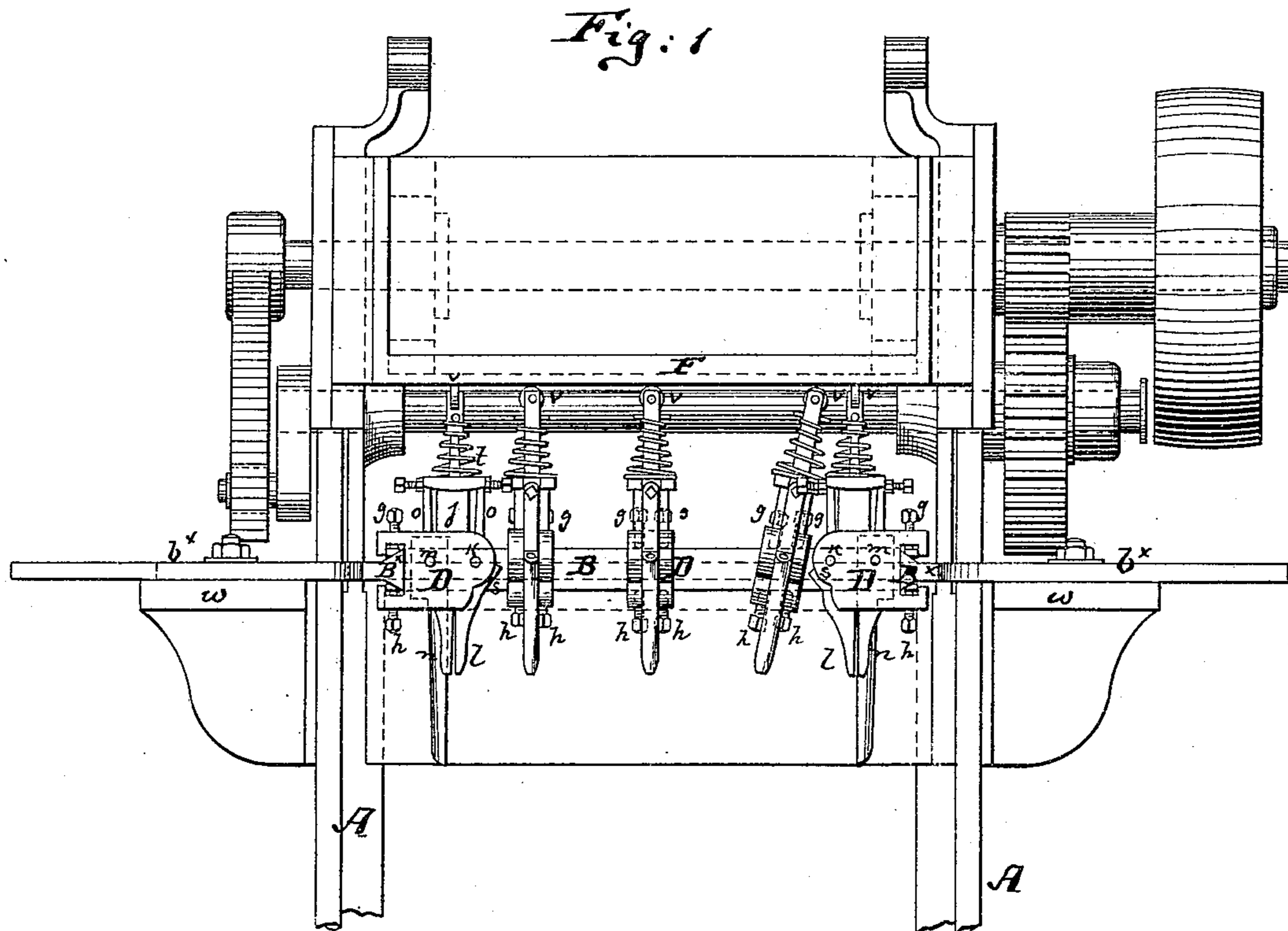
(Model.)

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F. ROCHOW.  
BOX NAILING MACHINE.

No. 248,668.

Patented Oct. 25, 1881.



Witnesses.  
Henry T. Parker  
John C. Thurbridge.

Inventor:  
Ferdinand Rochow  
by his Attorney  
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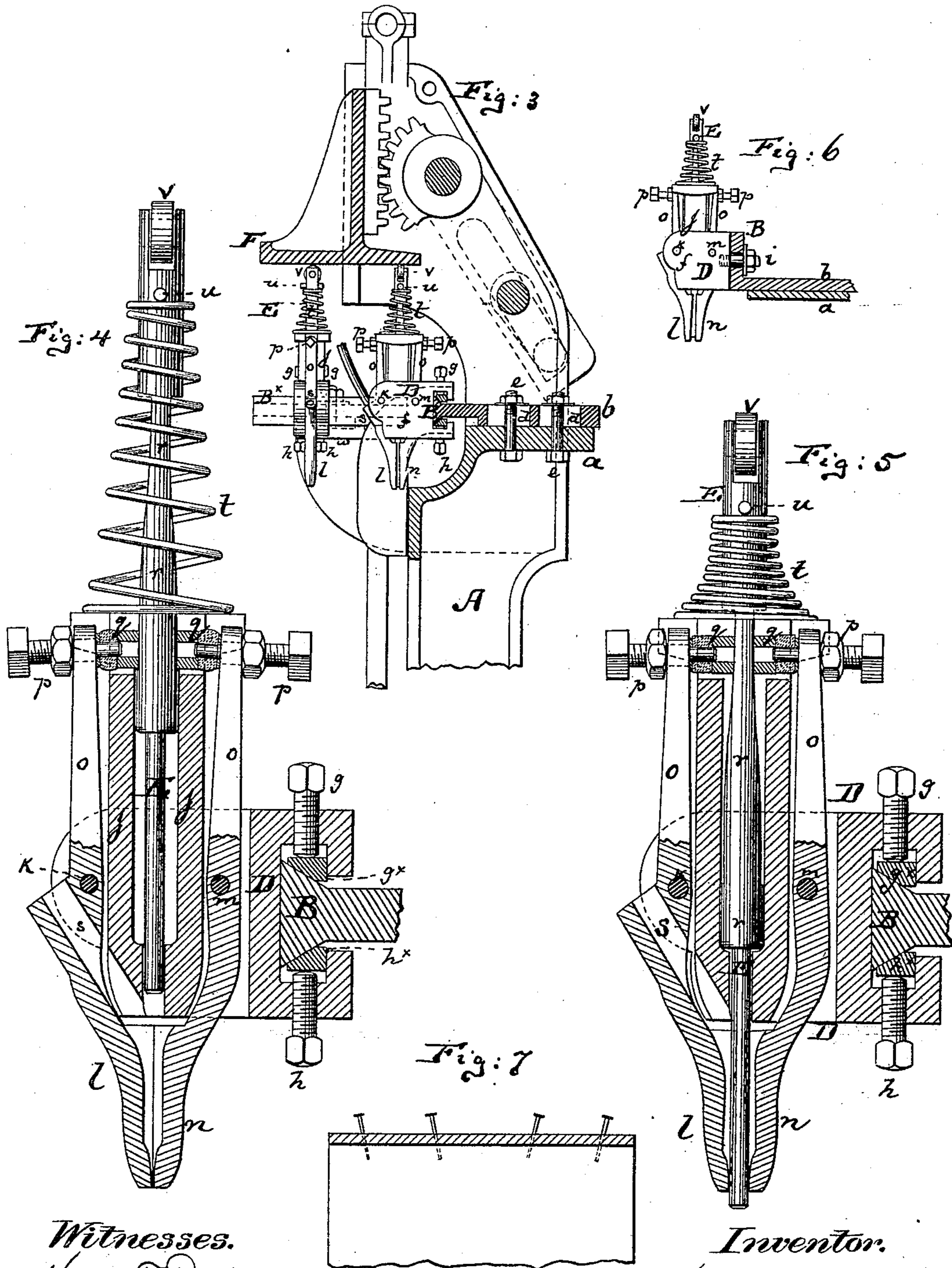
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# UNITED STATES PATENT OFFICE.

FERDINAND ROCHOW, OF BROOKLYN, NEW YORK.

## BOX-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 248,668, dated October 25, 1881.

Application filed February 7, 1881. (Model.)

*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 front elevation of the upper part of the box-nailing machine, showing my improvements. Fig. 2 is a horizontal section of the machine, taken directly above the top of the plungers. Fig. 3 is a vertical cross-section of the same. Fig. 4 is an enlarged sectional elevation of the nail-driving plunger, lifting-spring, and holding-jaw, showing the plunger raised. Fig. 5 is a similar view, showing the plunger depressed. Fig. 6 is a sectional side view on a reduced scale, showing the plunger pivoted to its carrying cross-bar. Fig. 7 is a diagram of a box, showing the position of the nails in which they can be driven by my machine.

The object of my invention is to improve the adjustability and the construction of machines for nailing boxes.

As heretofore constructed, all box-nailing machines known to me had adjustable nail-holding jaws suspended from a cross piece or bar, and combined with reciprocating plungers which are moved by a suitable cross-head, or the jaws were moved by a table. In all these former structures the nailing could only be either in the vertical direction, or, if in an inclined position, as in pegging-machines, lateral adjustment of the nail-holder was not possible.

By my invention I am enabled, in the first place, to attach the longitudinally and laterally adjustable jaws and the plungers which they carry in an inclined or oblique position to the line of longitudinal adjustment, so that the nails may be driven obliquely, thus greatly improving the character of the work performed.

Another feature of my invention consists in a peculiar construction of the jaws, which have upward extensions bearing against the tapering shank or stem of the plunger, so that as the plunger descends the lower ends of the jaws will be gradually opened to let the nail pass down, all as hereinafter described.

Another feature of my invention consists in supplying the machine, in addition to the rail

or cross-bar which carries the jaws that nail one side of the box, with rails that project at right angles, or thereabout, from said first rail, and are independently adjustable, so that if jaws and plungers are suspended from said additional rails two adjoining sides of the same box may be nailed, or even three adjoining sides.

I am well aware that heretofore it has been proposed to nail the two opposite sides of the same box at one operation, which arrangement required the use of two nailing-machines placed face to face. This, of course, I distinctly disclaim, and from it my invention differs, in that in lieu of nailing two opposite sides I am enabled to nail two or three adjoining sides, to wit: I can nail the bottom of a box to its body by driving the nails along one side and the adjoining ends into said bottom at one operation.

My invention also consists in combining with the adjustable jaw-carrying plates or cross-bars an upper plunger-depressing plate, which drives all the plungers simultaneously, and does not require any adjustment to match the adjustment of the jaws.

Other details of improvement which are embraced in my invention will be hereinafter more fully specified.

In the accompanying drawings, the letter A represents the frame-work of the box-nailing machine. This frame-work is of suitable construction, and carries on a suitable platform, *a*, the cross-bar B, from which the main set of carriages D, holding the jaws and plungers, is suspended. The cross-bar B is at the face of the machine and parallel therewith. This cross-bar B is attached to or provided with an extension-plate, *b*, which has suitable transverse slots, as shown at *d* in Fig. 2, through which bolts *e*, that fasten it to the platform *a*, are passed. By this means of attachment the cross-bar B can be set in or out more or less, serving thereby to regulate the distance the nails are driven from the edge of the upper board. Thus for boxes made of thicker wood the nails are driven at a greater distance from the edge of the upper board than in boxes which are made of thin wood.

The cross-bar B is preferably of dovetailed form, as shown in Fig. 3, or may be made of any other analogous form—as, for example,

shown in Fig. 6—so as to hold securely in place the carriages that hold the jaws and plungers. These carriages are preferably double-hook-shaped at their backs, as is clearly shown in Figs. 3 and 4, so as to embrace the cross-bar B in manner indicated, and yet be allowed longitudinal adjustment along the extent of the bar B lengthwise.

The carriages having the double hooks at the back are held in place on the cross-bar by means of suitable set-screws, *g* and *h*, and interposed blocks or plates *g*<sup>x</sup> *h*<sup>x</sup>. I prefer to have two set-screws, *g*, in the top and two set-screws, *h*, in the bottom of each carriage, as clearly indicated in Fig. 1, so that by properly setting these four screws the carriage may be placed in an inclined position, as shown on the right-hand side of Fig. 1; but the same effect may be produced by pivoting the carriage, as in Fig. 6, directly to the cross-bar B, in which case the cross-bar B must be slotted lengthwise, to allow the connecting of pivot *i*, with the carriage of which it forms part, to be also adjusted longitudinally in the spacing of the jaws.

Instead of having two set-screws, *g g*, on top and two set-screws, *h h*, at the bottom of the double-hooked carriage, either the top or the bottom hook of the carriage, above or below the rail, may be rounded convexly, to permit and facilitate the tilting operation and position above indicated. In other words, I do not limit myself to any special manner of attaching the carriage to the rail B, as long as the attachment is of such a character as to allow the carriage to be placed either into a vertical or into a more or less oblique position, and yet have it laterally adjustable. Each carriage D, which, as already stated, is capable of attachment to the rail B, is made with parallel outwardly-projecting cheeks *ff* in front, and carries between its cheeks *f* a rigid guide-tube, *j*, (see Fig. 4,) which is cast or otherwise intimately connected with the body of the carriage, and forms part thereof, and which serves to receive and guide the plunger E, as clearly shown in Fig. 4. In front of the tube *j* is pivoted, between the cheeks *f*, by a pin, *k*, one of the jaws, *l*, of the nail-guide.

Behind the tube *j* is pivoted, between the cheeks *f*, by a pin, *m*, the other jaw, *n*, of said nail-guide. These two jaws *l* and *n* have each an upward extension or arm, *o*, and these two arms *o*, at or above the upper end of the tube *j*, carry each on an adjustable screw-pin, *p*, an inner cushion, *q*. These cushions are made of india-rubber or other suitable elastic material, and are in contact with the shank or stem *r* of the plunger E, and serve, when the plunger E is elevated, to hold the lower ends of the jaws *l* and *n* together, as shown in Fig. 4. The shank *r* of the plunger E is made tapering, being thickest at the lower part, which is in contact with the cushions *q* when the plunger is raised, and of gradually reduced thickness from that point upward, so that as the plun-

ger is forced down the cushions *q* will be caused to expand and come nearer together, thereby permitting the jaws *l n* to open and let out the nail which the plunger forces into the box. The cushions, in connection with the tapering shank of the plunger, thus regulate the position of the jaws during the operation of the machine, and they also, because they are yielding, allow the jaws to adjust themselves to varying thicknesses of nails and varying sizes of nail-heads, and as the jaws open, and thereby form side openings between them, they will also allow nails which may happen to be wrongly inserted—for instance, head downward, or where there is more than one nail accidentally inserted—to pass out sideways without injuring any part of the machine or any part of the box.

The jaw *l* has a tubular extension, *s*, through which the nail enters between the jaws from a suitable automatic or other nail-feed. The plunger is held normally in an elevated position by means of a spring, *t*, which surrounds its upper part, rests on the carriage D, and bears against a projecting pin or shoulder, *u*, of the shank. The upper end of the plunger has, by preference, a friction-roller, *v*, hung in it, as shown. When the plunger is raised, the cushions *q* are compressed by the thick part of the tapering plunger.

To the frame of the machine, above the carriages D D, that are placed on the rail B, is attached in suitable manner a vertically-movable plate, F, which, by means of rack and pinion, or in any other suitable manner, receives up-and-down reciprocating motion, and which, in descending, reaches the upper ends of the plungers and gradually forces said plungers down into the position shown in Fig. 5, thereby discharging the nail which is inserted into each pair of jaws from said jaws into the box below, the box, or rather the boards which are to form the box, being placed upon a suitable table below the jaws.

The friction-roller *v* is very desirable, although not imperatively necessary, when the plungers are to be moved in a slightly oblique position to drive the nails slantingly, as shown in Fig. 7.

It is quite clear from what has been before stated that the jaws and plungers can all be set slanting to drive the nails in the manner shown in Fig. 7. The nailing-plate F, which moves the plungers, is of such size that the lateral adjustment of the cross-bar B and the longitudinal adjustment thereon of the jaws and plungers will always leave the latter beneath said plate F, so that the plate F need not be adjusted when the carriages are.

To the frame of the machine, in front of the cross-bar B, are or may be attached on suitable wings, *w*, cross-bars B<sup>x</sup>, which stand at right, or nearly right, angles to the cross-bar B, as shown in Fig. 2. These cross-bars B<sup>x</sup> are attached to plates *b*<sup>x</sup>, which are slotted and adjustable on the supporting wings, so

that each cross-bar  $B^*$  may be placed at any suitable distance from the end of the cross-bar  $B$ , and so that the two cross-bars  $B^*$  may be adjusted at any suitable distance from one another. On these cross-bars  $B^*$  may be held a suitable number of carriages,  $D$ , having nail-jaws and plungers, which, when so placed, will always be beneath the plate  $F$ , allowing the latter to force the plungers on the cross-bars  $B^*$  down at the same time that the plungers on the cross-bar  $B$  are forced down. By this arrangement I am enabled to nail not only one side of the box, but two or three adjoining sides.

It will be observed that by having the carriage  $D$  so arranged that it carries the jaws, the plunger, and the spring  $t$  in one compact structure, and at the same time making it laterally adjustable, together with its cross-bar  $B$ , the several adjustments about which I have spoken, both laterally, longitudinally, and obliquely, are made possible.

I do not limit myself, as far as the slanting position of the plunger is concerned, to a nailing-machine which operates by the descending action of the plate  $F$ , as that feature of my invention is applicable also to machines in which the lower board-supporting table rises in driving the nail.

$H H$  are gages for placing the ends of the boards to be nailed. They are preferably adjustable on the bar  $B$ .

I do not broadly claim making the carriage with nail-holding jaws, plunger, and lifting-spring in one compact structure, as this has been shown in the patent of Wicke, No. 38,924.

I do not claim machinery for driving nails obliquely by moving the box toward a stationary plunger.

I claim—

1. In a nailing-machine, the combination of the carriage  $D$ , having the plunger-guide  $j$ , with the reciprocating plunger  $E$ , and with the pivoted jaws  $l$  and  $n$ , the plunger having tapering shank  $r$ , with which upper extensions of the jaws come in contact, substantially as specified.

2. The combination of the jaws  $l n$  with the screws  $pp$  and cushions  $q q$ , and with the plunger  $E$ , having tapering shank  $r$ , substantially as described.

3. In a nailing-machine, the combination of the laterally-adjustable carrying cross-bar  $B$ , with series of carriages  $D$  suspended therefrom, each carriage having the nail-holding jaws, the plunger, and the lifting-spring for the plunger in one compact structure, all arranged in reference to each other in such manner that each carriage is adjustable independent of the others on the cross-bar  $B$  in a direction horizontal to said cross-bar, and so that all carriages on the cross-bar are adjusted simultaneously and equally in a lateral direction by moving said cross-bar forward or backward, substantially as herein shown and described.

4. A box-nailing machine having reciprocating nail-driving plungers and driving mechanism, substantially as described, and jaws, said plungers being fitted into carriage  $D$ , which is provided with fasteners  $g g h h$ , or equivalent pivot  $i$ , for holding it obliquely to the direction of the face of the carrying-bar  $B$ , and arranged to drive the nails obliquely to said direction, substantially as specified.

5. The combination of the cross-head  $B$  and its slotted extension  $b$  with the pivoted and longitudinally-adjustable carriage  $D$ , having the nail-jaws and the nail-driving plunger and the lifting-spring in one compact structure, all arranged for lateral and longitudinal adjustment, substantially as specified.

6. In a nailing-machine, the combination of the main jaw-carrying cross-bar  $B$  with one or more transversely-placed jaw-carrying cross-bars,  $B^*$ , substantially as specified.

7. In a nailing-machine, the combination of the laterally and longitudinally adjustable nail-driving plunger with the overhanging cross-plate  $F$ , which is disconnected from said adjustable plungers, and serves to force them down, substantially as specified.

8. In a nailing-machine, the combination of the reciprocating plunger  $E$ , having friction-roller  $v$ , with the overhanging reciprocating driving-plate  $F$ , substantially as specified.

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Witnesses:

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