2 Sheets—Sheet 1.

# J. H. SWIFT.

## BOX NAILING MACHINE.

No. 251,484. Patented Dec. 27, 1881.

Fig: 1.

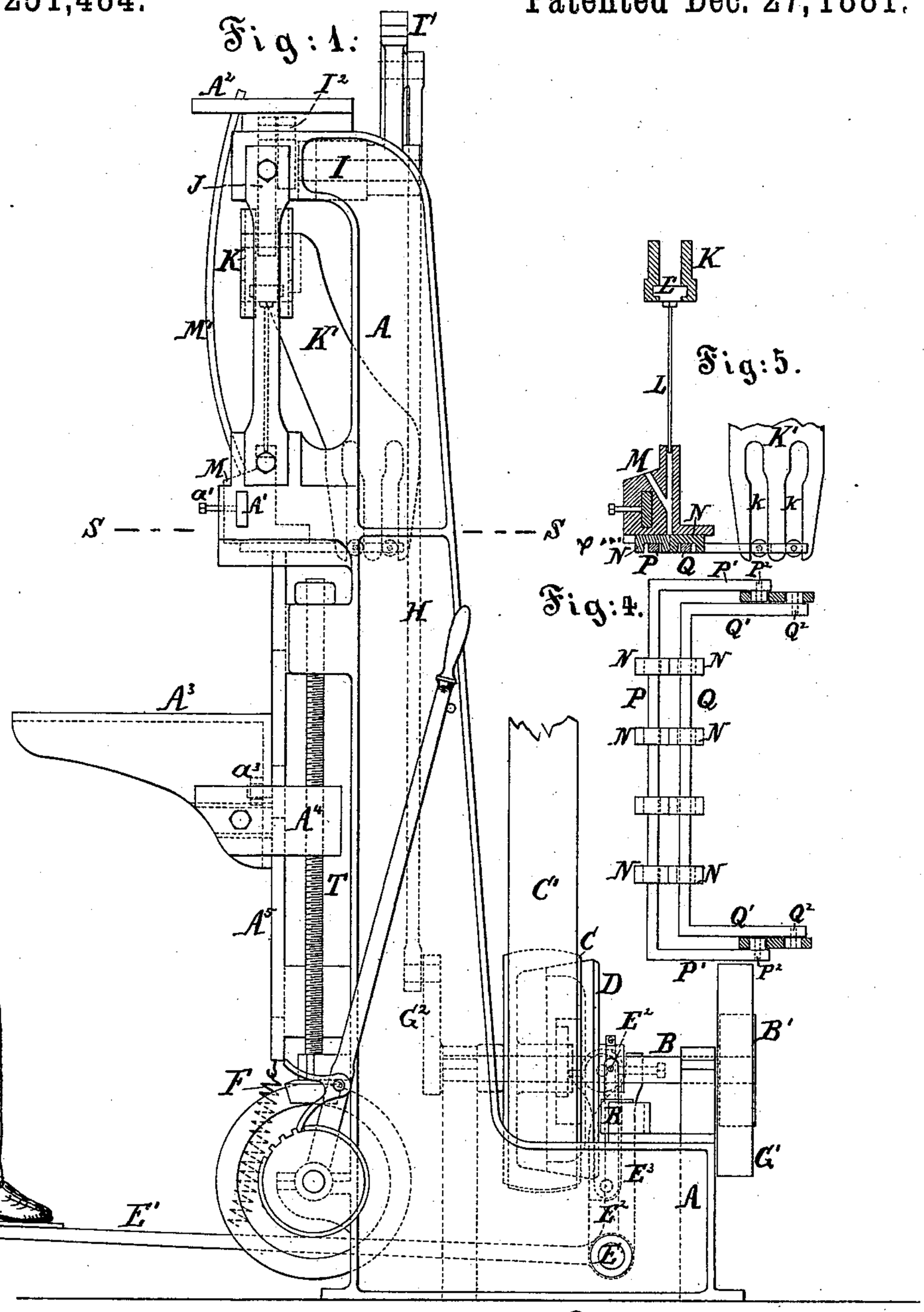


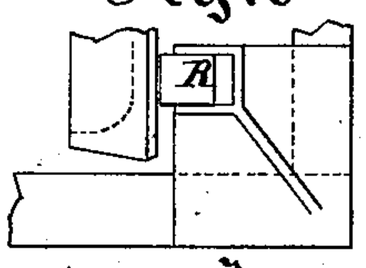

Fig: 5.




Fig: 4.




Fig: 3




Witnesses:
Chas. C. Stetson.
A. H. Burr, Jr.

Inventor:
J. H. Swift
by his attorney, C. C. Stetson

N. PETERS, Photo-Lithographer, Washington, D. C.

2 Sheets—Sheet 2.

# J. H. SWIFT.

## BOX NAILING MACHINE.

No. 251,484. Patented Dec. 27, 1881.

Fig: 2.

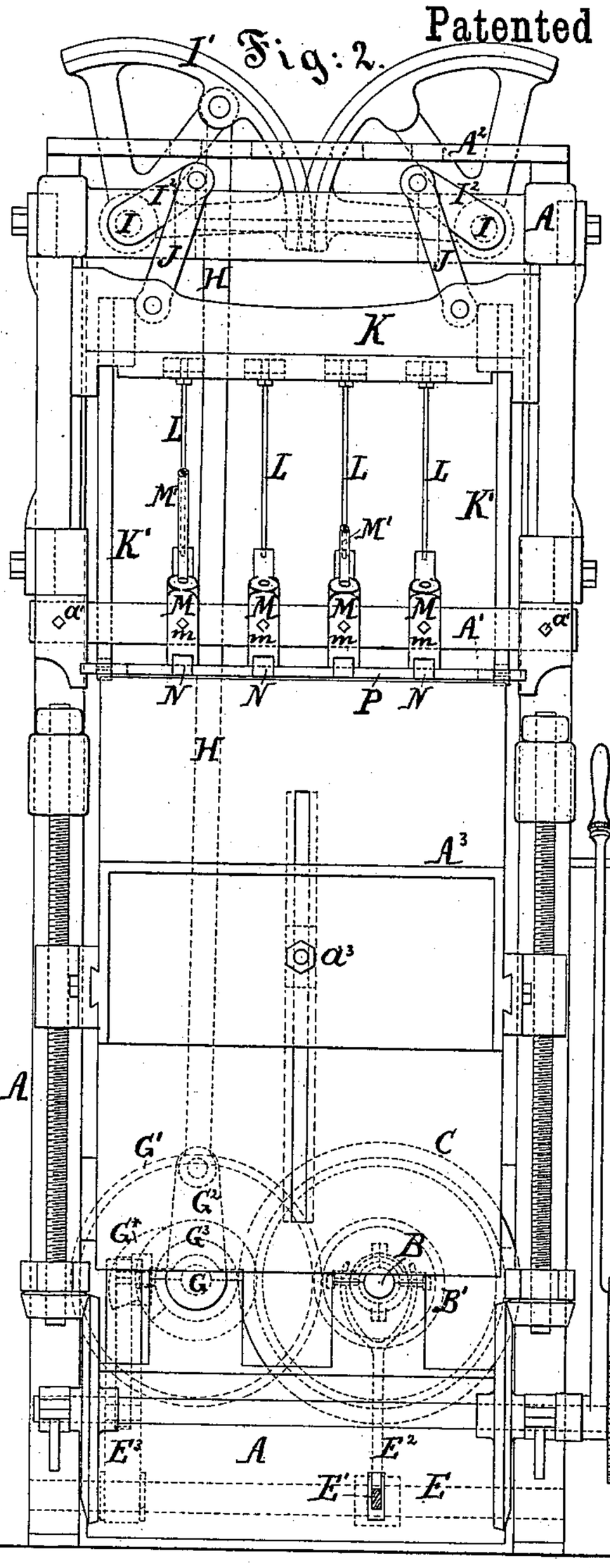



Fig: 6.

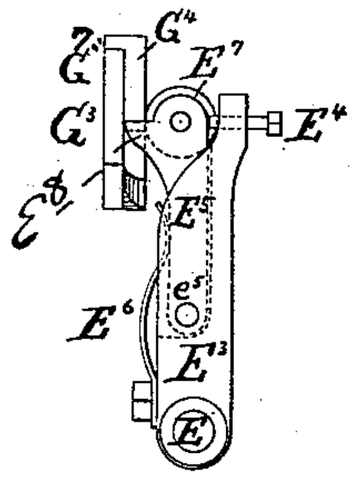
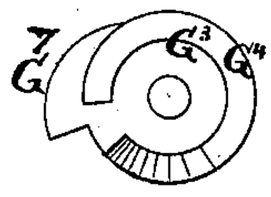



Fig: 7.




Witnesses:

C. H. Dyer Jr.

Chas. C. Stetson.

Inventor:

J. H. Swift

by his attorney

C. C. Stetson

N. PETERS, Photo-Lithographer, Washington, D. C.

# UNITED STATES PATENT OFFICE.

JOSEPH H. SWIFT, OF NEW YORK, N. Y.

## BOX-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 251,484, dated December 27, 1881.

Application filed June 18, 1877.

*To all whom it may concern:*

Be it known that I, JOSEPH H. SWIFT, of New York, in the county and State of New York, have invented certain Improvements relating to Box-Nailing Machines, of which the following is a description, including the accompanying drawings.

My invention consists in an improved stop-movement combined with nail-driving mechanism, whereby a positive intermittent motion is secured, and in the combination therewith of a brake to prevent sudden concussion.

Figure 1 is a side elevation of the entire machine. Fig. 2 is a corresponding front elevation. Fig. 3 is a plan view of a small portion, showing the brake R herein mentioned. Fig. 4 is a plan view of another portion detached, showing some of the parts in section on the line S S in Fig. 1. Fig. 5 is a vertical section through one of the guides and some of the adjacent parts. Fig. 6 is a side elevation of certain details of the machine used in connection with my automatic stopping mechanism. Fig. 7 is a face view or front elevation of one of the same parts, referred to herein as wheel $G^3$.

In the form of construction shown, A is a rigid frame, of cast-iron or other suitable material. B is a shaft supporting a loose pulley, C, and a friction-clutch, D, the latter feathered on the shaft B, so that the two are compelled to turn together, but allowing the cone D to be moved longitudinally into or out of frictional contact with the loose pulley C. The pulley receives motion from a belt, C′, and the cone D is controlled by an arm, $E^2$, from the rocking shaft E, which is operated by the treadle E′, which latter is held elevated by a spring, F. A spur-gear wheel, B′, keyed on the shaft B, gears into the spur-gear wheel G′ on the crank-shaft G, which latter, like the shaft B, is supported in stout bearings on the framing A. The shaft G carries a stout crank, $G^2$, which, through a connecting-rod, H, imparts a partial rotating motion alternately in opposite directions to the sector I′, which gears into a corresponding sector on the opposite side of the machine. Each of these sectors is mounted on a crank-shaft, I, supported in the frame, and carrying a crank, $I^2$, which latter, by means of links J, imparts the desired vertically-reciprocating motion to a cross-head, K, which traverses on stout guides or slides at the front of the framing and operates the slender plunger L, which drives the nails into the box.

The nail-guides are marked M. Four are represented, with a corresponding number of plungers; but a greater or less number may be employed at will. They are mounted on the cross-bar A′, which, when in position, forms a part of the rigid frame of the machine, being firmly held by the punching-screws *a′*. Each guide M has a straight vertical channel of the size of a plunger or only a little larger, through which the plunger descends, forcing the nail before it. It has also an oblique channel in front, through which the nail may be introduced. A tube, M′, communicates between each oblique passage and the horizontal board or plate $A^2$ above. The attendant who supplies the nails sits or stands in a convenient position at the top of the machine, and during or after each operation introduces a nail into each of the tubes M′. The nail, descending through this tube, enters the inclined front passage of the guide M, and assumes the correct position in the lower part of the upright passage, ready to receive the proper force at the next descent of the plunger.

P Q are parallel bars extending across the front of the machine immediately below the guides M. Each is formed with arms extending backward at each end, as indicated by P′ P′ Q′ Q′. The rear of each arm P′ has a pin, $P^2$, extending inward or toward the center line of the machine. The rear end of each arm Q′ has a corresponding pin extending outward. (Marked $Q^2$.) Each pin $P^2$ $Q^2$ carries an anti-friction roller, which is embraced in one of the peculiarly-crooked slots *k* in the pendent arms K′, which arms extend backward and downward from the cross-head K and form rigidly-connected parts thereof. At each descent of the cross-head K to force the nails downward out of the nail-guides M the slots *k* cause the bars P and Q to separate.

N N are pairs of shoes or dies supported on the bars P and Q, and adapted to come into contact each with its mate on the approach of the bars together. These dies N are controlled laterally by downward projections *x* on the guides M, between which they slide. Each

pair of dies receives the point of a nail when the nail is dropped down through the passage M′. Simultaneously with the descent of the plunger L through the vertical passage in the guide the dies N open sufficiently to allow the body of the nail to pass, and before the entire length of the nail is passed the dies open widely to allow the head of the nail and the lower end of the plunger to pass freely downward between them.

The guides M, with their connections, may be moved laterally on slacking the pinching-screws *m*, and may be readjusted in any desired position by tightening those screws against the cross-bar A′. The screws *m*, being at the front, allow ready access and great facility for adjustment. On adjusting the nail-guides the dies N below, as also the plunger L above, partake of the same lateral motion, the plungers being loosely held by their heads L′ in a horizontal groove, *k*′, in the cross-head K, as shown in Fig. 5.

Prior to this invention nail-driving mechanism of a similar character was in use provided with a stop-movement, and the stop-movement and friction-brake herein described are improvements thereon.

In operation the box or parts of the box which are to be nailed together are held in the proper position under the dies N, resting upon the table $A^3$, which is adjustable at the proper height by means of screws T, turned simultaneously by a connecting-shaft and double gear, as will be readily understood. The table, when properly adjusted, is rigidly set by a bolt, $a^3$, which extends through a slot in the adjacent vertical face of the frame A. After each descent and elevation of the cross-head K all the working parts come to rest, and remain so until the operator has again placed a box or other article which is to be nailed in a proper position on the table $A^3$. When this is effected he depresses and immediately after liberates the treadle E′, and the cross-head and its connections thereupon make one strong descent, and immediately again ascend and stop until the treadle E′ is again momentarily depressed. This action is important and requires something more than the mere connection and disconnection of the friction-clutch. I effect it by the following means:

The nail-driving mechanism hereinbefore described, except the improved stop-movement and friction-brake and their combination with nail driving mechanism, as herein claimed, is old, and I make no claim herein to the same.

On the shaft E, which is rocked by the treadle E′, I fix an arm, $E^3$, which extends up to the level of the shaft G, where it receives a horizontal screw, $E^4$. Another arm, $E^5$, is loosely pivoted at the point $e^5$, and, being acted on by the screw $E^4$ in one direction and by a spring, $E^6$, in the opposite direction, is capable of adjustment relative to the arm $E^3$. This adjustable arm $E^5$ is formed with a stout shoulder, $E^8$, as represented.

On the shaft G is fixed a wheel or partial wheel, $G^3$, having a projection, $G^7$, adapted to engage with the shoulder $E^8$ on the arm $E^5$. Each depression of the treadle draws out and liberates the shoulder $E^8$ on the arm $E^5$ from the projection $G^7$, and as the friction-clutch simultaneously comes into bearing causes the machine to start. As the shaft G turns around the arm $E^5$ is pressed into contact with the wheel $G^3$ by the force of the spring operating to elevate the treadle, and when the projection $G^7$ has made a complete revolution the shoulder on the arm $E^5$ engages again strongly with it, while at the same time the treadle is allowed to rise and the friction-clutch to be disengaged, causing the machine to stop.

To relieve the parts from friction I provide an anti-friction roller, $E^7$, running on the partial rim $G^4$ on the face of the wheel $G^3$, and omitted only in the vicinity of the projection $G^7$.

I relieve the machine from the concussion which might sometimes result from too violent engagement of the shoulder $E^5$ with the projection $G^7$ by providing a brake, R, which may be adjustable by screws or other devices, and comes in strong contact with the back face of the cone D as soon as the treadle rises. It follows that on the treadle E′ being momentarily depressed and liberated the machine automatically holds the treadle depressed, the friction-clutch engaged, and the cone D from the brake R until the anti-friction roller $E^8$ is allowed to sink into the depression in the rim $G^4$. At that moment the treadle rises, the motive force is disconnected, and the brake R is applied. A further operation of the machine under these conditions causes much friction, which soon brings the projection $G^7$ to absolute rest against the shoulder $E^8$ of the arm $E^5$.

It is important that the screw T be located, as shown, in rear of the table $A^3$ and of the front face of the upright part $A^5$, to which the table is bolted. This allows the table to be lowered to any required extent. The table engages with the screws by means of arms $A^4$, which reach backward from the sides of the table, as shown. Not only the screws T, but also the stout portions of the framing which form the upper bearings therefor, must be all in rear of the main body of the table.

Some of the advantages due to certain features of my invention may be separately enumerated as follows:

First, by reason of the projection $G^7$ on the wheel $G^3$ and of the arm $E^5$ presented thereto, as shown, I am able to stop the machine in a satisfactory manner after each nailing operation.

Second, by reason of the fact that the treadle E′, which actuates the clutch D, is connected, as shown, with the wheel G, having a projection or notch, $G^7$, I am able to present the stop-piece $E^5$ to the projection $G^7$, and consequently to stop the machine satisfactorily by the same motion which disconnects the clutch.

Third, by reason of the employment of the

swinging or movable piece $E^5$, with its adjusting-screw $E^4$ and spring $E^6$, for holding it in contact therewith, I am able to adjust its position relatively to the firmly set arm $E^3$, and consequently to the treadle E′, to allow for wear or for other cause with any required degree of delicacy.

Fourth, by reason of the employment of the brake R, as shown, I am able to insure that the motion shall be gradually reduced before the projection $G^7$ strikes on the unyielding stop $E^5$, and to insure that this shall be effected by the same movement which disengages the clutch.

The construction and operation may be varied within the scope of my improvements.

I claim as my invention—

1. In a nail-driving machine, the combination of treadle E′, spring F, rock-shaft E, arm $E^3$, having set-screw $E^4$, pivoted arm $E^5$, having projection $E^8$, roller $E^7$, and spring $E^6$, crank-shaft G, and wheel $G^3$, having notched rim $G^4$ and shoulder $G^7$, substantially as set forth.

2. In a nail-driving machine, the combination of treadle E′, spring F, driving-shaft B, loose pulley C, friction-clutch D, and friction-brake R, substantially as set forth.

3. The combination of a spring-treadle, a driving-shaft having a loose pulley with a friction-clutch, a friction-brake, and supporting and operating nail-driving mechanism, to secure intermittent motion, substantially as set forth.

4. The combination of a spring-treadle, a rock-shaft having an adjustable anti-friction yielding arm with an angular shoulder, a crank-shaft having a wheel thereon with a double-faced beveled angularly-shouldered rim, a driving shaft having a loose pulley with a friction-clutch, a friction-brake, and supporting and operating nail-driving mechanism, substantially as set forth.

5. The combination, in nail-driving mechanism, of a loose pulley with a friction-clutch, a friction-brake, a cross-head, plungers supported loosely thereon, guides engaged with the plungers, dies to open and close under the guides, and an adjustable table, substantially as set forth.

6. The combination, in nail-driving mechanism, of a loose pulley having a friction-clutch and a friction-brake, substantially as set forth.

7. The combination, in nail-driving mechanism, of an adjustable yielding arm, a wheel having an angularly-shouldered rim, a loose pulley with a friction-clutch, a friction-brake, a reciprocating cross-head with plungers supported thereon, guides engaged with the plungers, dies to open and close under the guides, and an adjustable table, whereby nails may be received and driven, substantially as set forth.

In testimony whereof I have hereunto set my hand this 8th day of June, 1877, in the presence of two subscribing witnesses.

J. H. SWIFT.

Witnesses:

A. HENRY GENTNER,

CHAS. C. STETSON.