

(No Model.)

3 Sheets—Sheet 1.

G. W. COPELAND.
TACK DRIVING MACHINE.

No. 475,488.

Patented May 24, 1892.

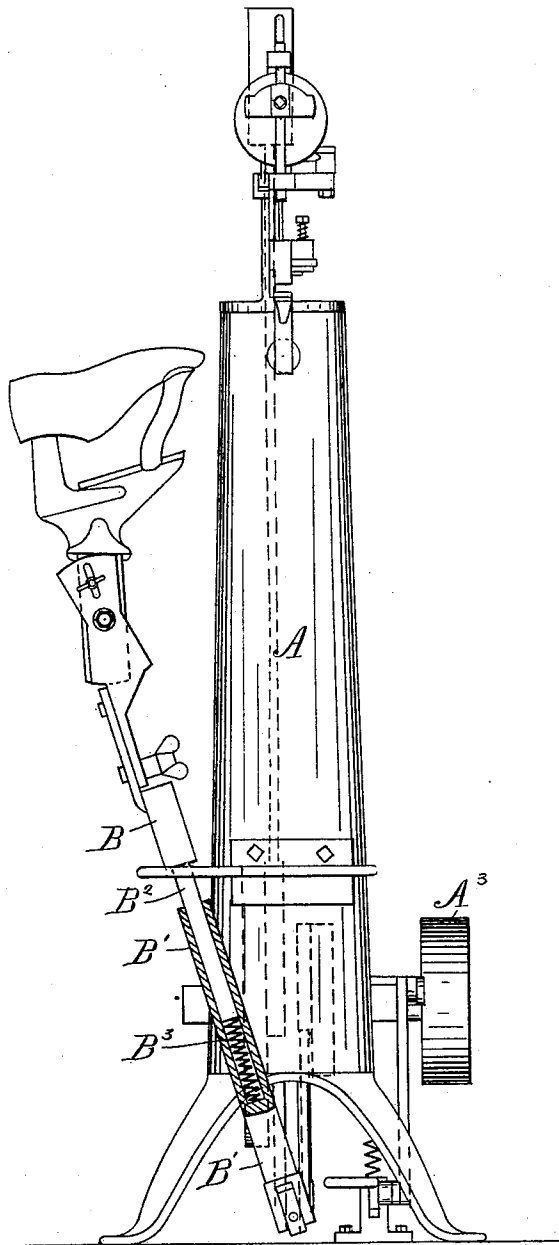


Fig. 1.

WITNESSES.

R. L. Stearns
H. T. Whitney

INVENTOR.

Geo. W. Copeland

(No Model.)

3 Sheets—Sheet 2.

G. W. COPELAND.
TACK DRIVING MACHINE.

No. 475,488.

Patented May 24, 1892.

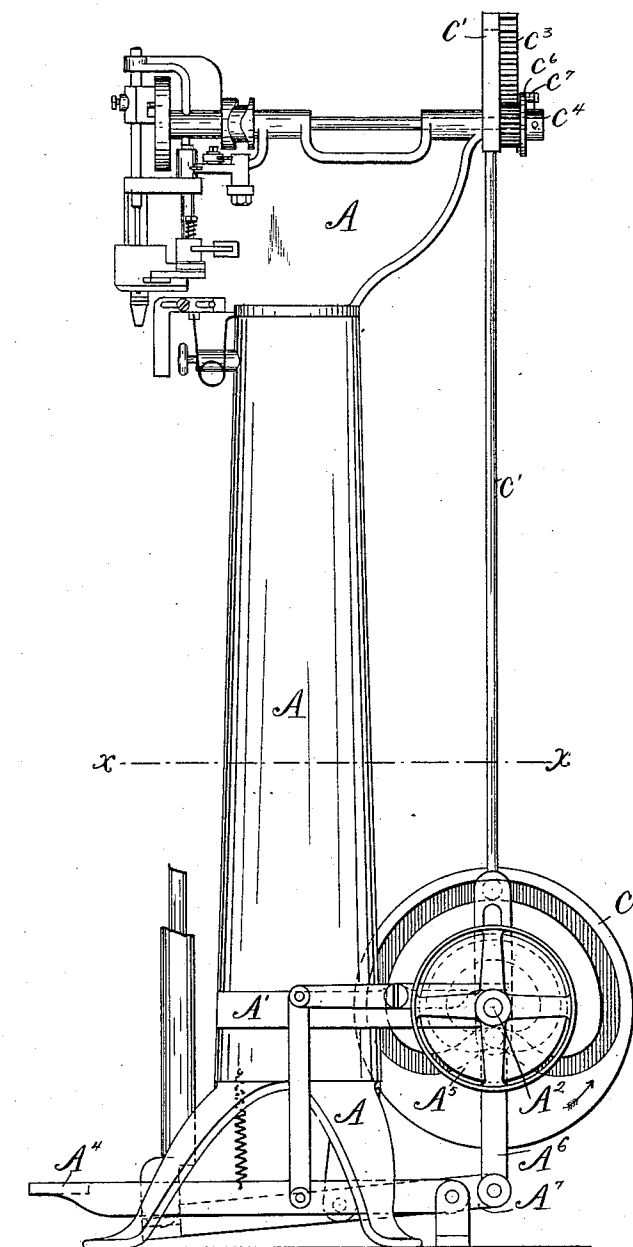


Fig. 2.

WITNESSES.

D. H. Stearns
H. A. Whitney

INVENTOR.

Geo. W. Copeland

(No Model.)

3 Sheets—Sheet 3.

G. W. COPELAND.
TACK DRIVING MACHINE.

No. 475,488.

Patented May 24, 1892.

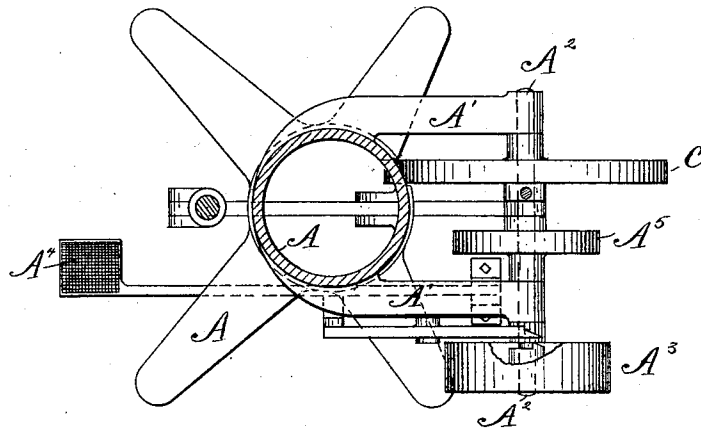


Fig. 3.

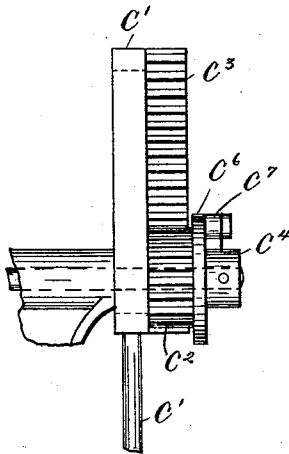


Fig. 4.

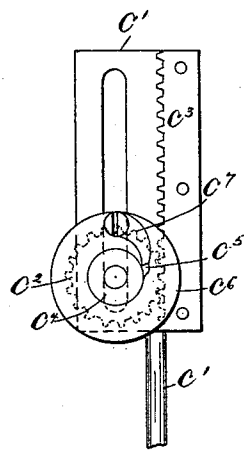


Fig. 5.

WITNESSES.

B. H. Stearns
H. A. Whitney

INVENTOR.

Geo. W. Copeland

UNITED STATES PATENT OFFICE.

GEORGE W. COPELAND, OF MALDEN, ASSIGNOR TO THE BOSTON LASTING MACHINE COMPANY, OF BOSTON, MASSACHUSETTS.

TACK-DRIVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 475,488, dated May 24, 1892.

Application filed February 16, 1891. Serial No. 381,644. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. COPELAND, of Malden, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Tack-Driving Machines; and I hereby declare the following, with the accompanying drawings, 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 that class of tack-driving machines in which the operator by depressing the treadle raises the jack with the last thereon up to and against the delivery-nozzle of the tack-driving mechanism and immediately receives a tack.

It consists in providing a machine of the class above referred to with a power-operating mechanism for raising the jack to the tack-delivery nozzle, and which at the proper time actuates the mechanism so that a tack is driven into the work supported by the jack. This mechanism is so arranged that a very slight movement of the operator's foot will cause the machine to perform its function, which is to raise the jack, drive a tack, and then lower the jack to its normal position.

One of the principal objects of my invention is to make lighter the work of the operator, who, in the machines of this class now in use, is obliged to raise the jack by the foot-treadle. For although in the machines in practical use the jack is balanced by a spring, yet it is easy to see that in raising the jack many thousand times a day by the use of the foot, considering the distance the foot has to move as well as the power needed in the operation, the expenditure of considerable strength is necessary. This expenditure of strength is largely saved by this invention.

The invention herein described is shown as applied to one of the machines constructed mainly in accordance with patent granted to Erastus Woodward September 11, 1888, No. 389,275, for tack-driving machines.

In the drawings, Figure 1 is a front elevation of a machine to which the improvements are attached. It shows the equalizing-spring operating in combination with the jack. Fig. 2 is a side elevation of the same machine,

showing the mechanism for elevating the jack and actuating the tack-driving mechanism. Fig. 3 is a sectional plan of Fig. 2, taken below line X X of said figure. Figs. 4 and 5 are elevations of the mechanism which operates the tack-driver in place of the ordinary driving-belt, as heretofore shown in connection with said machines.

No description is needed of the tack arranging, feeding, and driving mechanism, the same being constructed substantially as heretofore shown in the patents above referred to.

To the part of the machine A is attached the bracket-bearings A', which carry the driving-shaft A². This shaft has mounted upon its outer end the belt-pulley A³. This pulley is constructed and mounted upon the shaft substantially in the same manner as described in the patent granted to Norman C. Stiles January 30, 1866, and numbered 52,335, for a clutch for power-press pulleys, and operates in substantially the same way. A slight depression of the foot-treadle A⁴ allows the shaft of the pulley, which is constantly running, to couple with the shaft and cause the shaft to make one revolution. Upon this shaft is fixed the cam A⁵, whose roll is connected with the lever A⁷, which raises the jack by the connecting-link A⁶, Fig. 2. When the cam just referred to is set in motion by depressing the treadle A⁴ in the first ninety degrees of revolution, it raises the jack B by the above connections to its full limit, where it holds the jack during the next one hundred and eighty degrees of revolution, and in the remaining ninety degrees of revolution the jack is lowered to its normal position.

It will be understood that owing to the curves in the bottom of the last the jack, with the last thereon, must be raised to different heights as tacks are driven into different parts of the upper and insole mounted upon the last. It will be seen that the mechanism herein described would always raise the jack to a fixed point unless means were provided for suitable compensation. This compensation is provided for in the following manner: The lower part of the jack is constructed as a hollow sleeve B'. (See Fig. 1.) The lower part of the jack-post B² is fitted to slide freely in this sleeve and rests upon the compensat-

ing spiral spring B³, which spring is made of sufficient strength to hold the last properly up against the nozzle of the tack driver, ready for a tack to be driven into the lowest place in the bottom of the last at the shank. The spring yields sufficiently to bring every other part of the last into sufficiently firm contact with the tack-delivery nozzle without undue strain upon either the machine or the jack and so that all the tacks will be well and securely driven.

Upon the shaft A² there is mounted another cam C, which actuates the tack-driving mechanism during the period of rest of the cam A⁵ in the following manner: Connected to the cam-roll of the cam C is the sliding connection C', whose upper end is slotted for the purpose of guiding it in its vertical reciprocations by the main shaft of the tack-driving mechanism, which is mounted upon the upper part of the post A. (See Figs. 4 and 5.) Upon the main shaft, outside of the sliding connection C', is loosely fitted the pinion C², and attached to the sliding connection C' is the rack C³. The path of the cam C is constructed of such throw that ninety degrees of revolution cause the rack C³ to revolve the pinion C² one revolution and the next ninety degrees to reverse the same. The hundred and eighty degrees of motion of the cam C, which operate the tack-driving mechanism, occur at the period of rest at the same time of the cam A⁵, which operates the jack-raising mechanism, so that the jack is always up when the tack is driven. In order to connect the pinion C² with the main shaft of the tack-driving machine, there is fixed to said main shaft the hub C⁴, provided with one ratchet-tooth C⁵, and mounted upon a flange C⁶, attached to the pinion C², is the pawl C⁷, which engages with the single ratchet-tooth C⁵ of the hub C⁴ and causes by the above-described connections the main shaft of the tack-driving machine to make a revolution during one part of the reciprocation of the sliding connection C', the other part of said reciprocation causing the pawl C⁷ to move backward around the hub C⁴, where it is again engaged with the single tooth C⁵ of the hub C⁴, ready to again revolve the main shaft and drive a tack when the treadle A⁴ is depressed.

The operation of the improved machine is as follows: When the treadle A⁴ is depressed, the shaft A² makes one revolution, during which the cams A⁵ and C have caused the jack to rise and hold the jack firmly against the tack-delivering nozzle, from which a tack is

then driven into the work thus presented thereto, the jack then descending to its normal position, where it remains till the treadle A⁴ is again depressed.

Having thus described my invention, what I claim is—

1. In a tack-driving machine for lasting boots and shoes of the class described, the combination of suitable tack-driving mechanism with the jack-post B², the spring B³, the sleeve B', the lever A⁷, provided with the link connection A⁶, the cam A⁵, mounted upon the shaft A², and treadle and clutch machine starting and stopping mechanism, all operating substantially as shown and described.

2. In a tack-driving machine for lasting boots and shoes of the class described, suitable tack-driving mechanism, in combination with the jack B, the cam A⁵ for raising, holding, and lowering said jack, the connecting and jack-supporting lever A⁷, and suitable operating and connecting mechanism for said cam, substantially as shown and described.

3. In a tack-driving machine for lasting boots and shoes of the class described, in combination with suitable tack-driving mechanism, the hub C⁴, the pinion C², provided with connecting mechanism, substantially as described, to the cam C, the cam C, and suitable operating mechanism for said cam, substantially as shown and described.

4. In a tack-driving machine for lasting boots and shoes of the class described, the combination, with suitable tack-driving mechanism, of the cams A⁵ and C, mounted upon the shaft A², combined with proper clutch-pulley mechanism and provided with the starting-treadle A⁴, substantially as described, and a jack and intermediate connecting mechanism, for the purpose set forth.

5. In combination with a tack-driving machine for lasting boots and shoes, a pivotally-mounted jack, and mechanism for raising and supporting the same and operating substantially as described, tack-driving mechanism of the class described operating automatically in combination with the jack raising and supporting mechanism, and treadle and clutch machine starting mechanism, and intermediate connections between the jack-raising and tack-driving mechanisms, all operating substantially as shown and described.

GEO. W. COPELAND.

Witnesses:

B. H. STENZEL,
H. N. WHITNEY.