G. A. AMBLER.

MECHANISM FOR ACTUATING STOCK SUPPORTS.

APPLICATION FILED NOV. 27, 1905.

1,026,139. **Patented May 14, 1912.**

4 SHEETS—SHEET 1.

Fig. 1.

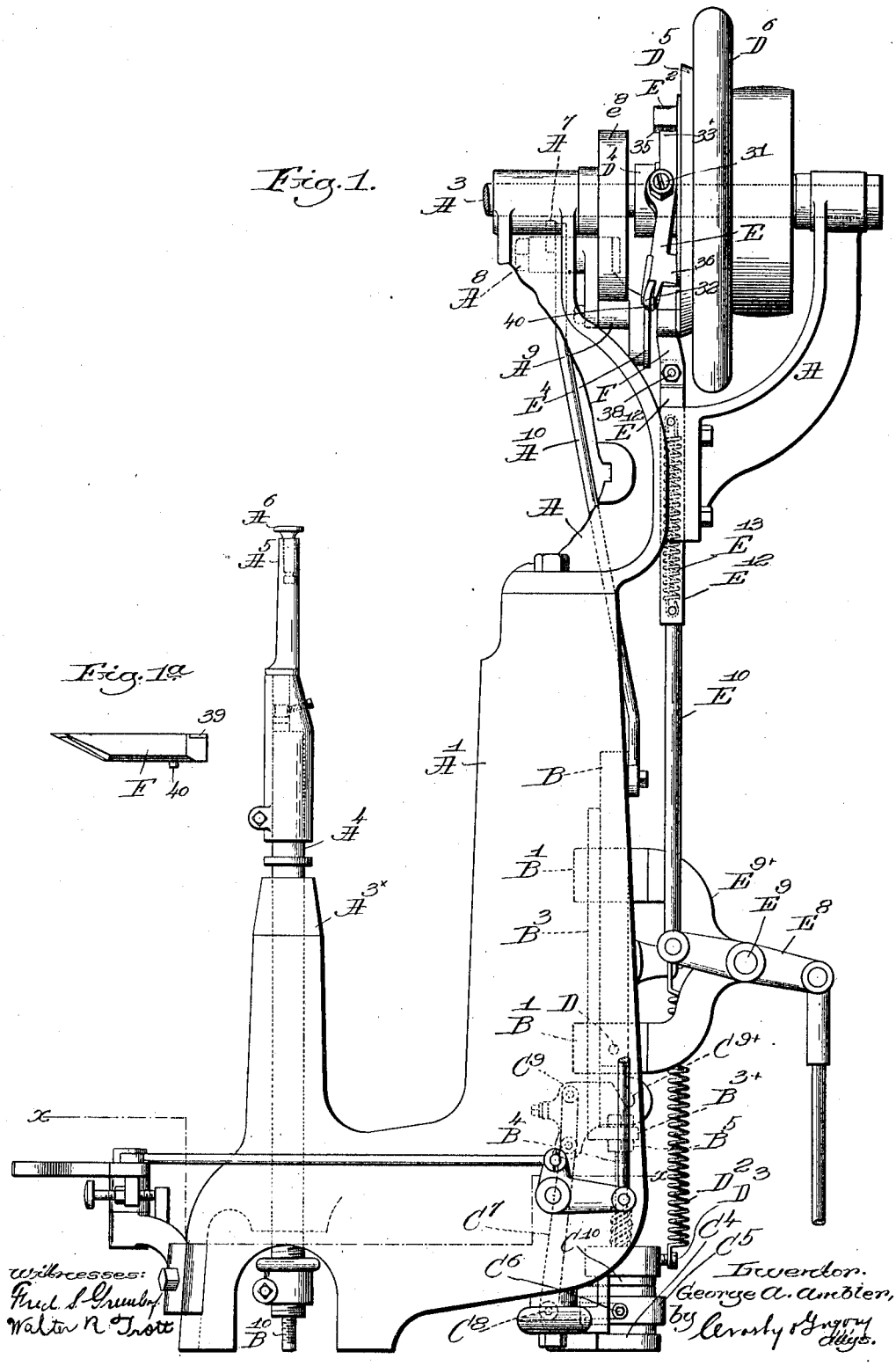

Fig. 1a.

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4 SHEETS—SHEET 2.

Fig. 2.

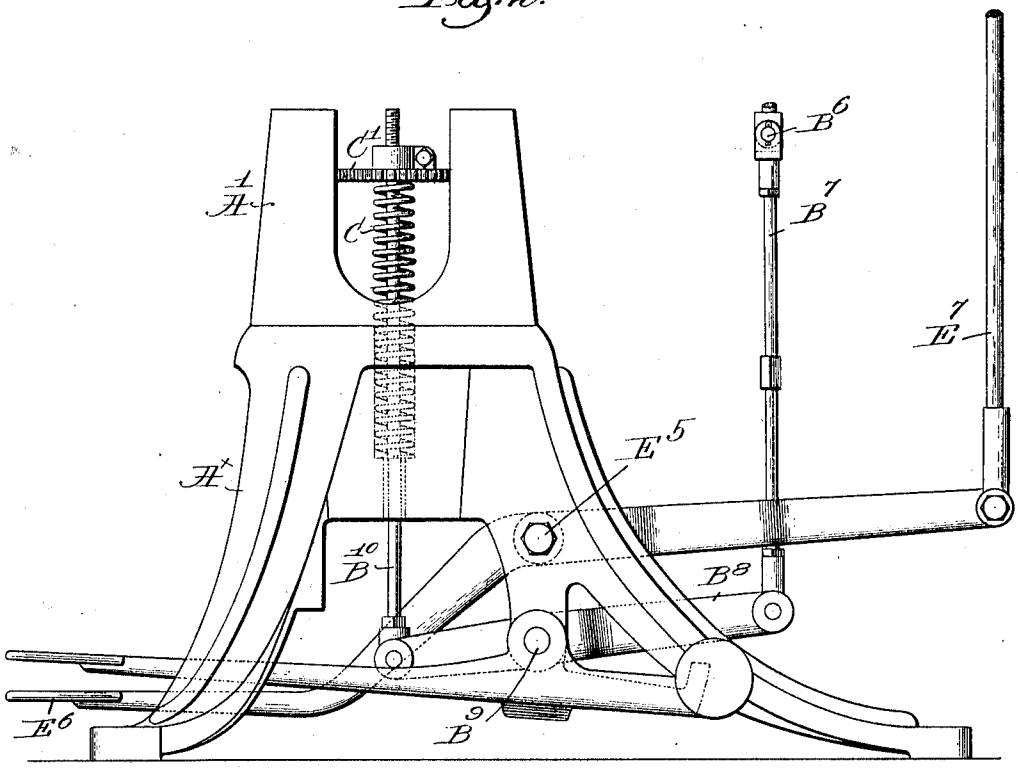
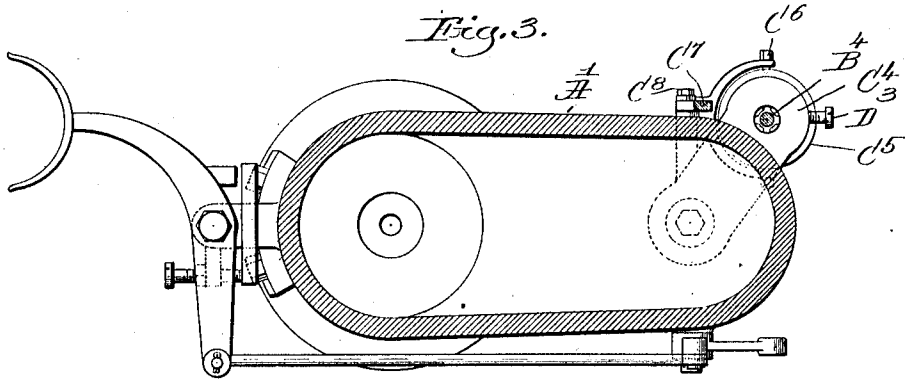


Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 4.

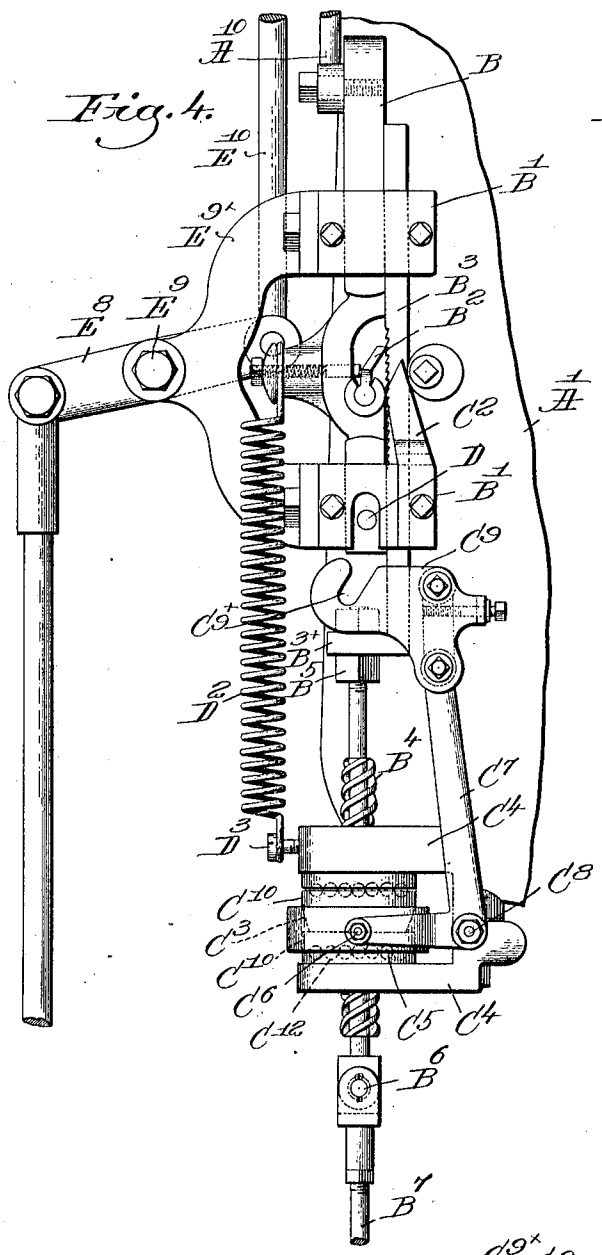


Fig. 5.

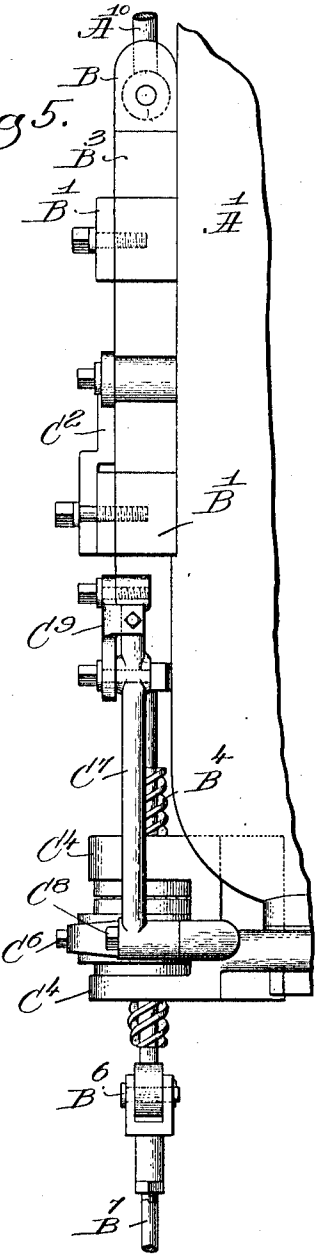
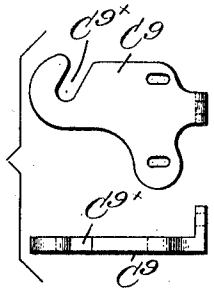


Fig. 6.



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4 SHEETS—SHEET 4.

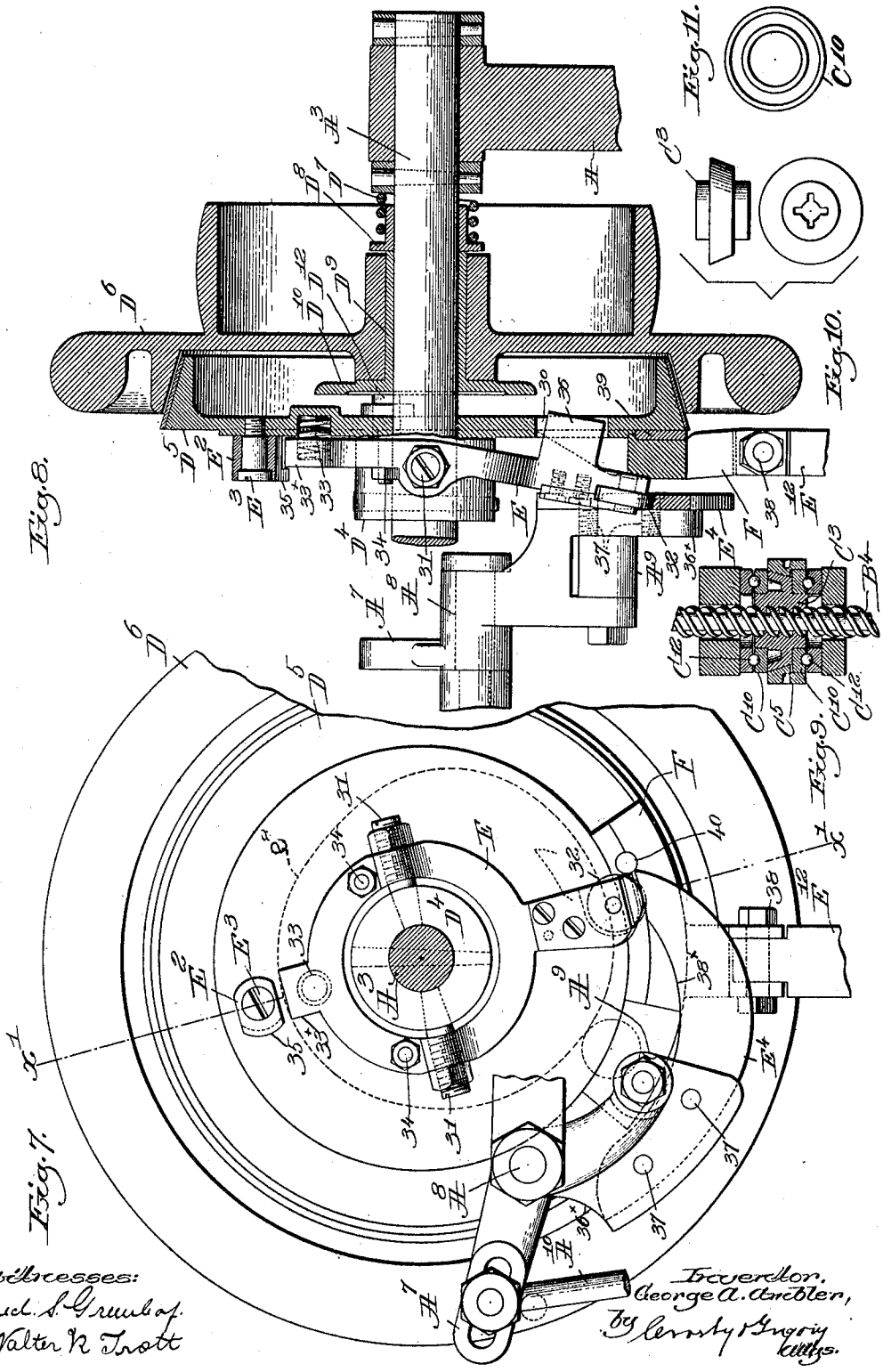

Fig. 8.

Fig. 10.

Fig. 11.

Fig. 9.

Fig. 7.

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UNITED STATES PATENT OFFICE.

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MECHANISM FOR ACTUATING STOCK-SUPPORTS.

1,026,139. Specification of Letters Patent. Patented May 14, 1912.

Original application filed August 31, 1901, Serial No. 74,036. Divided and this application filed November 27, 1905. Serial No. 289,160.

To all whom it may concern:

Be it known that I, GEORGE A. AMBLER, a citizen of the United States, residing at Winchester, county of Middlesex, and State of Massachusetts, have invented an Improvement in Mechanism for Actuating Stock-Supports, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This application is a division from my application Serial No. 74,036, filed August 31, 1901, which has matured as Patent No. 976,837 dated November 29, 1910, and which shows a nailing machine for inserting fastenings and slugs.

The invention herein claimed relates more particularly to the stock support or horn although the invention is not limited in its application to the specific type of machine shown in said patent but, as will be obvious to those skilled in the art, it may be embodied in machines of various other types which include a movable stock support.

One feature of this invention comprises novel means for locking the stock-support after it has been brought into contact with the stock, to thus prevent yielding of the stock support while a slug or fastening is being inserted. In accordance with this feature of the invention the means for locking the stock support against vertical movement comprises a longitudinally movable member connected to the stock support, a second member fixed against longitudinal movement but co-acting with the first member so as to be rotated by that member as it is moved longitudinally and means for holding the second member against rotation and thereby preventing movement of the first member and of the stock support which is connected thereto. This feature is deemed to be of considerable importance and is intended to be covered broadly by the claims.

The machine to be herein described has also been provided with novel means for giving to the horn or stock-support an extra depression when the machine stops, to thereby place the top of the horn in its lowest position to permit the stock easily to be removed from it or applied to it. Herein I employ the term "extra depression" to indicate the movement by which the horn is carried to its lowest position when the latter is depressed for the removal of or application of stock thereto, to distinguish from the usual depression occurring in each cycle of operations, which needs to be only sufficient to relieve the pressure on the stock so as to permit it to be fed.

In the drawings, which illustrate an embodiment of my invention in one of the best forms now known to me, Figure 1 is a side elevation of so much of the upper portion of a machine as relates to this invention; Fig. 1^a is a detail in plan of the wedge-block F; Fig. 2 is a side elevation of the lower portion of the machine, Figs. 1 and 2 showing respectively the top and the base of the machine; Fig. 3 is a section on the line x, Fig. 1, a knee lever and connections, however, being shown complete; Fig. 4 is an enlarged detail of the horn locking means; Fig. 5 is a view of Fig. 4 looking at the same from the right; Fig. 6 shows in two views one of the cam plates C^9 detached; Fig. 7 is a detail looking at the inner side of the clutch mechanism; Fig. 8 is a section of Fig. 7 on the line x'; Fig. 9 is a sectional detail through the box C^4 and its locking means, the screw being shown in elevation; Fig. 10 shows in two views the nut C^3 detached; and Fig. 11 shows the grooved side of one of the ball raceways.

The framework is represented as composed of a head A, a column A′ and a base A^x, the head A, only a portion of which is shown, having suitable bearings to sustain the main shaft A^3. The column A′ has erected upon it a sleeve A^{3x} which receives a horn shaft A^4 carrying a stock support or horn A^5 of any suitable character having an anvil tip A^6. The horn shaft A^4 is arranged to be depressed automatically through a lever A^7 pivoted at A^8, see Figs. 1, 7 and 8, after the driving of each slug or fastening to thereby release the stock that it may be fed over the horn. The lever A^7 is provided with a roller or other stud A^9, which is acted upon at each revolution of the shaft A^3 by the periphery of the cam e^8 carried by the main shaft. The lever A^7 has a connected link A^{10}, see Figs. 4 and 5, jointed to the upper end of carriage B adapted to slide in suitable guides B′ connected with the column A′. The carriage is

provided with a spring pressed dog B^2 which engages teeth of a toothed bar B^3 also free to be slid in said guides. The lower end of the toothed bar B^3 is provided with an ear $B^{3\times}$ through which is extended the upper end of a screw B^4, connected with the bar by means of suitable nuts B^5. The lower end of the screw B^4 is connected loosely by a pin B^6 to the upper end of a rod B^7, jointed, see Fig. 2, with the rear end of a lever B^8 mounted upon a stud B^9, the opposite end of said lever being joined to a rod B^{10}, the upper end of which is screwed to the horn shaft A^4.

The rod B^{10} is surrounded by a strong spiral spring C, see Fig. 2, seated at its lower end on a shoulder formed in the base $A^\times$, said spring at its upper end engaging an adjusting device C′, shown as a wheel having its hub threaded and applied to a screw threaded part of the rod B^{10}. This spring tends constantly to raise the horn to its highest position. So long, however, as the dog B^2 remains in engagement with the bar B^3, the distance which the horn may be raised is limited by the engagement of stud A^9 with cam e^8. Another spring D^2, connected at one end to the carriage B and at the other end to a screw D^3 on a fixed part of the machine, tends constantly to maintain the stud A^9 in contact with its cam. As this cam permits the horn to be raised and the carriage to be lowered, under the influence of the springs C and D^2 and also of the unbalanced weight of the connected parts, the dog B^2 meets a releasing device C^2, see Figs. 4 and 5, and is disengaged thereby from said bar B^3 permitting the spring C to raise the horn until it clamps the stock between itself and the usual footplate.

The devices so far described for depressing the horn and elevating the same to clamp the stock, with the exception of the screw B^4, and the additional spring D^2, are substantially the same as in prior constructions. Instead of employing the screw it is common to extend the rod B^7 up to and connect it with the bar B^3.

According to the present construction a nut C^3, which is located between the opposite sides of a box C^4 forming part of the column A′ and which is thereby restrained against vertical movement, surrounds the screw B^4 and co-acts with it. The screw B^4 has a thread with a relatively great pitch and, as shown, the screw has a triple or multiple thread. Reciprocation of the screw compels rotation of the nut C^3 but means are provided for holding the nut against rotation thereby locking the screw and the horn connected to it against vertical movement. The nut is tapered at its exterior, see Figs. 9 and 10, and is surrounded by a clutch C^5 correspondingly tapered at its interior. The clutch receives suitable studs C^6 carried by the forks of a clutch mover C^7, represented as an elbow lever pivoted at C^8 and having connected with its upper end by suitable screws a cam plate C^9 having an inclined slot $C^{9\times}$ which is entered in the operation of locking the horn by a stud D on the carriage B. The hubs at the upper and lower ends of the nut C^3 are shown as surrounded by two like washers or raceways C^{10} having annular grooves that receive a series of anti-friction devices or balls C^{12}.

The devices just described constitute means for locking the horn rigidly in raised or stock clamping position at the time when the slugs or fastenings are being driven even although the stock may vary greatly and suddenly in thickness.

The nut C^3 is free to be rotated by the screw B^4 excepting only for a small portion of the cycle of operation. The clutch locks the nut and prevents further reciprocation of the screw B^4 at this time which is after the horn has been raised to clamp the stocks and thus locks the horn or stock-support in its stock clamping position when fastenings or slugs are being driven.

Viewing Figs. 4 and 5, let it be supposed that the carriage B is descending in unison with the bar B^3. As soon as the carriage in its descent meets the releasing device C^2, the dog B^2 is released from its engagement with the teeth of the bar B^3 and immediately thereafter the spring C acts quickly to elevate the horn to its stock clamping position. The continued descent of the carriage under the influence of spring D^2 causes the stud D to enter the inclined slot $C^{9\times}$ of the cam plate C^9, forcing said cam plate to the right, turning the lever C^7 in a direction to lift the clutch C^5 into frictional engagement with the nut C^3 and thus immediately restraining further rotation of the nut and further longitudinal movement of the screw B^4 in either direction. Thus the stock-support or horn is locked in its elevated or stock clamping position so that it cannot yield while a slug or fastening is being driven into the clamped stock. A slug or fastening having been driven, the carriage B is raised by cam e^8 to effect the depression of the horn for feeding the stock, and during this movement the stud D travels upward along the left hand side wall of the slot $C^{9\times}$, moving the lever C^7 in the direction to cause the clutch to release the nut so that it may thereafter be turned freely thus permitting the screw B^4 to be moved vertically.

The main shaft A^3 has secured to it the hub D^4 of a fast pulley D^5, shown as having a conical face, see Fig. 8, said pulley being driven at the desired times by or through a continuously moving pulley D^6 loose on the shaft, a suitable spring D^7 surrounding said shaft acting through a collar D^8 loose on

said shaft to force the loose pulley toward and to engage the fast pulley frictionally.

In order that the loose pulley may be freed from its engagement with the fast pulley to allow the shaft to stop, the hub of the loose pulley D^6, as illustrated, is mounted upon a sleeve D^9 having at one end a plate D^{10}, which, when it is desired to release the loose pulley and stop the machine, is acted upon by studs D^{12}, free to be slid in holes made in the fast pulley.

The hub D^4 of the fast pulley D^5 is provided, see Fig. 7, with conical openings that receive the conical points of pivot screws 31 carried by a controller E, represented as a lever shaped to surround the shaft A^3, through which the depression of the stock support to its lowest position is effected. One end of this controller is shown as provided with a roller 32, while the other end is provided with a spring 33, one end of which preferably enters a recess in one side of the fast pulley D^5. The controller has connected with it suitable stud screws 34, see Fig. 7, which when the pressure of the spring 33 is overcome in the movement of the controller, meet the ends of the studs D^{12} before described, moving them to force the loose pulley away from the fast pulley. If at this time it should be desired to turn the shaft A^3 by hand, the attendant will turn the device E^2, mounted on a stud screw E^3 and having a lip 35, from its position shown in Fig. 7 into the position shown in Fig. 8 where the lip is shown as embracing the lug 33^x at the upper end of the controller.

The controller, see Fig. 8, is provided near its lower end with a projection 36 which enters a slot 30 in the fast pulley, said slot constituting a guide for the controller and thus obviating twisting strain on the pivot pins 31. Hence it rotates with the fast pulley and is also free to swing about the pivot pins.

I have provided novel means which will now be described, whereby the horn may have imparted to it extra depression, or be lowered farther than for feeding, this being desirable to enable the stock or work to be readily removed from the horn or stock support when the machine is stopped, and also that the work may be applied to the horn or stock support before the machine is started.

The base A^x of the machine has pivoted upon it at E^5, see Fig. 2, a starting and stopping lever or treadle E^6 to the rear end of which is joined a rod E^7, the upper end of which is connected with one end of a lever E^8 pivoted at E^9 on a bracket E^{9x} sustained by the column. The other end of the lever E^8 has jointed thereto a rod E^{10} in turn connected with a slide E^{12}. The rod normally kept elevated by a spring E^{13} has at its upper end a pin 38 carrying a rocking wedge block F. The block is tapered at one side, see Fig. 1^a, and its opposite face is provided with friction material 39, which may be leather, to contact with one side of the fast pulley and act as a brake.

Upon an extension 36^x of one arm of lever A^7, as shown in Figs. 7 and 8, is secured by screws 37 a plate E^4, the inner edge 38^x of which will be acted upon by roller 32 of controller E to give an extra depression to the stock support as the machine comes to rest. Just before the rotation of shaft A^3 ceases, roller 32 will come into engagement with a stop 40 on block F so that the machine will stop with the parts in a predetermined position corresponding to that shown in Figs. 7 and 8.

In order to start the machine, the operator depresses the starting treadle E^6 and, thereby, wedge block F so that the latter will be removed from contact with fast pulley D^5 and controller E, whereupon, the spring 33 turning the controller about pivots 31, the roller 32 will be moved to the right, as shown in Fig. 8, so that it will no longer contact with extension E^4 and so that spring D^7 will effect the engagement of pulleys D^5, D^6. This movement of the controller will allow spring D^2 to bring stud A^9 into contact with cam e^8, as indicated by the dotted line in Fig. 7, and thereafter, during each cycle of operations, the stock support will be depressed periodically by the cam to permit the stock to be fed.

When the operator desires to stop the operation of the machine, he removes his foot from the treadle E^6 permitting spring E^{13} immediately to lift block F into the position shown in Figs. 7 and 8 where it will be in the path of the lower end of controller E which, meeting the tapered end of the block, will be moved to the left, as shown in Fig. 8, against the resistance of spring 33 to disengage pulleys D^5, D^6 and to bring roller 32 into position to engage extension E^4 and thereby to turn lever A^7 for a greater distance than it is turned by the cam e^8 in depressing the stock support for the feed, the stud A^9 being carried away from the cam so that the stock support is put into its extra depressed or lowest position. Spring 33 acts also to force braking surface 39 against pulley D^5 and then stop 40 brings the machine to rest with the parts in the position shown in Figs. 7 and 8.

It will be understood from the above description that the release of the clutch and the depression of the stock support to its lowest position is under the control of the operator, through treadle E^6, wedge block F and connected parts, and hence that the term "manually" as herein employed is considered as equivalent to the expression—by the operator.

Having fully described my invention,

what I claim as new and desire to secure by Letters Patent is:—

1. Stock support actuating mechanism comprising a reciprocatory member connected to the stock support, a locking member connected with said reciprocatory member to be rotated as the latter is reciprocated, means for holding the locking member against axial movement, and means operating intermittently to lock said member against rotation and to hold the stock support rigidly in position.

2. Stock support actuating mechanism comprising a screw connected to the stock support, a nut fixed against axial movement and coöperating with said screw, a spring for moving the stock support into position to clamp the stock, and means for locking the said nut against rotation to prevent axial movement of the screw and thus to hold the stock support rigidly in clamping position.

3. Stock support actuating mechanism comprising a screw positively connected to the stock support, a nut fixed against axial movement and coöperating with said screw, means independent of said nut for moving said stock support, and means for locking said nut against rotation to prevent axial movement of the screw and thus to hold the stock support rigidly in position.

4. Stock support actuating mechanism comprising a screw positively connected to the stock support, a nut fixed against axial movement and coöperating with said screw, means constructed and arranged to be operatively connected with and disconnected from said screw for actuating the stock support, and means for locking said nut against rotation to hold the stock support rigidly in position when said actuating means is disconnected from the screw.

5. Stock support actuating mechanism comprising a screw positively connected to the stock support, a nut fixed against axial movement coöperating with said screw so as to be rotated as the screw moves through it, means constructed and arranged to be operatively connected with and disconnected from said screw for depressing said stock support, a spring constantly tending to raise the stock support, and coöperating devices acting to disconnect said means and then after a predetermined interval by engaging the nut to lock the stock support rigidly in position.

6. Stock support actuating mechanism comprising a screw connected to the stock support, a nut fixed against axial movement and coöperating with said screw, means through which said nut may be locked against rotation, a reciprocatory slide for moving said stock support constructed and arranged to be operatively connected with and disconnected from said screw and provided with a device for operating said locking means, and means for actuating said slide constructed and arranged to operate said locking means after the slide has been disconnected from the screw.

7. In a machine of the class described, a supporting frame, a stock support, a screw connected to the stock support, a nut mounted in the frame and fixed against axial movement, a non-rotatable clutch collar surrounding said nut and supported by the frame, and automatic means for bringing said nut and collar into operative engagement to restrain the screw against axial movement and to lock the stock support rigidly in position.

8. In a machine of the class described, a supporting frame, a stock support, a screw connected to the stock support, a nut mounted in the frame and fixed against axial movement, said nut being provided with a friction surface, a non-rotatable clutch collar surrounding said nut and having a friction surface to coöperate with the friction surface of the nut, a support for said collar provided with a cam surface and automatic means co-acting with said cam surface for bringing the said friction surfaces into operative engagement to restrain the screw against axial movement and to lock the stock support rigidly in position.

9. In a machine of the class described, a stock support, a lever, connections between said lever and stock support to depress the latter while feeding the stock, a shaft having an actuator to move said lever, a controller carried by said shaft, and manually operated means to move said controller that in its rotation with said shaft, it may meet said lever and move it to give the stock support an extra depression as the machine stops.

10. In a machine of the class described, a stock support, a lever for depressing it provided with a cam-shaped extension, a shaft, a controller mounted on a pivot at right angles to the axis of said shaft, a spring acting normally to retain said controller in one position, and a manually operated device to act upon one end of said controller when the stock support is to be put in its lowest position and put said controller in position to engage said extension and move said lever.

11. In a machine of the class described, a carriage movable vertically during the operation of the machine, a pin and a dog mounted on said carriage, a stock support, a ratchet toothed plate, connections between it and said stock support to depress the latter when the carriage is elevated, a releasing device to disengage the dog of the carriage from the ratchet toothed plate as the carriage descends, a screw, and a nut intermediate the ratchet toothed plate and the stock support, clamping means to engage said nut

and restrain its rotation, and means to depress said carriage after the dog has been released from the ratchet toothed plate to cause said pin to actuate said clamping means and restrain temporarily the rotation of said nut.

12. A vertically movable stock support and means for locking it in position comprising a longtiudinally movable member connected to said stock support, a second member fixed against longitudinal movement but co-acting with the first member so as to be rotated by the first member as it is moved longitudinally, and means for holding the second member against rotation and thereby preventing movement of the first member and of the stock support.

13. In a machine of the class described, a vertically movable stock support, a longitudinally movable member connected to said stock support, a second member fixed against longitudinal movement but co-acting with the first member so as to be rotated by the first member as it is moved longitudinally, means for reciprocating the first member and the stock support intermittently to permit feed of the stock over the stock support and means acting intermittently for holding the second member against rotation.

14. In a machine of the class described, a stock support, a rotary shaft, a clutch, a controller rotatable with the shaft but independently movable thereon, devices actuated by the movement of said controller for operating both clutch and stock support and a locking device for holding the controller in clutch releasing position.

15. In a machine of the class described, a stock support, a rotary shaft, a clutch, a friction brake, a controller rotatable with the shaft but independently movable thereon, devices actuated by the movement of said controller for releasing the clutch, applying the brake and depressing the stock support.

16. Stock support actuating mechanism comprising a shaft, a cam thereon, a member rotatable with the shaft but independently movable thereon and provided with a projecting part, a second member supported independently of the shaft and connected through thickness-compensating devices with the stock support for actuating it and being operable by said cam, said second member being located also in the path of movement of said projecting part when in one position with reference to its shaft whereby said second member is struck and moved by said part and the stock support is depressed at a predetermined point in the rotation of said shaft.

17. Stock support actuating mechanism comprising a shaft, a cam thereon, a lever movable by the cam and connected to the stock support, a member rotatable with the shaft but independently movable thereon into and out of position to act upon the lever and thus actuate the stock support.

18. Stock support actuating mechanism comprising a rotary shaft, a clutch for connecting and disconnecting said shaft respectively to and from a source of power, a controller rotatable with the shaft but independently movable thereon, and devices actuated by the movement of said controller for operating both clutch and stock support.

19. Stock support actuating mechanism comprising a shaft, a clutch, a lever connected to the stock support, a controller rotatable with the shaft but pivoted to move upon an axis transverse to the axis of the shaft, clutch actuating means operable through the controller, means tending to maintain said controller normally in position to render the clutch operative and out of engagement with the lever for actuating the stock support, and means under the control of the operator for moving said controller into position to release the clutch and to act upon the lever and thus actuate the stock support.

20. In a machine of the class described, a vertically movable stock support, a rotary shaft, a clutch for the shaft, a clutch controller carried by the shaft and movable to effect the engagement or the release of the clutch, and a movable member connected to the stock support and located in the path of said controller when it is in position to release the clutch whereby the controller effects the depression of the stock support as the clutch is released.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEO. A. AMBLER.

Witnesses:

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