G. GODDU.

WORK SUPPORT.

APPLICATION FILED MAY 10, 1910.

1,011,941.

Patented Dec. 19, 1911.

2 SHEETS—SHEET 1.

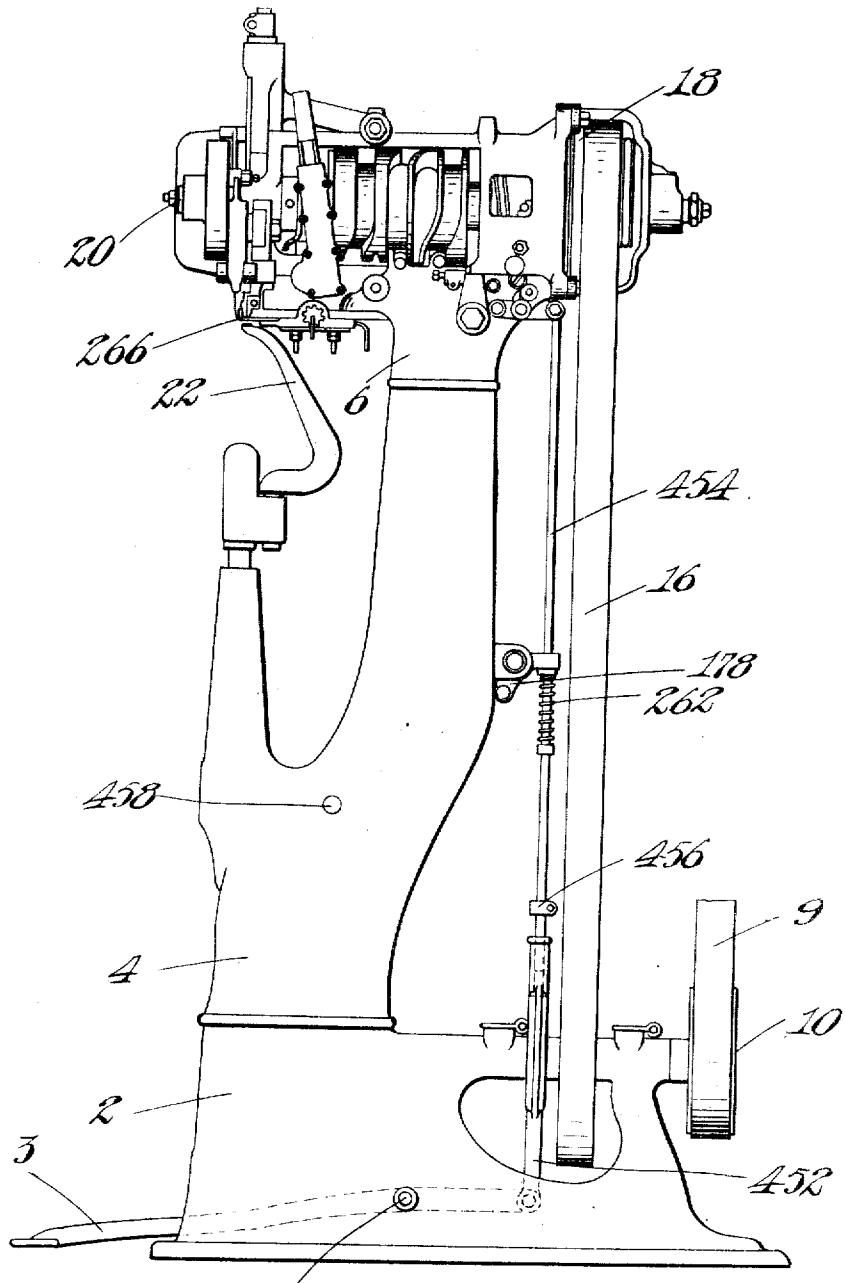

Fig. 1.

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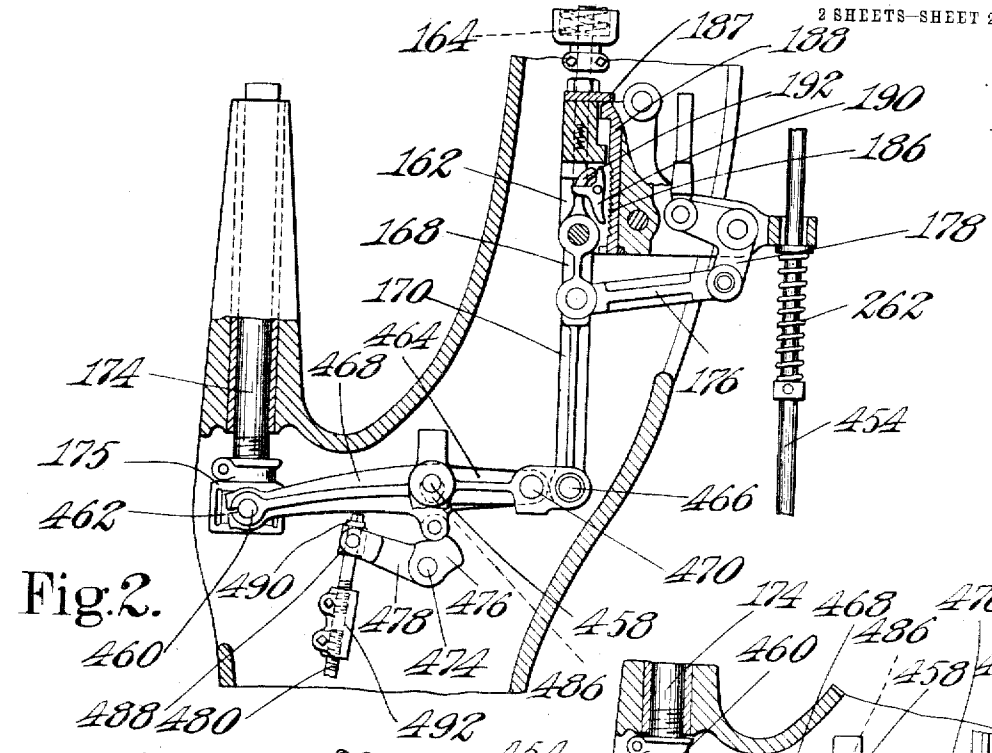

Fig. 2.

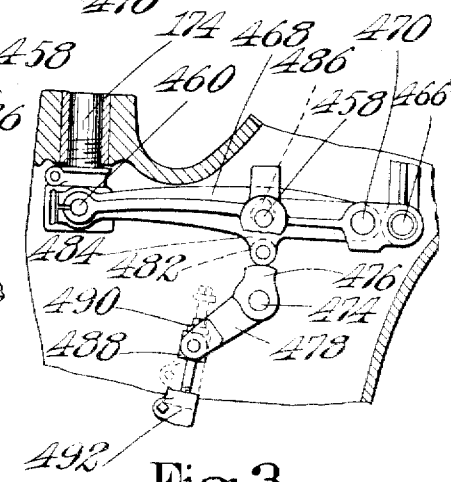

Fig. 3.

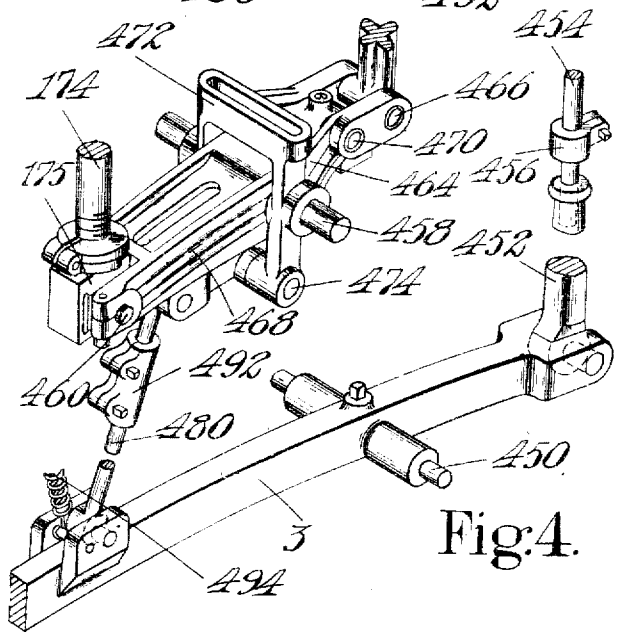

Fig. 4.

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WORK-SUPPORT.

1,011,941. Specification of Letters Patent. Patented Dec. 19, 1911.

Application filed May 10, 1910. Serial No. 560,454.

To all whom it may concern:

Be it known that I, GEORGE GODDU, a citizen of the United States, residing at Winchester, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Work-Supports, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to work support controlling mechanisms and particularly to mechanism for controlling the movements of a movable work support and for determining its operative and inoperative positions.

In its illustrated preferred embodiment the invention is shown as applied to a machine for inserting fastenings in which the work is supported upon a horn, the machine herein illustrated being of the type disclosed in my co-pending application Ser. No. 476,649, filed Feb. 8, 1909. Machines of the type disclosed in the said co-pending application are usually provided with mechanism for causing the horn to clamp the work against a work abutment during the fastening inserting operation and for intermittently releasing the work from the clamping pressure to permit it to be fed over the horn. In the illustrated construction the movement of the horn into work clamping position is effected by a spring, the work clamping pressure being furnished by the same spring, and means comprising a toggle and a self-adjusting spring lock is provided for lowering the work a uniform distance from the work abutment after each fastening inserting operation to permit the work to be fed into position to receive the next fastening.

Since the work releasing movement of the horn is neither so timed nor of such an amount as to permit the work to be removed from, or placed upon, the horn, provision must be made in constructions of this type for movement of the horn into a work receiving position. The construction shown in the co-pending application comprises, for this purpose, a treadle which is connected to the horn. Said construction also comprises a second treadle for rendering operative the mechanism for inserting fastenings. It will be apparent, however, that the manipulation of these two treadles will require the expenditure of considerable time and energy on the part of the operator, since they must be operated in succession, and that, therefore, the operation of removing the work from the machine, placing new work in position to be operated upon, and starting the machine, will take up a large part of the time which is spent upon each piece of work. The advantages of increased speed of operation of the machine will thus, to some extent, be nullified.

With the foregoing considerations in view, an object of the invention is to improve and simplify machines of this general type by providing improved means through which the movement of the work support between its work clamping and work receiving positions and the starting and stopping of the machine may be effected.

A particular object of the invention is to provide improved means by which a single treadle may effect both the desired movement of the horn from work receiving position into work clamping position, or vice versa, and the starting and stopping of the insertion of fastenings.

Other objects of the invention will be apparent from a consideration of the following description in connection with the accompanying drawings, in which,—

Figure 1 is a side elevation of the machine of the co-pending application above referred to, having embodied therein the present invention; Fig. 2 is a section through a part of the standard of the machine, this view disclosing a side elevation of the principal parts of the illustrated embodiment of the invention in the positions which they assume when the horn is lowered into work receiving position as the machine is stopped; Fig. 3 is a view similar to Fig. 2 of a part of the mechanism shown in Fig. 2 when the horn is in work clamping position; and Fig. 4 is a broken perspective view of the mechanism with the machine frame removed.

The frame of the machine comprises a base 2 in which the treadle 3 is mounted, a standard or column 4 in which the principal parts of the mechanism of this invention are carried, and a head 6. A counter shaft hav-

ing bearings in the base of the machine is driven from any suitable source of power by a belt 9 passing over the driving pulley 10 carried by said shaft. A second pulley attached to said shaft is connected by a belt 16 to a loose pulley 18 upon the main driving shaft 20 in the head of the machine. The pulley 18 may be clutched to the main driving shaft by suitable clutch mechanism controlled from the treadle 3, this mechanism in itself constituting no part of the present invention and being more fully described in the co-pending application above referred to.

The work support in the illustrated construction comprises, as above suggested, the horn 22 which has connections hereinafter to be described, with the horn release mechanism, said horn release mechanism comprising a toggle formed of links 168 and 170, the link 168 being pivotally connected to a slide 162 which is normally pressed toward its lowermost position by a spring 164, the spring 164 being strong enough to maintain the horn 22 in work clamping position during the fastening inserting operation. The work releasing movement of the horn is effected by breaking the toggle, through connections with a cam upon the main shaft, said connections comprising a link 176 pivoted at one end to the knee joint of the toggle and at its other end pivoted to one arm of a bell-crank lever 78, the other arm of said bell-crank lever having operative connections with the aforementioned cam upon the main shaft as more fully described in the co-pending application.

The spring lock, by which the spring 164 is held against action upon the toggle at the time the toggle is broken, comprises pawls 190 arranged to engage one or more of the teeth of a ratchet plate 186 carried by the machine frame. The movement of the pawls into engagement with the ratchet plate is controlled by a finger 192 attached to the toggle link 168, these parts being also more fully described in the co-pending application above referred to. A stop 187 carried by the slide 162 is arranged to engage the upper end of the casing 188 to limit the downward movement of the slide 162.

As above suggested, an important feature of the invention is the provision of an improved construction in which a single treadle may be utilized to start the insertion of fastenings and to effect the desired initial and final movements of the work support. To this end in the illustrated embodiment of the invention the treadle lever 3, which is fulcrumed at 450 in the base of the machine, has operative connections with the starting mechanism and also with the horn 22. These connections comprise a member 452 pivoted upon the rear end of the treadle lever 3 and provided with a bore to receive the lower end of the rod 454 through which the clutch is actuated to clutch the loose pulley 18 to the driving shaft 20. To prevent the actuation of this clutch before the horn 22 is in work clamping relation to the work abutment 266, lost motion is provided in the connection between the treadle lever 3 and the rod 454, the movement of the treadle lever 3 being transmitted to the rod 454 only when the member 452 is moved up over the rod 454, receiving the lower end of said rod in the aforementioned bore in said member, until the upper end of said member contacts with an adjustable collar 456 upon said rod. While this lost motion is being taken up, the horn 22 will be moved into work clamping relation to the work abutment 266 by mechanism now to be described.

The horn supporting rod or horn shaft 174 is operatively connected to the toggle link 170 by a lever fulcrumed upon a pivot pin 458 carried by the standard 4. To provide for horizontal movement of the end of the lever which is connected to the horn shaft as this end turns about the pivot pin 458, the end of the lever is forked and receives a pivot pin 460 carried in a block 462 arranged to slide in a horizontal slot in a member 175 screwed upon the lower end of the horn shaft 174 and clamped in adjusted position thereon. The parts of the machine are so timed that when the machine stops the toggle is straightened and the slide 162 is moved by the spring 164 into such position that, with the connections between the toggle and horn shaft in operative condition, the horn 22 would be held with its top in close proximity to, but not touching, the work abutment 266.

To provide for movement of the horn into such a position at the time the machine is stopped that the work may be easily placed upon it or removed from it and at the same time to provide for a return of the horn into work clamping relation as the machine is started, the lever connecting the toggle link 170 with the horn shaft 174 is preferably formed in two parts so constructed and arranged that one of said parts may move relatively to the other about or across the fulcrum of the lever to permit movement of the horn shaft without disturbing the position of the toggle. In the illustrated construction the part 464 of the aforementioned lever is fulcrumed upon the pivot pin 458 with provision for movement only about the axis of said pivot pin. The part 464 is pivotally connected at its end remote from the pivot pin 458 to the toggle link 170, the part 464 being forked to embrace the end of the toggle link 170 to which it is connected by the pivot pin 466 and to embrace also the end of the other part 468 of the lever, which is pivoted at 470 to the

part 464. The fork members of the part 464 extend rearward from a yoke 472 through which passes the pivot pin 458 and in which is carried, upon a second pivot pin 474, a lifting cam 476 having an arm 478 connected by a link 480 to the treadle lever 3.

The lifting cam 476 acts upon a cam roll 482 pivoted between ears 484 upon the under side of the part 468 of the lever which connects the horn shaft with the toggle. It will be noted that the part 468 is pivoted to the part 464 at a point upon the side of the pivot 458 opposite to that upon which the pivot 460 is located and to provide for the relative movement of the two parts of the lever a slot 486 is provided in the part 468 to receive the pivot pin 458, both the vertical and the horizontal dimensions of this slot being greater than the diameter of said pivot pin.

The cam 476 is so proportioned that when it is in the position shown in Fig. 3 the part 468 is moved up until the lower end of the slot 486 contacts with the under side of the pivot pin 458, whereby the two parts 468 and 464 are made to form a rigid lever turning about the pivot pin 458. When the cam 476 is in the position shown in Fig. 2 the part 468 is permitted to move under the action of gravity relatively to the part 464 until the upper end of the slot 486 rests upon the pivot pin 458, this movement serving to lower the horn 22 into a work receiving position. To prevent this movement from taking place too quickly when the treadle is released to stop the machine, lost motion is provided in the connection between the link 480 and the arm 478, the arm 478 having pivoted in its forked outer end a block 488 through an opening in which passes the upper end of the link 480, this end of the link 480 being provided with a head 490, arranged to limit the downward movement of said link with respect to the block 488.

As the link 480 moves upward with the treadle, when the treadle is released to stop the machine, it passes freely through the block 488 without turning the arm 478 until the adjusting sleeve 492 strikes the under side of the block and causes the lifting cam 476 to be turned toward its horn lowering position. As soon as the cam 476 has been turned far enough to carry its upper surface out from beneath the roll 482, the weight of the parts upon the cam will cause it to turn into the position shown in Fig. 2, in which position the block 488 is preferably in engagement with the head 490 of the link 480. To permit adjustment of the connection between the cam 476 and the treadle lever 3 the link 480 is formed in two parts oppositely threaded, which are screwed into the correspondingly threaded ends of the sleeve 492. The treadle lever 3 is maintained normally in its uppermost position by a spring 494.

The operation of the mechanism hereinabove described is as follows: When the machine is at rest the parts are in the position shown in Fig. 2, the treadle lever 3 being in its uppermost position and the horn 22 being in its work receiving position. The work having been adjusted upon or over the horn, the operator depresses the treadle lever 3, thereby raising the member 452 and rocking the cam 476 about its pivot 474. The head 490 of the link 480 being in engagement with the arm 478, the cam 476 begins to turn as soon as the operator begins to depress the treadle lever 3. Turning of the cam 476 lifts the part 468 of the lever connecting the horn shaft and toggle, this part turning in its initial movement about the pivot 470.

The work being thicker than the space normally provided between the horn top and the work abutment 266 when the slide 162 is in the position shown in Fig. 2, movement of the part 468 sufficient to cause the horn to clamp the work between the horn top and work abutment will not bring the bottom of the slot 486 into engagement with the under side of the pivot pin 458. The further movement of the lever 468 will therefore be about the pivot 460, the part 468 now acting as a lever of the third class and causing the part 464 to turn about the pivot pin 458 and thus, through the toggle, move the slide 162 upward to compress the spring 164. As the cam 476 completes its turning movement and comes into the position shown in Fig. 3, the member 452 upon the rear end of the treadle lever 3 engages the collar 456 upon the rod 454 and raises the rod 454 against the tension of the spring 262 to actuate the clutch by which the loose pulley 18 is clutched to the driving shaft 20. The machine is thus started and when the awl has entered the work the toggle is broken through the connections with the main shaft hereinabove described. As the toggle is broken the pawl 190 engages the teeth of the ratchet plate 186 to lock the spring 164 and at the same time to lock the upper pivot of the toggle against downward movement. The breaking of the toggle thus lifts the rear end of the part 464 of the lever connecting the horn shaft and toggle. The parts 464 and 468 forming at this time a rigid lever which turns about the pivot pin 458, the pivot 460 is lowered as the pivot 466 is raised and the horn is depressed to permit the feeding of the work.

When the operator desires to stop the machine, the treadle is released and the spring 494 returns it to its uppermost position. As the fastening inserting operation is the last operation performed upon the work it is

desirable that the horn be maintained in its work clamping position until the machine stops. The first part of the movement of the treadle lever, therefore, is utilized to cause the driving pulley 18 to be unclutched from the driving shaft 20. As the treadle lever continues to move upwardly under the action of the spring 494 the sleeve 492 engages the block 488 upon the arm 478 and turns the cam 476 about its pivot 474, thus permitting the horn to drop to its work receiving position.

The horn lowering movement of the parts 464 and 468 of the lever connecting the horn shaft and toggle will be in an order which is the reverse of that in which they moved when the horn was lifted into work clamping relation. Thus, as the cam 476 starts to turn to permit the horn to be lowered, the part 468 of the horn operating lever will turn first about the pivot 460 while the part 464 turns about the pivot pin 458 to permit the slide 162 to move downward until the stop 187 engages the casing 188. When the downward movement of the pivot 466 is thus limited, the part 468 will continue to turn about the pivot 470, thus lowering the pivot 460 until the horn comes into its work receiving position.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a machine of the class described, a work support movable between a work clamping position and a work receiving position, mechanism comprising work thickness compensating means for intermittently moving said work support into intermediate positions, a lever for transmitting movement from said mechanism to said work support composed of a plurality of parts so connected that they may move relatively to each other when said work support is to be moved into work receiving position, and treadle-operated means for moving said work support from work receiving position into work clamping position and for locking said lever parts against relative movement.

2. In a machine of the class described, a work support movable between a work clamping position and a work receiving position, mechanism for intermittently moving said work support into positions intermediate said aforementioned positions, a lever connecting said mechanism and said work support and comprising a plurality of parts movable relatively to each other when the work support is to be moved into work receiving position, and means for moving said work support from work receiving position into work clamping position and for locking said parts against relative movement to cause the movements of said mechanism to be transmitted to the work support.

3. In a machine of the class described, a work support movable between a work clamping position and a work receiving position, mechanism for intermittently moving said work support into positions intermediate the aforementioned positions, a lever connecting said mechanism and said work support and comprising a plurality of parts movable relatively to each other when said work support is to be moved into work receiving position, and means carried by said lever for moving said work support from work receiving position into work clamping position and for locking said parts against relative movement.

4. In a machine of the class described, a work support movable between a work clamping position and a work receiving position, a spring for moving said work support into work clamping position, means for intermittently locking said spring and moving said work support into positions intermediate its work clamping and work receiving positions, and other means for locking said spring when said work support is moved into work receiving position.

5. In a machine of the class described, a work support movable between a work clamping position and a work receiving position, mechanism for intermittently moving said work support into positions intermediate the aforementioned positions, a lever connecting said mechanism and said work support, said lever comprising two parts one of which is pivoted to the other to move relatively thereto across the fulcrum of said lever, and means for causing said parts to form a rigid lever turning about said fulcrum constructed to effect a movement of said work support from work receiving position into work clamping position.

6. In a machine of the class described, a work support movable between a work clamping position and a work receiving position, mechanism for intermittently moving said work support into positions intermediate the aforementioned positions, a lever connecting said mechanism and said work support comprising a plurality of parts movable relatively to each other when said work support is to be moved into work receiving position, and treadle-operated means for locking said parts against relative movement.

7. In a machine of the class described, a work support movable between a work clamping position and a work receiving position, mechanism for intermittently moving said work support into positions intermediate the aforementioned positions, a lever connecting said mechanism to said work support comprising a plurality of parts movable relatively to each other when said work support is to be moved into work clamping position, means carried by said

lever for locking said parts against relative movement constructed to effect a movement of the work support from work receiving position into work clamping position, starting mechanism, a treadle and operating connections between said locking means and treadle and between said starting means and treadle having provision for lost motion whereby said work support is moved into work receiving position only after said starting means has been actuated to stop the machine, and is moved into work clamping position before the machine is started.

8. In a machine of the class described, a work support movable between a work clamping position and a work receiving position, mechanism for intermittently moving said work support into positions intermediate the aforementioned positions, a lever connecting said mechanism and said work support, said lever comprising two parts, one of which is pivoted to the other at a point outside the fulcrum whereby said parts may move into different angular relations to each other, and means carried by said lever for locking said parts together whereby they will turn together about the fulcrum of said lever.

9. In a machine of the class described, a work support movable between a work clamping position and a work receiving position, mechanism for intermittently moving said work support into positions intermediate the aforementioned positions, a lever connecting said mechanism and said work support, said lever comprising two parts, one of which is pivoted to the other to move relatively thereto across the fulcrum of said lever and eccentric means carried by one of said parts and arranged to operate upon the other to cause said parts to form a rigid lever turning about said fulcrum.

10. In a machine of the class described, starting mechanism comprising a treadle yieldingly maintained normally in raised position, a work support movable between a work clamping position and a work receiving position, mechanism for intermittently moving said work support into positions intermediate the aforementioned positions, a lever connecting said mechanism and said work support, said lever comprising two parts connected respectively to said mechanism and to said work support, one of said parts being pivoted to the other to move relatively thereto across the fulcrum of said lever, and means connected to said treadle and operated by the depression thereof to start the machine for causing said parts to form a rigid lever turning about said fulcrum.

11. In a machine of the class described, a work support movable between a work clamping position and a work receiving position, mechanism for intermittently moving said work support into positions intermediate the aforementioned positions, a lever of the first-class connecting said mechanism and said work support, said lever comprising two parts, one of which is arranged to have movement only about the fulcrum of said lever and the other of which is pivoted to said first mentioned part to move relatively thereto, across the fulcrum of said lever, said last-mentioned part being connected to the work support, and eccentric means carried by said first mentioned part and under the control of the operator for causing said parts to form a rigid lever turning about said fulcrum.

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

GEORGE GODDU.

Witnesses:
H. DORSEY SPENCER,
JAMES R. HODDER.