

A. BATES, A. E. JERRAM & J. GOULDBOURN.

AWL CONTROLLING MECHANISM.

APPLICATION FILED JULY 5, 1907.

1,000,573.

Patented Aug. 15, 1911.

3 SHEETS-SHEET 1.

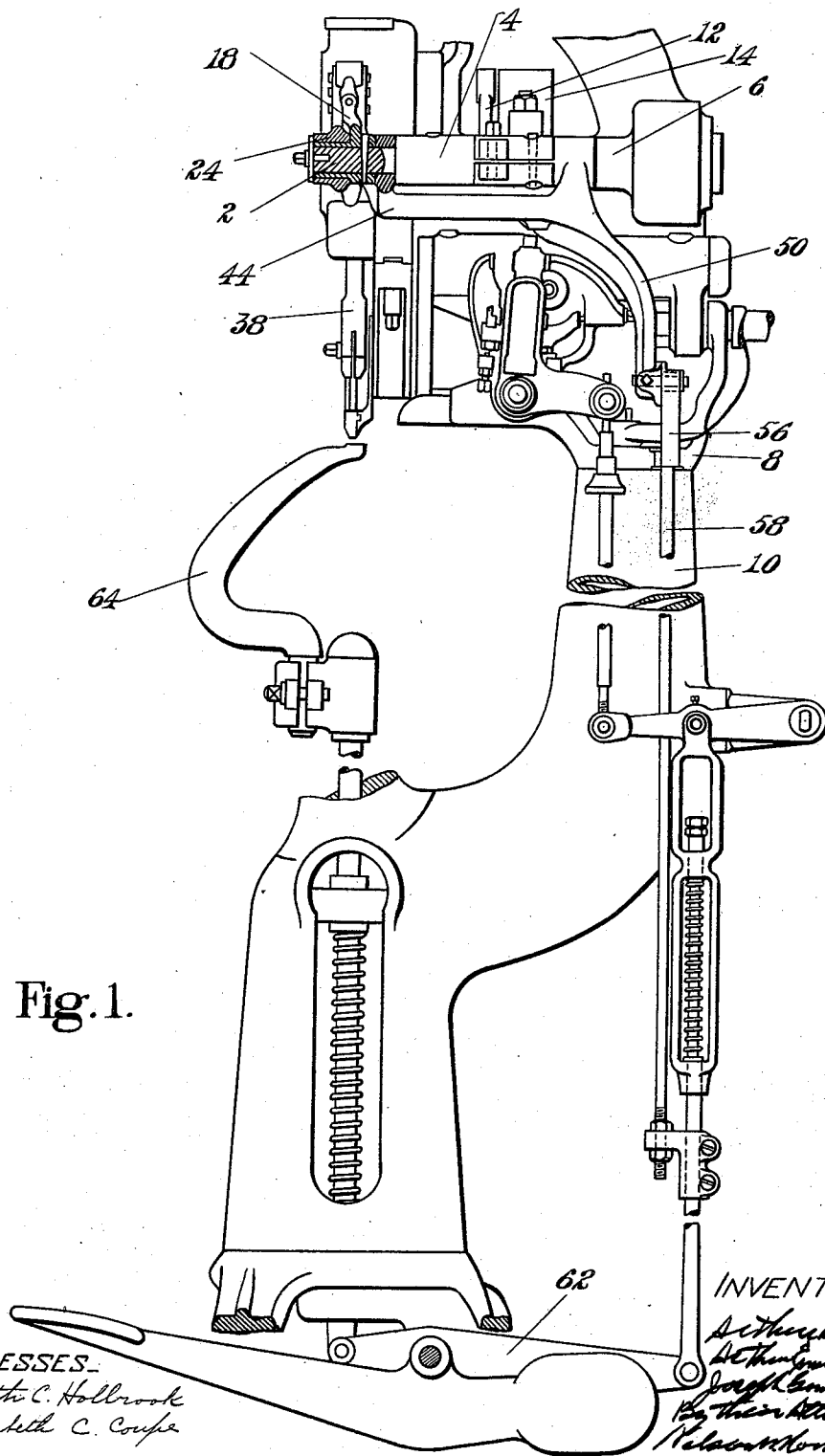


Fig. 1.

WITNESSES.

Edith C. Hallbrook
Elizabeth C. Coupe

INVENTORS.

A. Bates
A. E. Jerram
J. Gouldbourn
By their Attorney
H. L. Howard

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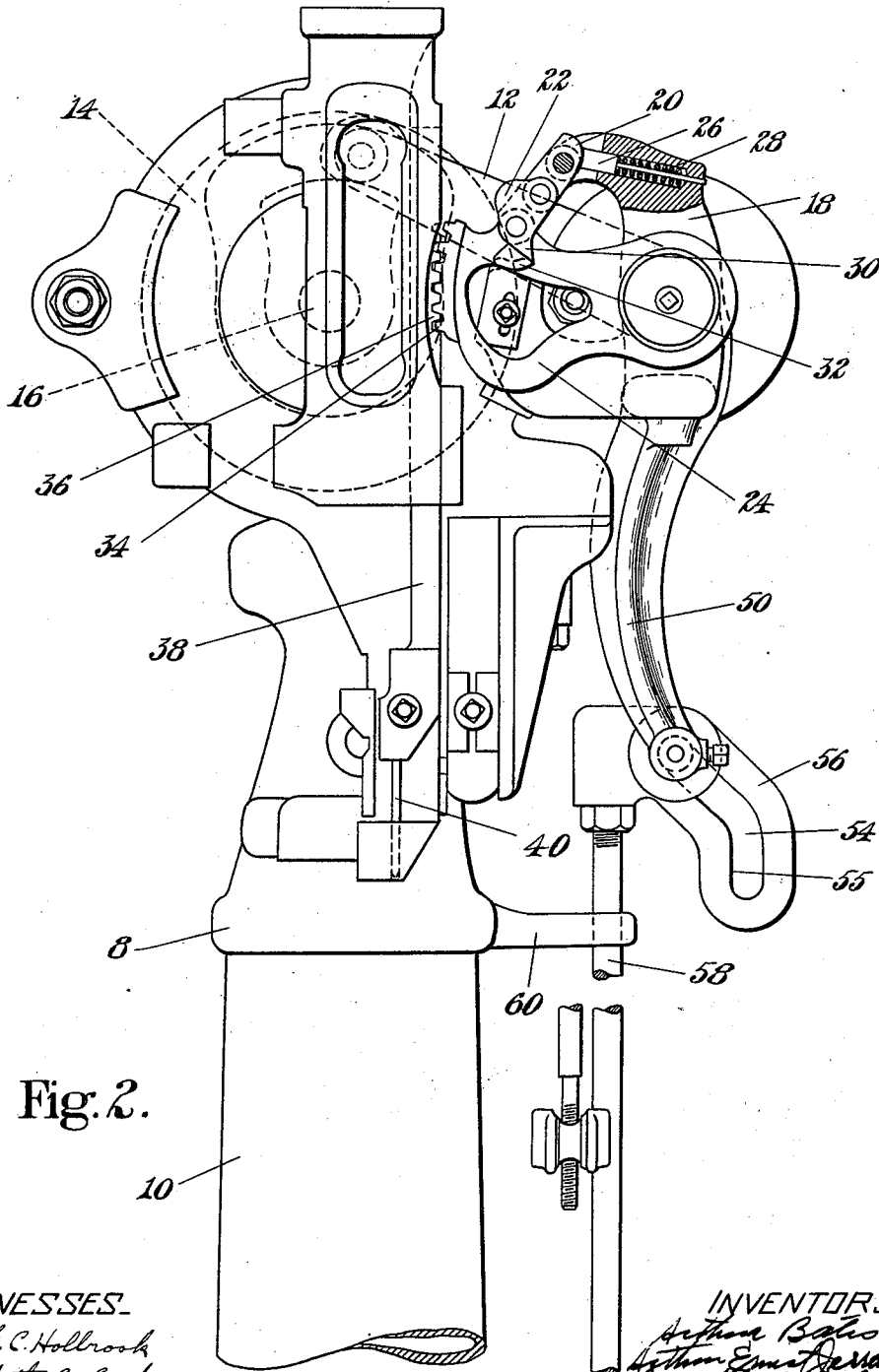


Fig. 2.

WITNESSES.

Edith C. Hollbrook
Elizabeth C. Coyle

INVENTORS.

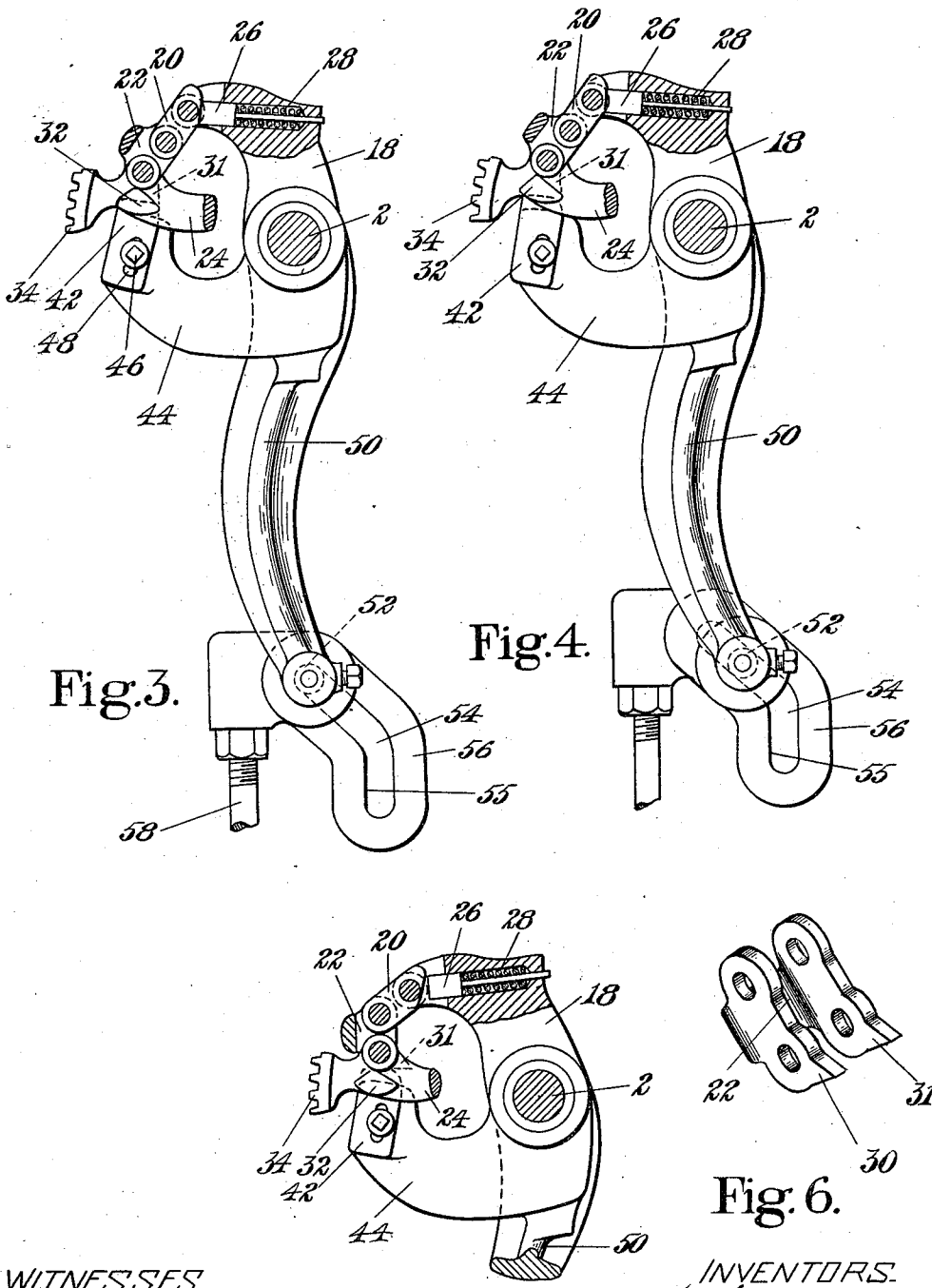
Arthur Bates
Arthur Ernest Jerram
Joseph Gouldbourn
By their Attorneys
Halsey Woodard

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3 SHEETS—SHEET 3.



WITNESSES.
 Edith C. Hollbrook
 Elizabeth C. Couper

Fig. 5.

INVENTORS.
 Arthur Bates
 Arthur Ernest Jerram
 Joseph Gouldbourn
 By their Attorney
 Nelson W. Howard

UNITED STATES PATENT OFFICE.

ARTHUR BATES, ARTHUR ERNEST JERRAM, AND JOSEPH GOULDBOURN, OF LEICESTER, ENGLAND, ASSIGNORS TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

AWL-CONTROLLING MECHANISM.

1,000,573.

Specification of Letters Patent. Patented Aug. 15, 1911.

Application filed July 5, 1907. Serial No. 382,266.

To all whom it may concern:

Be it known that we, ARTHUR BATES, ARTHUR ERNEST JERRAM, and JOSEPH GOULDBOURN, subjects of the King of England, residing at Leicester, in the county of Leicester, England, have invented certain Improvements in Awl-Controlling Mechanisms, 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 improvements in mechanism for controlling the operation of the awl in machines in which an awl is used to prepare the work for the operation of another mechanism, as, for example, in machines for inserting fastenings in which an awl is frequently used to pierce the work to form an opening to receive the fastening.

An object of the invention is to provide an awl-controlling mechanism which will cause the operation of the awl to contribute to a great extent to the effective operation of the machine in which it is incorporated, or with which it coöperates, by suiting the operation of the awl both to the requirements of the work upon which it is operating and to the requirements of the mechanism which is to operate subsequently upon the work. Such machines will thus be rendered more efficient in dealing with work of different classes.

In machines in which the nature or the shape of the work to be operated upon varies considerably, or in which the operation, for which the awl prepares the work, is performed at different times, or upon different parts of the work, with materials varying in size or nature, it is usually desirable that the amount of penetration of the awl into the work be also varied.

A particular object of the invention, therefore, is to provide an awl-controlling mechanism which will operate, preferably automatically, to cause the awl to penetrate the work to a predetermined suitable depth and then check its further penetration, preferably by causing the driving connection by which the awl is operated, to be broken. It is desirable usually to vary the extent of penetration of the awl in accordance with variations in the thickness of the work, and, therefore, in the preferred construction, a

work-calipering device is provided which determines the thickness of the work at or near the point at which it is to be operated upon, and controls the action of the awl in accordance with such determination.

The work-calipering device may be constituted advantageously by the parts which bear against the work when the work is in position to be operated upon, and in the preferred embodiment of the invention the movable member of such calipering device is constituted by a movable horn which is connected to the means for varying the penetrative movement of the awl.

When the awl is operating upon work of certain thicknesses, as, for example, when it is operating upon work of such thickness that the greatest penetrative movement permissible with its construction and size is imparted to the awl by the controlling mechanism, it is obviously useless, so far as the object of the invention is concerned, to increase the stroke of the awl when it is to operate upon still thicker portions of the work and, therefore, in the preferred embodiment of the invention, the awl-controlling mechanism is so constructed that it imparts to the awl a uniform penetrative movement when it is operating upon portions of the work of certain predetermined though varying thicknesses.

A convenient embodiment of the idea of providing a breakable driving connection for the awl comprises the interposition of a toggle in the connections between the awl-driving means and the awl carrier or awl bar. The toggle may connect the driving means, which may be in the form of a lever receiving a stroke of constant range, with a part that is geared to and actuates the awl bar.

A stop or cam operated by the moving part of the calipering device can be arranged to be moved into a position to "break" the toggle and so discontinue the further driving action of the first mentioned lever as it completes its movement. Furthermore, the toggle breaking cam and the surface it coöperates with may be so proportioned and arranged as to prevent automatically and positively any further descent of the awl bar after the toggle is broken. The movable part of the calipering device, which, in the preferred construction, is the

horn, can be arranged to operate a cam surface which will control the position of the stop so as to break the toggle earlier or later in the stroke of the operating lever and thus automatically curtail the extent of the stroke transmitted to the awl bar in exact or varying proportion to the variation in thickness of the stock.

In the accompanying drawings, the invention is shown as applied to a loose nailing machine of the type disclosed in United States Letters Patent to Arthur Bates and Henry Percival Gamble, No. 922,447, granted May 25, 1909, for improvements in machines for inserting fastenings, to which reference may be had for a description of parts illustrated but not described in this application. Only so much of a loose nailing machine is shown as is necessary to illustrate clearly the application of the invention thereto.

Figure 1 shows in side elevation the machine of the co-pending application with this invention applied thereto; Fig. 2 is a front view of the upper part of the machine shown in Fig. 1, drawn to an enlarged scale; and Figs. 3 to 5 inclusive are views, partly in section, showing the parts of the controlling mechanism in different relative positions; and Fig. 6 is perspective view of the lower toggle member.

In the construction illustrated, a rockshaft 2 is mounted in bearings 4 and 6 upon the head 8, which latter is supported by a base or standard 10. The rockshaft 2 receives an oscillating movement of unvarying extent, which movement may be imparted thereto by any suitable means, such, for example, as that shown, wherein a lever 12 is secured to the shaft 2 and is operated by a cam 14 mounted upon the main shaft 16 of the machine. Secured upon the shaft 2 is an arm or lever 18 to which one end of a member 20 of a pair of toggles is pivoted, the opposite end of the other member 22 being pivoted to a lever or segment 24 which is loosely mounted upon the rockshaft 2. The toggle 22 is of forked construction and straddles both the toggle 20 and the segment 24. The toggle members 20 and 22 are acted upon by a spring-actuated plunger 26 mounted in one of the members to which the pair of toggles is connected, which member, in the construction shown, is the arm or lever 18. The spring 28 causes the plunger 26 to bear upon an extension of the toggle member 20. The other toggle member is provided with an extension upon each of its forked members, which extensions are indicated by the numerals 30 and 31. The extension 30 is adapted to be engaged by a lug 32 formed upon the lever or segment 24, which engagement of the lug 32 and extension 30 coöperates with the action of the spring plunger 26 to maintain the toggle

members 20 and 22 in their extended or unbroken position. The engagement between the lug 32 and extension 30 also serves to restrict the "breaking" of the toggle to movement in one direction only. The lever or segment 24 is provided with teeth 34 which engage teeth 36 formed on the awl bar 38 carrying the awl 40, whereby the latter is raised and lowered during the operation of the machine. So long as the toggle members 20 and 22 remain in their extended or unbroken position the movement of the lever or segment 24, which, as aforesaid, is loosely mounted on the shaft 2, will correspond with the movement of the arm or lever 18, but when, however, the toggle 20 and 22 is "broken" the arm or lever 18 will move without affecting the lever or segment 24. It will therefore be evident that by breaking the toggle 20 and 22 at any part of the stroke of the arm or lever 18 which receives an unvarying stroke, the stroke of the lever or segment 24 can be more or less shortened, and, in consequence, the effective stroke of the awl bar 38 and awl 40 can be varied as desired. To effect this variation of the stroke automatically in accordance with variations in the thickness of the work the stop 42 is provided, which is secured to, or formed as a part of, the swing frame or tripper 44 that is loosely mounted upon the rockshaft 2. In the drawings, the stop 42 is shown as being adjustably secured to the swing frame by a bolt 46 which passes through a slot 48 in the stop and screws into the swing frame 44. The stop 42 is so located that it may be moved partially around the rockshaft 2 to occupy different positions in the path that the projection 31 traverses during the stroke of the lever or segment 24, the said projection 31 acting as a trip to effect the breaking of the toggle when engaged by the stop 42.

The swing frame 44 is provided with a pendant arm 50 having a roller 52 pivoted to its lower extremity. The roller 52 engages with a cam slot 54 formed in a plate 56, which slot is of such shape that when the plate 56 is moved upwardly or downwardly the pendant arm will be caused to be moved sidewise and the swing frame 44 will be moved around the shaft 2. This will cause the stop 42 to be brought into different positions to break the toggle earlier or later in the stroke of the arm or lever 18.

By operating the slot plate 56 in its vertical movement through a connection with the mechanism by which the horn is brought into contact with the work, the point at which the toggle will be broken will depend upon the thickness of the work being dealt with, and the awl will be caused to penetrate the work to a depth exactly proportional to the thickness between the horn and the fixed part of the calipering device. The

plate 56 is shown in the drawings as being secured upon the upper end of a rod 58, which rod may be guided in its vertical movement by being held in bearings one of which is shown at 60, and the rod may be connected to the lever 62 by which the horn 64 is raised into contact with the work or may be operated by any other suitable connections with the horn or its operating mechanism.

A portion of the controlling cam slot 54 in the slot plate 56 may be made with a straight part 55, as shown in the drawings, so as not to vary the stroke of the awl by the calipering device when the latter is acting on work that is thicker than the awl can penetrate owing to its limited length. Or this straight part of the slot may be dispensed with and the stroke of the awl varied over the full range of the varying thickness of the work being operated upon. The stop 42 on the swing frame 44 is so arranged that it will not only act to break the toggle 20, 22 when it engages the part 31, but will also act as a stop to engage the end of the lower toggle member 22 and positively prevent the awl bar from descending farther after the toggle has been broken. Obviously, the part with which the stop 42 engages to stop the farther descent of the awl bar may be located upon one of the other members of the awl-controlling mechanism, for example, it might be placed either upon the segment 24 or upon the awl bar 38.

In the views of the awl-controlling mechanism shown in Figs. 3 to 5 inclusive, Fig. 3 represents the position the operative parts assume before the work is placed upon the horn. In this view the cam plate 56 is shown in its lowermost position, the stop 42 being in the way of the projection 31 at substantially the beginning of the stroke of the lever 18. Fig. 4 represents the parts in the position they assume when work is placed upon the horn, the cam plate 56 being raised and the stop 42 being moved around the axis of the shaft 2, ready to engage the projection 31 to break the toggle and limit the stroke in accordance with the thickness of the work. Fig. 5 shows the engagement of the stop 42 with the projection 31, and the consequent breaking of the toggle.

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

1. In a machine of the class described, the combination with an awl and means for operating said awl to cause it to penetrate the work, of means for automatically interrupting the operative connection between the awl and its operating means when said awl has penetrated the work to a predetermined extent, said interrupting means comprising means so controlled by the work that the effective awl operating movement

of the awl operating means is cut short when work of less than a predetermined thickness is operated upon.

2. In a machine of the class described, the combination with an awl and means for operating said awl to cause it to penetrate the work, of means controlled by the thickness of the work which is being operated upon for automatically interrupting the operative connection between said awl and said operating means when the awl has penetrated the work to a predetermined but variable extent dependent upon the thickness of the work.

3. In a machine of the class described, the combination with an awl and means for operating said awl to cause it to penetrate the work comprising a member having a uniform amount of operative movement, of means for automatically interrupting the operative connection between said awl and said member when the awl has penetrated the work to an extent proportioned to the thickness of the work.

4. In a machine of the class described, the combination with an awl and means for forcing said awl into the work comprising a member having an unvarying amount of operative movement, of means controlled by the thickness of the work which is being operated upon for automatically interrupting the operative connection between said awl and said member when the awl has penetrated the work to an extent proportioned to the thickness of the work.

5. In a machine of the class described, the combination with an awl and means for operating said awl to cause it to penetrate the work, of means to interrupt automatically the operative connection between said awl and said operating means constructed to prevent the further penetrative movement of the awl when the awl has penetrated the work to a predetermined extent.

6. In a machine of the class described, the combination with an awl and means for operating said awl to cause it to penetrate the work, of means controlled by the thickness of the work which is being operated upon to interrupt automatically the operative connection between said awl and said operating means to prevent the further penetrative movement of the awl when the awl has penetrated the work to a predetermined extent.

7. In a machine of the class described, the combination with an awl and an operating member, of means comprising a toggle for operatively connecting said awl and operating member, and means for automatically breaking the toggle to interrupt the said connection after a predetermined but variable amount of work penetrating movement has been imparted to said awl.

8. In a machine of the class described, the

combination with an awl and an operating member, of means comprising a toggle for operatively connecting said awl and said member, and means for automatically breaking said toggle to interrupt the connection between the awl and the operating member after a predetermined amount of penetrative movement has been imparted to said awl, said means comprising a movable part positioned by the work to permit different amounts of penetrative movement of the awl for different thicknesses of the work.

9. In a machine of the class described, the combination with an awl and an operating member, of means comprising a toggle for operatively connecting said awl and said operating member, means for yieldingly holding said toggle extended, and means located in the path of movement of said toggle for automatically breaking the toggle to interrupt the operative connection and stop the awl after a predetermined amount of operative movement has been imparted to said awl.

10. In a machine of the class described, the combination with an awl and an operating member, of means comprising a toggle for operatively connecting said awl and said operating member, and adjustable means, located in the path of movement of said toggle and controlled by the thickness of the work, to interrupt automatically the said connection and to stop the awl after a predetermined amount of operative movement has been imparted to said awl.

11. In a machine of the class described, the combination with an awl and an oscillating shaft, of two members mounted upon said shaft, one of said members being rigidly connected to said shaft and the other loosely mounted thereon and having connection with said awl, a toggle connection between said members for transmitting movement of one to the other, a third member loosely mounted upon said shaft and carrying a toggle breaking stop, and means controlled by the thickness of the work being operated upon for varying the angular position upon the shaft of said third member.

12. In a machine of the class described, the combination with an awl and an oscillating shaft, of two members mounted upon said shaft, one of said members being rigidly connected to said shaft and the other loosely mounted thereon and having connection with said awl, a toggle connection between said members, means for holding said toggle straightened whereby movement of the shaft is transmitted through the rigid member to the loose member, a third member loosely mounted upon said shaft and

carrying a toggle breaking stop, and means controlled by the thickness of the work being operated upon for varying the angular position upon the shaft of said third member.

13. In a machine of the class described, the combination with an awl and means for operating said awl to cause it to penetrate the work, of means controlled by the thickness of the work being operated upon for automatically interrupting the operative connection between said awl and said operating means when the awl has penetrated the work to a predetermined extent, said means being constructed and arranged to cause the extent of penetration of the awl to be uniform when it is operating upon portions of the work of certain predetermined, though varying, thicknesses.

14. In a machine of the class described, the combination with an awl, of means for causing said awl to penetrate the work to an extent proportional to the thickness of the work within certain limits and for causing the extent of penetration to be uniform when the thickness of the work exceeds the upper limit.

15. In a machine of the class described, the combination with an awl, of means for operating said awl and means for controlling the operation of said operating means constructed to cause said awl to penetrate the work to an extent proportional to the thickness of the work within certain limits of work thickness and for causing the extent of penetration of the awl to have a different relation to the thickness of the work outside the said limits.

16. In a machine of the class described, the combination with an awl and means for operating said awl to cause it to penetrate the work, of means for automatically interrupting the operative connection between said awl and said operating means at different points in the awl operating movement of said latter means in accordance with the degree of penetration of the awl into the work, said interrupting means comprising a part so adjusted by the work, as portions of the work of varying thickness are brought into operative position beneath the awl, that the awl is permitted to penetrate to different depths in different thicknesses.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ARTHUR BATES.

ARTHUR ERNEST JERRAM.

JOSEPH GOULDBOURN.

Witnesses:

FRANCES ELLEN RIDLER,

GRACE HOLMES.