March 3, 1942. S. L. GOOKIN 2,274,685

EYELETING MACHINE

Filed Jan. 24, 1939 3 Sheets-Sheet 1

Fig. 2.

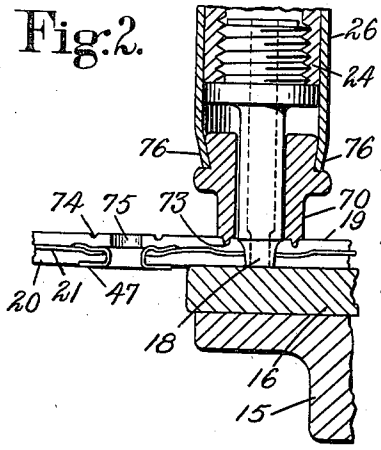


Fig. 3.

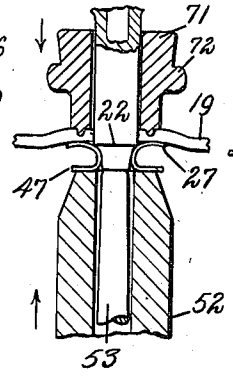


Fig. 4.

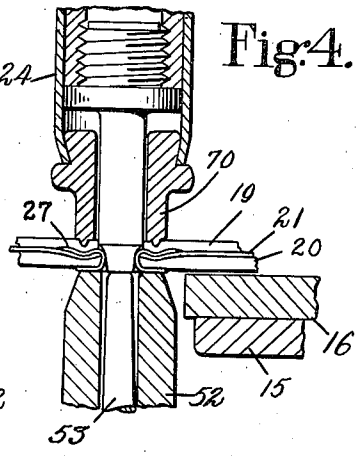
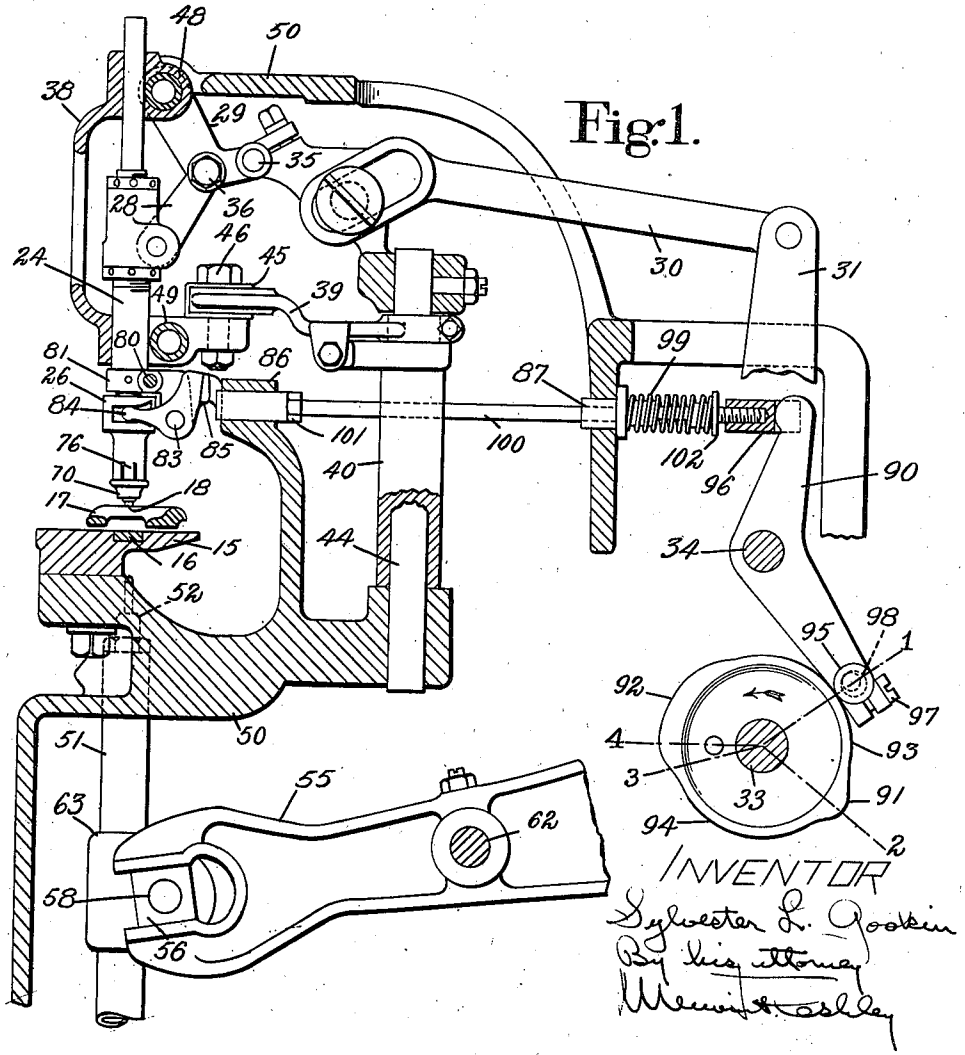


Fig. 1.



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March 3, 1942. S. L. GOOKIN 2,274,685

EYELETING MACHINE

Filed Jan. 24, 1939 3 Sheets-Sheet 2

Fig:8.

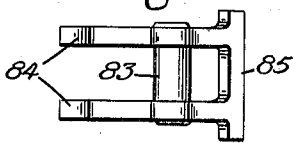
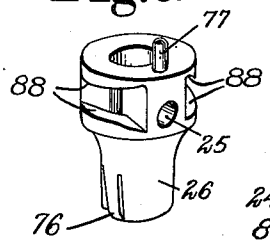


Fig:9.



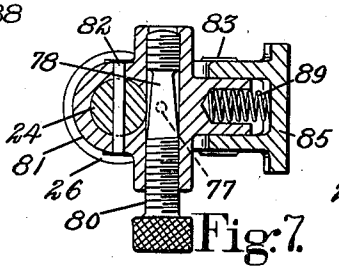


Fig:7.

Fig:6.

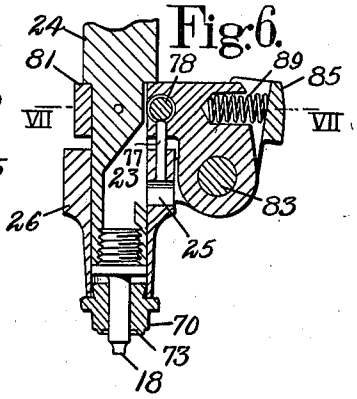


Fig:5.

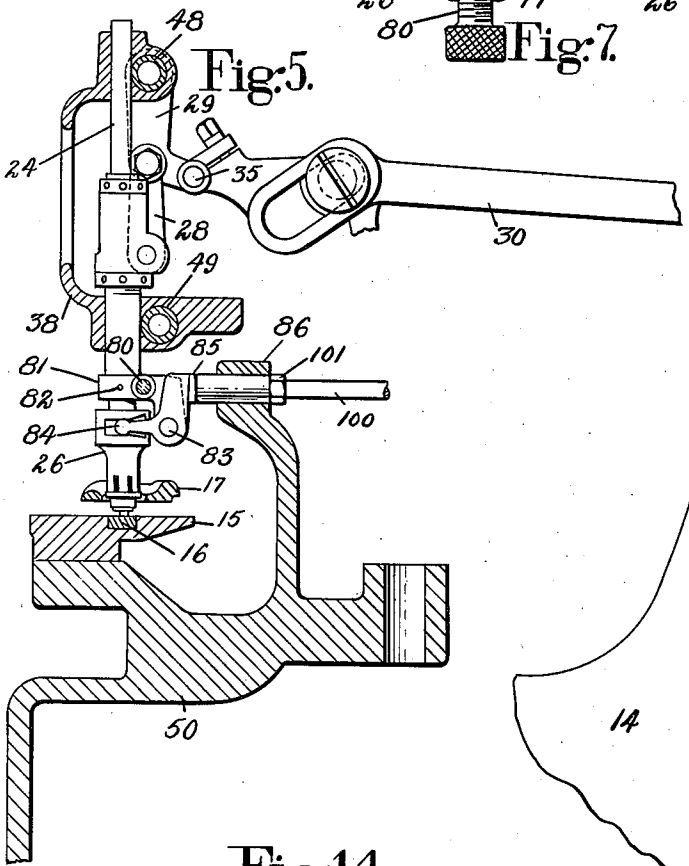


Fig:10.

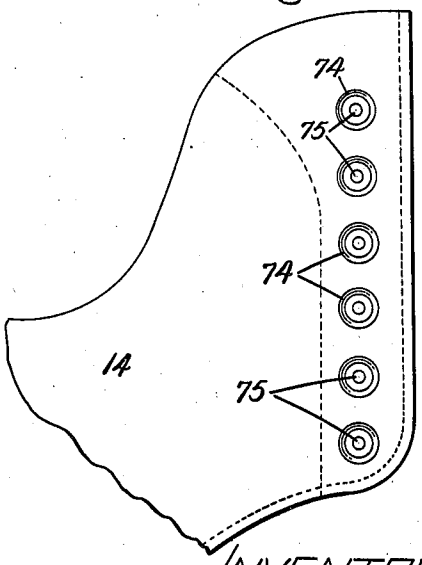
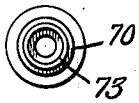


Fig:14.



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March 3, 1942. S. L. GOOKIN 2,274,685

EYELETING MACHINE

Filed Jan. 24, 1939 3 Sheets-Sheet 3

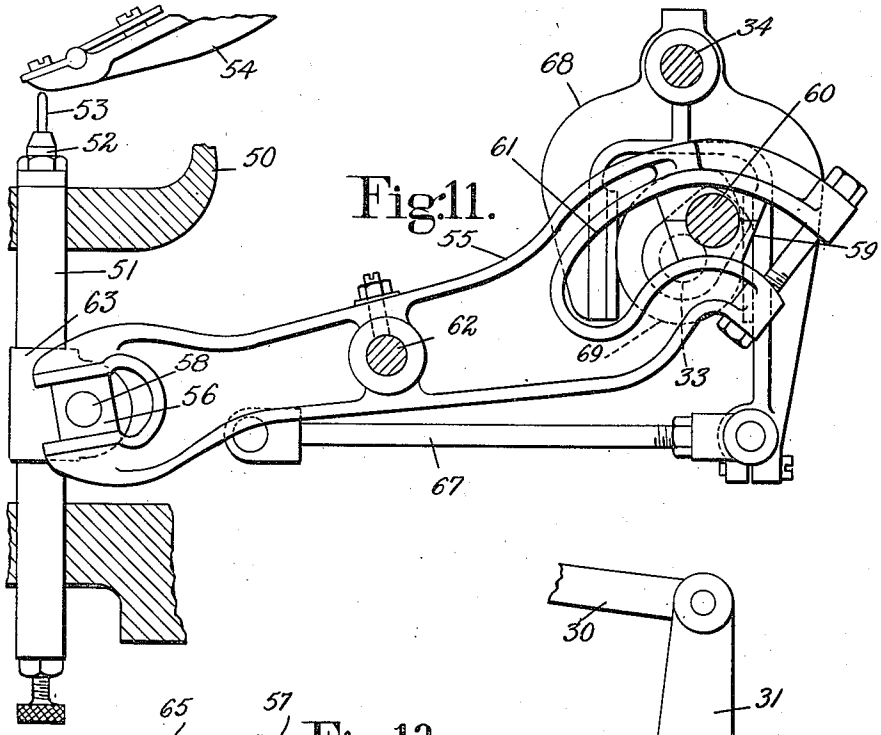


Fig:11.

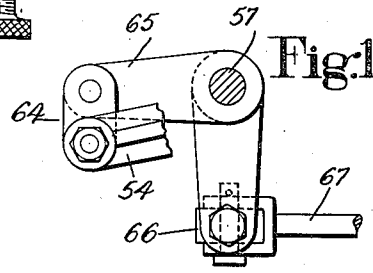


Fig:12.

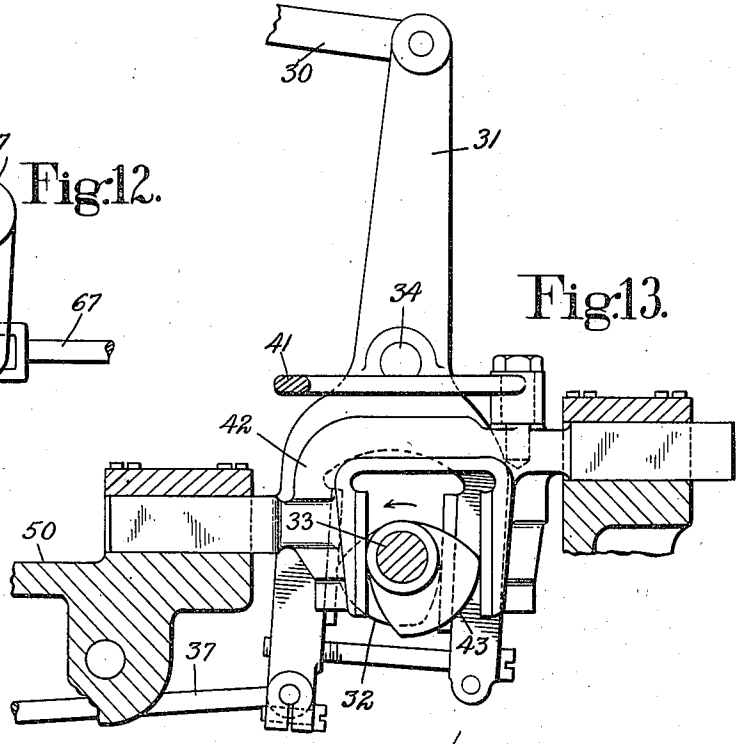


Fig:13.

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Patented Mar. 3, 1942 2,274,685

UNITED STATES PATENT OFFICE

2,274,685

EYELETING MACHINE

Sylvester L. Gookin, Quincy, Mass., assignor to United Shoe Machinery Corporation, Borough of Flemington, N. J., a corporation of New Jersey

Application January 24, 1939, Serial No. 252,599

19 Claims. (Cl. 218—14.1)

This invention relates to eyeleting machines and more especially those for inserting invisible eyelets in shoe-uppers. The invention is herein disclosed as embodied in a high-speed automatic eyeleting machine that includes means for punching holes one at a time in the work and mechanism for feeding the work step by step to space successive eyelets inserted in a series in each run of the machine.

Because of the fact that the prongs of a clenched invisible eyelet lie between two layers of the work (in a typical shoe-upper they are the outer leather and a stay-strip) and separate them, the prongs form mounds in the outer layer. These mounds are considered objectionable, and to reduce them the eyeleting operators in shoe factories have heretofore hammered them, thereby flattening the clenched and concealed prongs and embedding them in the flesh side of the outer leather.

One of the objects of the present invention is to provide an improved automatic eyeleting machine that will not only punch lacing holes and feed the work, but will also compress the work against each eyelet in process of being clenched, and thereby compress the eyelet and embed its prongs in the outer leather.

Another object is to provide improved means for making ornamental impressions in the outer surface of the outer leather.

In the illustrated machine both of these objective operations are performed by one mechanism which also performs, at an intermediate stage, the well-known function, indispensable to successful invisible eyeleting, of locating the work in the plane necessary to insure that the prongs of an eyelet in process of being inserted will enter between the outer leather and the stay-strip without fouling either of them. For this latter purpose every successful eyeleting machine equipped for invisible eyeleting includes an element usually termed an "abutment." To fulfill the object of making ornamental impressions, the abutment herein shown is a hardened steel die having a desired ornamental design in its impression surface.

The illustrated machine is so organized that the abutment cooperates first with a flat stationary punch-bed to make the desired impression in the outer leather; thereafter the abutment stands still at the position required to brace the work while the prongs of an ingoing eyelet are being spread between the outer leather and the stay-strip; and finally, the abutment is shifted toward the advancing eyelet-inserting tool with which it cooperates to compress the work and thereby flatten the prongs of the clenched eyelet.

The novel features above mentioned and others hereinafter described and claimed are illustrated in the drawings.

Referring to the drawings,

Fig. 1 is a vertical section of a portion of an eyeleting machine in which the present invention is embodied; the front of the machine being at the left;

Figs. 2, 3 and 4 are schematical sectional views representing successive stages of a cycle of operations;

Fig. 5 is a view similar to Fig. 1 except that it includes fewer elements and represents the punching stage of a cycle of operations otherwise represented in Fig. 2;

Fig. 6 is a vertical section of an assemblage including the tool for punching and feeding the work and the abutment for impressing the outer leather and compressing the clenched eyelets;

Fig. 7 is a horizontal section through the structure intersected by line VII—VII of Fig. 6;

Fig. 8 is a top plan view of a bell-crank lever (projected from Fig. 7) for imparting individual operation to the impressing and compressing member;

Fig. 9 is a perspective view of a sleeve by which the impressing and compressing member is carried;

Fig. 10 is a face view of a portion of a typical shoe-quarter that has been ornamented and provided with invisible eyelets by the illustrated machine;

Fig. 11 is a vertical section including a portion of a raceway, the eyelet-inserting tool and two trains of mechanism, one for operating the raceway and the other for operating the inserting tool;

Fig. 12 is a top plan view of parts of the raceway-operating mechanism;

Fig. 13 is a vertical section including two operating mechanisms, one for furnishing the punching motion and the other for furnishing the work-feeding motion; and

Fig. 14 is a face view of a member designed to form an ornamental annular impression in the work.

The general organization of the illustrated machine is similar to that disclosed in Letters Patent of the United States No. 1,223,768, granted June 5, 1917, on application of P. R. Glass, although some of its details of construction are of different design but do not involve any radical

difference in its mode of operation except with regard to the novel results produced by the supplemental mechanism constituting the subject-matter of the present invention. To prepare a basis for a clear understanding of the novel results with which the present invention is concerned, a description of the well known machine organization and its mode of operation will be given first.

The work, such as a quarter 14 of a shoe-upper (Fig. 10), is presented for operation by being placed upon a flat and rigid supporting bed 15 including a hardened steel punch-block 16. A presser-foot 17 is normally depressed by a spring (not shown) to clamp the work against the bed 15 but is raised by a cam once in each cycle of operations to permit the work to be fed for the purpose of spacing successive eyelets one from another. A tubular punch 18 cooperates with the punch-block 16, as shown in Figs. 2 and 5, to punch a hole through all the layers of the work-piece. A typical shoe-quarter such as that illustrated comprises three layers including the outer leather 19, a leather lining 20 and an intermediate strip 21 of woven fabric usually termed an "eyelet-stay" and provided to reinforce the anchorage of the eyelets.

For the purposes of invisible eyeleting, the punch 18 is provided with an annular setting shoulder 22, the diameter of which is restricted to little more than the diameter of the punching portion, to enable the shoulder to pass through the hole punched in the outer leather 19 and direct the prongs 27 of an ingoing eyelet between the layers 19 and 21. Referring to Fig. 6, the butt-end of the punch is provided with an external screw-thread and is screwed into a socket 23 in the lower end of a vertical punch-bar 24. The socket 23 is extended to provide a passageway through which the chips of the work may pass to be discharged through an outlet port 25 in a sleeve 26, see Fig. 9. The punch-bar 24 receives its punching motion from one of the power-operated mechanisms shown in Fig. 13 and it receives its sidewise feeding motion from the other mechanism shown in that figure.

The punching motion is furnished by a train of mechanism comprising toggle-members 28 and 29 (Fig. 1), a link 30, a lever 31 and a cam 32 (Fig. 13). The cam 32 is carried by a power-driven shaft 33 and this shaft is operated and controlled by well-known starting and stopping mechanism including a clutch (not shown) by which any desired number of revolutions for each run of the machine may be had according to the length of time the operator maintains a controlling treadle in its depressed position. A clutch of this type is disclosed in United States Letters Patent No. 2,056,316, granted October 6, 1936, on my application and treadle mechanism for controlling such a clutch is more fully described in United States Letters Patent No. 2,012,299, granted August 27, 1935, on application of M. L. Bliss. The cam-lever 31 is mounted on a fulcrum-pin 34, the forward end of the link 30 (Figs. 1 and 5) is connected to the toggle-members 29 by a pivot-pin 35, and the toggle-members 28 are connected to the toggle-members 29 by pivot-studs 36. The motions of the lever 31 are also utilized as heretofore to operate the presser-foot 17 by means of another train of connections including a link 37 and parts not herein shown.

The bearings in which the punch-bar 24 slides are formed in a horizontally movable feed-carriage 38 (Fig. 1) to which to-and-fro motions are imparted by a train of mechanism like that shown and described in the Glass patent above mentioned. Such mechanism comprises an arm 39, an oscillatory carrier 40 to which the arm is affixed, regulatable mechanism (not shown herein) for varying the amplitude of angular movement imparted to the carrier 40, a link 41 (Fig. 13), a slide 42 and a cam 43 carried by the shaft 33. The to-and-fro motions of the link 41 are communicated in well-known manner to the carrier 40 (Fig. 1) which is mounted on a stationary vertical fulcrum-pin 44. The operating connection between the arm 39 and the carriage 38 is provided by a block 45 and a pivot-stud 46 extending therethrough. Two parallel guide-rods 48 and 49 mounted in the main frame 50 of the machine support and guide the feed-carriage 38.

The eyelet-inserting mechanism comprises a vertical bar 51 (Figs. 1 and 11), an eyelet-inserting tool 52 affixed to the upper end thereof, the usual spring-pressed spindle 53 for picking an eyelet from the delivery end of a raceway 54, and a train of operating mechanism including a lever 55, a block 56 engaged thereby, a pivot-stud 58 on which the block is mounted, a crank 60 and a block 59 mounted on the crank and arranged in a slot 61 in the lever. The block 59 is made in separable sections merely for assembling purposes. The crank 60 is an integral portion of the cam-shaft 33. The lever 55 is mounted on a fulcrum-pin 62. The pivot-stud 58 is secured to a collar 63 and this collar is affixed to the eyelet-inserting bar 51. When the bar 51 is at or near the lower limit of its range of travel the spindle 53 is below the delivery end of the raceway 54 which oscillates sidewise to present an eyelet to the spindle and thereafter to clear the inserting tool 52. This tool carries the eyelet upwardly and thereby inserts it into the work and clenches it as shown in Figs. 3 and 4.

A train of mechanism for operating the raceway 54 to present the eyelets to the spindle 53 is shown in Figs. 11 and 12. It comprises a link 64, a bell-crank 65, a universal connection 66, a link 67, a lever 68 and a conjugate cam 69 carried by the shaft 33. The bell-crank lever 65 is mounted on a vertical fulcrum-pin 57, and the cam-lever 68 is mounted on the fulcrum-pin 34.

The several trains of mechanism are shown in their initial positions in Figs. 1, 11, 12 and 13, where they are arrested at the conclusion of each run of the machine. When the machine is stopped the punch-bar 24 is raised and is in register with the punch-block 16 but not in register with the eyelet-inserting tool 52; the feed-carriage 38 stands at the right-hand limit of its range of travel; the eyelet-inserting bar 51 stands at an intermediate point in its down-stroke; and the raceway 54 stands at an intermediate point in its travel toward the path of the eyelet-inserting tool 52. To place a work-piece such as a shoe-quarter 14 (Fig. 10) in the desired position on the work-supporting bed 15, the operator will operate a treadle (not shown) by which the presser-foot 17 may be temporarily raised to permit the work to be inserted under it. When the presser-foot is released it will descend to the level represented in Fig. 1 where it will clamp the work against the bed.

The first operating motion in a cycle is a down-stroke of the punch-bar 24 by which the punch 18 is depressed against the punch-block to punch a hole through all the layers of a work-piece as shown in Fig. 2. To produce this punching

stroke, the toggle-members 28 and 29 are moved to the position shown in Fig. 5 in which the knee of the toggle is on "dead center." The toggle does not stop at this position but moves beyond it to raise the punch 18 slightly from the punch-block but not far enough to withdraw the punch from the work. While the punch is passing through the work, the presser-foot 17 rises to relieve the work from clamping pressure and remains up until the toggle members 28, 29 begin their return stroke. Now, while the punch is thus slightly raised but still in the work and almost in contact with the punch-block, the feed-carriage 38 is shifted from right to left, thereby moving the punch to its upsetting position in register with the eyelet-inserting tool 52. At this position the punch stands still through a short time interval while an eyelet is inserted and almost completely clenched by upward movement of the tool 52.

When the tool 52 has risen far enough to complete the insertion of an eyelet, but before it quite reaches the limit of its upstroke, the knee of the toggle 28, 29 starts its return stroke to its initial position, incidentally passing its dead-center position. The shoulder 22 is thus moved slightly toward the tool 52 before receding therefrom. Fig. 3 corresponds to this dead-center position of the toggle, the upstroke of the tool 52 being almost but not quite completed. The remainder of its upstroke lifts the work slightly from the punch-bed 16 (Fig. 4) because no further insertion of the eyelet is possible after the flange of the eyelet strikes the work. While the inserting tool is moving upwardly from the position shown in Fig. 3 to that shown in Fig. 4, the prongs 27 of the ingoing eyelet are pressed down by a novel mechanism hereinafter described.

Since the diameter of the upsetting shoulder 22 may be only slightly larger than that of the punch 18, and since the curve that characterizes the profile of the upsetting shoulder must not be so abrupt as to crush the barrel of an eyelet lengthwise, it follows that the prongs 27 of an ingoing eyelet have a component of upward movement after their tips move beyond the upsetting shoulder. Consequently, the prongs become slightly humped or crowned and produce the aforesaid mounds in the outer leather 19 (Fig. 3) that have required hammering after the work is removed from an eyeleting machine.

All the mechanisms and operations hereinbefore described are well known, and the description will now set forth the novel subject-matter by which improved results may be obtained.

Referring to Figs. 5 and 6, the sleeve 26 carries a detachable member 70 of hardened steel that closely surrounds the shank of the punch. These members 26 and 70 constitute an individually operable unit that partakes of all the movements of the punch-bar 24, and the invention provides for utilizing them to perform three distinct functions; first, to form an ornamental impression in the outer leather 19 (Fig. 2), second, to prevent the outer leather from being pushed too far above the upsetting shoulder 22 by an ingoing eyelet, and third, to compress each clenched eyelet and thereby flatten its prongs (Fig. 4) and at the same time embed the prongs in the inner surface of the outer leather. The first of these results is obtained simultaneously with the punching operation, the second simultaneously with the inserting of an eyelet, and the third during the final stage of clenching movement of the inserting tool 52.

The work-engaging surface of the member 70 may be smooth and flat or of any desired ornamental characteristic, and a variety of these members, differing only in the form of their impressing surfaces, may be substituted one for another. To facilitate such substitution, each member 70 may be provided with a frusto-conical portion 71 and a circumferential flange or shoulder 72 to sustain operating pressure. The impression surface of the member 70 herein shown is characterized by a narrow circular bead 73 adapted to impress a circular groove 74 in the outer leather (Figs. 2 and 10). As shown, the bead 73 and the punch 18 are concentric. The lower end of the sleeve 26 is sawed to provide two diametrically opposite leaf-springs or tongues 76, the tips of which are bent inwardly as shown in Figs. 2, 4 and 9 to grip the frusto-conical portion 71 when the members are coupled and to maintain the pressure-sustaining shoulder 72 in contact with the lower end of the member 26. When the punch-bar 24 stands in its initial position, the member 70 may be readily detached from the sleeve 26 with simple telescopic movement by drawing it downwardly with the fingers, and another member 70 may be coupled to the sleeve by pressing it upwardly with the fingers, the tongues 76 having sufficient resilience to be spread apart by the conical portion 71.

The sleeve 26 has a bearing on the lower portion of the punch-bar 24 (Fig. 6) and is capable of limited individual sliding movements up and down, not only for individual operation but also for preliminary adjustments according to the thicknesses of leather used for outer layers 19 of shoe-uppers. For adjusting purposes, a pin 77 is driven tightly into the upper end of the sleeve 26 and projects a short distance above it to engage a smooth frusto-conical portion 78 of an adjusting screw 80 (Fig. 7). This screw is carried by an internally threaded bracket 81 affixed to the punch-bar 24 as by a pin 82. The pin 77 has access to the adjusting screw through a short vertical hole in the bracket 81 (Fig. 6) and this constitutes one means for preventing rotation of the sleeve 26. The bracket 81 also supports a fulcrum-pin 83 on which duplicate arms of a lever 84 are mounted. These arms are rigidly connected by a web 85 that receives impacts from a horizontal ram 100 (Figs. 1 and 5) to impart individual operation to the sleeve 26.

The arms of the lever 84 straddle the upper portion of the sleeve 26 and cooperate with shoulders 88 thereof to shift the sleeve up and down. A compression spring 89 (Figs. 6 and 7) inserted into a socket in the bracket 81 exerts its force against the web 85 of the lever and thereby maintains the pin 77 normally in contact with the under side of the adjusting screw 80. This adjusting means does not, however, prevent individual movement of the sleeve, since the pin 77 may slide freely up and down in the hole bored for its reception in the bracket 81.

The train of mechanism for imparting individual operation to the sleeve 26 is shown in Fig. 1 and comprises the aforesaid lever 84, the ram 100, a lever 90 and a cam having a short high portion 91, a longer high portion 92 and concentric low portions 93 and 94. This cam is carried by the shaft 33 and rotates in the direction indicated by an arrow. A stud 98 adjustably clamped in the lever 90 carries a cam-roll 95. The fulcrum of the lever 90 is the pin 34. The ram 100 includes two parts, the rear part 96 being bored and internally threaded and

the forward part being threaded and screwed into it. The rear part 96 is formed to straddle the lever 90 by which it is prevented from turning. The effective length of the ram may be regulated by turning the forward section thereof which is provided with a hexagonal portion 101 for that purpose. The ram has one fixed bearing 86 in the frame 50 and another in a bushing 87. A compression spring 99 normally retracts the ram from the web 85 (Fig. 8) and maintains the roll 95 in contact with its operating cam. It also prevents accidental turning of the forward section of the ram by its engagement with a collar 102 affixed to that section. The initial clearance between the ram and the web 85 provides for regulating the primary adjustment of the sleeve 26 by turning the screw 80.

Referring to Figs. 6, 7 and 8, the web portion 85 of the two-armed lever is extended both vertically and horizontally to maintain some portion thereof in register with the ram 100 under all conditions even though the ram remains on a fixed axis and the lever 84 is carried up and down by the bar 24 and shifted from side to side by the feed-carriage 38.

Referring to Fig. 1 the radial lines 1, 2, 3 and 4 intersect those portions of the cam that engage the roll 95 at successive stages of a cycle corresponding to the stages represented in Figs. 1, 2, 3 and 4 respectively. Accordingly, during the first portion of a cycle of rotation of the camshaft 33, the cam-roll 95 will remain on the concentric low portion 93 without imparting any movement to the ram 100, but during this stage the sleeve 26 and the lever 84 will be carried toward the work-supporting bed 15 by the punch-bar 24. While the punch 18 is passing through the work, the short high portion 91 of the cam will operate the ram 100 (Fig. 5) and thereby depress the sleeve 26 relatively to the punch-bar. The impressing member 70 will be thereby impressed into the outer leather 19, as shown in Fig. 2, and will thus form an ornamental impression 74 (Fig. 10) in the work while the latter is maintained in a flat condition by the rigid work-supporting bed. The ram and the member 70 will be immediately retracted to relieve the pressure on the work and the member 70 will then dwell above the shoulder 22 of the punch in the relation shown in Fig. 3. While the concentric low portion 94 of the cam is running past the cam-roll 95, the punch 18 is shifted sidewise into line with the tool 52, where it stands still while an eyelet is being inserted and almost completely clenched by upward movement of the bar 51, the member 70 being effective at this stage to prevent the work from being pushed too high by the ingoing eyelet. For the latter purpose the desired level of the member 70 with respect to the upsetting shoulder 22 may be obtained by preliminary setting of the adjusting screw 80 (Figs. 6 and 7) without affecting the lower limit of movement of that member.

The layers 20 and 21 are omitted from Fig. 3 merely to avoid obscuring the eyelet. In moving from the positions shown in Fig. 3 to those shown in Fig. 4 the eyelet-inserting tool 52 rises slightly, and the member 70 descends. At this stage the tool 52 is at its highest level, and the member 70 is at its lowest level, the cam-roll 95 (Fig. 1) is on radius 4 of its cam, and the knee of the toggle 28, 29 has moved slightly beyond dead center in its return stroke. The rise of the high part 92 of the cam is therefore utilized to impart the final downward movement to the member 70, and the clenched eyelet is thereby compressed axially, its prongs 17 are flattened and embedded in the leather 19, and the latter is also compressed and impressed, this time with cooperation of the tool 52 instead of the punch-bed. Incidentally, the layers 20 and 21 are compressed between the prongs 27 and the flange 47 of the eyelet. This second impression of the layer 19 by the member 70 is of longer duration than the first because the high portion 92 of the cam (Fig. 1) is extended through a considerable angle thereof. Moreover, the impression made in the outer leather 19 by the member 70 during the punching stage (Fig. 2) is intensified by the second operating stroke of the ram 100 at the conclusion of the eyelet-clenching stage (Fig. 4).

Referring to Fig. 1, the cam-roll 95 is mounted on an eccentric portion of the stud 98. When the clamping screw 97 is loosened to relax the cooperative clamping portions of the lever 90 the stud may be turned, and such turning will advance or postpone the strokes of the ram 100 to afford the most desirable timing of the individual movement of the member 70. Once the desired timing adjustment has been made, the length of the movements imparted to the member 70 may be regulated by changing the effective length of the ram 100 as hereinbefore explained. This latter regulation will be made to produce the desired compressive effects of the high portions 91 and 92 of the cam shown in Fig. 1, but it does not affect the initial setting of the member 70 as adjusted by the screw 80.

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

1. An eyeleting machine comprising an eyelet-inserting tool, an eyelet-setting tool having a restricted shoulder formed to enter a lacing hole and upset an invisible eyelet between two layers of work, a work-engaging abutment closely surrounding said setting tool, power-operated mechanism by which said setting tool and said abutment are moved to and from their respective setting positions and both maintained stationary for an interval of time in those positions, power-operated mechanism by which said eyelet-inserting tool is moved to insert an eyelet during said interval, and power-operated mechanism by which said abutment is moved individually toward said eyelet-inserting tool after its interval of rest to flatten the prongs of the clenched eyelet.

2. An eyeleting machine as defined in claim 1 comprising also adjustable means arranged to establish the position of said abutment during said interval, and other adjustable means by which to regulate the terminal limit of the eyelet-compressing movement of said abutment without affecting the position established by the adjustable means first mentioned.

3. An eyeleting machine as defined in claim 1 comprising also adjustable means arranged to regulate the terminal limit of the eyelet-compressing movement of said abutment, and other adjustable means arranged to regulate the position of said abutment during said interval without affecting said terminal limit.

4. An eyeleting machine comprising an organized combination including a work-supporting bed, power-operated mechanism arranged to cooperate therewith to punch holes one at a time in the work, power-operated mechanism arranged to feed the work step by step, power-

operated mechanism arranged to insert eyelets one at a time into said holes and clench the prongs of the eyelets between two layers of the work, and power-operated mechanism having an individually operable abutment arranged to stand still in one work-engaging position while each eyelet is being inserted and to compress each eyelet and the portion of the work engaged thereby after the eyelet has been clenched but before it is disengaged from said inserting mechanism.

5. An eyeleting machine comprising a tubular punch having a restricted shoulder formed and arranged to upset and clench an eyelet between two layers of a work-piece, a punch-bed, power-operated means arranged to insert an eyelet adjacent to said punch-bed, power-operated mechanism arranged to impart punching movement to said punch, power-operated mechanism arranged to impart work-feeding movement to said punch, a work-engaging abutment surrounding said punch and arranged to travel therewith in the punching movements and the work-feeding movements thereof, and power-operated mechanism arranged to impart individual work-compressing movement to said abutment while it is in register with said punch-bed.

6. An eyeleting machine comprising a tubular punch having a restricted shoulder formed and arranged to upset and clench an eyelet between two layers of a work-piece, a punch-bed, power-operated means arranged to insert an eyelet adjacent to said punch-bed, power-operated mechanism arranged to impart punching movement to said punch, power-operated mechanism arranged to impart work-feeding movement to said punch, a work-engaging abutment surrounding said punch and arranged to travel therewith in the punching movements and the work-feeding movements thereof, and power-operated mechanism arranged to impart two individual work-compressing movements to said abutment in each cycle, the first in cooperation with said punch-bed and the second in cooperation with said eyelet-inserting means.

7. An eyeleting machine comprising a work-supporting bed, a power-operated work-feeding assemblage including a punch-bar and a tubular punch carried thereby, said punch having a restricted shoulder formed and arranged to upset and clench an eyelet between two layers of a work-piece, power-operated mechanism for operating said punch-bar against said bed, power-operated mechanism arranged to insert an eyelet into the work and clench it with movement against said shoulder of the punch, a work-engaging sleeve arranged to slide on said punch-bar, means by which said sleeve is maintained in one work-engaging position while an eyelet is being inserted and clenched, and power-operated mechanism arranged to impart individual work-compressing movement to said sleeve after an ingoing eyelet has been clenched but before it is released by said eyelet-inserting mechanism.

8. An eyeleting machine comprising a punch-bed, power-operated punching mechanism including a hollow punch having a restricted shoulder formed and arranged to pass through a layer of the work to upset and clench an eyelet between two layers of the work, power-operated mechanism arranged to impart relative sidewise movement of said punch and said punch-bed to and from a cooperative relationship, power-operated mechanism arranged to cooperate with said punch to insert an eyelet into the work and clench it against said shoulder, an abutment arranged to brace the work against the thrust of an ingoing eyelet, and mechanism arranged to shift said abutment individually to compress the eyelet-engaging area of the work against said eyelet-inserting mechanism and thereby flatten the prongs of the clenched eyelet in that area.

9. An eyeleting machine comprising a work-supporting bed, power-operated punching mechanism including a punch-bar and a tubular punch carried thereby, said punch having a restricted shoulder formed and arranged to upset and clench an eyelet between two layers of a work-piece, power-operated mechanism arranged to feed the work step by step, power-operated mechanism arranged to insert eyelets successively into the work and clench them against said shoulder, a work-engaging sleeve carried by and surrounding said punch-bar to brace the work against the thrust of an ingoing eyelet, and power-operated mechanism arranged to operate said sleeve individually to compress the work with pressure against the eyelet-engaging element of said inserting mechanism at the conclusion of each eyelet-clenching operation.

10. An eyeleting machine comprising a punch-bed, power-operated punching mechanism including a punch arranged to cooperate therewith and a bar by which the punch is carried, said punch having a restricted setting shoulder formed and arranged to spread the prongs of an ingoing eyelet between two layers of a work-piece, power-operated mechanism arranged to insert eyelets successively into the work in cooperation with said setting shoulder, a work-engaging abutment surrounding said punch, a carrier for said abutment, and adjusting means by which said carrier may be adjusted to locate said abutment with respect to said shoulder, said abutment and said carrier having cooperative coupling portions formed to be coupled with telescopic movement without disturbing said adjusting means.

11. An eyeleting machine as defined in claim 10 in which said coupling portions include resilient means arranged to maintain coupled relationship of the abutment and its said carrier.

12. An eyeleting machine comprising a tubular punch having a restricted shoulder formed and arranged to upset and clench an eyelet between two layers of a work-piece, a punch-bed, power-operated means arranged to insert an eyelet adjacent to said punch-bed, power-operated mechanism arranged to impart punching movement to said punch, power-operated mechanism arranged to impart work-feeding movement to said punch, a work-engaging abutment surrounding said punch and arranged to travel therewith in the punching movements and the work-feeding movements thereof, and power-operated mechanism arranged to impart individual work-compressing movement to said abutment after the work-feeding movement of said punch in each cycle.

13. An eyeleting machine comprising a work-supporting bed, power-operated punching mechanism including a punch-bar and a tubular punch carried thereby and provided with a shoulder arranged to upset and clench an eyelet, a power-operated mechanism arranged to insert an eyelet against said shoulder, a work-compressing sleeve telescopically related to said punch-bar, a lever carried by said punch-bar and ar-

ranged to operate said sleeve, and power-operated means arranged to impart operating movements to said lever.

14. An eyeleting machine comprising a work-supporting bed, power-operated punching mechanism including a punch-bar and a tubular punch carried thereby and provided with a shoulder arranged to upset and clench an eyelet, a power-operated mechanism arranged to insert an eyelet against said shoulder, a work-compressing sleeve telescopically related to said punch-bar, a power-operated mechanism including a reciprocatory ram arranged in a fixed bearing, and means carried by said punch-bar to communicate operating movements from said ram to said sleeve.

15. An eyeleting machine comprising a work-supporting bed, power-operated punching mechanism including a punch-bar and a tubular punch carried thereby and provided with a shoulder arranged to upset and clench an eyelet, a power-operated mechanism arranged to insert an eyelet against said shoulder, a work-compressing sleeve telescopically related to said punch-bar, and mechanism including a rotary power-driven cam arranged to impart successive work-compressing movements to said sleeve in each cycle of operations, one before and one after an eyelet is inserted.

16. An eyeleting machine comprising a work-supporting bed, power-operated punching mechanism including a punch-bar and a tubular punch carried thereby and provided with a shoulder arranged to upset and clench an eyelet, a power-operated mechanism arranged to insert an eyelet against said shoulder, a work-compressing sleeve telescopically related to said punch-bar, power-operated mechanism including a reciprocatory ram arranged on a fixed axis, and a lever carried by said punch-bar to transmit operating movements from said ram to said sleeve, said lever having a surface arranged to receive impacts from an end of the ram.

17. An eyeleting machine comprising a punch-bed, power-operated mechanism arranged to insert an eyelet into a lacing hole, power-operated mechanism arranged to cooperate successively with said punch-bed and with said eyelet-inserting mechanism to punch a lacing hole in a work-piece and to clench an eyelet inserted therein, and power-operated means arranged to form an ornamental impression in the work surrounding the lacing hole.

18. An eyeleting machine comprising a punch-bed, power-operated mechanism arranged to insert an eyelet into a lacing hole, power-operated mechanism arranged to cooperate successively with said punch-bed and with said eyelet-inserting mechanism to punch a lacing hole in a work-piece and to clench an eyelet inserted therein, and means arranged to brace the work-piece against the thrust of an ingoing eyelet and thereafter to cooperate with said eyelet-inserting mechanism to form an ornamental impression in the work surrounding the lacing hole.

19. An eyeleting machine comprising a punch-bed, power-operated mechanism arranged to insert an eyelet into a lacing hole, a punch having a restricted upsetting shoulder formed and arranged to pass through one layer of a punched work-piece and spread the prongs of an eyelet between two layers thereof, power-driven mechanism by which said punch is caused to cooperate successively with said punch-bed and said eyelet-inserting mechanism first to punch a lacing-hole in a work-piece and thereafter to upset an ingoing eyelet, an abutment arranged to brace the eyelet-engaging area of said layer against the thrust of an ingoing eyelet until the prongs of the latter have been spread, and power-operated mechanism arranged to move said abutment thereafter from its bracing position toward the punching end of said punch to flatten the prongs of the eyelet with pressure against said eyelet-inserting mechanism.

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