Sept. 2, 1958 R. V. McGAHAN 2,849,734

NARROW EDGE FOLDING MACHINES

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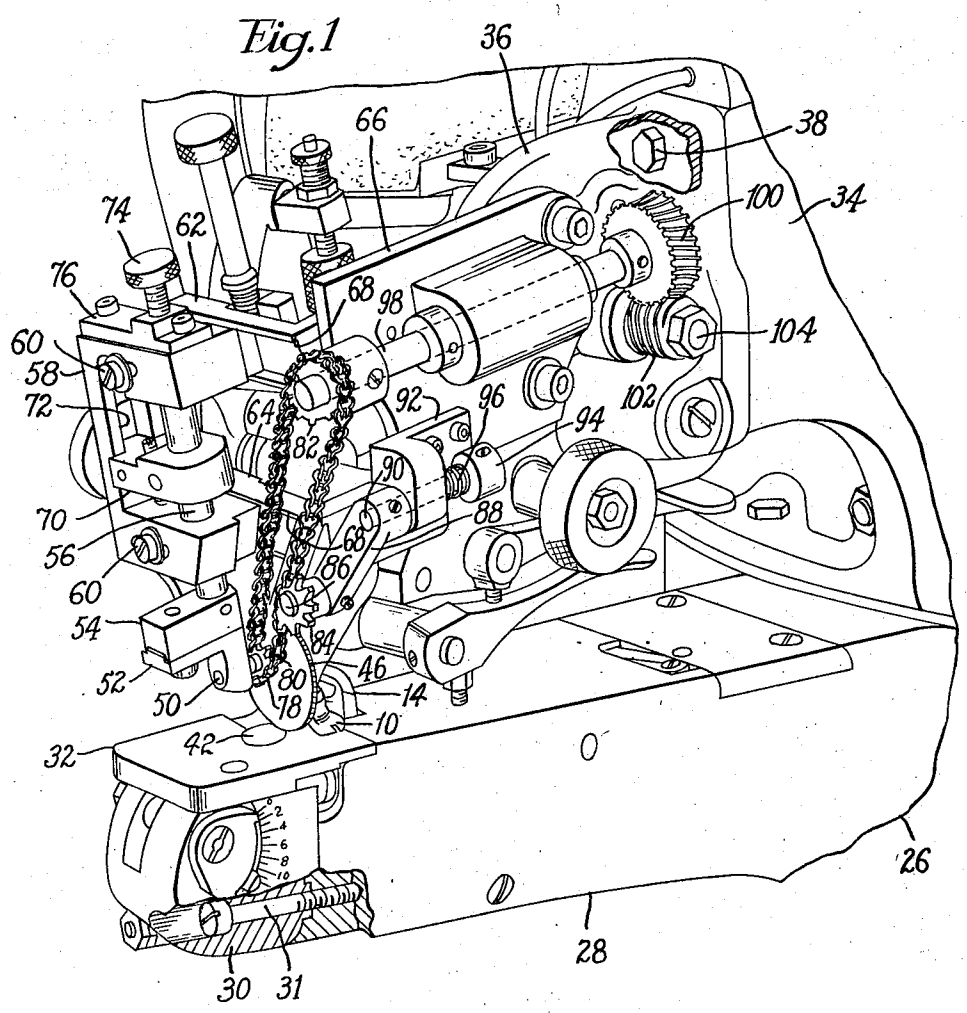
Fig. 1



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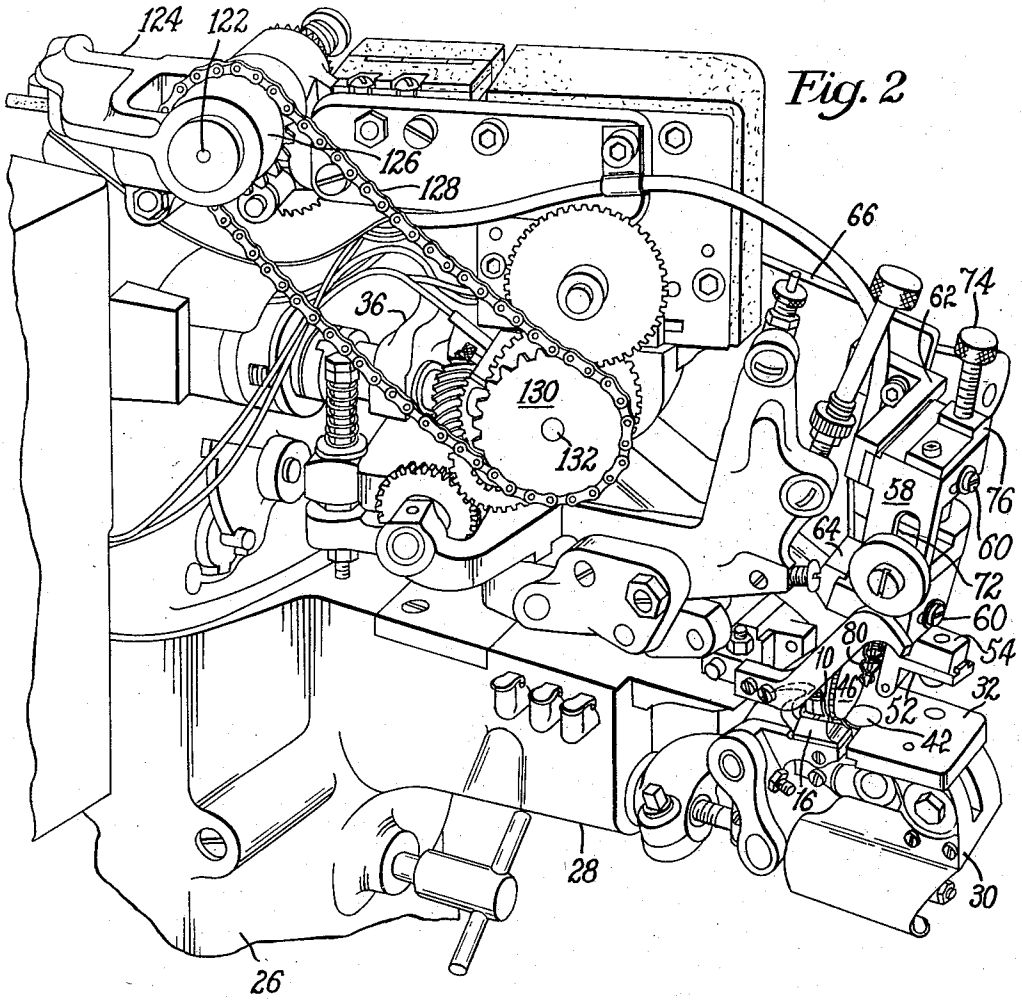

Fig. 2

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NARROW EDGE FOLDING MACHINES

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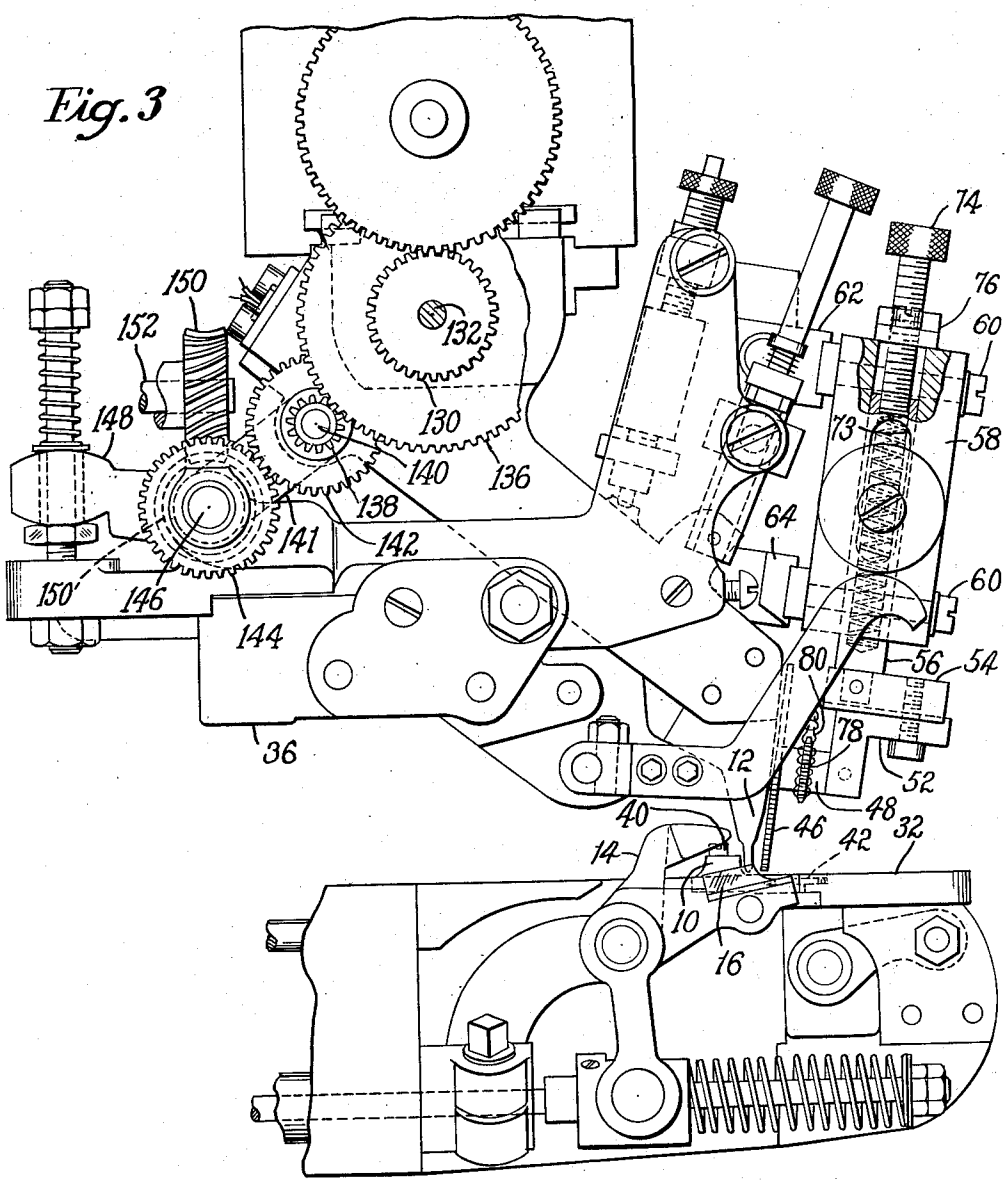
Fig. 3



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NARROW EDGE FOLDING MACHINES

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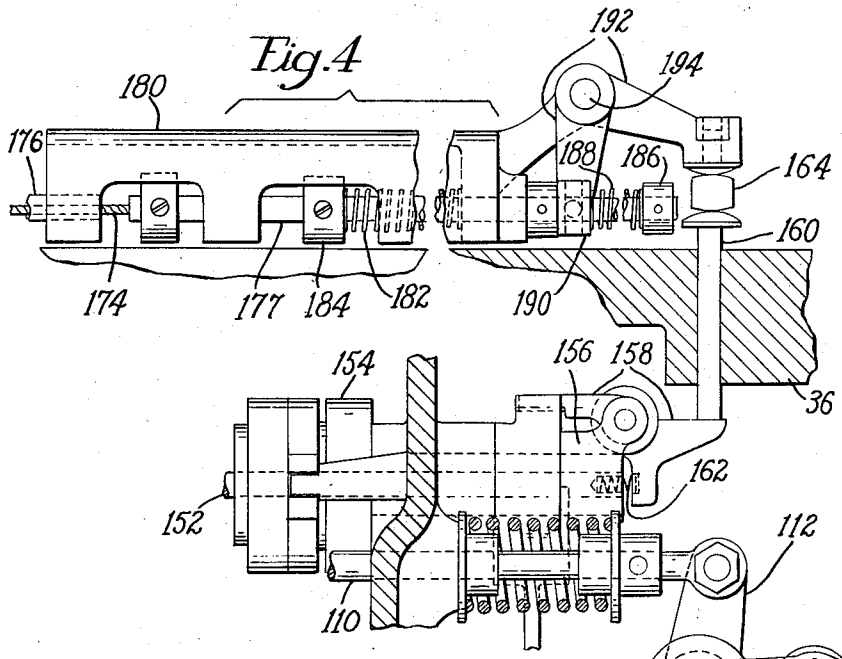
Fig. 4



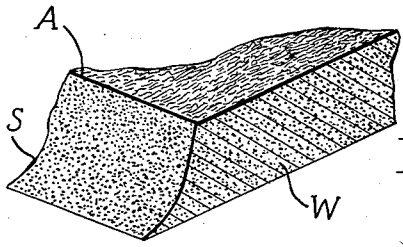


Fig. 5

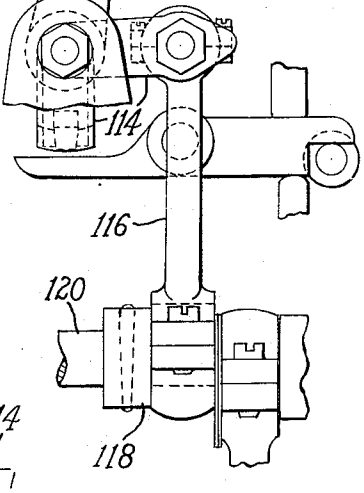


Fig. 6

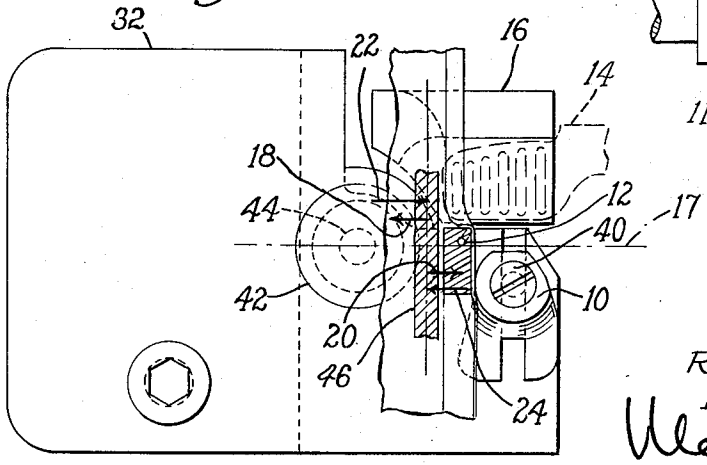


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Fig. 9

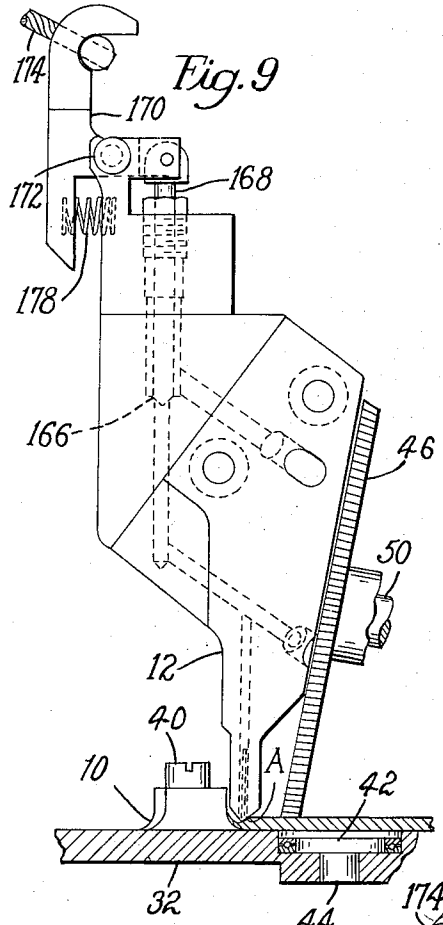


Fig. 7.

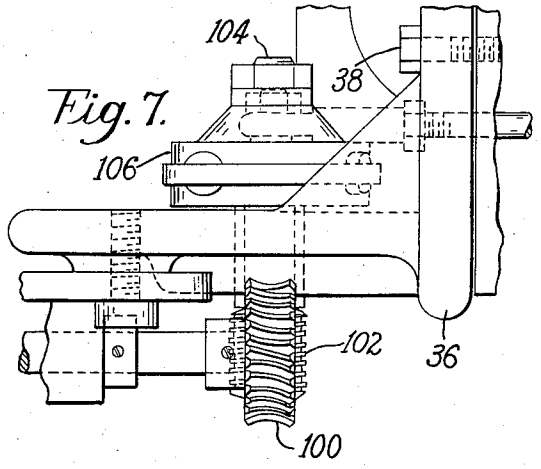
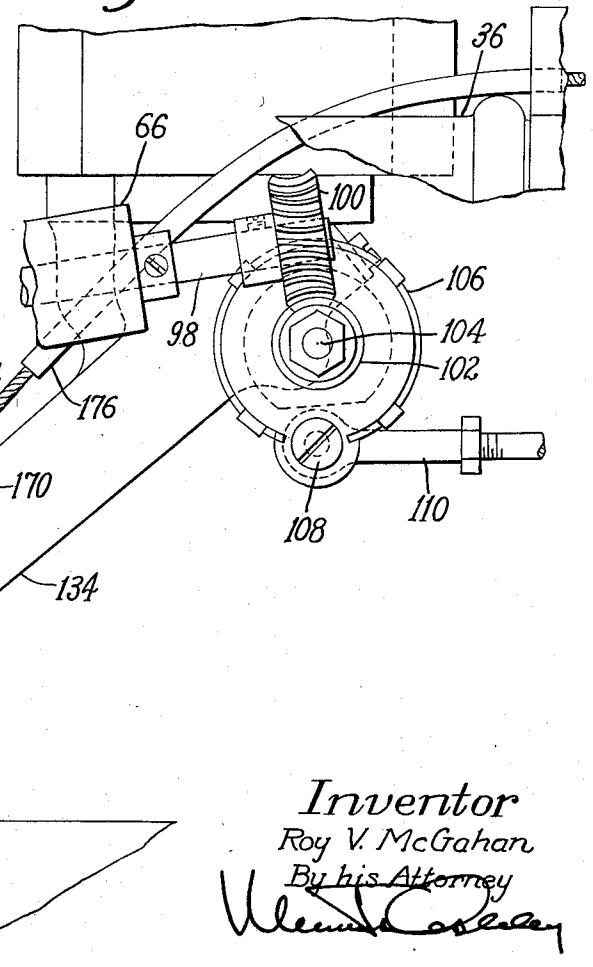


Fig. 8



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United States Patent Office

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NARROW EDGE FOLDING MACHINES

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Application July 22, 1957, Serial No. 673,417

8 Claims. (Cl. 12—55)

This invention relates to improvements in machines for folding the skived margins of leather work pieces to form a so-called "narrow edge" fold. An example of a machine for accomplishing a narrow edge folding operation is disclosed in United States Letters Patent No. 2,526,691, granted October 24, 1950, upon application of Milton H. Roske.

To prepare a work piece for the machine of the prior patent, above noted, the skived margin is formed with an abrupt shoulder and with a relatively narrow reduced margin beyond the shoulder, the width of which margin is commensurate with the work thickness, rather than being several times as wide as the thickness of the work. A machine for skiving a work piece in this way is disclosed in United States Letters Patent No. 2,651,933, granted September 15, 1953 in the name of Milton H. Roske.

In folding a work piece, the edge of which is skived with a margin of regular width, a work-engaging hammer and anvil are actuated together as a unit to clamp the work piece, and while clamping it to move it a step at a time, after which step movement the hammer releases the work piece from the anvil and the two are shifted back to their original starting positions. Gripping and releasing the work piece are repeated, causing it to be moved in a step-by-step manner.

Because of the narrowness of the edge operated upon by a narrow edge folding machine of the type disclosed in Patent No. 2,526,691, it has been found necessary to control the movement of the work piece more accurately than with regular width edge folding. Thus, in the narrow edge folding machine of Patent No. 2,526,691 a feed wheel has been provided acting upon the upper surface of the work piece along the edge opposite the hammer and at a position inside the abrupt shoulder rather than on the reduced margin. This work feeding wheel is rotated continuously and clamps the work piece firmly against a radial surface of a friction reducing disk or roll mounted for rotation on a vertical axis. While the operation of the folding machine disclosed in the patent is successful, it has been found that under some conditions irregular results may be obtained unless expert adjustments of clamping pressure are made and careful direction of the work piece is exercised in presenting it to the machine.

The objects of the present invention are to improve the construction and mode of operation of the machine disclosed in Patent No. 2,526,691, above identified, and to provide a narrow edge folding machine, in which a uniform precise movement of a work piece through the machine may easily be obtained without the necessity of accurate control or expert adjustments for the machine.

In an important feature of the invention by which those objects relating to accuracy and ease in controlling the work piece through the machine are attained, the feed wheel rotation supplements the feeding movement of the work piece imparted to it by the hammer and anvil intermittently only, rather than imparting a continuous

feeding movement to it as in the prior patented narrow edge machine and, preferably, simultaneously with the feeding movements of the hammer and anvil. With intermittent rotation of the feed wheel it has been found that there is less possibility of displacement of the edge of the work piece from proper engagement by the hammer and anvil than when rotation is imparted to the feed wheel while the hammer and anvil are back feeding.

In the narrow edge folding machine of Patent No. 2,526,691 the skived margin has a solvent type adhesive spread upon it before engaging the folding devices. After being coated with adhesive the solvent is driven off by contact with a heated iron which also assists in spreading the adhesive thoroughly over the surface of the skived margin. In the machine of the present invention a supply in the form of a rod-like strip of thermoplastic adhesive is melted and extruded under pressure from a nozzle formed in one of the folding devices, in a manner similar to that disclosed in United States Letters Patent No. 2,765,768, granted October 9, 1956, upon application of Hans C. Paulsen. The machine of the Paulsen patent is intended for operation upon work pieces having regular width skived margins and utilizes larger quantities of thermoplastic adhesive than the present machine which operates upon relatively narrow margins. Because the present adhesive is of the thermoplastic type its smaller quantity after being extruded from the nozzle hardens much more quickly upon contact with the work piece, and, accordingly, a difficulty is encountered in spreading the adhesive and causing it to enter into a firm gripping relationship with the narrow edge skived margin. The use of an intermittent feed is particularly desirable with narrow edge folding where extremely small quantities of thermoplastic adhesive are employed, since the work piece to which it is applied remains stationary between feeding movements, so that the adhesive has a better opportunity to penetrate between and form a firm bond with the fibers of the skived surface of the work piece margin before being spread in a thin layer.

A further object of the invention is to provide a machine capable of performing narrow edge folding with reliability, in which portions of the frame are readily replaceable with other frame members for supporting a complete set of folding devices, including an adhesive supply capable of operating effectively on regular or narrow width skived margins, while at the same time retaining features of adjustability common to present day folding machines. The features of the invention, relating to replaceable frame portions to render the machine capable of operation on both narrow and regular width skived margins, reside in a machine frame comprising a base formed with a laterally extending arm on which is secured a quickly removable end having a work supporting plate, a cap on the base having a neck overhanging the arm, a quickly removable head attached to the neck, folding and feeding devices on the removable end including a plow, a hammer movable toward and from the work to press the margin turned up by the plow against the shoulder on the work piece and an anvil arranged to sustain the work piece against the action of the hammer, and means in the arm for mounting and actuating the hammer and anvil as a unit to feed the work, in which machine supplemental feeding and adhesive applying devices are mounted in the head, including an intermittently rotating wheel acting on the work piece between the plow and the hammer to direct the entry of the work piece along the plow by engagement with the nozzle. Because of a common mounting for the supplemental feed wheel and adhesive extruding nozzle in the removable head, the relationship of the wheel and nozzle is maintained even after removal from the machine, so that

the regular width folding and adhesive applying devices not requiring a supplemental feed wheel may be substituted for the narrow edge folding device and vice versa with a minimum of essential adjustment after assembly. As illustrated, the rotatable disk against which the feed wheel presses the work piece is mounted on the work-supporting plate, which also is quickly removable from the laterally extending arm of the base.

These and other features of the invention as hereinafter described and claimed will be apparent from the following detailed description, taken in connection with the accompanying drawings, in which:

Fig. 1 is a fragmentary perspective view, looking partly from the front and partly from the left, of a removable head portion for a thermoplastic cementing and narrow-edge folding machine, embodying the features of the present invention;

Fig. 2 is a similar view of the same portion of the machine shown in Fig. 1, looking partly from the rear;

Fig. 3 is a detail view on an enlarged scale in rear projection of the machine, illustrating more particularly the relationship between certain operating parts in the machine head and work-supporting arm;

Fig. 4 is a front sectional detail view on a further enlarged scale of driving connections for certain of the work-feeding parts in the machine;

Fig. 5 is a view on an enlarged scale of a portion of a work piece skived in preparation for use with the present machine;

Fig. 6 is a plan view of a supplemental work feed wheel and associated work-engaging parts of the machine;

Fig. 7 is a plan view of a portion of the driving connections for the feed wheel;

Fig. 8 is a detail view partly broken away and in front elevation, including the driving connections for the feed wheel and the cementing nozzle with associated parts; and

Fig. 9 is an enlarged sectional detail view in left side elevation, showing the nozzle and supplemental work feed wheel in relation to the other work engaging parts.

The machine illustrated in the drawings is in general similar to that disclosed in United States Letters Patent No. 2,270,891, granted January 27, 1942, upon application of Carl A. Newhall. The machine of the Newhall patent is arranged for forming folded edges on leather work pieces prepared by skiving the margins with a gradual taper from the thickest to the thinnest sections along a width several times the thickness of the work pieces. The present machine differs from that of the Newhall patent in that it is intended to operate upon work pieces formed along their margins with abrupt shoulders and narrow skived areas beyond the shoulders, the width of which is commensurate with the thickness of the work pieces rather than several times their thickness as in regular width edge folding. The advantages of such narrow edge folding are more or less obvious and briefly include conservation is use of material from which the work pieces are cut and increase in strength of material close to the folded edges of the work pieces.

Referring more particularly to Fig. 5 of the drawings, the work piece W is shown formed with an abrupt shoulder A and a narrow skived scarf S, which as the margin is fed through the machine of the invention is turned upwardly and cemented against the shoulder A. The completely folded edge corresponds very closely with that produced by an edge finishing machine wherein the edge is shrunk and curled by the momentary application of a highly heated iron. The advantage of the narrow edge folding by the machine of the present invention is that it avoids the use of a heated iron which tends to weaken the edge and to discolor it particularly when light-colored materials are operated upon.

To turn up the scarf S on the work piece W and cement it to the shoulder A, the illustrated machine is provided with folding and cementing devices, generally similar to

those of the Roske patent above referred to. Instead of applying a solvent cement to the scarf S, however, it has been found possible to utilize a thermoplastic adhesive capable of being fed into the machine in the form of rods or strips in a manner more fully described in Patent No. 2,765,768, referred to above.

By applying a thermoplastic adhesive instead of a solvent cement certain benefits have been obtained, while in other respects it has been found necessary to overcome newly presented obstacles. For instance, in the narrow edge folding machine of the Roske patent it has been found necessary to employ a heated iron to drive the solvent out of the adhesive quickly before the skived edge is cemented against the shoulder and also to assist in curling and the machine of the patent to Roske No. 2,526,691 is provided with a constantly rotating feed wheel for gripping the work piece inside the shoulder A against an antifriction supporting disk or roll. The supporting disk is mounted to rotate on a vertical axis and the work feed wheel is arranged to press the undersurface of the work piece against a radial surface on the disk. In the machine of the Roske Patent No. 2,526,691 the work feed wheel is rotatably mounted upon a substantially horizontal axis in a common vertical plane with the axis of rotation of a similar work supporting disk, the plane of whose axes intersects the margin of the work piece at a point where it is gripped by the hammer and anvil. The location of the feed wheel and supporting disk axes in the manner of the Roske No. 2,526,691 patent establishes a definite turning point about which the work piece swings as it is being guided about abruptly curving edges of the work piece. Due to the length of the margin of the work piece engaged by the folding devices and to the tendency for the supporting disk to twist the work piece in the machine of the Roske Patent No. 2,526,691 a turning force is imparted to the work piece abruptly at a point in line with the hammer and anvil, the tendency being to swing the work piece away from the adhesive applying nozzle. At the same time the scarf may be swung strongly against the post **10** of the patented machine and the uniformity with which the scarf is turned up by the post may accordingly be adversely affected unless the feeding wheel is expertly adjusted and the work piece is dexterously guided. The use of thermoplastic adhesive in the illustrated narrow edge folding machine is not only effective in shrinking the edge after the manner employed in the regular edge finishing machine, with consequent deterioration in strength and discoloration of the material. With the use of a supply of thermoplastic adhesive these difficulties are avoided and instead of applying adhesive substantially in advance of the point of operation of the edge folding devices, it may be applied directly at the point of operation of the folding devices. Also, because the highly heated iron is eliminated in the present machine the length of the margin on the work piece engaged by the folding devices is reduced, so that curvatures along the work piece edges of smaller radius may be operated upon more easily than with the prior Roske narrow edge folding machine.

The present folding and cementing devices include a post **10** having an upturned plow surface for deflecting the scarf S of the work piece upwardly toward the shoulder edge, and an adhesive applying nozzle **12** disposed in such close proximity to the post **10** that the scarf S may enter between them a short distance, as best shown in Fig. 9, but the entry of the scarf between them is limited by the engagement of the shoulder A with the end of the nozzle. Other folding devices include a hammer **14** and an anvil **16** operating in the same manner, as in the prior patents to compress the upturned scarf S on the work piece against the shoulder A between them, to grip the edge of the work piece and to move in unison in a direction away from the post **10** to feed the work. Thereafter the hammer is raised from the

anvil and the parts are fed back to their initial positions by mechanism described in the Newhall patent.

To assist in feeding the work piece and to avoid its displacement while the hammer and anvil are being back fed eliminating the use of a highly heated iron with its undesirable results, but the thermoplastic adhesive is extruded through the nozzle **12**, which may be disposed in such close proximity to the post **10**, that there is substantially less tendency for movement of the work piece away from the nozzle and against the post than in the patented machine.

In the machine of the present invention the positions of the work feed wheel and the supporting disk axes are changed to bring their plane, indicated by the dot-dash line **17** of Fig. 6, into intersection with the margin of the work piece between its point of engagement by the post and nozzle on the one hand, and its point of engagement by the hammer and anvil on the other hand at their nearest approach to the plow. The effect of these changes in positions of the feed wheel and supporting disk axes is to form a different turning point for the work piece whereby a greater uniformity of folding action is obtained, the force tending to twist the work piece relatively to the folding devices being offset more effectively than heretofore. Also, by reason of the simultaneous movement of the feed wheel and the hammer and anvil the twisting action of the supporting disk **42** on the undersurface of the work piece is positively prevented by gripping the work piece between the hammer and anvil whenever the work piece moves. If the twisting forces applied to the work piece by the disk **42** are resolved into a couple, indicated at **18** and **20** in Fig. 6, it is apparent that the force **20** tends to crowd the work piece toward the post **10**, and that the force **18** tends to retract the edge of the work piece from the grip of the hammer **14** and the anvil **16**.

As has been stated, since the work feed wheel of the present invention is rotated intermittently only, and its feeding movements occur simultaneously with those of the hammer and anvil, no motion is imparted to the work piece at any other time. Accordingly, whenever the coupled forces **18** and **20** are impressed on the work piece they are resisted by opposing coupled forces **22** and **24** applied to the work piece by the grip of the hammer and anvil on the one hand and the engagement of the shoulder A (Fig. 9) between the post **10** and the nozzle **12**. In this way a uniform guiding action is impressed on the work piece and, except for abrupt angle turns, it has been found that the work piece is carried through the present machine with the exercise of little, if any, attention or directing effort by the operator.

The frame of the machine is substantially the same as that disclosed in the Newhall and Paulsen patents above referred to, and comprises a hollow base, a portion of which is shown at **26** (see Figs. 1 and 2) and a laterally extending arm **28** on the base. On the arm **28** is a removable end **30** attached by a screw **31**. On the removable end is secured a work-supported plate **32**. Secured to the upper portion of the base **26** is a cap **34** (see Fig. 1) having a neck which overhangs the arm **28** and terminates in a removable head **36** attached by a screw **38**.

All of the folding and cementing devices which require replacement when a change is made for different widths of folding margin are mounted in the removable head **36** and the end **30**. By reason of their mountings in removable frame parts the narrow edge folding devices of the present invention may be interchangeably substituted for those of the regular width edge folding devices of the patented machines without modifying or machining any of the parts or the connections for operating the devices. Thus, a substitution may be made in field locations where heavy machine tools are not conveniently available.

On the upper surface of the plate **32** is mounted the post **10** shaped to initiate formation of the desired narrow edge fold. The post is secured to the supporting plate **32** by a screw **40**. The plate **32** also has a circular recess into which is inserted the antifriction work supporting disk, indicated at **42**, having an integral vertical stud **44** (see Fig. 9) rotatable in a bearing portion of the plate.

The hammer **14** and the anvil **16** and the machanisms for actuating them in the present machine are of the same construction and mode of operation as disclosed in Patents Nos. 2,270,891 and 2,765,768.

Mounted on the head **36** above the disk **42** is the work feed wheel, indicated at **46**, of suitable diameter to enable the operator's fingers to guide the work piece close to the wheel without danger of injury. For this purpose the diameter of the wheel is made approximately 1¾" providing a clearance of at least three-quarters of an inch beneath a central hub **48** projecting forwardly from the wheel. The hub **48** serves as a bearing for the wheel surrounding a fixed mounting stud **50** passing into a right angle bracket **52** secured adjustably for forward and rearward movements on a block **54**, attached to the lower end of a substantially vertical bar **56**. The bar **56** is mounted for vertical movement in the arms of a U-shaped bracket **58**, also having slots in its arms through which pass clamp screws **60** into threaded engagement with angle plates **62** and **64** secured to a bearing plate **66** on the head of the machine. In the forward arms of the angle plates **62** and **64** is a pair of horizontal guideways **68** (Fig. 1) into which fit protruding portions of the U-shaped bracket **58**. By means of the protruding portions of the bracket and the guideways **68** in the angle plates the entire mounting for the feed wheel **46** may be shifted horizontally in the direction of work feed when the screws **60** are loosened. To prevent rotation of the bar **56** in the U-shaped bracket **58** the bar has secured to it a block **70** having a tongue entering a slot **72** in the bracket. To press the feed wheel **46** downwardly against the work the bar **56** has a central bore in which is a compression spring **73** (Fig. 3) engaged at its upper end by a thumb screw **74** passing through a threaded opening in a block **76** fixed to the upper surface of the U-shaped bracket. By rotating the thumb screw **74** the pressure of the feed wheel on the work may be increased or decreased.

For actuating the work feed wheel **46** intermittently with the hammer **14** and the anvil **16** while the hammer and the anvil are gripping and feeding the work piece the hub **48** of the feed wheel has mounted upon it a sprocket **78** engaged by a chain **80** running upwardly over a driving sprocket **82**. Between the sprockets **78** and **82** the chain is engaged by a chain tightener sprocket **84** rotatable on a pin **86** fixed to the lower end of an arm **88**. The arm **88** is secured to the forward end of a stud **90** rotatably mounted in a bearing block **92** fixed to the plate **66**. At the rearward end of the stud **90** is a collar **94** to which one end of a torsion spring **96** is made fast, the other end of the spring being secured to the bearing block **92** in such relation that a continual yielding force is applied to the tightener sprocket **84**.

The driving sprocket **82** for the work feed wheel is fixed to the forward end of a shaft **98** rotatable in a boss on the bearing plate **66** and provided at its rearward end with a worm wheel **100** meshing with a worm **102**. The worm **102** is secured to a right angle shaft **104** passing through a bearing in the head **36** and carrying at its opposite end a pawl clutch **106** (see Fig. 7) similar to that disclosed in United States Letters Patent No. 2,276,913, granted March 17, 1942 upon application of Fred Ashworth. Pivotally connected at **108** to the main body of the pawl clutch in eccentric relation to the worm shaft **104** is the forward end of a horizontal rod **110**, the rearward end of which is pivotally connected to an oscillating arm **112** (Fig. 4) forming a part of the mechanism in the machine of the prior patents

for actuating a snipping knife. In the prior machine this arm is actuated only at selected intervals whenever found necessary by the operator, a latch being provided to connect the arm with an actuating lever, corresponding to a lever illustrated at **114**. To drive the lever **114** one arm is pivotally connected to a pitman **116** engaging an eccentric **118** on a main horizontal drive shaft **120**. In the illustrated machine the latch for connecting the arm **112** with the lever **114** is prevented from being disabled, the arm **112** and lever **114** being permanently connected together, so that the feed wheel **46** will be rotated whenever the machine is operated. Also, because the timing requirements for the snipping knife are different from those of the illustrated work feed wheel, it has been necessary to change the relationship of the eccentric **118** and the shaft **120** by 180°. Otherwise the mechanism for rotating the work feed wheel intermittently is the same as that for operating the snipping knife in the prior patented machine.

By changing the relationship of the eccentric **118** on the drive shaft **120** by 180° the time of each rotation of the feed wheel is brought into proper relationship with the feeding movements of the hammer and anvil while gripping the work. Accordingly, there will be no tendency to displace the work by reason of torsional force applied by the rotary movement of the work supporting disk **42** from a position of alinement with the direction of feed, the hammer and anvil holding the work against displacement by applying the force **22** on the work, which resists the force **18** of the roll.

To feed the supply of thermoplastic adhesive in rod form into the machine mechanisms are provided for engaging the rod to advance it intermittently in a manner similar to that disclosed in the Paulsen patent. These mechanisms comprise, briefly, a pair of adhesive rod feed rolls (not shown), one of which is mounted upon a horizontal shaft **122** rotatable in a bracket **124** supported by the removable head **36**. The shaft **122** carries a sprocket **126** connected through a chain **128** to a sprocket **130** secured to a shaft **132** of an adhesive pump. As the shaft **122** is rotated a solid rod of adhesive is fed into the melting apparatus from which it is drawn into the pump by rotation of the shaft **132** and extruded by the applying nozzle **12** removably supported on an inclined nozzle carrier **134** (see Fig. 8). The nozzle carrier **134**, in turn, is supported on the head **36** in a manner more fully described in the Paulsen patent, the carrier being formed with suitable passageways to conduct the melted adhesive from the pump to the nozzle.

To drive the shaft **132** it carries a pinion **136** (see Fig. 3) meshing with a spur **138** secured to a stud **140** rotatable in an arm **141** of the head frame. The stud **140** also has secured to it a pinion **142** meshing with a similar pinion **144** secured to a shaft **146** rotatably mounted in the arms of a yoke **148**. The shaft **146** is driven through a pair of meshing skew gears **150**, the lower one of which is secured to the shaft **146** and the upper one of which is secured to a shaft **152** (see also Fig. 4) through a roll clutch **154**.

To prevent operation of the adhesive feeding pump mechanism the roll clutch **154** is actuated by an intermittent drive comprising a notched lever **156** oscillating loosely at the end of the shaft **152**, the notch of which lever is arranged to be engaged by a latch in the form of a lever **158** having a horizontal arm controlled by a vertical rod **160** slidingly mounted in the head frame **36**. The rod **160** is pressed yieldingly upwardly by a spring **162** compressed between the end of the shaft **152** and a downwardly extending arm of the lever **158** and the upper end of the rod engages a control lever **164**.

The control lever **164** is actuated by a solenoid (not shown) whenever required by the operator of the machine. When the end of the lever **164**, illustrated in Fig. 4, is raised the adhesive supply rod is fed into the machine and the pump is driven to extrude the adhesive from the nozzle **12**.

To provide a further control of the extrusion of adhesive through the nozzle **12**, the upper portion of the nozzle, best shown in Figs. 8 and 9, is provided with a valve having a seat **166** engaged by a valve pin **168**, pivotally connected to one arm of a three-armed lever **170**. The lever **170** is fulcrumed on a pin **172** passing through a pair of upstanding fingers and the nozzle, between which fingers the lever is located. The upper end of the lever **170** is hooked to receive an enlargement at the end of a cable **174** running through a sheath **176** (Fig. 8) to a slide bar **177** (see Fig. 4). The cable **174** is clamped within a recess at one end of the slide bar and is pressed in a direction to cause the valve pin **168** to engage the seat **166** of the valve under the force of the spring **178**. The slide bar **177** is loosely supported for horizontal movement in lugs extending downwardly from a bracket **180** secured to the head frame **36**. Also surrounding the slide bar **177** is a compression spring **182** acting at one end against the bracket **180** and at the other end against a collar **184** clamped to the slide bar, the spring **182** moving the slide bar in a direction to close the adhesive valve in the nozzle.

To open the adhesive valve in the nozzle the slide bar **177** has at its end opposite the cable **174** a collar **186** against which a spring **188** is pressed, the other end of the spring bearing against a spool **190** loose on the slide bar and engaged between its flanges by a pin carried by a downwardly extending end of a lever **192**. The lever **192** is rotatable on a pivot **194** carried by an arm of the bracket **180** and a laterally projecting arm of the lever **192** engages the upper surface of the control lever **164**. The arrangement is such that in starting the machine in operation the control lever is raised and the valve **166**, **168** is opened. When the machine is stopped the valve is closed and since this occurs at the same time that the adhesive supply feed and pump mechanisms are actuated the flow of adhesive is under instantaneous control by the operator at all times.

It has been found that in narrow edge folding the quantity of adhesive is a small fraction of that required for regular width edge folding. Consequently, the gear ratios of the chain and pinion drives for the adhesive supply feed and pump mechanisms must be reduced correspondingly from that common to regular width edge folding. Because of the small quantity of adhesive employed, a difficulty arises from cooling and congealing of the adhesive before it has had an opportunity to become spread adequately and forced into firm gripping relationship with the fibers at the surface of leather or other materials operated upon. For this reason, the present arrangement of the nozzle opposite to the post **10** is in as close a location as possible to the hammer and anvil along the line of feed. Such location is conducive to more effective results than can be obtained with the arrangement of the prior machines, in which the adhesive nozzle is separated by a portion of the width of a folding finger or lip turner from the hammer and anvil, as in the Paulsen patent. In this respect it will be noted that besides the omission of the folding finger, no gripping member is employed in the present machine and no heat of fiber weakening intensity is required as in the folding machine of the Roske Patent No. 2,526,691 or in other types of edge finishing machines. For instance, the heat of the present nozzle **12** never reaches a temperature of 400° F., whereas the shrinking iron of an edging machine is commonly heated to a temperature of 1400° F.

To ensure that a reliable grip is obtained by the thermoplastic adhesive on the skived margins during each feeding period in the machine of the present invention, the adhesive is applied by the nozzle **12** along a rigidly supported portion of the scarf S and is immediately acted upon by the hammer and anvil to press the scarf against the edge of the work piece. Because of the close relationship lengthwise of the margin between the nozzle and post on

the one hand and the hammer and anvil on the other, it is possible to fold and cement securely an extremely uniform edge with less attention on the part of the operator than in any of the prior machines. This advantage, taken in connection with the quick replaceability of the removable frame parts, including the end 30 on the arm 28 and the head 36 on the base 26 renders the machine capable of extremely flexible utility. These capabilities, as well as the known advantages of narrow edge folding in general, constitute an unquestionable advance in the art of edge folding and an improvement in the manufacture of shoe parts or similar articles requiring such treatment.

The nature and scope of the invention having been described, what is claimed is:

1. In a machine for folding a work piece formed with an abrupt shoulder and with a narrow skived margin beyond the shoulder, the width of which margin is commensurate with the work piece thickness rather than several times its thickness, said machine having a work support comprising a rotatable disk, a post with which the margin of the work piece is engaged to turn up the margin, a nozzle for applying adhesive to the work piece opposite the post, a rotating feed wheel for pressing the work piece against a radial surface of the disk, a hammer movable toward and from the work piece to press the upturned margin against the shoulder beyond the post, an anvil arranged to sustain the work piece against the action of the hammer, and means for mounting and actuating the hammer and anvil as a unit to feed the work piece intermittently past the post, the combination with mechanism for actuating the wheel to feed the work piece only while the hammer and anvil are feeding it.

2. In a machine for folding a work piece formed with an abrupt shoulder and with a narrow skived margin beyond the shoulder, the width of which margin is commensurate with the work piece thickness rather than several times its thickness, said machine having a work support comprising a rotatable disk, a post with which the margin of the work piece is engaged to turn up the margin, a nozzle for applying adhesive to the work pieces opposite the post, a rotating feed wheel for pressing the work piece against a radial surface of the disk, a hammer movable toward and from the work piece to press the upturned margin against the shoulder beyond the post, an anvil arranged to sustain the work piece against the action of the hammer, and means for mounting and actuating the hammer and anvil as a unit to feed the work piece intermittently past the post, the combination with mechanism for actuating the wheel intermittently to feed the work piece.

3. In a machine for folding a work piece formed with an abrupt shoulder and with a narrow skived margin beyond the shoulder, the width of which margin is commensurate with the work piece thickness rather than several times its thickness, said machine having a work support comprising a rotatable disk, a post with which the margin of the work piece is engaged to turn up the margin, a nozzle for applying adhesive to the work piece opposite the post, a rotating feed wheel for pressing the work piece against a radial surface of the disk, a hammer movable toward and from the work piece to press the upturned margin against the shoulder beyond the post, an anvil arranged to sustain the work piece against the action of the hammer, and means for mounting and actuating the hammer and anvil as a unit to feed the work piece intermittently past the post, the combination with mechanism for actuating the wheel simultaneously with the movements of the hammer and anvil to feed the work piece and only while the hammer and anvil are feeding it.

4. In a machine for folding a work piece formed with an abrupt shoulder and with a narrow skived margin beyond the shoulder, the width of which margin is commensurate with the work piece thickness rather than several times its thickness, said machine having a work support comprising a rotatable disk, a post with which the margin of the work piece is engaged to turn up the margin, a nozzle for applying adhesive to the work piece opposite the post, a rotating feed wheel for pressing the work piece against a radial surface of the disk, a hammer movable toward and from the work piece to press the upturned margin against the shoulder beyond the post, an anvil arranged to sustain the work piece against the action of the hammer, and means for mounting and actuating the hammer and anvil as a unit to feed the work piece intermittently past the post, the combination with mechanism for actuating the wheel to feed the work piece only while the hammer and anvil are feeding it, the axis about which the disk rotates being located along the work piece margin between the post and the hammer in its nearest approach to the post to insure that the rotary force impressed on the work piece by the disk will be offset by the grip of the hammer and anvil.

5. In a machine for folding a work piece formed with an abrupt shoulder and with a narrow skived margin beyond the shoulder, the width of which margin is commensurate with the work piece thickness rather than several times its thickness, said machine having a work support comprising a rotatable disk, a post with which the margin of the work piece is engaged to turn up the margin, a nozzle for applying adhesive to the work piece opposite the post, a rotating feed wheel for pressing the work piece against a radial surface of the disk, a hammer movable toward and from the work piece to press the upturned margin against the shoulder beyond the post, an anvil arranged to sustain the work piece against the action of the hammer, and means for mounting and actuating the hammer and anvil as a unit to feed the work piece intermittently past the post, the combination with mechanism for actuating the wheel to feed the work piece only while the hammer and anvil are feeding it, a supply of thermoplastic adhesive connected to the nozzle and a pump for extruding adhesive through the nozzle on the skived margin of the work piece opposite the post to enable the adhesive to be spread during the feeding movement of the work piece and to obtain a grip on the skived margin between movements.

6. In a machine for folding a work piece formed with an abrupt shoulder and with a narrow skived margin beyond the shoulder, the width of which margin is commensurate with the work piece thickness rather than several times its thickness, said machine having a work support comprising a rotatable disk, a post with which the margin of the work piece is engaged to turn up the margin, a nozzle for applying adhesive to the work piece opposite the post, a rotating feed wheel for pressing the work piece against a radial surface of the disk, a hammer movable toward and from the work piece to press the upturned margin against the shoulder beyond the post, an anvil arranged to sustain the work piece against the action of the hammer, and means for mounting and actuating the hammer and anvil as a unit to feed the work piece intermittently past the post, the combination with mechanism for actuating the wheel to feed the work piece only while the hammer and anvil are feeding it, the feed wheel and the supporting disk being so located that their axes both lie in a plane intersecting the margin of the work piece between its points of engagement with the post and nozzle on the one hand and by the hammer and anvil on the other hand.

7. In a machine for folding margins of a leather work piece formed with an abrupt shoulder and a narrow skived edge, the width of which is commensurate with the work thickness rather than several times its thickness, said machine having a frame comprising a base formed with a laterally extending arm, a quickly removable work supporting plate secured to the arm, a cap on the base having a neck overhanging the arm

and a quickly removable head attached to the neck, folding and feeding devices on the arm including a post with which the margin of the work piece is engaged to turn up the margin, a hammer movable toward and from the work piece to press the upturned margin against the shoulder, and an anvil arranged to sustain the work piece against the action of the hammer, and means in the arm for mounting and actuating the hammer and anvil as a unit to feed the work, the combination with feeding and cementing devices on the head including a cement applying nozzle and an intermittently rotating feed wheel acting on the work piece inside the shoulder and between the post and the hammer to direct entry of the extreme edge of the work piece along the post by engagement of the shoulder with the nozzle.

8. In a machine for folding margins of a leather work piece formed with an abrupt shoulder and a narrow skived edge, the width of which is commensurate with the work thickness rather than several times its thickness, said machine having a frame comprising a base formed with a laterally extending arm, a quickly removable work supporting plate secured to the arm, a cap on the base

having a neck overhanging the arm and a quickly removable head attached to the neck, folding and feeding devices on the arm including a post with which the margin of the work piece is engaged to turn up the margin, a hammer movable toward and from the work piece to press the upturned margin against the shoulder, and an anvil arranged to sustain the work piece against the action of the hammer, and means in the arm for mounting and actuating the hammer and anvil as a unit to feed the work, the combination with feeding and cementing devices on the head including a cement applying nozzle, an intermittently rotating feed wheel acting on the work piece inside the shoulder and between the post and the hammer to direct entry of the extreme edge of the work piece along the post by engagement of the shoulder with the nozzle, and a disk rotatably mounted in the work supporting plate about an axis between the post and the hammer, against the radial surface of which disk the feed wheel presses the work piece.

No references cited.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,849,734 September 2, 1958

Roy V. McGahan

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 46, beginning with "shrinking" strike out all to and including "fed" in column 5, line 5, and insert the same after "curling and" in column 4, line 15; column 10, line 43, after "between" insert -- feeding --

Signed and sealed this 5th day of May 1959.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents