Nov 2, 1937. M. W. HOWARD 2,097,948

AUTOMATIC EDGESETTER

Filed Oct. 18, 1935 4 Sheets-Sheet 1

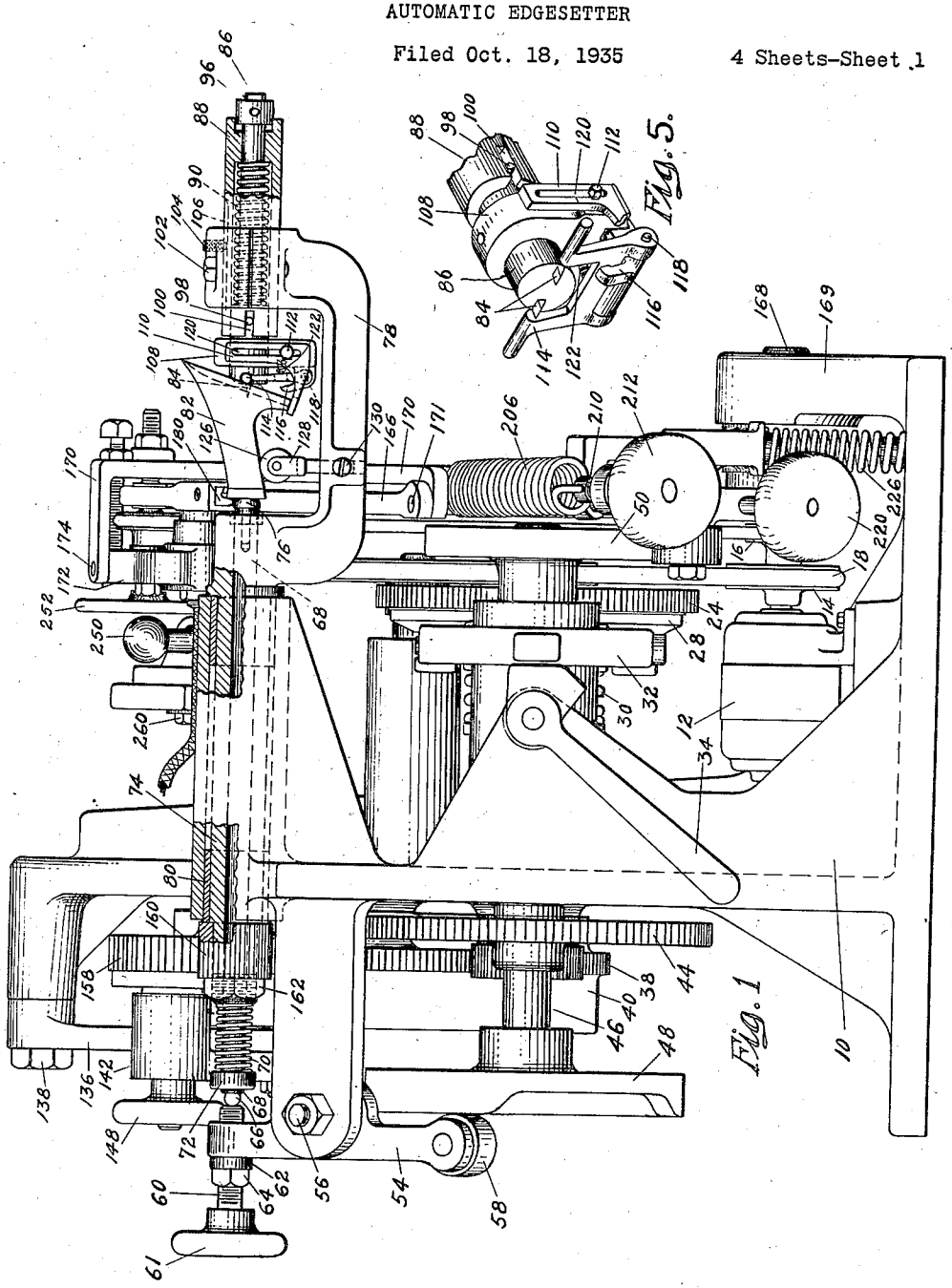


Fig. 1

Fig. 5.

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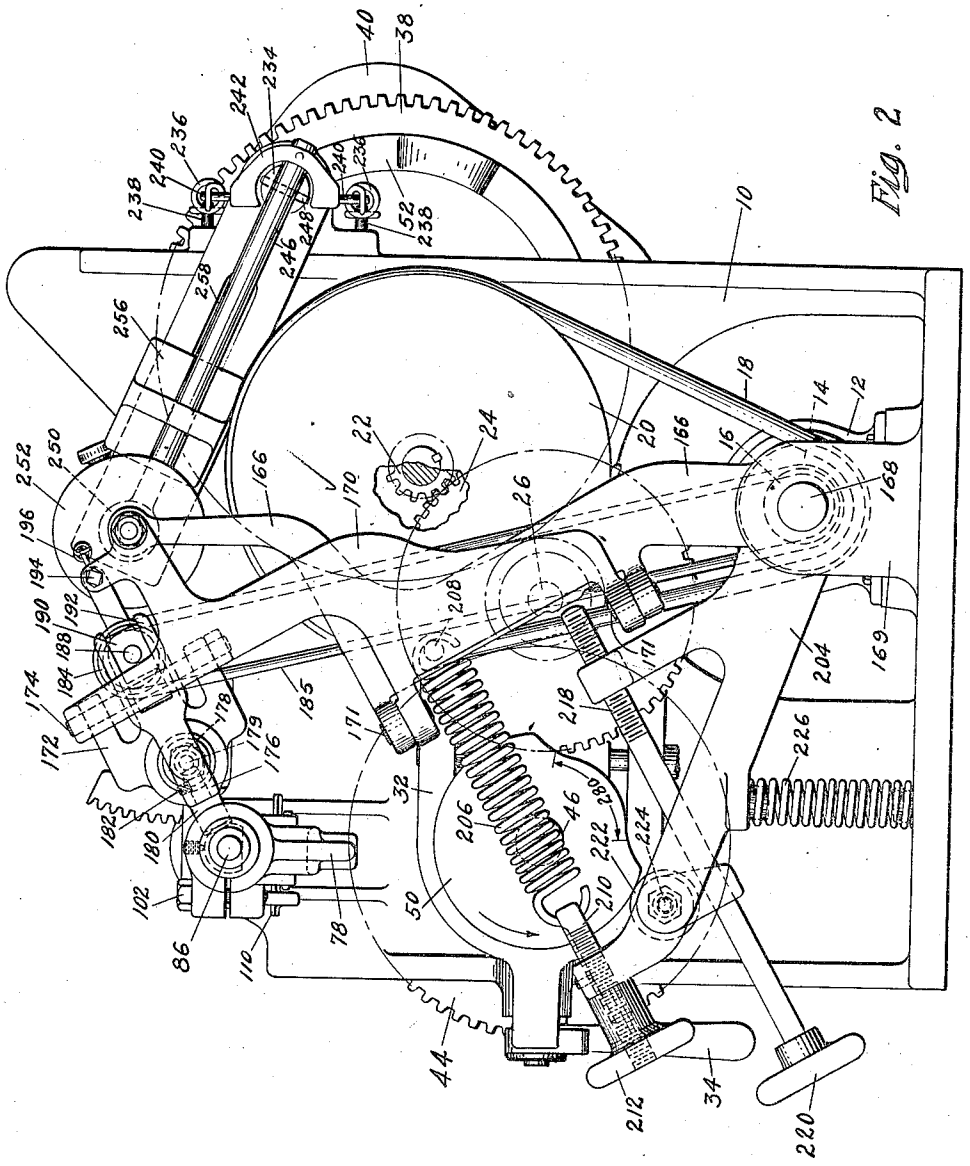


Fig. 2

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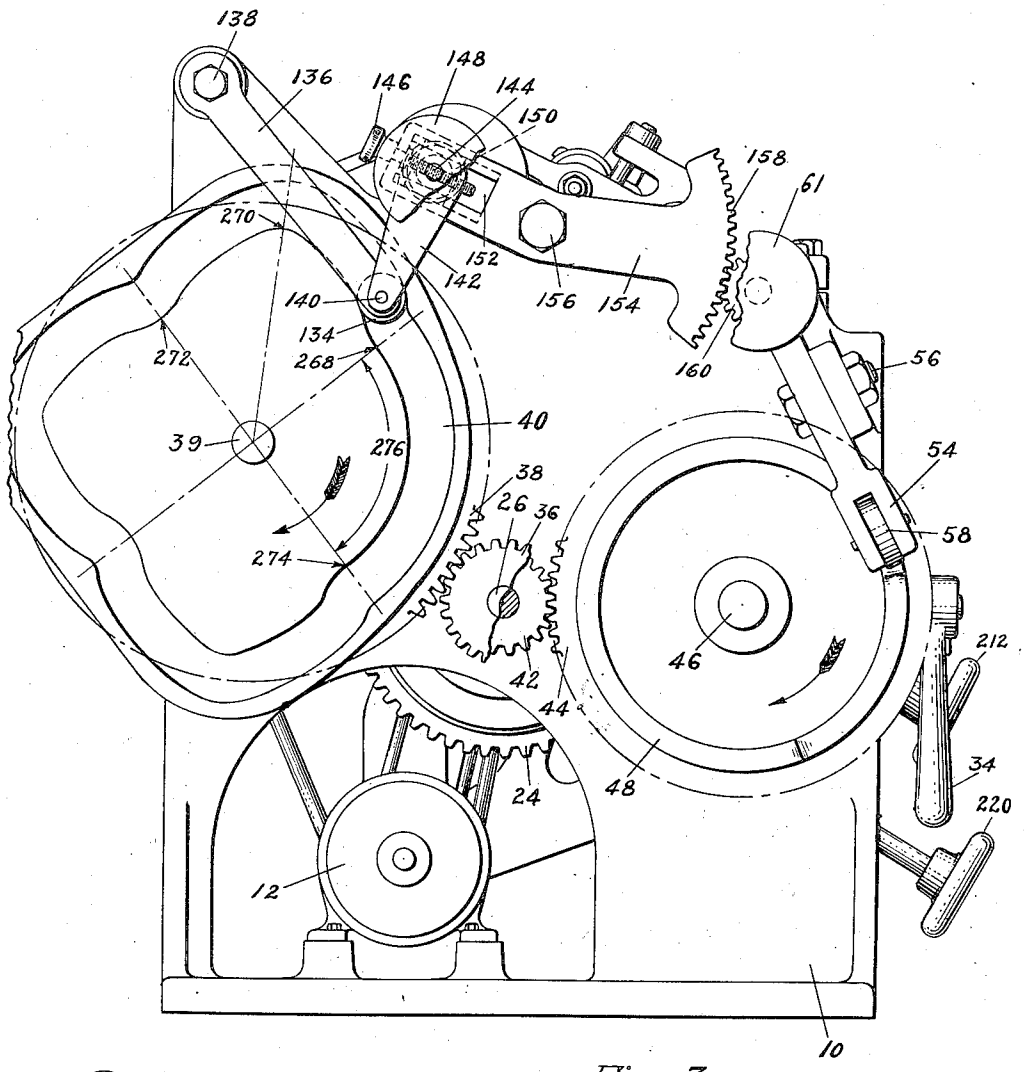


Fig. 3

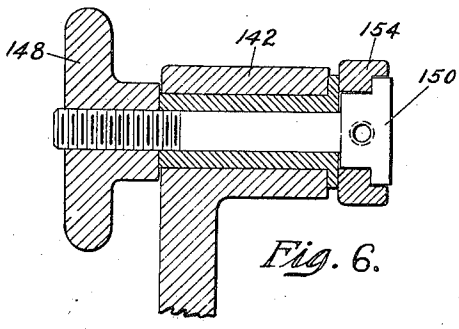


Fig. 6.

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AUTOMATIC EDGESETTER

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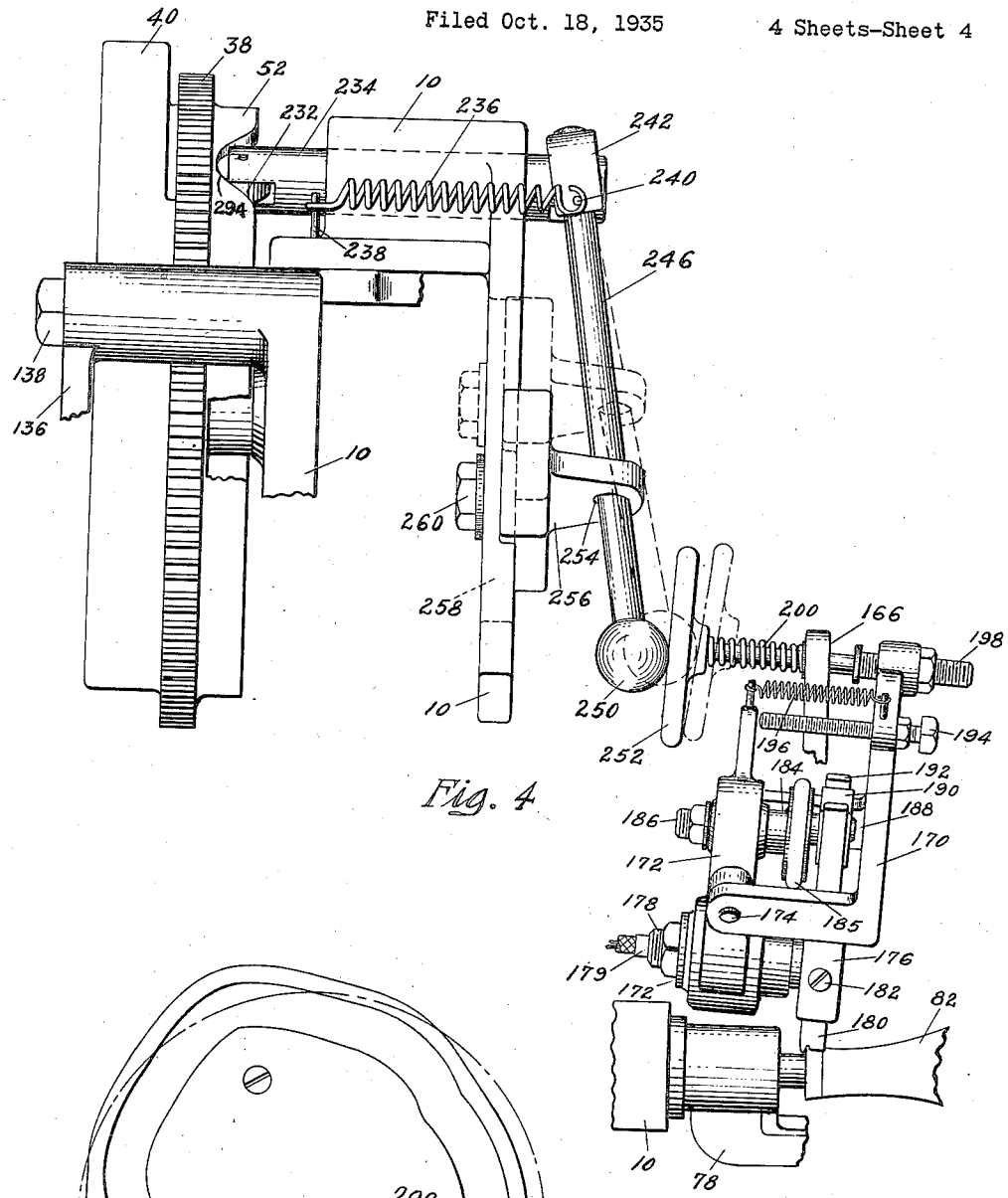


Fig. 4

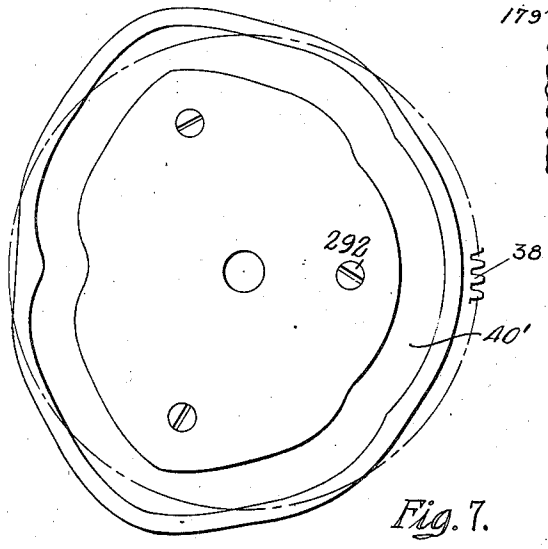


Fig. 7.

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Patented Nov. 2, 1937 2,097,948

UNITED STATES PATENT OFFICE

2,097,948

AUTOMATIC EDGESETTER

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Application October 18, 1935, Serial No. 45,555

16 Claims. (Cl. 12—72)

The present invention relates to edgesetting machines and more particularly to semi-automatic edgesetting mechines for setting the edges of wood heel toplifts.

Edgesetting machines as heretofore constructed include as essentials a power-driven oscillating heel-clamping device or jack, the angular amplitude of such oscillation being adjustable, the oscillation being periodically interrupted and the jack being automatically opened and closed in timed relation to said interruption. The jack is provided with means for locating the heel so as to bring the toplift into a predetermined position relative to the jack's axis of oscillation and to the edgesetting iron. A heated edgesetting iron is mounted in a mechanism adapted to apply the iron automatically to the toplift edge during the oscillation of the heel and toplift in the jack, to rock the iron transversely of the edge of the toplift at a predetermined time during the oscillation and to withdraw the iron from contact with the toplift in timed relation to the interruption of jack oscillation.

The general object of this invention is to provide a machine having improvements resulting in greater production capacity and better edgesetting ability than machines heretofore used.

The more particular objects of the invention includes the providing of improved means and methods of controlling the movements of the edge iron in its application to, and withdrawal from, the edge of the toplift, for rocking the iron transversely of the toplift edge to close the joint between the toplift and the heel and for actuating the oscillating movement between the iron and the toplift.

A further object is to provide an improved jack mechanism for clamping, holding and releasing the heel during the operation cycle.

Prior to the edgesetting operation on wood heels, the toplifts are nailed or slugged onto the heels and the surplus leather is trimmed therefrom, the edge of the toplift being allowed to project about 1/64 inch beyond the edge of the heel top, to be pressed flush by the edge-iron in the edge-setting operation. The trimming machines in general use trim more closely at the sides on some styles of heels than at the back. This is because the closeness of the cut to the wood is gaged by a gage riding on the wood heel along a line slightly spaced away from the toplift surface edge to clear the cutter. The side surfaces of these heels meet the toplift surface at a more acute angle than does the back surface so that the gage allows the cutter to trim the toplift closer, relative to the heel toplift surface edge, at the sides than at the back. In actual practice, the result of this variation is that on such styles the lift cannot be trimmed closely enough to the heel at the back portion without trimming too closely at the sides so that the operator sets his machine to trim as close as he dares at the sides in order to leave as small amount of excess projection at the back as possible. The extent of this excess back projection depends upon the particular shape or style of the heel. This excess projection of the lift is always at the back, never at the sides, and the greater the difference between the back projection and the side projection the greater the probability of a too close side trimming as the result of the operator's endeavor to reduce the back projection as much as possible, so any device on the edge-setting machine intended to roll in and hide or remedy this fault at the back must never extend its effect onto the sides, and particularly is this true when an extra large amount of the rolling-in effect is needed at the back for in such cases the sides are almost sure to be too closely trimmed. If the roll-in extends onto the closely trimmed sides, the iron indents and burns the heel cover and seriously damages or destroys the heel.

In the present invention, the roll-in device is one that is adjustable as to the number of degrees the iron is rocked out of its normal position, but has a definite constant range of rolling-in action for any given length of stroke, regardless of the angle of rocking.

Another result of the customary non-uniformity of trim of a toplift is that the rear portion of the toplift edge, projecting out further than the side portions, needs more edgesetting than the side portions. Moreover, the extra rolling-in required for the rear portion tends to reduce the edgesetting effectiveness of the edge-iron on this portion. According to the present invention, this difficulty is counteracted by the provision of mechanism by which the edge-iron moves more slowly, and hence with relatively more effectiveness, over the rear portion than over the side portions of the toplift edge.

A complete cycle in the edgesetting operation includes a period during which the edge-iron is operating on a heel and a pause during which the operator removes the heel from the jack and replaces it with another. Different grades of work may require more or less strokes of the edge-iron for satisfactory results, but the most desirable (i. e. the minimum) length of pause for discharging and loading is preferably the same for all

grades. According to the present invention, mechanism is provided whereby the number of strokes of the edge-iron may be readily varied independently of the duration of the pause between successive periods.

Among additional novel features in the present invention are improvements in the clamp or jack for positioning and gripping the heel during the edgesetting operation as hereinafter described in detail. These improvements result in greater durability of the machine itself, ease of operation of the jack, more definite and accurate positioning of the heels, and more efficient support of the heel against the thrust of the edge-iron.

For certain grades of work and on toplifts of certain texture and quality, it is desirable that the edge-iron be oscillated as well as the heel jack. Thus the relative movement between the iron and the heel is compounded of the two separate oscillations of the heel and the iron. The advantage secured is that by its use the number of jack oscillations can be fewer as the effects of the toplift oscillations and the iron oscillations are to an extent added together. In the machine hereinafter described, the mechanism for oscillating the edge-iron can be made inoperative by simply throwing off its drive belt.

The invention will be more clearly understood from the following description in conjunction with the drawings in which

Figure 1 is a front elevation partly in section of a machine embodying the invention.

Figure 2 is a side elevation showing the heel jack and edge-iron carrier assemblies.

Figure 3 is a side elevation of the opposite side showing the cams and associated parts that operate the heel jack.

Figure 4 is a partial plan view of the roll-in mechanism showing the parts as they appear in the middle of the roll-in action.

Figure 5 is a perspective view of a portion of the heel jack.

Figure 6 is a sectional view of an adjusting clamp.

Figure 7 is an elevation of a cam of modified form.

In the drawings is illustrated a machine which includes a frame 10 (Figure 2) on which is mounted a motor 12 having two driving pulleys 14 and 16. A belt 18 on the pulley 14 drives a pulley 20 having a pinion 22 meshing with a gear wheel 24. The gear wheel 24 is clutch-mounted on a shaft 26 (Figures 2 and 3). A conventional disk clutch may be employed, only the driven plate 28, the clutch spring 30, the yoke 32 and the operating lever 34 of the clutch being shown in the drawings. The shaft 26 carries two pinions 36 and 42. The pinion 36 meshes with a cam gear wheel 38 mounted on a shaft 39. An internal cam 40 is shown as cast integral with its gear wheel 38, but, if interchangeable cams are desired, the cam may be detachably secured to the face of the gear wheel as by screws. A cam 52 (Figure 4) is also mounted on or integral with the opposite side of the gear wheel 38 for a purpose hereinafter explained. Another pinion 42 is mounted on the shaft 26 and meshes with a gear 44 which is mounted on the shaft 46. Also mounted on the shaft 46 are cams 48 and 50. Thus the main operating cams of the machine are all mounted on the two shafts 39 and 46 which are driven in synchronism, the sizes of the pinions 36 and 42 and of their corresponding gear wheels 38 and 44 being such as to keep the latter in step.

The cam 48, as indicated in Figure 1, operates the mechanism by which heels are clamped for edgesetting and are released at the completion of the edgesetting operation. Cooperating with the cam 48 is a cam follower 58 which may be in the form of a roller and which is carried by a rocking lever 54 mounted to rock about a fixed axis 56 near its mid-point. At its other end the lever 54 carries a screw 60 having a hand wheel 61 and in threaded engagement with the lever, this screw being yieldingly locked against self-rotation by a rubber washer 62 and a nut 64. A steel ball 66 is cup-seated in the end of a rotatable shaft 68. This ball bears against the end of the screw 60 to provide a frictionless bearing for relative oscillations between the shaft 68 and the hand screw 60. The shaft 68 is longitudinally slidable in a tubular shaft 74 and is constantly pressed toward the screw 60 by a spring 70 which is compressed between an end of the shaft 74 and a collar 72 secured to the shaft near the end thereof adjacent to the screw 60. Inserted in the opposite end of the shaft 68 is a toplift engaging button 76. The tubular shaft 74 is mounted in suitable bearings 80 in the main frame and is fixed to or integral with a C-shaped jack cradle 78 so that the cradle is rockable about the axis of the shaft 74.

When the heel 82 is in position to be operated on, as indicated in Figure 1, it is clamped between the toplift button 76 and a pair of pricks 84 which engage the seat of the heel at two points about ¾ inch apart. The pricks 84 are fixedly mounted in the end of a shaft 86 which is slidably mounted in a tubular holder 88. The shaft 86 is strongly pressed toward the heel 82 by a compression spring 90 acting between a shoulder on the shaft 86 and a shoulder inside the tube 88. A collar 96 fast on the shaft 86 limits the movement of said shaft toward the heel and preloads the spring 90. The shaft 86 is held against rotation relative to the tube 88 by means of a pin 98 projecting laterally from the shaft 86 and working in a slot 100 in the tube 88. Adjustment for different heights of heels is made by loosening a clamping cap screw 102 which normally clamps the tube 88 to the cradle 78, whereupon the tube 88 can be slid in or out as desired. Relative rotation between the tube and cradle is prevented by a dog point screw 104 working in slot 106 in the tube. Since the shaft 86 cannot rotate relatively to the tube 88, it is thus held against rotation relative to the cradle, and the heel 82 which is engaged by the pricks 84 in the shaft 86 is constrained to oscillate with the cradle when the latter is oscillated as hereinafter described.

When a heel is inserted in the jack, the heel seat is guided past the pricks 84 by a divided heel-seat bar 114 which is pivoted at 118 to the sleeve bracket 108 which is secured on the shaft 86, the bar 114 being resiliently pressed forward by a spring 122, its forward movement being limited by a stop 116.

When in position for edge-setting, the heel 82 is pressed against the yielding pricks by the button 76 in the end of the slidable shaft 68, the yielding of the pricks being opposed by the strong spring 90. When the button 76 is retracted to release the heel 82, the heel is dislodged from the pricks by the bar 114. Mounted on the bracket 108 and locked thereto by a cap screw 112 is a heel-seat stop 110, the horizontal portion of which (shown in Figure 1 but not in Figure 5) is adapted to be engaged by the shank

lip of a heel inserted in the jack, thus serving to determine the vertical position of the seat of the heel with reference to the jack. This heel-seat stop can be angularly and vertically adjusted by reason of the slot 120 in which the cap-screw 112 rides. A cylindrical rubber breast stop 126 is revolvably mounted in a support 128 which in turn is mounted in the cradle 78 and is locked in its adjusted position by a screw 130.

In carrying out an edgesetting operation, the edge-iron is held stationary, or nearly so, while the heel is oscillated so as to rub the edge of the toplift against the iron. For this purpose, the cradle 78 is oscillated by mechanism controlled by the cam 40. As shown in Figure 3, the cam 40 is in the form of a channel the side walls of which are engaged by a suitable cam follower 134 such as a roller, this roller being mounted on two links by a common pivot 140. One of these links 136 is pivoted at 138 to the frame 10. The other link 142 is pivoted at 144 to a block 150 which is slidably adjustable in a slot 152 in one arm of a lever 154 rockable on pivot 156 under the control of a screw 146. The block 150 may be locked in its adjusted position by a hand wheel 148. At the opposite end of the rocking lever 154 is a gear sector 158 which meshes with a pinion 160. As shown in Figure 1, this pinion is secured on the jack cradle shaft 74 as by a lock nut 162 so that rocking movement of the lever 154 results in oscillatory rotation of the cradle 78 which carried the heel 82.

The oscillatory rotation of the heel causes the side and rear edges of the toplift to travel past the edge-iron so that, when the edge-iron is held properly with relation to the toplift, the edge of the toplift is rubbed against the edge-iron, thus performing the edgesetting operation. Movement of the edge-iron into and out of engagement with the toplift is effected by a rocking movement of a lever 166 which is pivoted on a fixed horizontal shaft 168 mounted on a standard 169 which rises from the base of the main frame 10. A secondary lever 170 is carried by the lever 166 and rocks relatively thereto on a pair of trunnions 171, the axis of which is alined with the working end of the edge-iron and intersects the axis of the shaft 168. Rocking movement of the lever 170 about the axis of the trunnions 171 alters the angular relation between the edge-iron and the toplift without any lateral displacement. As indicated in Figure 4, rocking movement of the lever 170 is limited in one direction by an adjustable stop 198. Rocking movement in the opposite direction is opposed by a spring 200. Pivoted to the lever 170 is a third lever 172 (Figure 2) which rocks about a pivot pin 174 having an axis parallel to the axis of the trunnions 171. This lever permits movement of the edge-iron laterally of the toplift, that is, in the general direction of the vertical height of the heel. As shown in Figure 4, rocking movement of the lever 172 about its axis is limited in one direction by an adjustably fixed stop 194. A spring 196 normally holds a portion of the lever 172 against this stop but permits yielding movement therefrom.

If desired, short-period oscillations along the edge of the toplift may be imparted to the edge-iron during the edgesetting operation. To this end a lever 176 is rockably carried by the lever 172, the lever 176 being secured to a horizontal tubular shaft 178 which is suitably journaled in the lever 172 and which carries therein a heating unit 179. The lever 176 serves as the holder for the edge-iron 180 which is removably secured to one end thereof as by a setscrew 182. As indicated in Figure 2, the work-engaging face of the tool 180 is preferably arcuate, the radius of curvature of the arc being equal to or slightly less than the radius of the arcuate path of the tool face as it rocks about the axis of the shaft 178 in its oscillating movements. The oscillations of the tool thus result in rubbing movements against the toplift, and hammering action on the part of the tool is prevented. The opposite end of the lever 176 is in the form of a yoke 192 in which a block 190 is slidably fitted. A crankpin 188 on a pulley wheel 184 imparts motion to the block 190 when the wheel 184 rotates and thus causes the iron holder 176 to rock. The pulley wheel 184 rotates on a shaft 186 mounted on the lever 172, and is driven by a belt 185 from the pulley wheel 16. The belt can readily be disconnected if it is desired to operate the iron without oscillation.

Rocking movement of the primary lever 166 is produced by the cam 50, but the lever is indirectly connected thereto, as follows. A lever 204 is mounted to rock independently on the shaft 168, thus having a common axis with the lever 166. These two levers are yieldingly pulled toward each other by a tension spring 206 which is anchored to the lever 166 by a pin 208 and adjustably attached to the lever 204 by a screw 210 which is operated by a hand wheel 212. A screw 218 adjustably limits the movement of these two levers toward each other. A hand wheel 220 operates the screw 218. A cam roller 222 is mounted on the lever 204 by a stud 224 and is held against the cam 50 by a compression spring 226 acting between the frame 10 and the lever 204. The function of these members is, as hereinafter explained, to move the iron into and out of operative relation to the work.

Mechanism for rocking the lever 170 about the axis of the trunnions 171 is illustrated in Figure 4 and includes a cam roller 232, mounted in the end of a plunger 234 slidably mounted in the frame 10, the roller being held in constant engagement with the cam 52 by tension springs 236 acting between pins 238 in the frame 10 and pins 240 in a yoke 242 which is rigidly attached to a lever 246. The lever 246 is pivotally attached at one end to the plunger 234 by a pin 248, its other end being ball-shaped as at 250 for smooth and uniform engagement with a disk 252 regardless of the angle of contact therewith. The lever 246 is loosely fulcrumed in a hole 254 in a bracket 256 slidably adjutable on the frame 10 to vary the working stroke of the ball-end 250 from zero to the maximum required. The bracket 256 may be locked in adjusted positions by a bolt 260 which extends through a slot 258 in the frame 10.

In operation the edge is set by oscillating the toplift in its own plane against the edgesetting iron 180. It is well understood that in semi-automatic machines of this type, in which the loading is done by hand, it is essential that the loading time be reduced to the lowest possible point in order that the largest possible part of the total time of a cycle of operation may be devoted to the working portion of the cycle so that the production may be large without sacrifice of quality.

It is essential that the heel 82 be clamped in the jack in such position angularly that the plane of its toplift face is approximately at right angles to the jack's axis of oscillation and

bodily so that the curved portion of its edge will be as nearly concentric with the jack's axis of oscillation as possible. According to the invention, rapid and accurate locating of the heel in this manner in the jack is facilitated by the provision of gages adapted to engage the heel laterally at or near its two ends, the breast stop 126 engaging the breast of the heel near the toplift end and the heel-seat stop 110 engaging the heel at the seat end. The heel-seat cross bar 114 acts to guide the heel seat past the clamping pricks 84 and the toplift-engaging button 76 guides the other end so that the operator, to insert a heel in the jack, may grasp the heel near its middle by his thumb and first two fingers and thrust it in vigorously between the guides and against the gages with confidence that its location is correct. The crosswise location is had by feel as the operator's thumb and fingers touch the ends of the breast stop 126 and its supporting member 128. As arranged for in the machine shown in the drawings, the heel is loaded into the jack with its breast facing downward and away from the operator at an angle of about 45°. As the heel is clamped by motion of the toplift-engaging button 76 (shown in Figure 1) toward the right, the breast is pressed more firmly onto the rubber roll 126 on account of the angle of the breast surface of the heel relative to its line of movement, thus insuring firm, but non-damaging, contact and support for the heel against the iron thrust while edgesetting. In like manner, owing to the slope of the lip stop, the lip of the heel seat moves clear of the lip stop as the pricks 84 sink into the wood, thus insuring that the thin, fragile lip edge will not be bruised or damaged from the thrust of the edge-iron. The edge is set by causing the iron 180 to travel continuously along the convex curved edge of the toplift from one front corner to the other front corner and then back again over the same path to the first-named corner, thus completing what we may call, for convenience, two "strokes", these being produced by one rotary oscillation of the jack. These oscillations are controlled by the cam 40 revolving about its axis 39. The shape of the cam is clearly illustrated in Figure 3. Starting at the point 268, which is at minimum distance from the cam center 39, and following the course of the cam in a counter-clockwise direction, it will be seen that the cam trends outward to the point 270 which is at maximum distance from the cam center. From this point it trends inward to the point 272, at minimum distance from the cam center. This in and out motion is repeated until the point 274 is reached. From this point to the starting point 268 the cam follows a circular arc described from the cam center 39. It is evident from Figure 3 that outward movement of the roller 134 in the cam slot 49 results in rotative movement of the jack in one direction, and that inward movement of the roller 134 results in rotative movement of the jack in the opposite direction, the rate of such movement at any instant depending upon the particular shape of the cam 40. Thus, for example, the rate of inward and outward movements of the roller 134 may be slower at the middle of each stroke than at the ends, this resulting in a slower setting of the rear edge of the toplift than the setting of the side portions. Hence, the cam as illustrated in Figure 3 is designed to cause six strokes or three complete oscillations of the jack while the roller travels from the point 268 to the point 274. The roller in its travel from the point 274 to the point 268 is held against any radial movement. This results in a pause in the movement of the jack which is utilized for reloading the jack. The duration of the pause is determined by the length of the arc 276 and is preferably designed to be as short as will permit of proper insertion of a heel into the jack. It is evident that the cam 40 can readily be replaced by other cams having more or less stroke-producing portions, but having the pause-producing portion 276 of the same preferred length. Such a cam 40' is illustrated in Figure 7, this cam being designed to produce four strokes for each edgesetting operation instead of six strokes produced by the cam shown in Figure 3. Instead of being cast integrally with the gear wheel 38, the cam member 40' is shown as removably secured to the gear wheel as by screws 292.

In order to burnish or "set" the edge of the toplift, the heated iron 180 must be yieldingly pressed against the edge as the toplift is oscillated in the jack. The toplift shown in Figure 2 is nearly circular in shape, but some toplifts, as on Cuban and military heels, are much longer than they are wide, and in setting these toplifts the iron 180 must move toward and away from the axis of the heel during the edge-setting operation in order to keep in contact with the edge of the toplift. That means that the primary lever 166 must rock slightly on its axis 168 against the tension of the spring 206. It is essential that a uniform predetermined pressure be maintained between the edge-iron and the toplift by the spring 206. Hence the spring is chosen such that the slight rocking movements of the lever 166, resulting from travel of the iron along a non-circular toplift edge, will not appreciably alter the tension of the spring.

While unloading and reloading the jack, the iron must be lifted well away from its working position and this extra movement would act to overload spring 206 unless provision was made for its relief. To this end, I have devised means which acts not only to prevent overload, but which actually reduces the load on the spring while the iron is lifted for re-loading to a point below its working load.

The loading of the spring 206 while the edge is being set is determined in part by the angular location of the lever 204 (Figure 2), and this in turn is determined by the roller 222 working on the cam 50. The cam 50 has two concentric cam surfaces, one having a greater radius than the other, the two being joined by surfaces inclined as sharply as is consistent with smooth operation. The concentric surface having the larger radius extends over nearly three-fourths of the circumference of the cam and the other concentric surface nearly one-fourth in the machine as shown. The cam 50 is driven in a counter-clockwise direction as illustrated in Figure 2. When the roller 222 rides up onto the high part of the cam 50, the lever 204 is rocked in a counter-clockwise direction (as shown in Figure 2), pulling the lever 166 in the same direction through the connecting spring 206. If a heel is in position in the jack at the time, the iron encounters the toplift, preventing further rocking of the lever 166. The end of the screw 218 pulls away from contact with the lever 166, thus causing the tension of the spring 206 to be fully operative in pressing the iron against the edge of the toplift. The length and position of the high portion of the cam 50 are designed so that the roller 222 rides thereon during the period of oscillatory movement of

the jack. Coincident with the cessation of oscillation of the jack, the cam roller 222 will have reached the end of the high portion of the cam and will proceed to roll down the incline toward and onto the low portion. Shortly after the roller starts down the incline, the end of the adjustable screw 218 comes into contact with the lever 166, whereupon the spring 206 becomes inactive and the lever 204 and the lever 166, carrying the edge-iron holding mechanism, are rocked as a unit on the pivot 168 under the actuation of the compression spring 226 and under the control of the cam 50 until the roller 222 reaches the low surface, at which time the edge-iron will have been retracted sufficiently for re-loading the jack. During the unloading and reloading period, the roller 222 will be rolling over the low surface 280, thereby holding the iron motionless in its retracted position. During this pause the spring 206 is in a relatively relaxed condition. Having completed its travel over the low portion 280 of the cam 50, the roller will climb up the incline and onto the high portion, thereby putting spring 206 back into action and bringing the iron into yielding contact with the new heel toplift as shown in Figure 2.

The average iron pressure on the work may be adjusted conveniently and quickly by the use of the hand wheel 212 which acts to increase or diminish the spring tension, and the minimum approach of the iron toward the axis of jack oscillation may be controlled with equal facility by the screw 218 which is adjusted by manipulation of the handwheel 220. This latter adjustment functions only when the machine operates idly or when the iron is being retracted from the toplift. Different sizes of toplift-engaging buttons 76 are used according to the style of heel being edgeset and the adjusting screw 218 is used to adjust the edge-iron so that, when the machine is operated idly, the iron will just clear the particular toplift button in use. This adjustment and the spring-tension adjustment are in frequent use. Consequently the two hand wheels 212 and 220, which operate these controls, are located at the front of the machine so that adjustments may be freely and safely made while the machine is running.

The jack opening and closing mechanism is preferably so adjusted that, immediately following the cessation of jack oscillation and the retraction of the edgesetting iron from the toplift, the jack is opened to release the edgeset heel, but, while the edgesetting is being done, this mechanism is as shown in Figures 1 and 3 of the drawings. The face cam 48 corresponds in shape to the edge-iron lifting cam 50 hereinbefore described. There are two arcuate cam surfaces, a long one and a short one, the long one being high and the short one low, the two being joined by steep inclines as in the cam 50 and for the same purpose, namely, a quick transition from one level to another. During the actual edgesetting operation, the heel 82 is held tightly clamped in the jack between the points 84, backed by the compression spring 90, and the toplift-engaging button 76 is held positively in a fixed position axially by the cam 48 acting through the cam roller 58, the lever 54, the screw 60, and the steel ball 66 and the shaft 68 in which the button 76 is inserted.

The cam 48 is so related to the other operating cams that, when the edgesetting is completed and the jack oscillation has ceased and the iron has been retracted from the toplift, the cam 48 will then have rotated clockwise as seen in Figure 3 to a point at which the roller 58 will at once roll down the steep incline from the high to the low portion of the cam. When this occurs, the lever 54 rocks, thereby allowing the shaft 68 to slide in a direction away from the heel, at first under the combined impulses of the spring 90 in the jack and the spring 70 on the shaft, and finally, after the collar 96 has seated on its shoulder in the sleeve 88, the sliding movement of the shaft 68 is continued by the action of the spring 70 alone to open the jack for unloading and reloading.

This pause lasts only long enough to allow these operations to be performed, after which the jack is closed and the iron is moved into engagement with the toplift edge and the jack oscillations are resumed by the action of the cams 48, 50 and 40, respectively, and their associated apparatus as described.

The yielding pressure required to hold the heel in its clamped position is furnished by the compression spring 90. For this spring, as in the case of the edge-iron pressure spring, I have devised means for relieving the spring load when the heel is unclamped and for using the maximum spring load for doing the useful work of clamping the heel for edgesetting. The value of this arrangement lies in the fact that thereby maximum spring life is obtained and a minimum amount of work is required to jack and unjack the heel.

Owing to the characteristics of the machines usually employed for trimming the edges of toplifts after they have been secured to the heels, the trimmed edge ordinarily projects slightly beyond the edge of the heel itself, such projection usually being greater at the rear of the heel than at the sides. It is desirable to roll-in this extra projection, when present, so as to remedy the fault. Rolling-in is accomplished by rocking the edge-iron out of its normal angular relation to the toplift. The rolling-in effect must, however, be restricted to the portion of the edge which needs it, that is, the rear portion, as any rolling-in applied to the sides would in most cases damage the heel. From the foregoing it is evident that the desirable roll-in device is one that is adjustable as to the number of degrees the iron is rocked out of its normal position, but that confines its range of action, regardless of its angle of rocking, to the portion that needs rolling-in. In the machine illustrated, the rolling-in effect is obtained by rocking the lever 170 on the trunnions 171 so as to vary the angle at which the edge-iron is held against the edge of the toplift. As hereinbefore described the rocking of the lever 170 is controlled by the cam 52 and associated mechanism (Figure 4). The amplitude of the rocking movement of the lever 170, and hence of the rolling-in angle of the iron, can be varied by adjusting the positions of the fulcrum piece 256, so that the machine can be readily adjusted for any degree of rolling-in from almost none to the maximum required.

The cam 52 is for the most part in a single plane but is provided with a brief depression 294 which causes rolling-in movement of the iron as the roller 232 rolls into and out of the depression. The range of rolling-in movement on the toplift is determined by the length of the depression 294 and is thus entirely independent of the amplitude of the rocking movement of the iron. The shape of the contour of the depression in the cam 52 determines the rate of progressive variation of the rocking angle as the iron rocks,

during the rolling-in stroke, to and from its maximum rocking angle. As long as the roller 232 rides on the high portion of the cam 52, the ball-shaped end 250 of the lever 246 is held away from contact with the disk 252 (as indicated in Figure 1) so that no rolling-in movement can occur until the roller enters the depression 294. In the machine illustrated, the rolling-in action occurs in the first stroke only, as is evident from a comparison of the cams 40 and 52 as shown in Figures 3 and 4 respectively, the remaining strokes being purely edgesetting strokes with no rolling-in, but it is evident that these cams can easily be relatively adjusted so that the rolling-in action will occur in the second or some other stroke.

The several operating cams are driven in synchronism so that each makes a single revolution during one complete cycle of operations, the cams being gear-driven from a common drive shaft for this purpose.

To summarize the operation of the machine, the hand loading, the subsequent automatic movements, and the hand unloading of one cycle will be described in detail, it being understood that the continued operation of the machine consists of an uninterrupted succession of said cycles.

In operating the machine, the operator places a heel in the open jack, pushing it in between the toplift button 76 and the cushioned seat guiding bars 114 until it stops in proper position against the breast stop 126 and the heel seat stop 110. The heel is then automatically clamped by the cam 48 acting through the cam roll 58, lever 54, ball 66, shaft 68, and toplift button 76 to push the heel to the right as seen in Figure 1, onto the pricks 84 and then continuing against the resistance of the compression spring 90 to clamp the heel.

As soon as the heel is thus clamped, the cam 40, which during the loading and clamping period has been moving its concentric portion 276 past the cam roller 134, now begins to move said roller 134 first away from and then towards said cam center to cause the lever 154 through its gear teeth 158 meshing with the pinion 160 to oscillate the jack cradle 78 and the heel 82 clamped therein. Simultaneously with these actions, the cam 50, which has also during said loading and clamping period been moving its concentric portion 280 past the cam roller 222, now moves its roller to cause the lever 204 to move the lever 166 by means of the tension spring 206 to pull the edgesetting iron 180 into contact with the heel toplift upon which the cam 40 as shown in Figure 3 will cause the heel jack to make three oscillations to set the toplift edge, after which the cam 50 cooperating with the compression spring 226 lifts the edgesetting iron, the cam 48 acts to stop the jack oscillation, and the operator removes the edge set heel, thus completing one cycle.

In cases where it is necessary or desirable to roll-in the portion of the toplift next to the wood of the heel so as to tighten the joint between the leather and the wood, the tool is caused to rock back and forth during a portion of one of its strokes. For this purpose, the bracket 256 is adjusted so that the roller 232 is effective to rock the tool 180 as the roller enters and leaves the low portion 294 of the cam 52. The roller and the spring 236 rock the lever 246. The end 250 of the lever presses against the disk 252, rocking the tool-holding lever 170 about the trunnions 171. Thus the tool is caused to bear strongly against the portion of the top-lift edge adjacent to the wood of the heel, especially when the rear portion of the edge is moving past the tool, thus closing any crack or gap there may have been between the leather and the wood.

It is evident that various modifications and changes may be made in the apparatus herein shown and described without departing from the spirit or scope of the invention as defined by the following claims.

I claim:

1. An edgesetting machine for heel toplifts, comprising an edgesetting iron, means for supporting said iron in a predetermined operating position, means including a rotatable heel jack for supporting a heel in operative relation to said iron, continuously operating means for alternately oscillating and locking said jack through predetermined periods of oscillation and rest, and means for driving said continuously operating means.

2. An edgesetting machine for heel toplifts, comprising an edgesetting iron, means for supporting said iron in a predetermined operating position, means including a rotatable heel jack for supporting a heel in operative relation to said iron, operating means for imparting groups of oscillations to said jack and for locking said jack in the same position for predetermined periods of rest alternating with said groups of oscillations, and means for driving said operating means.

3. In an edgesetting machine for heel toplifts, means including a rotatable heel jack for holding a heel in position for edgesetting, means actuable to impart oscillations to said jack, said actuable means including a rotatable cam member and a cam follower engaging said cam member and operatively connected with said jack, and means for driving said actuable means.

4. In an edgesetting machine for heel toplifts, means including a rotatable heel jack for holding a heel in position for edgesetting, means actuable to impart a predetermined number of oscillations to said jack in groups and to lock said jack against rotation for predetermined time intervals between successive groups of oscillations, said actuable means including a rotatable cam member, and means for rotating said cam member.

5. In an edgesetting machine for heel toplifts, means including a rotatable heel jack for holding a heel in position for edgesetting, means actuable to control the rotary movements of said jack through successive cycles, each consisting of a predetermined number of oscillations followed by a pause, said actuable means including a driven cam member having an endless cam channel therein, a cam follower riding in said channel and means operatively connecting said cam follower with said jack, and means for driving said actuable means.

6. An edgesetting machine for heel toplifts, comprising an edgesetting tool, means for supporting a heel in operative relation to said tool, means for causing relative movement between said heel and tool whereby said tool progressively engages the side and rear edges of the toplift of said heel back and forth in successive strokes from one front corner of the toplift to the other, means for varying the angular relation between the long axis of said tool and the plane of the toplift face during a predetermined portion of one of said strokes, and means for adjustably altering the amplitude of such variation without

appreciably altering the portion of the stroke through which said variation takes place.

7. An edgesetting machine for heel toplifts, comprising means for imparting oscillations to a heel, means for holding an edgesetting tool against the edge of the toplift during oscillation of said heel, and means for rocking the long axis of said tool relatively to the plane of the toplift face, said rocking means including a driven cam member, a cam follower engaging said cam member and mechanism operatively connecting said follower with said tool, said mechanism including a lever rockable on a fulcrum between its ends, and means for adjustably shifting said fulcrum.

8. An edgesetting machine for heel toplifts, comprising an edgesetting tool, a heel jack adapted to receive and support a heel in operative position, and means for causing relative movement between the heel and tool whereby said tool progressively engages the curved edge of the toplift of said heel back and forth from one corner thereof to the other, said last-mentioned means including means for causing the relative movements between the heel and the tool on the rear portion of said edge to be slower than on the side portions thereof.

9. A heel jack for an edgesetting machine, comprising a frame rotatable about an axis, a pair of heel-engaging members relatively movable along said axis toward and from each other to engage and release the top and seat, respectively, of a heel, a stationary guide element engageable by the breast of said heel, and means for moving said heel axially in the direction of its seat to its position for operation after the top and seat have been engaged by said members.

10. A heel jack for an edgesetting machine, comprising a frame rotatable about an axis, means carried by said frame for engaging the ends of a heel to hold the heel in position for edgesetting, said means including an element movable along said axis and adapted to engage the face of the toplift of a heel and a second element movable along said axis and adapted to engage the seat of said heel, means resiliently pressing said seat-engaging member toward said toplift-engaging member, a stop element definitely limiting movement of said seat-engaging member toward said toplife-engaging member, and means actuable to move said toplift-engaging member positively toward said seat-engaging member to a predetermined position.

11. In an edgesetting machine, means for supporting a heel in position for edgesetting, said means comprising a frame rotatable about an axis, a heel-seat-engaging member carried by said frame and movable along said axis, a continually tensed spring pressing said member toward said position, a toplift-engaging member movably carried by said frame and means for moving said toplift-engaging member along said axis to engage a heel between said members and to press the other said member so as to increase the tensing of said spring.

12. In an edgesetting machine, a jack for supporting a heel in position for edgesetting, said jack comprising a C-shaped frame rotatable about an axis, a pair of heel-engaging members slidably supported by said frame in alinement with said axis, means for moving one of said members to engage the toplift of a heel inserted in the jack and to move said heel against the other said member to displace said other member from a normal position of rest, and means yieldingly pressing said other member toward said normal position of rest.

13. A device for clamping a heel in position for an edgesetting operation, comprising a frame, a pair of spaced heel-engaging members coaxially supported by said frame and slidable along their common axis, one of said members having a pair of pricks in the end thereof to engage the seat of a heel inserted in the device, a guide element supported by said one member beyond the end thereof and laterally offset therefrom to be engaged by the seat lip of said heel, said element having a sloping surface whereby said lip moves clear thereof when said heel is pressed axially against said pricks, and means for moving said other member against the toplift of said heel to clamp it against said one member.

14. A device for clamping a heel in position for an edgesetting operation, comprising a frame having a pair of spaced arms, a shaft slidably projecting through one of said arms, an adjustable tubular casing adjustably projecting through the other said arm and coaxial with said shaft, a plunger axially slidable in said casing, a stop to limit movement of said plunger toward said shaft, a spring resiliently pressing said plunger against said stop, means for moving said shaft against the toplift of a heel inserted in the device to press the seat of the heel against the end of said plunger and to force the plunger back from its stop, and a breast guide for said heel adjustably mounted on said frame.

15. In an edgesetting machine for heel toplifts, an edgesetting tool, support means for said tool, and means for actuating said support means to move said tool toward and away from operative position, said actuating means including a tensed spring operative to press the tool against the work when in operative position and reaction means for relieving excess tension on the spring when the tool is retracted from its operative position, whereby retractive movement of the tool is not opposed by said spring.

16. In a semi-automatic edgesetting machine for heel toplifts, an edgesetting tool, means for oscillating said tool, means for rocking said oscillating tool to vary the angular relation between the tool and the plane of a toplift, and means for holding and imparting oscillations to a toplift in operative position relative to said tool.

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