Jan. 9, 1951 S. I. SHERR 2,537,164

WORK HOLDER FOR PINKING SHEARS

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Fig. 3.

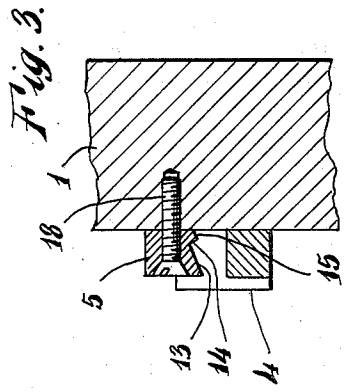
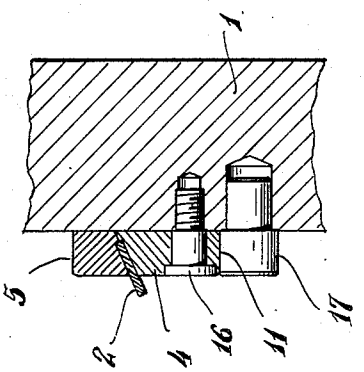


Fig. 2.



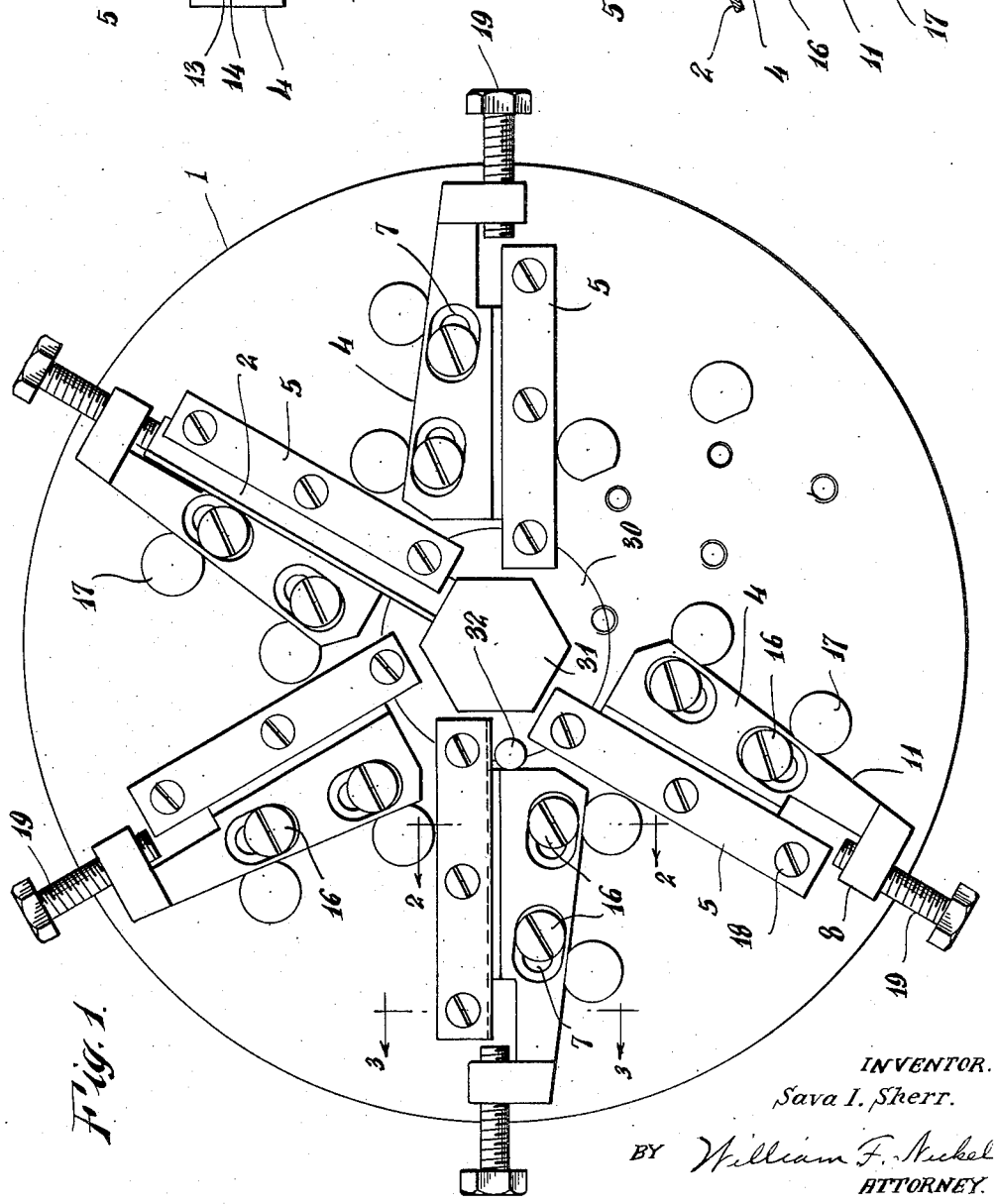


Fig. 1.

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Fig. 7.

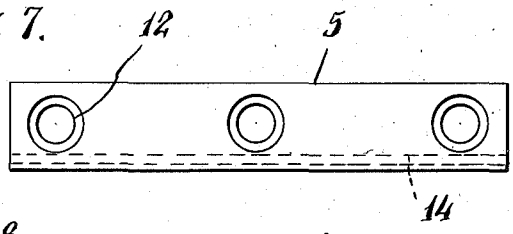

Fig. 8.

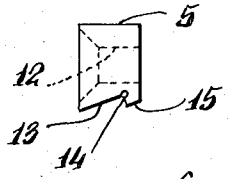

Fig. 4

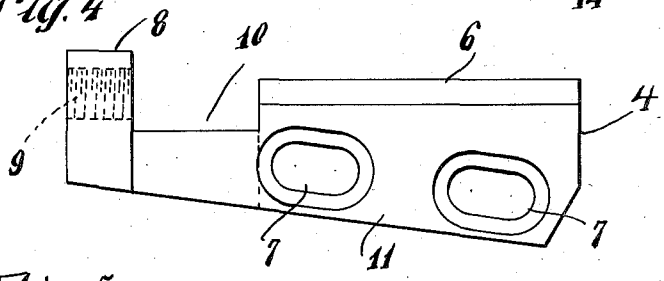

Fig. 6.

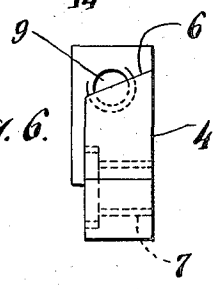

Fig. 5

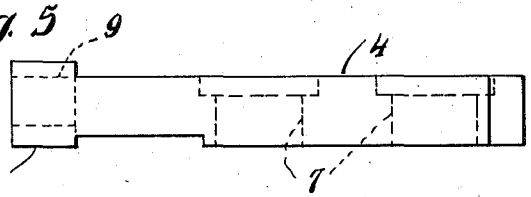

Fig. 9.

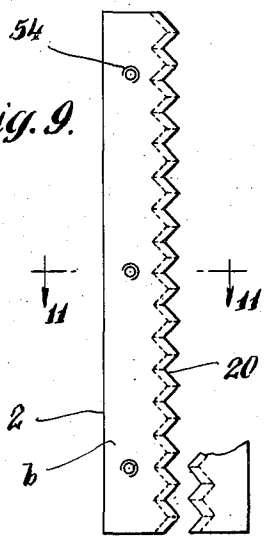

Fig. 12.

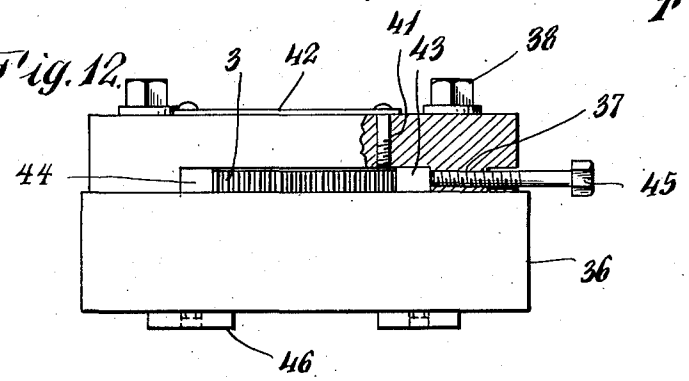

Fig. 11.

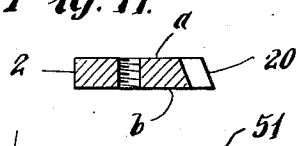

Fig. 10.

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Fig. 13.

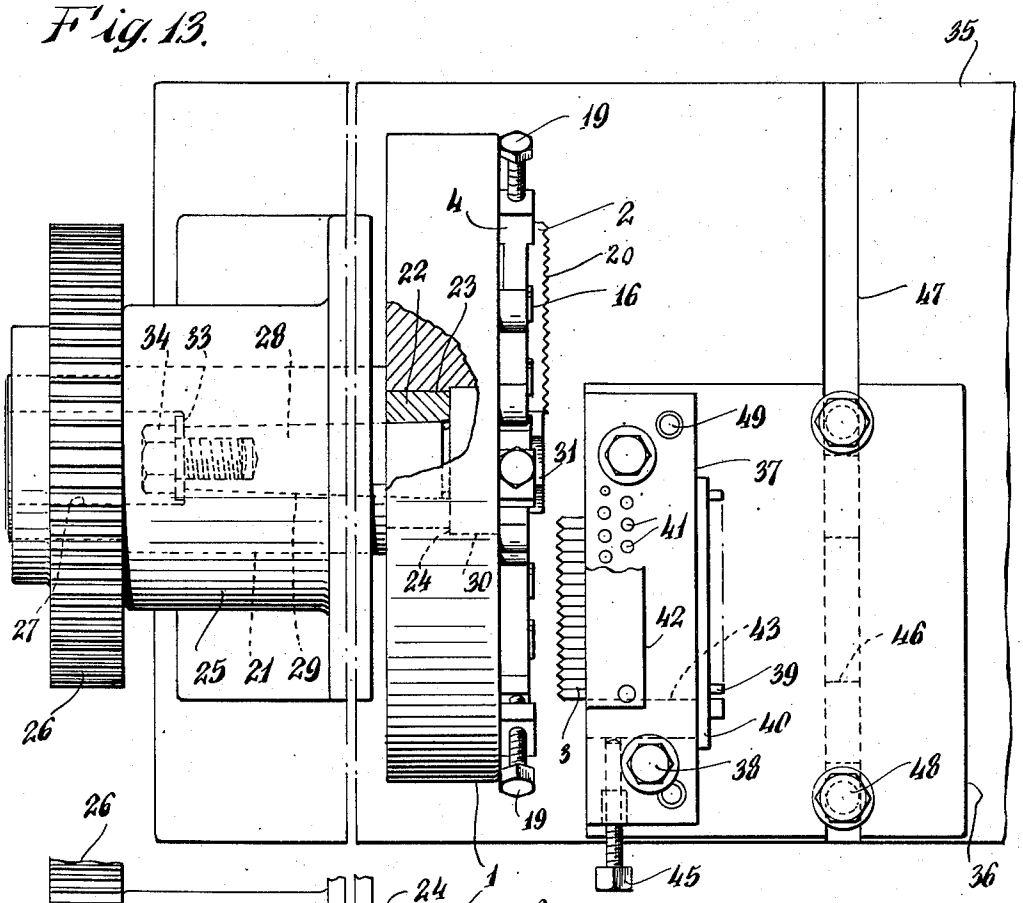
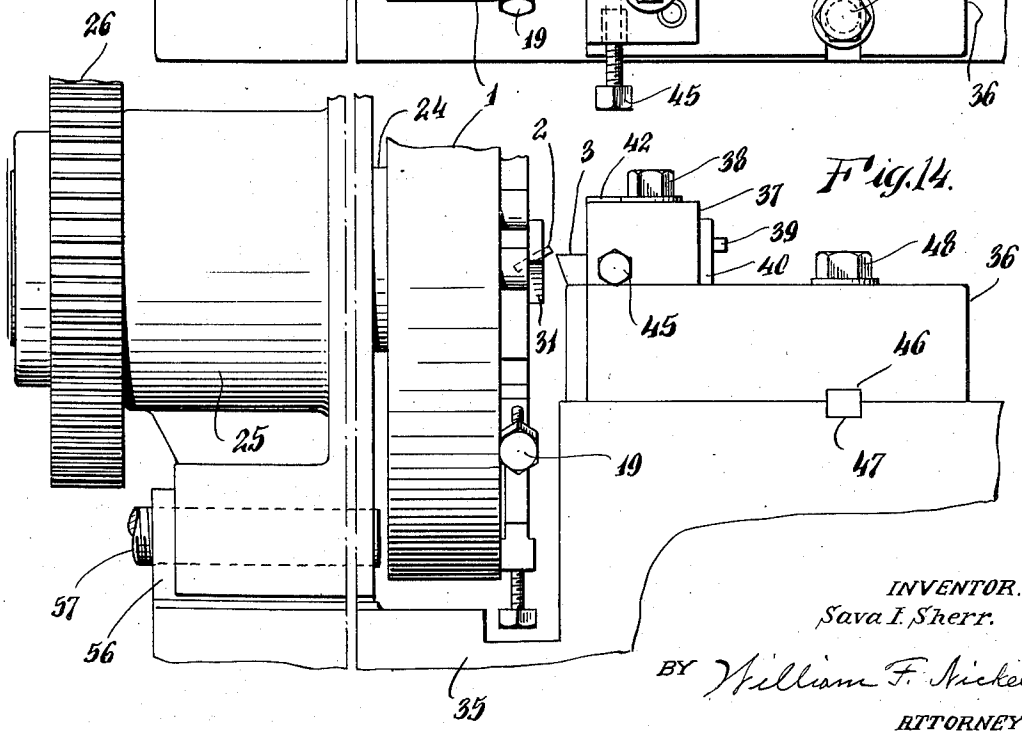


Fig. 14.



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Patented Jan. 9, 1951 2,537,164

UNITED STATES PATENT OFFICE

2,537,164

WORK HOLDER FOR PINKING SHEARS

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Application July 3, 1946, Serial No. 681,257

1 Claim. (Cl. 90—59)

1

This invention is an improvement in manufacturing machines and fixtures and particularly to manufacturing machines having a plurality or gang of cutters to form teeth in blades, made separately, for mounting in shears of the so-called pinking type.

The main object of this invention is to provide a fixture in which a blank of metal having the required hardness and other necessary properties can be securely held; and which is actuated to carry the blank repeatedly into position to be worked by the cutters, till the teeth in the blank are finished, in a manner that results in a highly uniform product with virtually no variations in the teeth as to shape, size inclination, or other characteristics. Hence with blades that are identical, no final compensating adjustments have to be made when the parts of the shears are finally assembled.

Another object of the invention is to provide apparatus that will reduce the number of steps involved in the working of separate blade members for pinking shears, and further will perform such steps quickly and efficiently, thus saving time and expense in the process; besides yielding a superior product. The assembly of the shears is thus also greatly facilitated because some of the finishing operations can even be performed after the blade members are attached to the shears, without any displacement of the blade members from their final, nicely adjusted position.

The character and advantages of the invention are fully described herein, and the novel features are defined in the appended claim. This disclosure, however, is illustrative only, and changes may be made in shape, size, arrangement of parts and other details, without departing from the essential construction in which the invention resides.

On the drawings:

Figure 1 is a front view of the plate or rotating head which carries the blanks in which teeth are to be cut and the other parts forming the principal part of my improved machine.

Figure 2 is a section on line 2—2 of Figure 1;

Figure 3 is a section on line 3—3 of Figure 1;

Figure 4 is a top view of one of the clamps carried by the rotating face plate;

Figure 5 is a side view of said clamp;

Figure 6 is an end view thereof;

Figure 7 is a top view of one of the locator blocks which cooperate with said clamp;

Figure 8 is an end view of said block;

Figure 9 is a top view of a finished blade member for the shears;

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Figure 10 is a side view of a jaw or handle member constituting the half of a pair of shears for which the blade members are intended;

Figure 11 is a section on line 11—11 of Figure 9, seen in the direction of the arrows;

Figure 12 is a view partly in section of the means for mounting the cutters;

Figure 13 is a top view of the complete machine; and

Figure 14 is a side view thereof.

This invention is designed primarily for the production of blades which are turned out separately and then mounted in place on the two main parts or jaw members of pinking shears; which are pivotally united in the completed implement.

It has heretofore been the practice, in the formation of teeth in the separately made blades of pinking shears to cut the blades on a cutting machine; several flat blanks to make the blades being held simultaneously in a vise at an angle calculated to give the proper clearance, and passing the blanks so held under a rotatable gang cutter, carrying pointed radially arranged blades extending in axial rows. This produces a series of V cuts in the edges, running from one face to the opposite face, straight back into the thickness of the blanks and inclined downward from one face to the other. It has been necessary to perform next an operation known as shearing; wherein a blade is clamped in a fixture bearing as a cutting member a master blade of opposite hand to the blade being worked; both blades having teeth and each occupying in the fixture the same relative position that two blades assume in finished shears. The blade being so worked is thereupon manually moved through an arc (this arc being controlled by the fixture) which approximates the arc of action of the shears. The longitudinal axis of this blade does not pass through the center of the arc, but the blade is so mounted that one end is near said center, and said axis is offset from said center and extends in a direction that is a little to one side of it. The longitudinal axis of the master blade is offset to the same extent on the opposite side of said center; the long axes of the two blades intersecting each other at the ends adjacent said center. The result is a shaving off of some of the metal from both inclined sides of each tooth at the edge adjacent one face of the blade, where the tooth juts out or projects to a greater extent than at the opposite face. Thus another small area of surface is imposed upon the sides of each tooth along the sharpest edges, and these small surface areas are not concentric with

the remainder of the surfaces of the teeth. Between each such movement and the subsequent one, the master blade is manually fed inward toward the blade being processed thus effecting additional removal of stock from the latter.

The feed is manual and often entails variation in depth of cut; so that no two cut blades are identical. In addition to this, due to the fact that the blade to be sheared is moved flatwise through a circular angle with one end of the blade near the axis as above stated, the cut made by the master blade is not uniform or balanced. Hence uneven wear on the master blade ensues. Also, when the master blade is re-sharpened or replaced, the tooth contour is no longer the same, causing additional discrepancies between teeth in the shear blades obtained by this method.

It has also been the practice to fasten the toothed blade of the shears to the handle by means of three screws. This way is necessary to permit minute adjustments to be made during final assembly of the shears so that the latter will cut in a satisfactory manner, the adjustment being required because of non-uniformity of the blades produced. The outstanding disadvantage of this expedient is that, under impact or great pressure the toothed blades shift in the shears; thus getting out of correct alignment and impairing or destroying the shearing action. It is then necessary to readjust the blades to restore proper functioning.

Blades with teeth that have been sheared by this method must next be subjected to a step known as lapping in which metal is removed by mounting two blades so that the flat, inclined surfaces of the teeth on one blade make contact along a line with the inclined faces of the teeth on the other blade; and rubbing the two blades together under pressure, with a fine abrasive on the contact faces of the teeth. Hence when the blades are finally fastened to the shears with screws, it is not feasible to lap the blades after the shears have been assembled; since the pressure generated by lapping would cause the blades to shift in their seats, thereby relieving the pressure, and consequently halting the erosion of the teeth by the abrasive thereon as the lapping proceeds.

Because of this objection it has been necessary to lap the blades prior to assembly by securing them rigidly in a lapping machine. This machine actuates the two blades so that they move flatwise through an arc as before; one end of each being adjacent the center of said arc; both blades being offset from said center in the same manner and to the same extent as in shearing. After lapping the blades have to be adjusted at final assembly, thus consuming much additional time.

The chief feature of this invention is an arrangement of parts by which the lateral faces of all the teeth of the blanks are formed by relative rotation of the blades and cutters about a common axis; and all such faces are radial with respect to said axis; and due to more consistent uniformity of the blades that will be produced by the apparatus of this invention, no adjustment in final assembly will be needed. Thus a more permanent mounting of the blade on the shear handle is possible, and under the new procedure this will be accomplished by doweling the blades to the shear jaws or handles. Once the blade is doweled on, it will be unable to shift either under shock or under pressure, and therefore lapping after assembly will be rendered possible.

The overall advantage thus gained is the reduction of lapping time from about four hours to twenty minutes or so, and the elimination of most of the tedious adjustments that slow the final assembly of the shears. This result, plus the elimination of the separate shearing step affords a marked increase in the production of pinking shears and a corresponding drop in manufacturing costs.

Moreover, this invention, capable of eliminating the above mentioned objections and yielding in one operation all the results previously calling for two, is fully adapted to turn out toothed blades which are more uniform, with little or no appreciable variation from blade to blade. Therefore all subsequent steps (lapping, assembly, etc.) can be performed with more ease and quickness than previously.

In the particular description of what the drawings present, the number 1 indicates a circular head or plate mounted to rotate about an axis and designed to hold on the face thereof in more or less inclined position a number of blanks of steel 2 in which teeth are to be cut. These blanks have the length and thickness indicated on Figures 9 and 11, and they are so mounted on the plate 1 as to extend outward from the axis of rotation thereof toward the perimeter of the plate; they are inclined or tilted sidewise with respect to the plane of the front of this plate. The various cutters or bits are indicated at 3 and as the plate 1 revolves each of the blanks 2 is carried past these cutters and the sharp ends of the latter shave away portions of the metal from the projecting edge of the blanks. The cutters have pointed ends with preferably straight converging edges as indicated in Figure 13, and the inclination of the blanks 2 is shown as such that as each of these blanks is carried downward past the cutters the blank is careened about its long axis and rearward with reference to the direction of motion. They may, however be inclined in the opposite direction and be worked in the same manner. Each blank 2 is secured to the face plate 1 between one of the clamps 4 and one of the locator blocks 5 which are mounted thereon.

The clamps have the general shape indicated in Figures 4, 5 and 6. Each clamp has a pair of elongated openings 7 therein; these openings having depressed seats on the outer faces of the clamps; and the top of each clamp has a laterally inclined surface 6 which slants with reference to the face plate 1. The outer end of the clamp is laterally offset as indicated at 8, and this end has a threaded opening 9, the axis of which is in line with the inclined surface 6 between the long edges thereof. The end 8 is a lateral projection separated from the surface 6 by a recess 10, and the edge 11 on the side opposite the inclined surface 6 is diagonal to the length of this clamp; the edge 11 and surface 6 converging toward the projection 8. Hence the clamp is somewhat wider at one end than at the other and the wider end is closest to the center of the plate 1.

Each of the locator blocks 5 has three countersunk openings 12 extending therethrough in the course of its length. One side thereof has an inclined face 13 which slants or tilts at the same angle as the surface 6. This face terminates at a shoulder 14 on the same side of the block, the shoulder 14 being perpendicular to the surface 13, and the remainder of the same face of the block 5 indicated at 15 is parallel to the surface 13. The faces 6 and 13 are parallel when the clamps and blocks are attached to the plate 1; and each blank 2 is secured between one of the clamps and one

of the blocks between the surfaces 6 and 13, and its inner edge abuts the shoulder 14.

The clamps 4 are secured against the face of the plate 1 by means of shoulder screws 16 that pass through the openings 7 into threaded holes in the plate 1 and the blocks 5 are attached by screws 18 passing through the holes 12 into other threaded holes in the plate. The edge 11 of each of the clamps abuts against a pair of clamp means or pins 17, the heads of which have parts of their lateral surfaces planed away to be flat and engage this surface 11 firmly; these pins fitting tightly into additional holes in the face of the plate 1. The threaded openings 9 in the projections 8 of the clamps receive adjusting screws 19. The blocks 5 are held rigidly in position by the screws 16, but the clamps can be moved a little towards the axis of the center of the plate 1, the screws 16 then sliding in the elongated holes 7, with their heads against the seats thereof. This permits the blanks or blade members 2 to be inserted between the clamps and the blocks; and when the screws 19 are turned, the inner ends thereof thrust against the blocks 4. The clamps are thus drawn outward and are moved diagonally to a slight extent, or convergently as regards the blocks 5; gripping the blade members 2 tightly between the surfaces 6 and 13 of the clamps and the blocks. In this position, the blanks are held firmly as they are revolved past the cutters 3 and worked to form the teeth 20.

As stated above and as indicated in Figures 2 and 14, the blanks 2 are held in such position as to be tilted a bit to the rear (or the front, if desired) around their longitudinal axis as they are revolved by the plate 1. This causes one corner along the outer side of this blade member to project slightly and the edge along this corner is first cut through by the cutters or bits 3, and as the operation proceeds the cutter elements 3 and the blade member 2 are moved closer and closer together to form the triangular of V-shaped teeth shown in Figure 9 of the required depth. The teeth, however, will be at an incline from one face of the blade member 2 to the other, and the lateral surface of each tooth will be a small element of a geometrical cone having its axis at the center of the plate 1.

The face plate 1 is mounted on an operating shaft 21, with a reduced end 22 that fits into a recess 23 at the rear of this plate. This recess widens out to form a shoulder 24. The shaft 21 is mounted to revolve in an upright bearing 25 and carries a gear 26 which abuts the rear end of this bearing. The shaft 21 is affixed to the face plate 1 by means of a tapered center stud 28 which fits into a central tapered bore 29 in shaft 21. The stud 28 has a cylindrical flange 30 which is received in the enlarged opening at the center of the plate beyond the shoulder 24 and seats against this shoulder. Beyond the flange 30 the center stud terminates in a hex head 31, and the face plate and the flange 30 may be bored out to provide an opening partly in the plate 1 and partly in this flange as indicated in Figure 1 to receive a dowel pin 32. This pin keys the shaft and plate together. At its opposite end the shaft 21 has a central bore 27 which extends inward as far as the adjacent end of the center stud 29 and terminates in a shoulder 33. The adjacent end of the stud 29 has a threaded opening into which is screwed a headed bolt 34; the head of this bolt seating against the shoulder 33; and thus the plate 1, the center stud 29 and the shaft 21 are all fastened together.

The bearing 25 for the shaft of the plate 1 is supported on a table or platform 35 and this platform has an elevated surface on which is mounted a carriage 36 which supports the cutters or bits 3. A clamping block 37 holds the cutters 3 in place on the carriage 36. This block is secured to the carriage 36 by screws 38, and the cutters 3 are arranged in a horizontal row on the top of the carriage. The lower face of the block 37 has a recess and the cutters lie crosswise therein, projecting towards the plate 1 at one end. Each cutter can be adjusted to project farther out of block 37 by a screw 39; one of these screws being provided for each cutter and mounted in line on a plate 40 attached to the back of the block 37. For the sake of convenience only part of the screws 39 is shown in Figure 13. Each cutter is securely held in its proper position of adjustment by a binding screw 41 in the top of the block 37, these screws projecting downward through the top of the block 37 into contact with the cutters 3. Over these screws lies a cover plate 42, normally held in place by fastening screws so that it can be removed whenever the screws 41 need to be reached. The recess in the other or lower face of the block 38 extending front to back to receive the cutters 3 side by side, also contains spacer bars or plates 43 and 44 engaged by a screw 45 in one end of the block 37, the bars or plates acting as shims, so that the cutters can be bound side by side against one another and the other end of this recess. The under face of the carriage 36 has guide shoes 46 which fit into a transverse groove 47, and the carriage 36 carries screws 48 which extend through it and into the shoes 46; so that this carriage with the block 37 and the cutters 3 can be moved across the face of the plate 1 into any desired adjusted position. The block 37 can be further secured to the member 35 by dowel pins 49.

One of the two main parts or members of a pair of shears is indicated in Figure 10 at 50. It has a depressed surface or seat 51 along one side which terminates at a shoulder 52 near the pivot aperture 53 to receive one of the blade members 2 which fits the seat and abuts the shoulder 52. The blade is attached to the part 50 by screws which are turned into the handle member 50 through three holes 54 as shown in Figure 9. Dowel pins are added, received in additional holes not shown, and then lapping can be performed as stated above.

One of the loops for the fingers of the hand is shown at 55. The teeth 20 of each member 2 are inclined from one face or side *a* to the other side *b*, the edges of the teeth at the side or face *b* being sharpest. When viewed from the left the part of the shears indicated at 50 in Figure 10 will carry the blade member 2 in such a position that the side or face *a* is uppermost; and the faces of the teeth 20 will be inclined and the sharp edges at the lower ends of the teeth will be in lowermost position, the teeth all being along the inner side of the jaw 50. The complementary blade member will have a similar seat 51 at its upper edge, opposing the seat 51 in Figure 10; and the complementary blade member 2 will be secured thereon with its face *a* in contact with the seat; and the teeth also along the inner side, so the teeth of said member slope back in an upward and outward direction. Figure 10 also indicates the arc or curvature of each face of a tooth about a common axis, which now coincides with the center of the aperture 53. When the shears are manipulated the sharper edges of the

teeth on the two blade members are carried past each other in close proximity to make the shearing cut with maximum cleanness and efficiency. When the teeth 20 are cut for the complementary blade member, the blank is affixed between the clamps 4 and blocks 5 as before, but the cutters 3 must be in slightly different position; so that, when the two finished blade members are matched with their ends flush, as indicated in Figure 9, the points of the teeth 20 on one will register exactly with the centers of the spaces between the teeth on the other. The complementary blade member will have a similar seat 51, in the other half of the shears.

The feeding of the parts of the machine to carry the cutters 3 and the blade members 2 closer and closer together as the teeth are formed can be accomplished by any suitable mechanism that either will move the carriage 36 and block 37 toward the face plate 1, as revealed in patent No. 2,289,155, granted to Samuel Briskman, or will displace the plate 1 as it revolves and carry it closer to the cutters 3. In the latter case the necessary adjustment can be made by mounting the bearing 25 upon a support 56 (Figure 14); this support resting on the table 35 and being engaged by a screw 57. This screw can be connected by suitable transmission devices to the driving connections for the short shaft 21 so as to feed the bearing 25 and face plate 1 towards the milling cutters at the required rate.

As illustrated the plate 1 is designed to carry six clamps 4 and six blocks 5 but of course a larger or smaller number can be utilized. The blocks 5 will each be perpendicular to one of the sides of the hexagonal head 31 of the center plug 28. Each blank 2 between one clamp 4 and one block 5 is held in place by the tightening of the bolt 19, which shifts the clamp backward and forces the blank against the block 5. The inner end of the blank should make contact with the head 31. The distance from the center of this head to the adjacent end of each blank will be equal to the distance from the center of the pivot opening 53 in the member 50 to the adjacent end of the blade member 2 mounted thereon, as shown in Figure 10. The screws 16 fit the slot 7 loosely enough to permit this action.

Thus the bits 3 are presented to the blanks and stock is removed therefrom. Due to the rotary motion of the face plate 1, the cuts made in the blanks are curved; that is the sides of the teeth, though apparently flat, really constitute small parts of conical surfaces concentric with the axis of rotation of the plate 1. The proper cutting clearances between the teeth of the two blades when the shears are assembled is thus assured.

As will be seen from Figure 1, the outer edges of the surfaces 13 on the blocks 5 are not radial. They do not coincide with a radius from the axis of rotation through the middle of the adjacent side of the head 31; instead such edges lie to one side of such radii and are parallel therewith. This arrangement offsets the blanks 2 with respect to the axis of rotation and the cutters 3 to such a degree that shearing is not required. This step is rendered unnecessary because the whole surface on each side of every V-shaped tooth receives from the cutters 3 in the operation of cutting the same inclination or angle with the flat faces of the blank that was previously obtained only along a thin strip across the V-shaped faces at the sharper edges of the tooth, such as are shown at the bottom face of the blade member 2 in Figure 11. That is, in prior methods of manufacture, the teeth were cut first in the blank, and then the latter was mounted in a fixture that moved about an axis, but the blade was offset from the axis to about the same extent as it is offset on the plate 1. The proper shearing effect was thus gained. Lapping was subsequently carried out; and the blade members then mounted in final position on the shear jaws or handles, but offset a little more to bring the sheared edges of the teeth somewhat closer whenever the jaws were brought together for cutting. It is therefore clear that, with this invention, the special shearing operation can be dispensed with, because the equivalent of cutting and shearing are done together.

The outer edges of the surfaces 13 of the blocks 5 may overlap the radii above mentioned; and in fact the desired results can be obtained with the clamps 4 and blocks 5 so held that said edges extend in either a radial or a non-radial direction.

The necessary lapping can then be performed as soon as the teeth are all cut in the blade members, by putting said members in place on the jaws of the shears and connecting the jaws with a pivot in the aperture 53. The jaws and the pivot will be so formed that the members 2 on the seats 51 will be offset from the axis of the pivot to the same extent as when they were secured on the plate 1. During the lapping the blades are dowelled fast on the jaws; and when lapping is completed, the pivot connecting the two jaws is adjusted to offset the blades a little further, to hold them precisely and permanently in cutting position. The shears are thus finally assembled. The shaft 21 may be driven by gear 26 or another member.

From the foregoing the nature and advantages of this invention are plain. The steps in the manufacture are reduced, the steps still necessary are performed in much less time; variations in the product are prevented and the expense of producing greatly diminished.

Having described my invention, what I believe to be new is:

A work holder for an elongated blank comprising a head, an elongated locator element and an elongated clamping element positioned on the head in adjacent side by side relationship with each other and parallel to said head, the side of said clamping element facing said locator element being beveled outwardly of said head and slanting towards said locator element, the side of said locator element adjacent said clamping element being recessed to provide an elongated shoulder adjacent said head and a beveled side parallel to but spaced from said beveled side of said clamping element to provide an undercut recess to receive a blank, means for securing said locator element to said head, means for mounting said clamping element on said plate for lengthwise sliding movement, the aforesaid clamping element having a side opposite its said beveled side extending at an angle to said beveled sides, stationary means mounted on said plate and engaging said angular related side and means to slide said clamping element whereby to move said angularly related side along said stationary means to press said beveled sides together and clamp the blank.

SAVA I. SHERR.

(References on following page)

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
693,974	Koeller et al.	Feb. 25, 1902
1,959,190	Wyner et al.	May 15, 1934
2,286,874	Schwartz	June 16, 1942
2,346,053	Smith	Apr. 4, 1944
2,353,096	Weidauer	July 4, 1944
2,390,653	Kilgore	Dec. 11, 1945
2,430,823	Nielsen	Nov. 11, 1947