

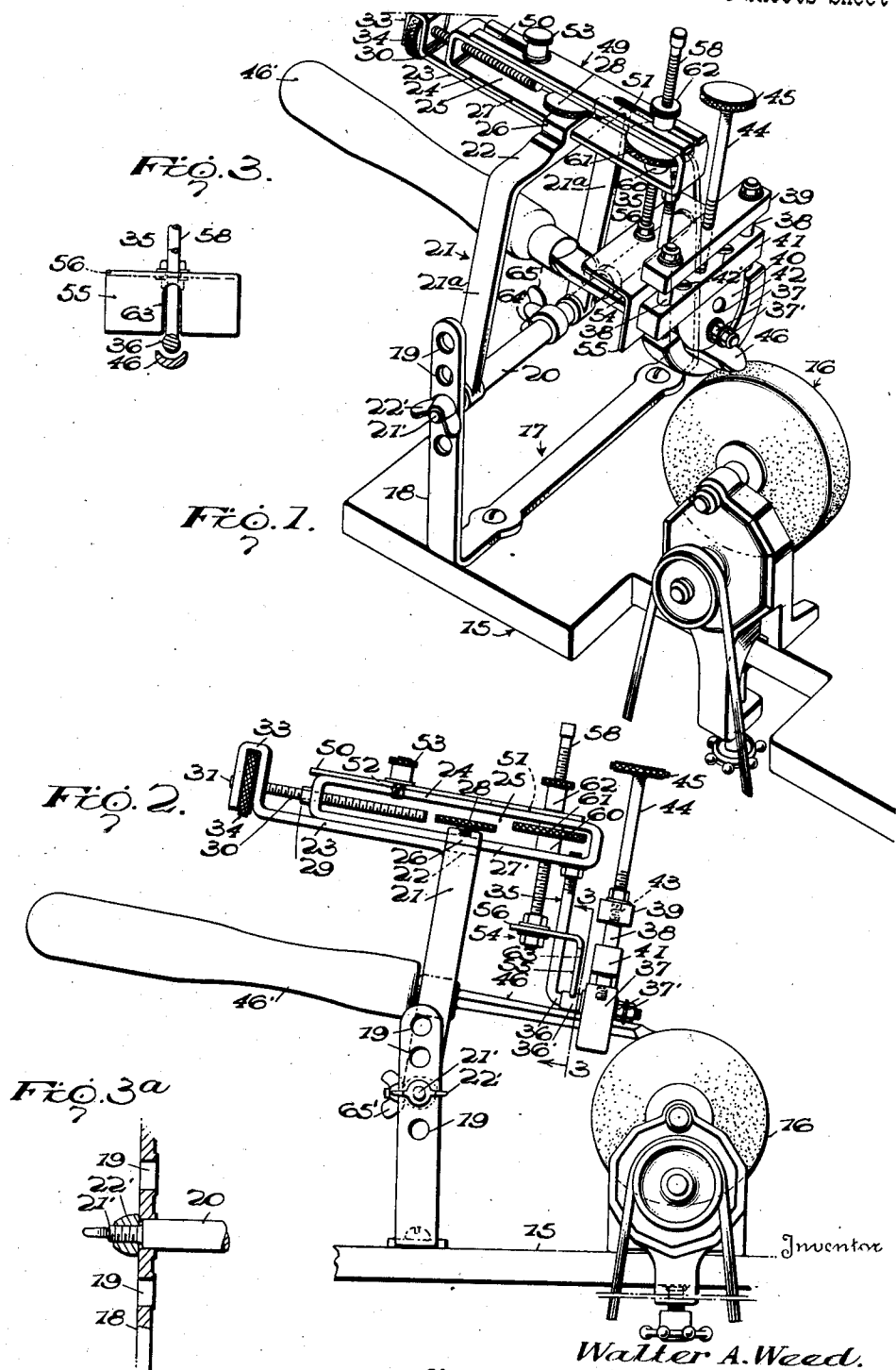
Feb. 8, 1938.

W. A. WEED
GRINDING DEVICE

2,107,921

Filed Nov. 11, 1936

4 Sheets-Sheet 1



Inventor

Walter A. Weed.

By

B. P. Ingham

Attorney

Feb. 8, 1938.

W. A. WEED

2,107,921

GRINDING DEVICE

Filed Nov. 11, 1936

4 Sheets-Sheet 2

Fig. 4.

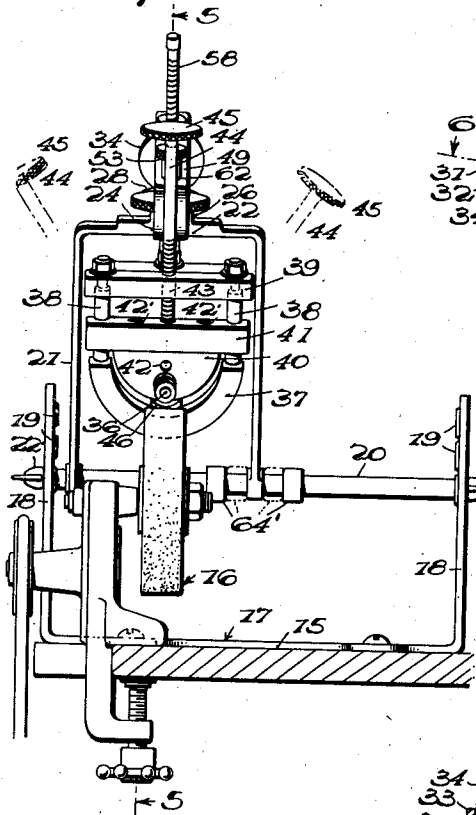


Fig. 5.

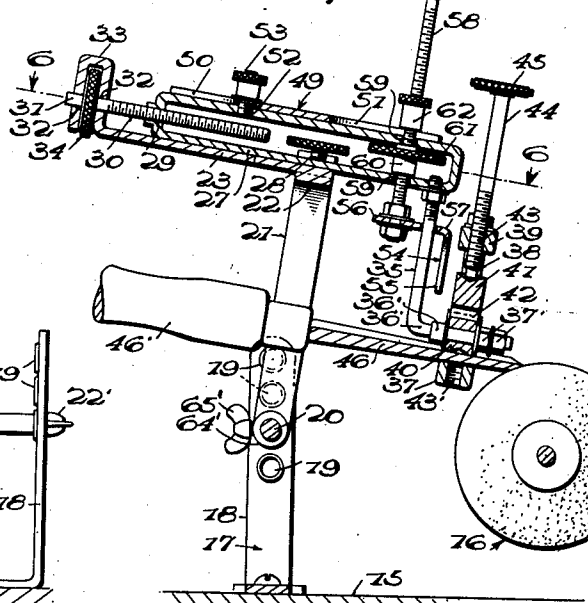


FIG. 6.

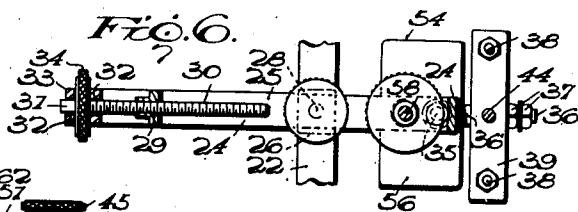
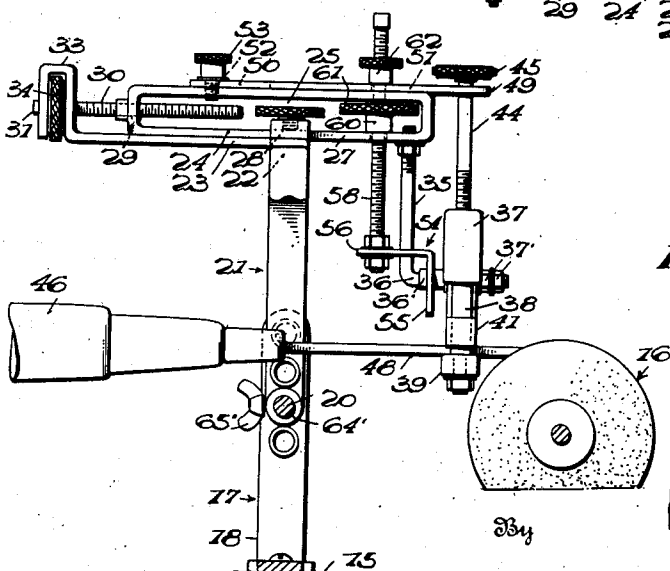


Fig. 7.



Inventor

Walter A. Weed.

B.P. Fuhlerme

Attorney

Feb. 8, 1938.

W. A. WEED
GRINDING DEVICE

2,107,921

Filed Nov. 11, 1936

4 Sheets-Sheet 3

FIG. 8

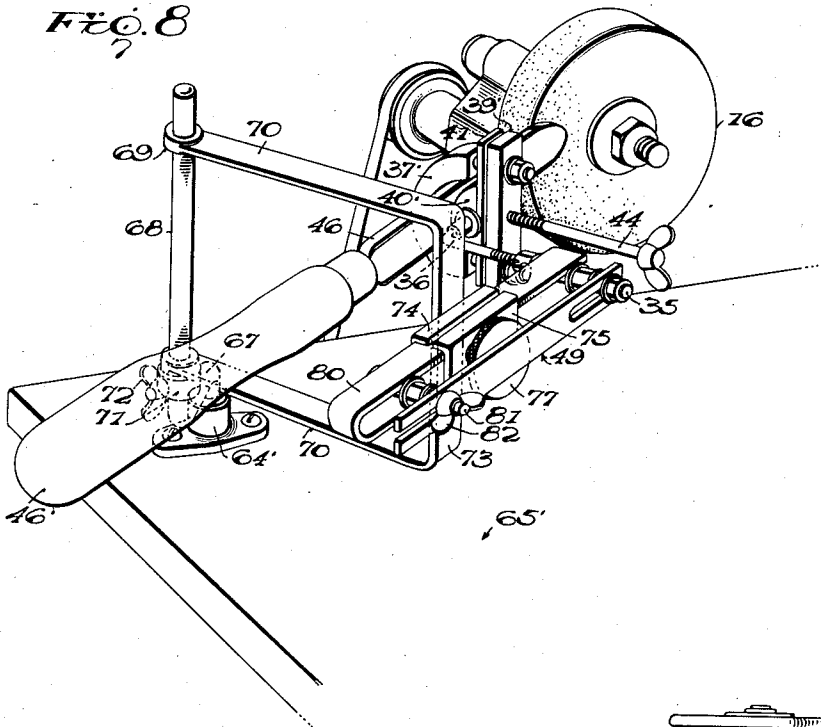
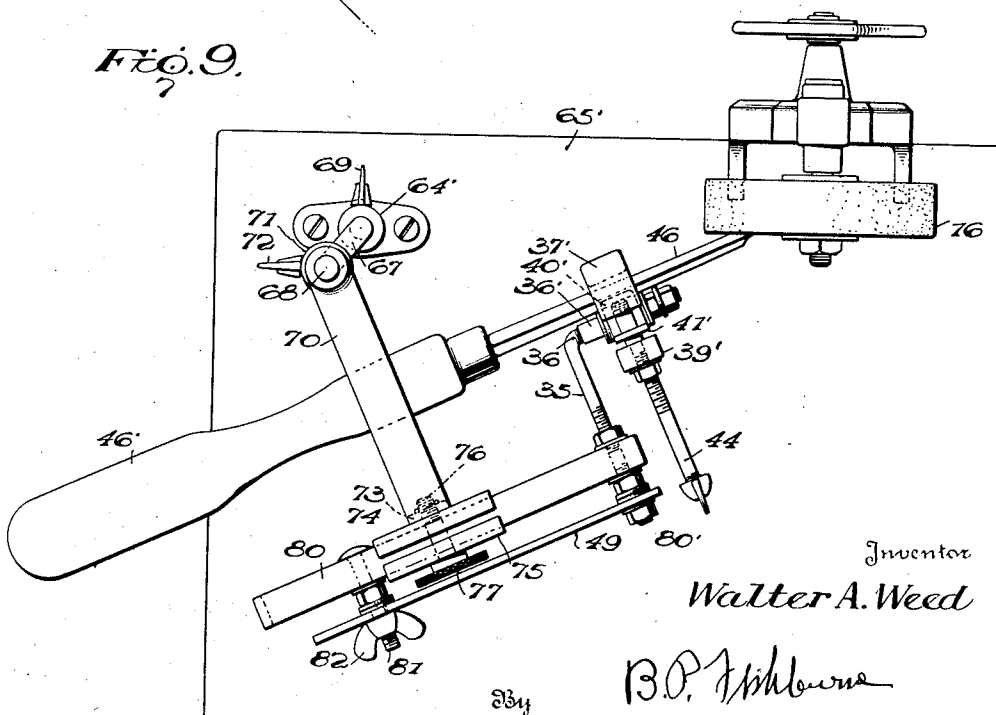


FIG. 9



Inventor
Walter A. Weed

B. P. Fishburne

Attorney

Feb. 8, 1938.

W. A. WEED

2,107,921

GRINDING DEVICE

Filed Nov. 11, 1936

4 Sheets-Sheet 4

FIG. 10.

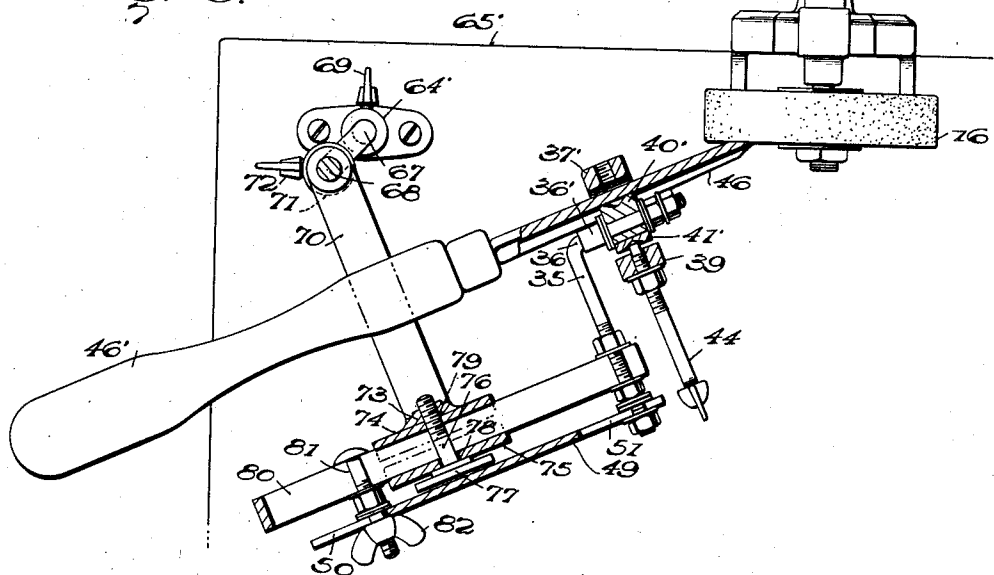
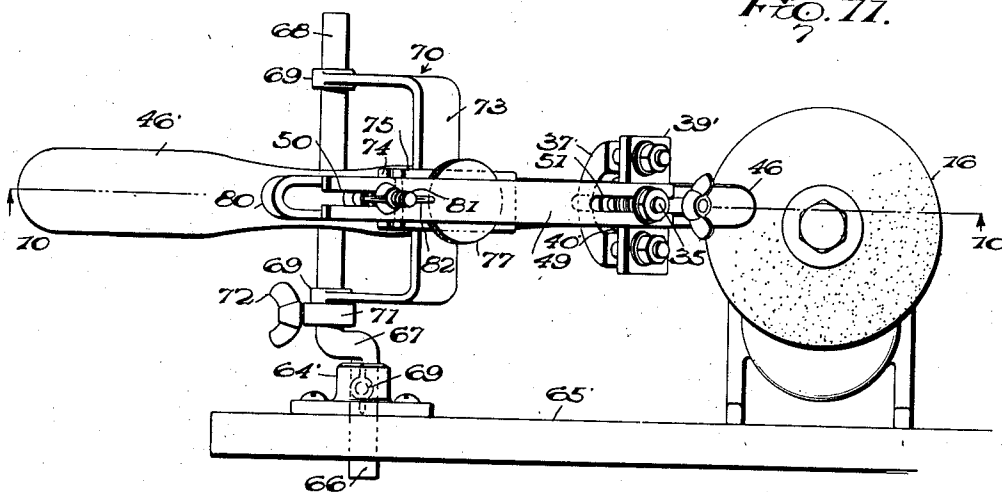


FIG. 11.



Inventor

Walter A. Weed

By

B. P. Fihlman

Attorney

UNITED STATES PATENT OFFICE

2,107,921

GRINDING DEVICE

Walter A. Weed, Lakeland, Fla.

Application November 11, 1936, Serial No. 110,395

10 Claims. (Cl. 51—234)

My invention relates to devices for sharpening or grinding tools or the like, having straight or curved cutting edges.

The important object of the invention is to provide a device of the above mentioned character which will hold and guide a tool having a beveled edge to be sharpened or ground so that the beveled edge will be tangent to the periphery of the rotary grinding element.

A further object of the invention is to provide a device of the above mentioned character which will guide the tool in its swinging movement across the face of the rotary grinder to grind or sharpen its curved edge and limit such swinging movement to insure proper action.

A further object of the invention is to provide adjustable means to limit the swinging movement of the tool holder so that the same may be used with rotary grinding elements of different sizes.

A further object of the invention is to provide means to adjust the tool holder toward and from the periphery of the grinding element so that the beveled edge of the tool will be presented at a proper angle to the grinding element.

A further object of the invention is to provide adjustable means for retaining the tool holder against swinging movement while the tool holder is being adjusted or receiving the tool therein, or while it is holding a tool having a straight cutting edge to be ground.

A further object of the invention is to provide a tool holder adapted for holding blades which are curved or flat in cross section.

A further object of the invention is to provide a device of the above mentioned character which is adapted to hold and guide the blade to the side of the rotary grinding element, at the proper angular position with relation thereto.

Other objects of advantage of the invention will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a perspective view of a grinding device embodying my invention,

Figure 2 is a side elevation of the same,

Figure 3 is a transverse section taken on line 3—3 of Figure 2,

Figure 3^a is a detailed section through the arm of the support,

Figure 4 is an end elevation of the device,

Figure 5 is a vertical longitudinal section taken on line 5—5 of Figure 4,

Figure 6 is a horizontal section taken on line 6—6 of Figure 5, parts in elevation,

Figure 7 is a side elevation, parts omitted, showing the work clamp inverted to receive a flat blade.

Figure 8 is a perspective view of a device embodying a modified form of the invention,

Figure 9 is a plan view of the same,

Figure 10 is a horizontal section taken on line 10—10 of Figure 11, parts in elevation, and,

Figure 11 is a side elevation of the device.

Attention being called first to Figures 1 to 7 inclusive, the numeral 15 designates a horizontal support or table top, upon which is mounted a grinding unit, comprising a rotary grinding element or wheel 16, which may be cylindrical. This grinding element or wheel may be a dry grinding wheel, such as emery, or it may be a wet grinding element, such as a grind stone. The grinding element 16 rotates in a vertical plane and is preferably power driven.

Arranged near and upon one side of the grinding element or wheel 16 is the work holding and guiding device, comprising a lower U-shaped support or bracket 17, rigidly attached to table top 15 and including vertical arms 18. This bracket has its longitudinal axis disposed at a right angle to the plane of rotation of the grinding element 16 and projects beyond the ends of the same, and for a considerable distance upon one end, as clearly shown in Figure 4. The vertical arms 18 are provided with spaced openings 19, extending longitudinally thereof, and these openings slidably receiving a horizontal pivot or supporting rod or element 20, having a reduced extension 21' at each end, which is threaded to receive a winged-nut 22'. The shaft or pivot element 20 is therefore, removable from within the openings 19 so that it may be inserted within selected openings 19 at the desired elevation. The winged-nuts hold the shaft 20 in place against displacement, but permit of its removal, when desired. It may be necessary to vary the elevation of the shaft or pivot element 20, to compensate for the diameter of the grinding element or wheel 16.

The numeral 21 designates a swinging support or yoke, including arms 21^a, having openings at the lower ends to slidably receive the shaft or pivot element 20. This support or yoke is therefore, pivotally mounted upon the shaft 20 so that it may be swung vertically in the plane of rotation of the grinding element or wheel 16. The support or yoke 21 is provided at its upper closed end 22 with a guide-base or strap 23, rigidly secured thereto, and this guide-base has a carriage

24 slidably mounted thereon. This carriage is preferably in the form of a loop, affording an inner passage 25. Rigidly attached to the upper closed end 22 of the yoke 21 at the end of the guide-base 23 is a transverse guide socket 26, through which the base 27 of the carriage slides. The carriage 24 is therefore capable of moving longitudinally of the guide-base 23 but can not move perceptibly transversely thereof. The guide socket 26 carries a set screw 28, by means of which the carriage 24 may be locked in the longitudinal adjusted position. The carriage is provided in its rear end with a screw-threaded opening 29, for receiving a screw threaded rod 30, 15 having a smooth portion 31, rotatable within openings 32, formed in a transverse loop 33, carried by the guide strap on base-guide 23. A milled wheel 34 operates within the loop 33 and is rigidly attached to the screw threaded rod 30. 20 It is thus seen that by turning the milled wheel 34 the carriage 24 may be longitudinally adjusted upon the guide base 23.

A vertical rod or bar 35 is rigidly attached to the forward end of the carriage 24, and depends below the same and this bar is provided at its lower end with a horizontal portion 36, disposed at a right angle to the bar 35. This horizontal portion extends longitudinally of the carriage in a forwardly direction from the same. The horizontal portion 36 is adapted to pivotally support a work holder or clamp, to be described.

The work holder or clamp comprises an outer unit including an outer curved jaw 37, rigidly attached to rods 38, which are rigidly attached to the ends of a straight outer jaw 39. The numeral 40 designates an inner coacting curved jaw of an inner unit and this jaw is secured to an inner straight jaw 41, to coact with the straight jaw 39. The jaws 40 and 41 are preferably rigidly and detachably connected by screws 42' or the like. 40 The curved jaw 40 is provided with vertical space apertures 42, for pivotally receiving the horizontal extension 36. Two or more of the openings 42 are provided to vary the elevation of the pivot of the work clamp and adjust the extent of swinging movement. The extension 36 has a shoulder or stop 36', and carries nuts 37' having screw-threaded engagement therewith. The elements 36' and 37' hold the jaw 40 against displacement. The flat stationary jaw 39 has a screw threaded opening 43, receiving the screw threaded portion of a clamping rod 44, turned by a milled wheel 45 rigidly secured thereto. The lower end of this clamping rod contacts with 55 the movable straight jaw 41 but has no screw threaded engagement therewith. It is thus seen that the blade or work 46, which is curved in cross section may be arranged between the curved surfaces of the jaws 37 and 40 and rigidly clamped 60 between them by manipulation of the clamping rod 44. By removing the clamping rod 44 from within the opening 43, and inverting the work clamp, the clamping rod 44 may then have its screw threaded portion engaged within the 65 threaded opening 43' of the stationary curved jaw 37, while its free end will contact with the upper portion of the movable curved jaw 40 but will have no screw threaded engagement therewith. With the parts so adjusted, as shown in 70 Figure 7, the work 48, which may be a flat blade, may be arranged between and clamped to the straight jaws 39 and 41.

Adjustable means are provided to hold the work holder against swinging movement upon 75 the extension or pivot 36, when the clamping rod

44 is secured to either end thereof. This means comprises a sliding latch-bar 49, arranged upon the top of the carriage 24, and having slots 50 and 51. The slot 50 is adapted to receive a screw 52, rigidly attached to the top of the carriage 24, and carrying a nut 53. The nut is employed to clamp the latch-bar in the selected adjusted position. When the latch-bar is projected forwardly, the clamping rod 44 is held within the slot 51, and hence the work clamp can not swing 10 upon its pivot 36.

Adjustable means are provided to limit the swinging or rocking movement of the work holder and work clamped therein. This means comprises a vertically adjustable stop-element 54, 15 which is L-shaped in cross section and includes a vertical web 55 and a horizontal web 56. The horizontal web is provided with an opening 57, slidably receiving the rod 35 and the horizontal web 56 has a screw threaded rod 58 rigidly attached thereto, near and rearwardly of the rod 35. This screw threaded rod operates within openings 59, formed in the top and bottom of the carriage 24 and has no screw threaded engagement with the walls of the openings 59, which 25 are not screw threaded. The screw threaded rod is therefore capable of moving longitudinally within the openings 59 and does not turn therein. An adjusting nut 60 is arranged within the carriage 24 and has screw threaded engagement 30 with the rod 58 and is provided with a milled wheel 61, by means of which it may be turned. By turning the nut 60 the screw threaded rod 58 is moved longitudinally. The screw threaded rod extends through the slot 51 in the forward end 35 of the sliding latch-bar 49, and the screw threaded rod is provided with a locking-nut 62, arranged to have clamping engagement with the sliding latch-bar 49 and hence serving to lock the rod 58 against accidental turning movement. 40 The vertical web 55 is provided with a vertical slot 63 for receiving the horizontal extension 36, when the stop-element is lowered. It is thus seen that the stop-element is vertically adjustably mounted near and rearwardly of the work 45 holder and extends in a plane parallel to the plane of rocking movement of the work holder. The vertical web 54 is disposed in the path of travel of the blade 46 of the work, and will therefore limit the rocking movement of the blade and 50 work holder, when swung in opposite directions. The adjustable stop-element serves to thus limit the rocking movement of the work transversely of and upon the periphery of the grinding wheel 16, thus retaining the blade upon this periphery, 55 during the grinding operation.

Adjustable means are provided to hold the yoke 21 against accidental longitudinal movement upon the rod 20, including collars 64', slidably mounted upon the shaft 20 and clamped thereto 60 by set screws 65'. The collars 64' may be omitted if desired.

The operation of the first form of the device embodying my invention is as follows:

When it is desired to grind the blade 46 which 65 is curved in cross section and has a beveled cutting edge, the curved jaws 37 and 40 of the work holder are arranged lowermost, as shown in Figures 1 to 5 inclusive. When these curved jaws are to be adjusted to receive and clamp the work 70 46 therebetween, the sliding latch-bar 49 is shifted to the forward position so that the clamping rod 44 is held within the forward slot 51. This holds the work holder against rocking movement and thereby renders more convenient 75

the insertion of the work 46 between the jaws 37 and 40. After the work has been placed between the jaws 37 and 40, the clamping rod 44 is turned and the inner end of this rod will force the jaw 40 toward the jaw 37, thereby securely clamping the work between these jaws. The pivoted yoke 21 tilts forwardly so that the beveled cutting edge of the work will contact with the periphery of the rotary grinding wheel 16. In order that this beveled cutting edge may be disposed at a tangent to the periphery of the grinding wheel 16, the work must be arranged at the proper angle with respect to the grinding wheel, and this is effected by longitudinally adjusting the carriage 24. This is effected by unscrewing the set screw 28 and then turning the milled wheel 34 which turns the adjusting rod. If the adjustment of the carriage 24 is forwardly toward the grinding wheel, the work is advanced toward the top of the grinding wheel and the carriage and yoke 21 are automatically swung upon their pivot 20 so that the proper angular adjustment of the work is obtained, and the carriage is moved longitudinally until the beveled edge of the work is at a tangent to the grinding surface or periphery of the grinding wheel. After this adjustment is made, set screw 28 is again screwed up and the carriage is locked in the adjusted position. It now remains to adjust the stop-element 54 vertically to properly limit the rocking movement of the work so that the entire beveled cutting edge may be brought into engagement with the periphery of the grinding wheel, and yet will not accidentally move therefrom. This adjustment is effected by moving the sliding latch-bar 49 rearwardly so that it releases the clamping rod 44 and the work clamp is free to rock. The operator grasps the handle 45' of the work and then rocks the work-holder through the medium of the work. The lock-nut 62 is first unscrewed sufficiently and the adjusting nut 60 is turned to vary the elevation of the stop-element 54, until the selected elevation is obtained, at which time the stop-element is again clamped in the adjusted position by screwing up the lock-nut 62. The operator holds the handle 46' in the hand and the grinding wheel 16 is set into rotation and the work 46 is now rocking in opposite directions, the work-holder turning upon the extension 36, and having its rocking movement limited by the contact of the work with the vertical web 54 of the stop element, Figure 3.

Should it be desired to grind the beveled edge of flat work 48, Figure 7, the clamping rod 44 is removed from within the opening 43 and the work-holder is inverted so that the straight jaws 39 and 41 are in the lowermost position. The screw threaded portion of the clamping rod 44 is now engaged within the screw threaded opening 43' of the curved jaw 37 and the clamping rod will not contact with the top of the inverted curved jaw 40. The sliding latch-bar 49 is shifted forwardly to engage with the clamping rod 49 and prevent rocking movement of the work-holder. The work 48 is now passed between the jaws 39 and 41 and clamped between them by turning the wheel 45, as is obvious. The carriage 24 is longitudinally adjusted to angularly adjust the work with respect to the grinding wheel. Since the work is flat it is not rocked during the grinding operation and hence the sliding latch-bar 49 remains in the forward position. The grinding wheel is rotated and the work may be held under suitable pressure upon

the grinding wheel by the operator holding the handle of the work or holding the carriage 24.

Particular attention is called to the fact that the sliding latch-bar 49 serves to hold the work-holder against rocking movement when the curved work is being inserted therein, and subsequently releases the work-holder for rocking movement, while the same latch-bar holds the work-holder against rocking movement during the insertion of the work therein and also during the grinding operation, when flat work is acted upon.

The collars 64' may be clamped to the rod 20 so that the yoke 21 is held against longitudinal movement upon the rod, after being adjusted thereon, or the collars 64' may be slidable thereon. When using a dry grinding wheel, it is desirable to cool the work, which may be effected by shifting the yoke to the right, Figure 4, until it clears the grinding wheel and then swinging the yoke 21 downwardly to dip the work into water held within a receptacle supported upon the table top 15.

In Figures 8 to 10 inclusive, I have shown a modified form of the device, wherein the work is applied to the end of the grinding wheel during the grinding operation. This device comprises a vertical socket 64, rigidly mounted upon the upper surface of a table top 65. This vertical socket pivotally receives the down turned vertical extension 66 of a crank 67, formed upon a vertical pivot element or shaft 68. The extension 66 may be clamped against movement within the socket 64 by a set screw 69. The vertical shaft is pivotally mounted within openings 69 formed in a horizontal support or yoke 70, the downward movement of the yoke being limited by a ring 71 which is vertically adjustable upon the rod 68 and clamped thereto by a set screw 72 or the like.

Rigidly secured to the vertical closed end 73 of the horizontally swinging yoke 70 is a stationary grooved jaw 74 of a guide including an adjustable companion grooved jaw 75. A clamping screw 76 is provided having a wheel 77 to turn it. This clamping screw passes through an opening 78 in the jaw 75 but has no screw threaded engagement therewith and the clamping screw passes through an opening 79 formed in the jaw 74 and end 73 and has screw engagement therewith. By turning the screw 78 the jaw 75 may be drawn toward the jaw 74. A hollow or loop carriage 80 is held by the jaws 74 and 75 and is longitudinally adjustable with respect to the jaws since it is slidable therein, upon the manipulation of the screw 76. This carriage is shifted manually as the adjusting screw 30 of the first form of the invention is omitted. After this adjustment, the carriage is locked in the adjusted position by screwing up the screw 76. The same supporting rod 35 and extension 36 are employed, which pivotally support the same work-holder which is quite similar to the work-holder shown and described in connection with the first form of the invention. The work-holder comprises curved jaws 37' and 40', and straight jaws 39' and 41'. The jaw 41' is thinner than jaw 41 and jaw 40' has but one opening for pivot 36. All other parts are substantially identical as shown in the first form work-holder. In this form of the invention the stop-element 54 is omitted. The same clamping rod 44 is employed. This rod is adapted to be held and released by the sliding latch-bar 49. The supporting rod 35 is rigidly attached to the forward end of the carriage 80, and in Figure 9 extends to the opposite

sides of the carriage and projects into the slot 51 of latch-bar 49. This slot receives the clamping rod 44. The sliding latch-bar 49 has its rear slot 50 slidably receiving a bolt 81, rigidly attached to the carriage 80 and carrying a winged-nut 82, adapted to clamp the latch-bar 49 in the adjusted position.

The operation of the device embodying the second form of the invention is as follows:

10 The sliding latch-bar 49 is moved forwardly so that its slot 51 receives the clamping rod 44 of the work holder, and the latch-bar may be locked in this position by manipulating the nut 82. The work 46, which is a curved blade is now
15 passed between the curved jaws 37' and 40' and clamped therebetween by turning the rod 44. The carriage 80 may be longitudinally adjusted with respect to the yoke 70, by suitably unscrewing the screw 76, and moving the carriage longitudinally toward the grinding wheel 16, subsequently to which the carriage is clamped to the
20 guide by screwing up the screw 76. Since the end of the grinder is flat, the angular adjustment of the work to bring the beveled cutting edge of the work into parallel relation with the
25 end of the grinding wheel must be effected. The horizontally swinging yoke 70 must therefore be angularly adjusted when the work engages the end of the grinding wheel. To accomplish this, the set screw 76 is unscrewed sufficiently and the
30 vertical rod 68 shifted about its extension 66, until the beveled edge of the work becomes parallel with the end of the grinding wheel at which time the set screw 69 is screwed up. When the
35 sliding latch-bar 49 is again moved rearwardly, the work-holder is free to rock, and the operator holding the handle of the work presses the work against the grinding wheel and also rocks the work and work-holder. It is obvious that by reversing the work-holder as explained in connection with the first form of the invention, flat
40 work may be held between the flat jaws 39 and 41 and the sliding latch-bar 49 will then be shifted forwardly to hold the work-holder against rocking movement. The beveled cutting edge of
45 the flat work may then be held in proper engagement with the end of the grinding wheel.

It is to be understood that the forms of my invention here shown and described are to be taken as preferred examples of the same and that various changes in the shape, size, and arrangement of parts, may be resorted to, without departing from the spirit of my invention or the scope of the subjoined claims.

53 Having thus described my invention, I claim:

1. In a grinding machine, a rotary grinding element, a movable support arranged near the grinding element to be shifted toward the same, an adjustable rocking work-holder pivotally carried by the support, a rod to adjust the work-holder to cause the same to clamp the work, and an adjustable latch carried by the support to hold and release the rod, said rocking work-holder being incapable of rocking movement when
60 the rod is held by the latch.

2. In a grinding machine, a support, a work-holder comprising an inner unit including a straight jaw at one end and a curved jaw at its opposite end, a separate outer unit having slidable engagement with the inner unit and including a straight jaw at one end thereof and arranged opposite to the first named straight jaw and a curved jaw at the opposite end of the outer unit and arranged opposite to the first named
70 curved jaw, the straight jaw and the curved jaw

of the outer unit having screw-threaded openings, a screw-threaded element for engagement within either screw-threaded opening to contact with the inner unit, and means to pivotally connect the inner unit with the support.

3. In a grinding machine, a rotary grinding element, a pivotally mounted support arranged near the grinding element and adapted to be swung in a vertical plane toward the grinding element, a longitudinally adjustable carriage
10 mounted upon the pivoted support for movement in the plane of movement of the support, means to longitudinally adjust the carriage, a rocking work-holder pivotally supported by the carriage to swing transversely of its movement so that
15 the work is shifted in engagement with the periphery of the rotary grinder, the means to limit the rocking movement of the work holder and permit of the swinging movement of the work-holder in opposite directions within the limit
20 of movement.

4. In a grinding machine, a pivoted support to be arranged near a rotary grinding element and having a part to be swung in a plane toward the grinding element, a carriage adjustably
25 mounted upon said part of the pivoted support to partake of rectilinear movement in the plane of movement of the pivoted support toward the grinding element and with relation to the pivoted support, a pivot element secured to the
30 carriage and extending longitudinally thereof, and a rocking work-holder mounted upon the pivot element to swing at generally a right angle to the movement of the carriage.

5. In a grinding machine, a support pivoted
35 near one end and having its opposite end adapted to be swung in the plane toward the grinding element, an elongated carriage adjustably mounted upon said opposite end of the pivoted support to be shifted longitudinally in a rectilinear direction with relation to the pivoted support and in the plane of movement of the pivoted support and toward the rotary grinding element, a pivot element secured to the elongated carriage and extending longitudinally
45 thereof, and a rocking work-holder supported upon the pivot element to swing at generally a right angle to the movement of the carriage.

6. In a grinding machine, a support, means for pivotally supporting the support so that its free end portion is movable toward the rotary grinding element, a carriage adjustably mounted upon the free end portion of the support and shiftable in a rectilinear direction with relation to the support and forwardly toward the work, a pivot element secured to the forward end of the carriage and extending longitudinally of the carriage, and a rocking work-holder mounted upon the pivot element to be arranged near the rotary grinding element to swing at generally a right
60 angle to the movement of the carriage.

7. In a grinding machine, a pivoted support to be arranged near a rotary grinding element and having a part to be swung in a plane toward the grinding element, a carriage adjustably mounted
65 upon said part of the support to partake of rectilinear movement in the plane of movement of the pivoted support toward the rotary grinding element and with relation to the pivoted support, a pivot element secured to the carriage and extending longitudinally thereof, a rocking work-holder mounted upon the pivoted support, a stop element arranged upon one side of the rocking work-holder to limit the rocking movement of the same, and adjustable means to move the stop
75

element in a plane substantially parallel with the plane of movement of the rocking work-holder.

5 8. In a grinding machine, a substantially vertical rotary grinding element, a vertically swinging support having a part adapted to be moved toward the grinding element, guide means fixedly secured to said part, a carriage movable toward the grinding element and slidably mounted upon the guide means, a generally horizontal pivot element secured to the carriage and extending longitudinally of the same, and a generally vertically rocking work-holder mounted upon the pivot element to swing transversely of the carriage.

10 9. In a grinding machine, a rotary grinding element, an adjustable support movable toward the grinding element, a supporting rod carried by the support, a rocking work-holder pivotally mounted upon the rod to swing generally at a right angle to the movement of the adjustable support, an adjustable stop mounted upon the rod and arranged upon one side of the work carried by the work-holder and spaced from the work when the work is in the intermediate position and engaged by the work when the work is swung

to the end of its movement in either direction, and means to move the stop longitudinally of the rod.

10. In a grinding machine, a pivoted support to be arranged near a rotary grinding element 5 for swinging movement toward the same, guide means fixedly secured to the swinging support, a carriage slidably mounted upon the guide means, means to longitudinally adjust the carriage, a pivot element extending longitudinally of the carriage and secured thereto, an adjustable work-holder mounted upon the pivot element to swing transversely of the carriage, a rod having screw threaded engagement with a part of the work-holder to adjust it, the work-holder being 15 normally free to swing in opposite directions from its intermediate position, a latch adjustably mounted upon the carriage to engage the rod when the work-holder is in the intermediate position, and a stop serving to limit the swinging 20 movement of the work-holder in either direction from the intermediate position.

WALTER A. WEED.