E. B. GARDNER.

WORK TABLE FOR GRINDING MACHINES.

APPLICATION FILED SEPT. 21, 1918.

1,337,352.

Patented Apr. 20, 1920.

3 SHEETS—SHEET 1.

Fig. 1.

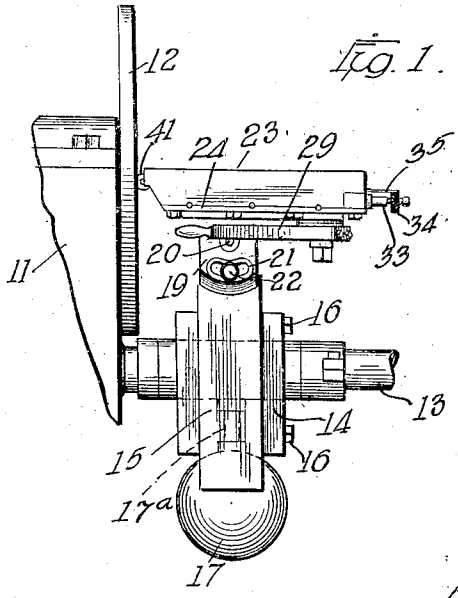
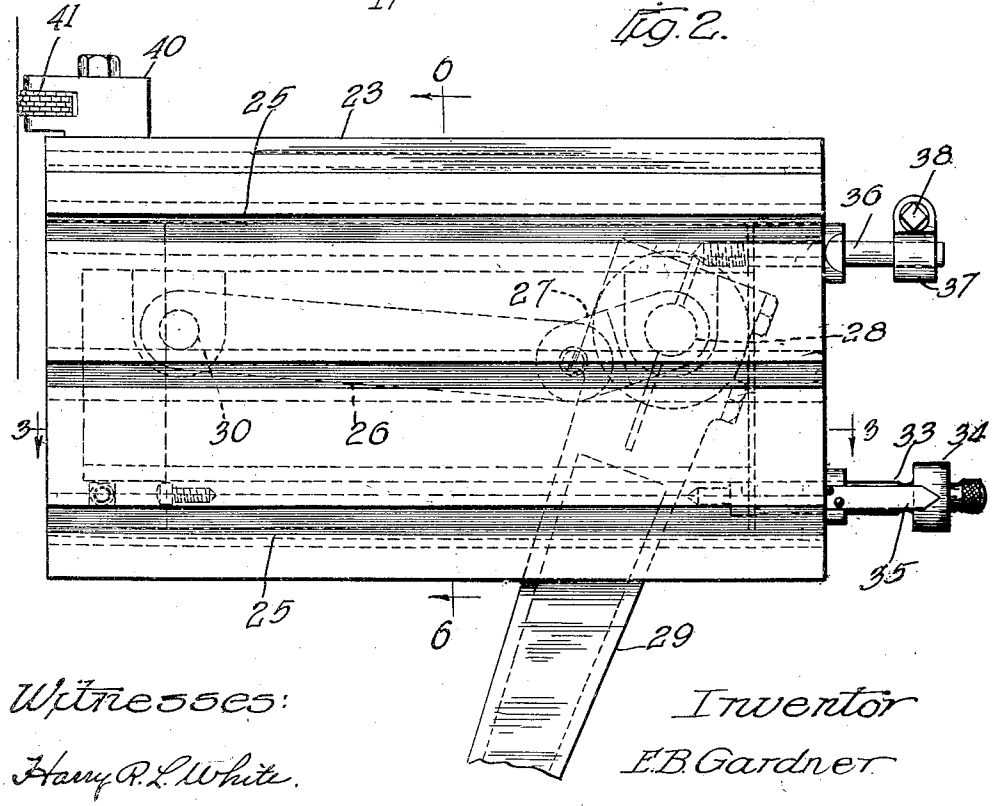


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

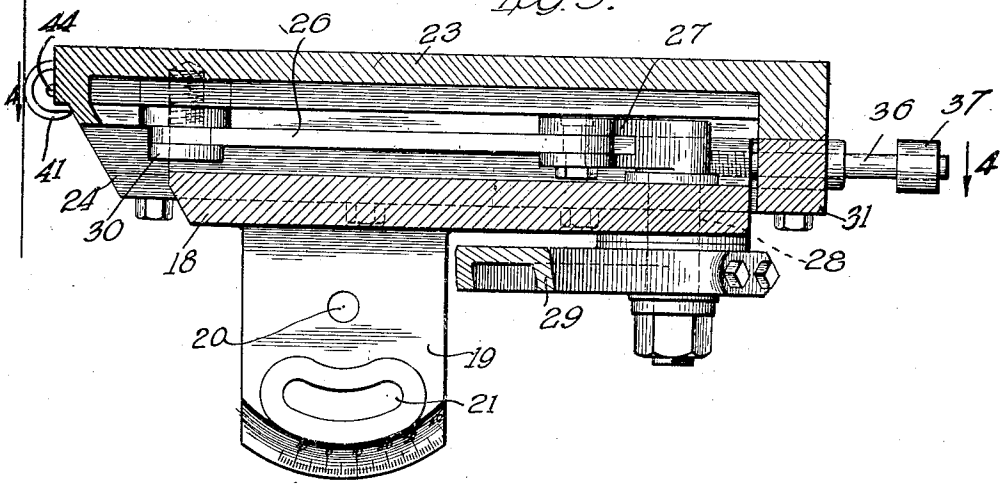
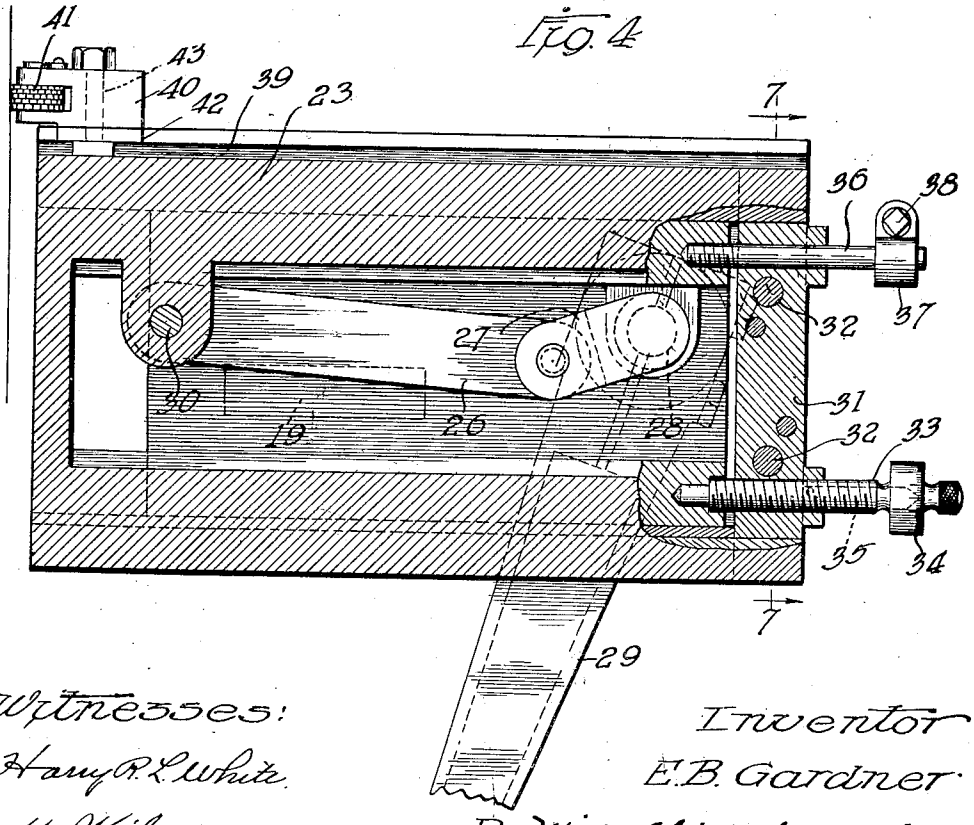


Fig. 4



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3 SHEETS—SHEET 3.

Fig. 5.

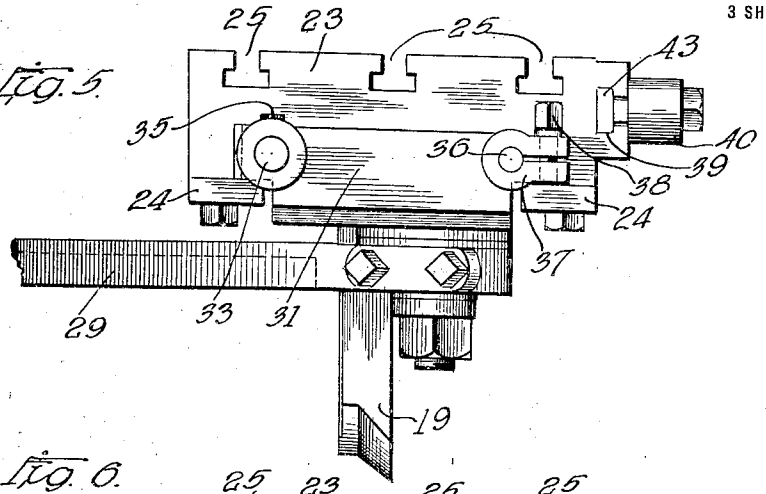


Fig. 6.

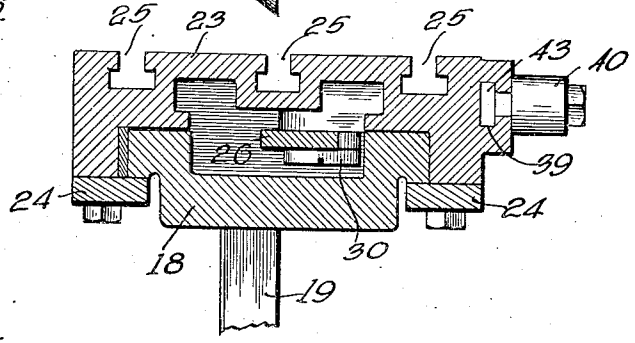


Fig. 7.

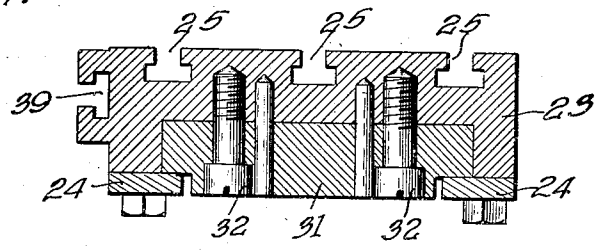


Fig. 8.

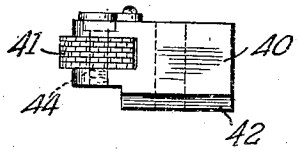


Fig. 9.

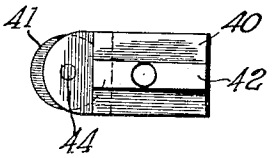
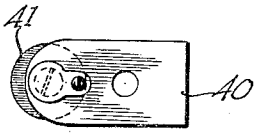


Fig. 10.



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UNITED STATES PATENT OFFICE.

EDWARD B. GARDNER, OF BELOIT, WISCONSIN, ASSIGNOR TO BADGER TOOL COMPANY, OF BELOIT, WISCONSIN, A CORPORATION OF WISCONSIN.

WORK-TABLE FOR GRINDING-MACHINES.

1,337,352. Specification of Letters Patent. Patented Apr. 20, 1920.

Application filed September 21, 1918. Serial No. 255,022.

To all whom it may concern:

Be it known that I, EDWARD B. GARDNER, a citizen of the United States, residing at Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Work-Tables for Grinding-Machines, of which the following is a specification.

This invention relates to the art of grinding machines and more particularly to a work-table for such machines comprising a support, a table top mounted thereon to slide toward and away from the grinding wheel, and means for moving said table top whereby the work clamped thereon may be pressed against the grinding wheel.

One of the objects of the invention is to provide improved means for moving the table top toward and away from the grinding wheel.

Another object is to provide adjustable means for limiting the travel of the table top in both directions.

In the accompanying drawings, Figure 1 is a side elevational view of so much of a grinding machine as is necessary to the understanding of my invention. Fig. 2 is a top plan view of the work-table detached. Fig. 3 is a longitudinal section through the work-table taken in the plane of line 3—3 of Fig. 2, and looking in the direction of the arrows. Fig. 4 is a sectional plan view in the plane of line 4—4 of Fig. 3. Fig. 5 is a rear end elevation of the work-table. Fig. 6 is a transverse sectional view in the plane of line 6—6 of Fig. 2. Fig. 7 is a transverse sectional view in the plane of line 7—7 of Fig. 4. Figs. 8, 9 and 10 are detail views of the grinding wheel dresser, Fig. 8 being a plan view and Figs. 9 and 10 elevational views of opposite sides of the dresser.

For a general understanding of the relationship of the work-table in one form of grinding machine, reference may be had to Fig. 1, which shows a disk grinder of a well-known type equipped with a work-table embodying my invention. A fragment of the body of the grinder is indicated at 11. 12 designates the grinding wheel, and 13 a bar which projects from the body of the grinder beneath the grinding wheel and constitutes the means on which the work support as a whole is mounted. A rocker box 14 is rotatably mounted on the bar 13 and has a slot or groove in which an upright bar 15 is slidably mounted, the bar being held in different positions by means of set screws 16 to support the work-table at different elevations. A counterweight 17 is fixed to the lower end of a rod 17^a which is fixed to and depends from the sleeve portion of the rocker box 14. The counterweight thus serves to hold said bar 15 in upright position.

The work-table comprises a base or support 18 having a downwardly extending lug 19 overlapping a portion of the upper end of the bar 15, being pivoted at 20 thereto and having an arcuate slot 21 through which passes a screw or bolt 22 that is seated in the bar for clamping the parts together in any desired position of angular adjustment. The parts so far described are of standard and well-known grinder construction, and form no part of the present invention.

The work-table further comprises a table top 23 slidably mounted on the support 18 to move toward and away from the grinding wheel 12. The particular shape or construction of the table top is not essential, but it preferably comprises depending flanges at opposite sides of the support 18, and two gibs 24 secured to said flanges and underlying the edges of the support. The upper face of the table is provided with undercut slots 25 through the medium of which the work may be bolted to the table top.

The means for moving the table top back and forward comprises two members 26 and 27 pivoted together at their adjacent ends, the remote ends of said members being pivotally attached respectively to the table top 23 and the support 18. In the present instance, the member 27 is fixed on the upper end of a shaft 28 which is rotatably mounted in a bearing of the support 18, the lower end of said shaft projecting through said support and having fixed thereon a horizontal hand lever 29 which projects laterally beyond one edge of the table to be grasped by the operator. The member 27 forms a crank on the upper end of the shaft 28 and the two members 26 and 27 together constitute a toggle connection between the table top and its support. The shaft 28 and the pivot 30 for the member 26 are located at or near the center of the table. By swinging the hand lever 29 toward the grinding wheel 12, the operator causes the

members 26 and 27 to move toward a position in alinement with each other, thereby advancing the table top toward the grinding wheel.

If a piece of work be fastened to the table top ready to be ground, it is desirable for the work to be pressed against the grinding wheel relatively lightly at first, in order to smooth off any rough points or projections that might injure the grinding disk if the work were immediately forced against the disk under great pressure. As the grinding proceeds, the table top is advanced farther and farther under pressure of the lever and the pressure on the work is increased.

The peculiar relationship of the parts of my operating means is such that it conforms to the most desirable mode of operation in grinding a piece of work, as above explained. When the crank member 27 is in its initial position with the table top retracted from the grinding wheel, said crank member extends more or less laterally away from its shaft 28 with respect to the table, and therefore, a given movement of the hand lever 29 will advance the work-table a maximum distance. Continued movement of the hand lever carries the crank and link members of the toggle joint into a position more and more approaching alinement, during which movement the advance of the table top in a given arc of swinging of the hand lever becomes less, but the power exerted on the table top with a given pressure on the hand lever is proportionately increased. Thus, as the grinding action of the wheel 12 on the work becomes slower, the rate of advance of the table top correspondingly slows up and the power exerted upon the table top increases so that the pressure of the operator upon the hand lever 29 is utilized to its maximum efficiency.

In some of the work-tables heretofore known the operating means has exerted its power upon one corner of the slidable table top with the result that there was a tendency toward binding along the guides. This binding tendency is entirely eliminated in my table since the pressure upon the table top is exerted along the center line of the table. My operating means is extremely powerful in action and at the same time the table top may be quickly advanced or withdrawn. These combined attributes of great power and quick movement are very desirable in a work-table of this character.

The means for limiting the travel of the table top will now be described. A block 31 is fitted between the depending flanges and gibs 24 of the table top and lies alongside the rear end of the support 18, said block being suitably fixed to the table top as by screws 32 (Fig. 7). A micrometer screw 33 is threaded in this block and is arranged to abut against the end of the support 18 to limit inward travel of the table top. A graduated head 34 on the screw coöperates with an indicator 35 projecting from the table top so that the variations in position of the stop screw may be observed. In the opposite end of the block 31 is a bearing, through which a rod 36 slidably passes, one end of said rod being threaded or otherwise anchored in the support 18 and the free end of the rod having a head 37 or other stop adjustably fixed thereon and arranged to limit the travel of the table top in a rearward direction. The head 37 is slotted as seen in Fig. 5 and is arranged to be clamped on the rod 36 by suitable means such as a screw 38.

In one edge of the table top is formed an undercut slot 39, in which is mounted a bracket 40 carrying a dresser-roller 41 for dressing the face of the grinding wheel. The bracket 40 has a rib 42 (Figs. 8 and 9) on one side entering the narrow part of the slot 39, and a bolt 43 passing through a hole in the bracket has its head engaging in the wider part of the slot and has a nut on its outer end for clamping the bracket in any desired position on the table top. The forward end of the bracket is bifurcated to form two arms between which the dresser-roller 41 is mounted on a pin or screw 44. When the grinding wheel is to be dressed, the bracket 40 is moved to the forward end of the work-table so that the dresser wheel 41 projects beyond such forward end, and the bracket is then clamped tightly in place. By means of the hand lever 29 the table top 23 may then be advanced to carry the dresser into contact with the grinding wheel and the work-table as a whole may be rocked upon the bar 13 in the usual manner to cause the dresser to travel across the face of the grinding wheel.

The wheel dresser as a whole is located below the upper surface of the table top and is a small compact device so that it occupies little room and is never in the way. It may, therefore, be left attached to the work-table at all times.

While I have described a preferred embodiment of my invention in considerable detail for the sake of clearness, I recognize the fact that various modifications may be made within the spirit and scope of the invention, and I, therefore, aim to cover in the appended claims all equivalent and alternative constructions which fall within the scope of the invention. As an example of an alternative construction, it might be mentioned that while the member 27 of the toggle connection is, in the present instance, in the form of a crank attachment to the shaft which carries the hand lever 29, it is not necessary that said member bear such relationship to the hand lever or any shaft. Other means of connecting the hand lever

to the toggle members might be provided while still retaining the advantages of my invention.

The wheel dressing means forms the subject matter of my copending application Serial No. 278,277, filed February 20, 1919, which is a division of the present application.

I claim as my invention:

1. A work-table comprising a support, a table top slidably mounted thereon, a shaft journaled in said support, a hand lever fixed on said shaft and adapted to be swung by the operator, and means disposed between said table top and said support and adapted to be actuated by said shaft for moving said table top with a gradually increasing force upon application of uniform force to said hand lever.

2. A work-table comprising a support, a table top slidable thereon, a hand lever mounted on said support, and means operable by said hand lever for moving said table top on said support with a gradually increasing force and correspondingly decreasing speed as said lever is swung on its pivot at a constant linear speed by a uniform force.

3. A work-table comprising, in combination, a support, a table top slidable thereon, a shaft journaled in said support, a handle fixed on the lower end of said shaft, and means located in the space between said support and said table top and connecting the upper end of said shaft to said top for advancing said top when said hand lever is swung.

4. A work-table comprising, in combination, a support, a table top slidable thereon, a pair of members pivoted together at their adjacent ends, the remote ends of said members being pivoted respectively to said support and said table-top, and means for swinging one of said members so as to cause said three pivot points to approach a common line to thereby move said table top with respect to said support with a gradually increasing force.

5. A work-table comprising a support, a table top slidably mounted thereon, a crank member pivoted on said support, a link pivoted at one end to said table top and at its other end to said crank, said crank and link being inclosed between said support and said top, and a hand lever connected to said crank whereby the crank may be actuated to move said top relatively to said support.

6. A work-table comprising a support, a table top slidably mounted thereon, a hand lever and mechanism operable by said hand lever for moving said top on said support with a gradually increasing force and decreasing speed, and said mechanism comprising relatively movable members arranged to exert a moving force upon said top along a substantially medial line.

7. A work-table comprising, in combination, a support, a table top slidable thereon, a stop screw carried by said table top and adapted to abut against a part of said support to limit the travel of the table top in one direction, a rod fixed at one end in the support, and a stop adjustably mounted on said rod arranged to form an abutment for a part on the table top to limit the travel of the table top in the opposite direction.

8. A work-table comprising, in combination, a support, a table top having sides and a rear end overhanging the sides and end of said support, a rod fixed at one end in said support and projecting slidably through an opening in the depending end of said table top, and a stop adjustably mounted on said rod and forming an abutment to be engaged by said end of the table top for limiting travel of the table top in one direction.

9. A work-table comprising, in combination, a support, a table top slidable thereon, means adjustably mounted on said top to abut against a part on said support for limiting the travel of the top in one direction, and adjustable means carried by the support and arranged to be engaged by a part on the top for limiting the travel of said top in the opposite direction.

10. A work-table comprising a support, a table top slidably mounted thereon, a hand lever pivoted on said support, and means inclosed between said top and said support and operable by said lever to exert a moving force upon said top along a substantially medial line.

In testimony whereof, I have hereunto set my hand.

EDWARD B. GARDNER.