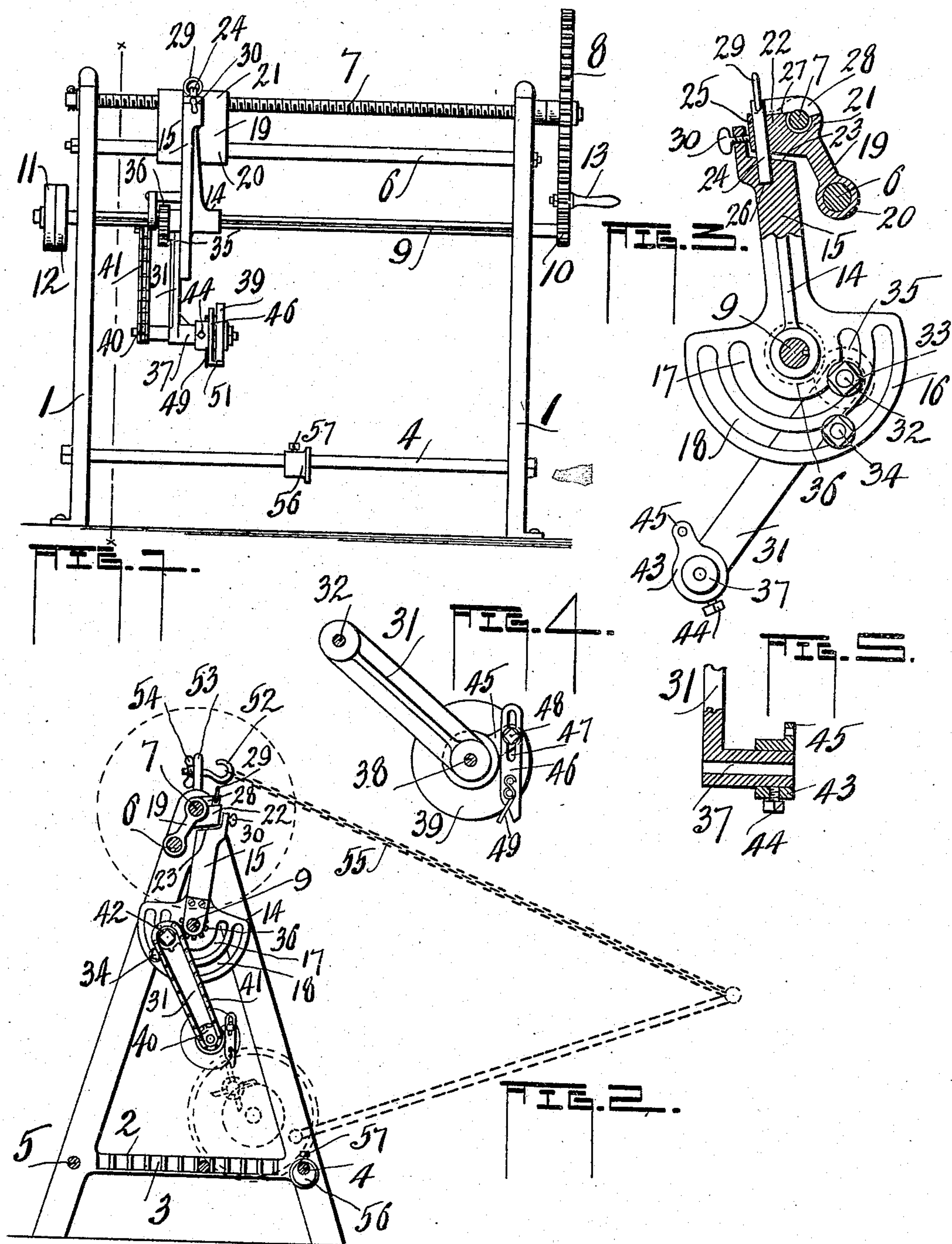


A. C. WARNER.
GRINDING MACHINE.
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937,035.

Patented Oct. 12, 1909.



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UNITED STATES PATENT OFFICE.

ALBERT C. WARNER, OF PEORIA, ILLINOIS, ASSIGNOR TO PEORIA LAWN MOWER GRINDER CO., OF PEORIA, ILLINOIS, A CORPORATION OF ILLINOIS.

GRINDING-MACHINE.

937,035.

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To all whom it may concern:

Be it known that I, ALBERT C. WARNER, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Grinding-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to certain new and useful improvements in grinding machines and has particular reference to that class of machines for grinding or sharpening lawn-mower blades.

The object which I have in view is to provide a machine where the arm supporting the grinding wheel is capable of a great amount of adjustment, and wherein the support for the arm which carries the grinding wheel is swingably and slidably carried on the shaft, through which motion is imparted to the grinding wheel.

The invention has for its further object an adjustable supporting arm which carries the grinding wheel and a guide which is carried adjacent to and cooperating with the grinding wheel which is adjustably carried on an extension of the said arm; and a further object is the detachable connection of the support which carries the adjustable arm, with a supplemental support slidably carried on a threaded shaft, connection between the said supplemental support and first mentioned support, being a key for locking the two parts together which has an extension serving as a traveling nut in engagement with the threads of the threaded bar.

For a further and full description of the invention herein and the merits thereof, and also to acquire a knowledge of the details of construction of the means for effecting the result, reference is had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which:

Figure 1 is a front elevation of a grinding machine embodying my invention; Fig. 2 is a section on the line $x-x$ of Fig. 1, and in addition, showing in dotted lines, the manner of supporting a lawn-mower with

one of its blades against the grinding wheel; Fig. 3 is a detached and enlarged side elevation partly in section of the support to which is adjustably attached the arm which carries the grinding wheel and showing the connection between the said support and the supplemental support which is slidable on the threaded shaft; Fig. 4 is a side elevation enlarged, of the arm which carries the grinding wheel and the adjustable guide carried thereby; Fig. 5 is a sectional detail enlarged, of the lower end of the adjustable arm and a revolubly adjustable collar or sleeve which supports the guide.

Like numerals of reference indicate corresponding parts throughout the figures.

In the drawings, the machine is shown consisting of a pair of standards 1 which support the working parts to be described. The standards are substantially A shaped, as shown in the drawings, and are provided with the cross braces 2 having the notched or cut-out portions 3, as shown in Fig. 2. The legs of the opposite standards are connected at their lower ends by means of the stationary rods 4 and 5 and at or near their upper ends, by the stationary rod 6. Journalled in the upper ends of the said standards 1, is shown a threaded shaft 7, which passes out through one of the standards and on the outer end thereto is carried a large gear wheel 8. Also suitably journalled in the standards 1 and disposed at a suitable distance beneath and parallel with the threaded shaft 7, is a grooved driving shaft 9, on one end of which is a pinion 10 meshing with the wheel 8 and on the opposite end of the said shaft, is seen a pair of pulleys 11 and 12. Although not shown, it is adapted to make both of these pulleys fast with the shaft 9, or one loose and the other fast, which will adapt the same being connected with suitable power mechanism for driving said shaft, or in the event that manual power is used, the said shaft 9 may be actuated by means of an operator turning the wheel 8 and through the handle 13, when the pulleys 11 and 12 would be made fast to the shaft and serve as a fly wheel.

Slidably and swingably carried on the shaft 9, is shown a support 14 having the elongated neck portion 15 and the wing or flared portion 16. The wing or flared portion 16 is provided with a pair of semi-circular slots 17 and 18, struck on an arc of

a circle whose center is the center of the shaft 9.

19 denotes a supplemental support having a tubular portion 20 serving as a bearing and slidably carried on the stationary rod 6 and provided with a further tubular portion 21 which serves as a bearing and is slidably carried on the threaded shaft 7, and 22 indicates a neck or extension of the supplemental support which is adapted to overlies the cut-out portion 23 of the upper end of the neck of the support 4, and it is adapted to lock the support 14 to the supplemental support 19 by means of a finger or pin 24, serving as a key which is adapted to be inserted through a perforation 25 in the neck 22 of the supplemental support 19 and also a socket 26 in the upper end of the neck 15 of the support 14. The bearing portion 21 of the supplemental support 19 and the extension 22 thereof, is provided with a cut out portion or slot 27 in which is adapted to be seated a laterally disposed finger 28 of the key 24 and engaging with the threads of the threaded bar 7, somewhat as shown in Fig. 3, serves as a nut and in the rotation of the threaded shaft 7, feeds the supplemental support 19 and the support 14, from one side of the machine to the other. The key 24, as well as the extension 28 thereof, it is understood, is detachable to adapt the disconnection of the support 14 from the supplemental support 19, and to enable an operator to easily remove the same, I have provided the ring 29, which serves as a finger hold and adapts the removal of the said key. And to adjust the supplemental support 19 and the said support 14 in a position somewhat as shown in Fig. 3, where there is space between the matching faces of the extension 22 of the supplemental support and the upper edge 23 of the neck 15 of the support 14, I have provided the thumb screw 30 for locking the position of the said parts after the insertion of the key. From the description, it will be understood, that upon the release of the support 14 it will swing downward in the direction of the arrow, shown in Fig. 3, for a purpose to be described.

31 indicates an arm of suitable length adapted to be supported by the support 14. Its connection with the support 14 is through a threaded spindle or bolt 32 adapted to be carried through the slot 17 of the wing or flared portion 16 and retained in a fixed position by means of a nut 33. From an examination of the figures, it will be seen, that by releasing the nut 33, the spindle or bolt 32 may be placed at different points in the slot 27, or the arm 31 which is carried thereby, may be swung on the bolt 32, which serves as a pivot therefor; as a further means for securing the arm 31, I provide the bolt 34 which is adjustable in the slot 18 of the wing or flared portion 16, against which

the lower edge of the arm 31 bears, substantially as seen in Figs. 2 and 3. On one end of the spindle or bolt 32, is carried a gear wheel 35 which is continuously in mesh with and driven by the gear wheel 36, slidable upon and revoluble with the driving shaft 9.

The lower end of the arm 31 is provided with a laterally carried tubular extension 37, in which is journaled a short spindle 38, on one end of which is carried a grinding wheel 39, consisting of emery or other suitable material, and on the opposite end of the said spindle is a sprocket pinion 40 connected by a sprocket chain 41 engaging a sprocket pinion 42 carried on the end of the spindle or bolt 32 opposite to that on which the gear 35 is secured. Thus it will be seen, were power transmitted to the shaft 9, it in turn would transmit motion to the grinding wheel 39 through the gears 36 and 35 and the sprocket pinions 42 and 40. Revolvably adjustable on the tubular extension of the arm 31, is a sleeve or collar 43, adapted to be fixed in adjusted positions by means of the bolt 44, and the said sleeve or collar is provided with the arm extension 45, as clearly seen in Figs. 4 and 5, which is positioned adjacent to the face of the grinding wheel 39. Slidably adjustable on this arm 45 of the sleeve or collar 43, is a guide 46 slotted as at 47, through which is carried a bolt 48 which is secured in the arm 45. Unloosening the bolt 44, it will be seen that the sleeve 43, together with the guide 46, are revolubly adjustable on the extension 47, and that by unloosening the bolt 48, the guide 46 may be slidably adjusted on the arm 45 or swung into different positions on the bolt 48, which serves as a pivot. The adjustment of the sleeve 43, also the guide 46, is to adapt the machine to lawn-mowers of different sizes and also to compensate for wear of the grinding wheel 39. On one face of the guide 46, is a spring 49 between which and the tapered edge 50 of the guide 46, it is adapted to place the cutting blades of the mower, when grinding, substantially as seen in Fig. 2; the lower end of the guide 46 having the lateral extension 51, see Fig. 1, which crosses in front of the peripheral surface of the grinding wheel 39.

In Fig. 2, in dotted lines, enough of a lawn-mower is shown to illustrate the manner of supporting the same for the purpose of sharpening or grinding the blades thereof. In supporting the mower, the wheels rest on the rod or brace 4 and a detachable and movable rod 4', the opposite ends of which are adapted to be seated in the notches 3 of the braces 2 of the standards. The diameter of the mower wheels will determine the position of the rod 4, which it is believed is understood, and by means of the adjustment of the spindle 32, on which the arm 31 is hung, and the adjustment of

the sleeve 43 and the guide 46, will enable the operator to properly fix the position of the grinding wheel with reference to the blades of the mower and the lower end of the guide with its spring which engages the blades, as seen in Fig. 2. For the purpose of holding the mower in the position shown in Fig. 2, whereby an operator will not have to hold the same, I have provided the hook 52 carried in an extension 53 of one of the standards and which is engaged by a winged nut 54, and 55 is a chain, one end of which is attached to the hook 52 and the opposite end looped about the end of the handle of the mower for holding the same elevated, as shown. The looping of the chain in connection with the hook 52 where one or more turns of the winged nut will change the position of the said hook, adapts the minute adjustment of the mower in connection with the grinding devices.

In the construction of mowers, the axis of the shaft carrying the blades and the spindles or journals for the mower wheels are supposed to be parallel, but it is found that sometimes the construction is irregular and the distance between the centers of the opposite wheels and the opposite ends of the blades shaft, are not at the same distance apart, which would mean, that unless this irregularity could be provided for, the grinding of the blades would be irregular. To anticipate such construction in mowers and overcome such irregularities, I have provided a collar 56 which is eccentrically carried on the rod 4 and slidably adjustable thereon, by means of the adjusting screw 57. In the event that a mower, when placed on the machine, is found to be lower at one end than at the other, the collar 56 is positioned on the rod 4 beneath the wheel at that end on the machine which is the lowest, and so adjusted as to elevate the blade to make it uniform throughout.

The advantage of the detachable connection between the upper end of the support 14 and the supplemental support 19, whereby when the support 14 is released, it will swing in the direction indicated by the arrow in Fig. 3, is, that when the grinding devices have moved from one end of the machine to the other, to remove the mower, it is only necessary to detach the key 24 when the support 14 will drop and raise the grinding device out of the way of the blades and adapt the mower to be easily removed.

I am aware that machines intended for the purposes herein, are not broadly new and that grinding wheels have been slidably and rotatably carried on a driving shaft, but that the support for the said grinding wheel is fixed relative to any adjustment which will change the position of the wheel or guiding devices, if they are used in connection therewith; and I am not aware that any grinding

device for the blades, in connection with the grinding wheel, has ever been employed where the support for the guide is rotatably adjustable and where the guide itself is adjustable on such a support. Furthermore, I am not aware of any adjustment, such as I show, for the irregularity in the construction of the lawn-mower, where the grinding of the blades will be uniform.

Attention is here called to the non-revoluble shaft 6, on which is slidably carried the lower portion of the supplemental support 19, which is for the purpose of making a rigid connection for the support 14. In carrying the grinding wheel in an adjustable manner, wherein the same is not slidably carried on the driving shaft, the least variation between the shafts 7 and 9 would cause a slight vibration in the grinding wheel, inasmuch as it is desirable to have the operation of such grinding wheel as near correct as it is possible to get it, I have provided the connection, such as the shaft 6, for the supplemental support 19, so that when the key 24 is in position and the screw 30 locking the extension of the support 14 with the extension of the supplemental support 19, the arrangement is such that the grinding wheel is as rigid as though it were revoluble on the driving shaft.

Having thus fully described my invention, what I claim and desire to secure by Letters Patent of the United States, is:—

1. In a device of the character described, the combination of a threaded shaft, a driving shaft, means for driving said shaft, a support slidably carried on the driving shaft having a slotted extension, connections between such support and the threaded shaft, an arm having an adjustable connection with the slotted extension of said support and swingable on said support, a grinding wheel revolubly carried on the free end of said arm, and means for transmitting motion from the driving shaft to the grinding wheel.

2. In a device of the character described, the combination of a slidably carried support, a threaded shaft and connection between said shaft and the said support, an arm pivotally connected at one end with said support and capable of having its pivotal point adjusted in an arc of a circle, the body of said arm and its free end being free to be swung into different angles when adjusted, a grinding wheel revolubly carried on the free end of said arm, driving mechanism, and connection between such mechanism and the grinding wheel.

3. In a device of the character described, the combination of a slidably carried support having a depending semi-circular flared extension, a threaded shaft, connection between such threaded shaft and an upper extension of said support, an arm having an

adjustable connection at one end with the flared extension of the support, a grinding wheel revolubly mounted on the free end of said arm, driving mechanism, and connection between such mechanism and the grinding wheel.

4. In a device of the character described, the combination of a slidably carried support having a depending semi-circular flared extension provided with a semicircular slot, a threaded shaft, connection between such shaft and an upper extension of said support, an arm carried by a spindle at one end and the said spindle carried through and adjustable in the slot of the said support, a grinding wheel revolubly mounted on the free end of said arm, driving mechanism, and connection between such mechanism and the grinding wheel.

5. In a device of the character described, the combination of a slidably carried support having a flared extension provided with a pair of parallel spaced semicircular slots, a threaded shaft and connection between such shaft and the support, an arm carried by a spindle at one end and the said spindle carried through one of said slots and adjustable thereon, a member adjustably carried through the other slot of the said support which is adapted to engage one edge of the said arm, a grinding wheel revolubly mounted on the free end of said arm, driving mechanism, and connection between such mechanism and the grinding wheel.

6. In a device of the character described, the combination of a slidably carried support, a threaded shaft and connection between said shaft and the said support, an arm connected with said support, a grinding wheel revolubly connected with the lower end of said arm, a guide adjustably carried on the lower end of said arm adjacent to said wheel, driving mechanism, and connection between the said mechanism and said wheel.

7. In a device of the character described, the combination of a slidably carried support, a threaded shaft and connection between said shaft and the said support, an arm adjustably connected with said support, a grinding wheel revolubly connected with the lower end of said arm, a guide adjustably carried on the lower end of said arm adjacent to said wheel, driving mechanism, and connection between the said mechanism and said wheel.

8. In a device of the character described, the combination of a slidably carried support, a threaded shaft and connection between said shaft and the said support, an arm connected at one end to the said support and having a tubular extension at its lower end, a spindle journaled in the said extension of the arm, a grinding wheel mounted on one end of said spindle, a guide support

revolubly adjustable on the arm extension, a guide attached to said guide support, driving mechanism and connection between the said mechanism and the spindle aforesaid.

9. In a device of the character described, the combination of a slidably carried support, a threaded shaft and connection between said shaft and the said support, an arm connected at one end to the said support and having a tubular extension at its lower end, a spindle journaled in the said extension of the arm, a grinding wheel mounted on one end of said spindle, a guide support revolubly adjustable on the arm extension, a guide adjustably connected with the said guide support, a spring attached to said guide, driving mechanism and connection between the said mechanism and the spindle aforesaid.

10. In a device of the character described, the combination of a slidably carried support, a threaded shaft and connection between said shaft and the said support, an arm adjustably hung at one end of the said support, a rest for the said arm also adjustable on the said support, the arm provided at its lower end with a tubular extension, a spindle revolubly mounted in said extension, a grinding wheel on one end of said spindle, a guide support revolubly adjustable on the extension of the arm, a guide adjustably connected with the said guide support, driving mechanism and connection between the said mechanism and the spindle aforesaid.

11. In a device of the character described, the combination of a threaded shaft, a driving shaft and a non-revoluble shaft, a support swingably and slidably carried on the driving shaft, a supplemental support slidably connected with the threaded and non-revoluble shafts, a key for locking the said supports together, said key provided with means for engaging the threads of the threaded shaft, an arm connected with the swingable support, a grinding wheel revolubly carried on the lower end of said arm, connections between the driving and threaded shafts, and connections between the driving shaft and the grinding wheel.

12. In a device of the character described, the combination of a threaded shaft, a driving shaft and a non-revoluble shaft, a support swingably and slidably carried on the driving shaft and having a slotted and flared extension, a supplemental support slidably connected with the threaded and non-revoluble shafts, a detachable key for locking the said supports together, said key provided with means for engaging the threads of the threaded shaft, an arm carried at its upper end by a spindle slidably adjustable in the slot of the support aforesaid, a grinding wheel revolubly carried on the lower end of said arm, connections between the driving and the threaded shafts,

and connections between the driving shaft and the grinding wheel.

13. In a device of the character described, the combination of a threaded shaft, a driving shaft and a non-revoluble shaft, a support swingably and slidably carried on the driving shaft and having a slotted and flared extension, a supplemental support slidably connected with the threaded and non-revoluble shafts, a detachable key for locking the said supports together, said key provided with means for engaging the threads of the threaded shaft, an arm carried at its upper end by a spindle slidably adjustable in the slot of the support aforesaid, said arm also adapted to have a swinging connection with the said spindle, a grinding wheel revolubly carried on the lower end of said arm, connections between the driving and the threaded shafts, and connections between the driving shaft and the grinding wheel.

14. In a device of the character described, the combination of a driving shaft, a threaded shaft and a non-revoluble shaft, driving connections between the threaded and the driving shafts, a support revolubly carried on the driving shaft, a supplemental support slidably carried on the threaded and non-revoluble shafts, and the said supplemental support having a transverse slot in

its upper face, a key having a detachable connection with both of said supports for connecting the same and provided with an extension adapted to be seated in the slot of the supplemental support and to engage the threads of the threaded shaft, a grinding wheel suitably supported by the swinging support, and driving connections between the driving shaft and the grinding wheel.

15. In a device of the character described, a supporting frame comprising a pair of standards, rods connecting the standards at their lower ends, and a driving and a threaded shaft journaled in the upper ends of said standards, a support slidably carried on the driving shaft, connections between the threaded shaft and the said support, a grinding wheel suitably supported by the said support, and a sleeve eccentrically and adjustably carried on one of the rods connecting the lower ends of the said standards, a driving mechanism for the said shafts and the grinding wheel, all arranged substantially in the manner and for the purposes set forth.

In testimony whereof I affix my signature, in presence of two witnesses.

ALBERT C. WARNER.

Witnesses:

ROBT. N. McCORMICK,
CHAS. N. LA PORTE.