

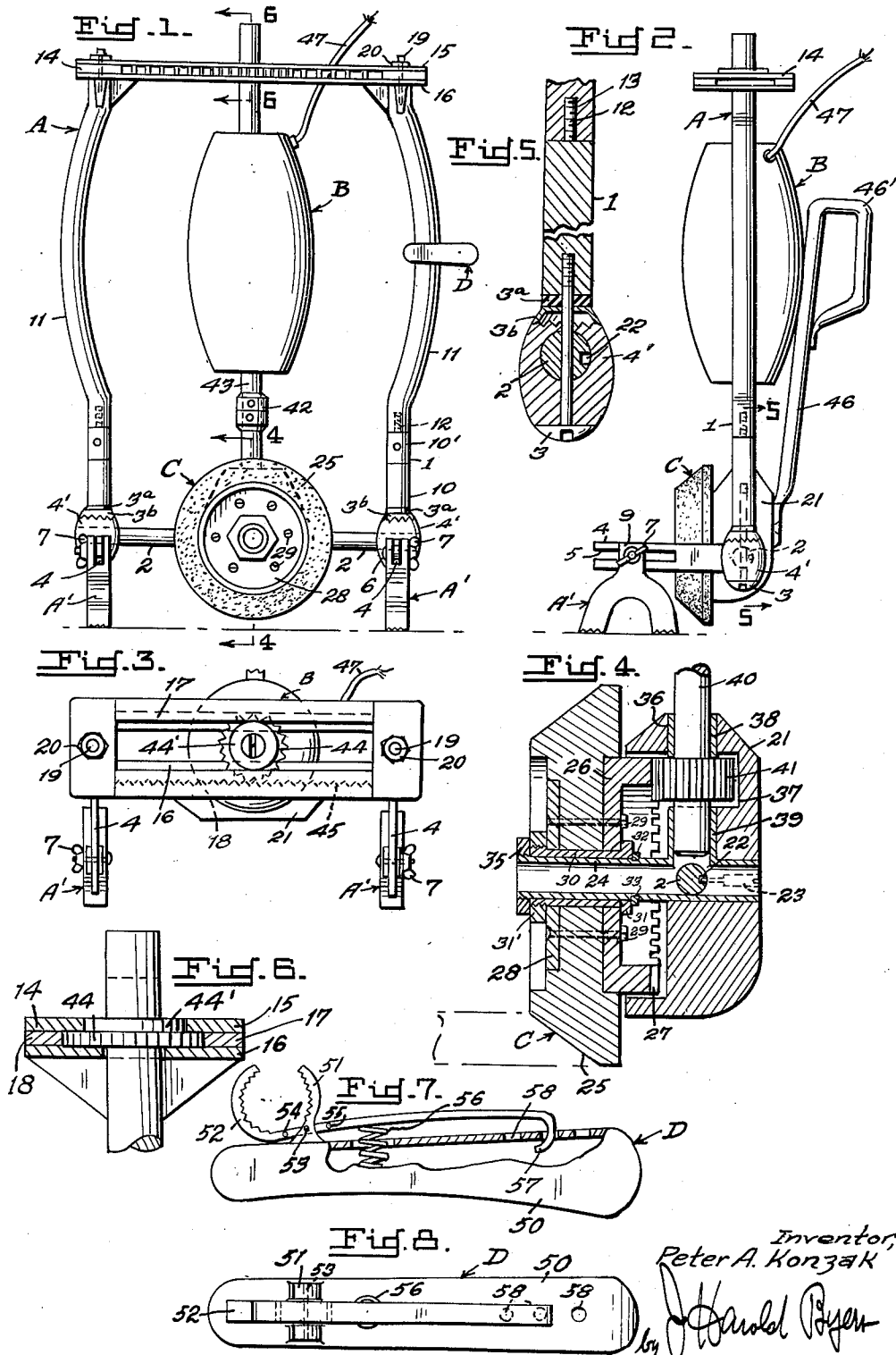
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MOWER SECTION GRINDER

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MOWER SECTION GRINDER

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1 Claim. (Cl. 51—173)

This invention relates to a blade sharpener and particularly to a hand-operated power-driven sharpener for the blades of agricultural machinery such as mowing machines.

In mowing machines of a known design the knives or sickles are formed of substantially flat triangular shaped teeth or sections having angularly disposed cutting edges. Due to wear and damage in the course of use, the edges become dull, worn or damaged, and require frequent resharpening. Devices hitherto available for performing the sharpening operation leave much to be desired in convenience and portability, and involve a serious danger to the operator when the sharpening is carried out with the blades in motion. Due to these factors, the costly replacement of sections rather than the resharpening thereof is frequently preferred.

It is an object of the present invention to provide a machine which can be used to sharpen the cutting edges of the sections without removing the knife, and thus saving the time involved in disassembling and reassembling.

It is a further object of this invention to provide a machine for the described purposes which will simplify the said sharpening operation.

A further object of the invention is the provision of a machine that will rapidly and efficiently sharpen mower blade sections.

A further object of the invention is the provision of a hand-operated power-driven machine that will be fully portable and can be taken into the field and operated from a tractor battery as a source of power.

In general, the machine constituting the subject matter of the present invention comprises a grinding or sharpening wheel rotatably driven by a motor, the wheel and motor being supported by a frame provided with foot members adapted to support the frame, the wheel being laterally movable with respect to the frame, together with the appurtenant part of the motor driving means, in a direction following an edge of the section being sharpened, and being further movable about an axis spaced from the grinding surface, the arrangement being such as to permit the frame to be stationed firmly with respect to the section, and to enable the operator to bring the periphery of the rotating wheel into proper contact with the section and to grind the wheel along the section edge to sharpen same, the wheel being formed of or provided with a suitable abrasive material of available type.

The various features and novel characteristics of the present invention are pointed out with particularity in the claim annexed to and forming a part of this specification. However, for a better understanding of the invention, the advantages thereof, and the manner in which same may be practiced, reference now is made to the accompanying drawings and description wherein is illustrated and described a preferred embodiment of the invention.

Figure 1 is a front elevation of the grinding machine.

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Figure 2 is a side elevation looking toward Figure 1 from the right.

Figure 3 is a top plan view of the machine of Figure 1.

Figure 4 is a detailed sectional view on line 4—4 of Figure 1.

Figure 5 is a detailed sectional view on line 5—5 of Figure 2.

Figure 6 is a detailed sectional view on line 6—6 of Figure 1.

Figure 7 is a side elevation of a handle forming an element of the invention.

Figure 8 is a plan view of the handle of Figure 7.

The grinding machine of the present invention consists essentially of a supporting frame A having feet A' and a motor B driving a grinding wheel C. A handle D is engageable with the frame to assist in positioning the machine.

Frame A is formed of two standards 1, 1 connected at their lower ends by a longitudinal bar 2 and at their upper ends by a longitudinal sub-frame 14. The bar 2 is joined to the standard at each end through the laterally extending member 4. This member is formed at one end with an enlarged portion 4' having a bore receiving the end of bar 2. The enlargement 4' and bar 2 have aligned openings, and screw 3 extends through these openings and is threaded into the standard 1 to hold the parts in assembled position. A rubber washer 3A and spring member 3B are interposed between each portion 4' and standard 1 to reduce the effect of vibration and decrease the tendency for the fastening to become loose.

The other end of member 4 is slotted at 5 to receive a bolt 6 having wing nut 7 to clamp foot A' to the member 4. The head portion 9 of the foot A' is slotted to receive the member 4 and has two legs extending downwardly in an inverted U-shape to form a support for the frame. The slotted connection and bolt provide an adjustable connection so that the frame may be adjusted laterally and angularly with respect to the feet A'. By spacing this connection laterally of the grinding surface 25 of grinding wheel C, the wheel may be adjusted vertically and angularly.

Each standard is formed of two sections, a lower straight section 10 and an upper, outwardly bowed section 11. The upper end 10' of the lower section 10 carries a threaded stem 12 and is swivelly connected to the main body of the section, and the lower end of the upper section 11 is internally threaded at 13 to receive said stem.

The top of the supporting frame A composed of sub-frame 14 is formed by top and bottom plates 15, 16 separated by intermediate spacers 17, 18, the sub-frame being clamped together and secured to the standards 1, 1 by studs 19 extending from the standards and carrying nuts 20.

Slidably mounted on the cross-bar 2 is the grinding wheel carrier 21. The bar 2 is grooved along one side at 22 and the carrier member 21 has a stud 23 threaded into the member and extending into said groove to prevent rotation of the carrier member. A stud shaft formed as a hollow sleeve 24 is fixed in the member 21 and extends outwardly of the member to support the grinding wheel C. Secured to opposite sides of the grinding wheel are plate 26 carrying crown gear 27 and plate 28, bolts 29 fastening these plates to the grinding wheel. The grinding wheel and gear assembly is mounted on a bearing, here shown as a bearing sleeve 30 having flange 31 and a ring 31' threaded on the end of the sleeve. A split ring 32 located in groove 33 in sleeve 24 forms an inner abutment for sleeve 30. A nut 35 threaded on the end of sleeve 24 prevents endwise movement of bearing sleeve 30.

The carrier member 21 is formed with bore 36 extend-

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ing vertically at right angles to the stud shaft 24, the member also having an enlarged recess 37 intersecting said bore. Bearing sleeves 38, 39 are fixed in the ends of the bore on opposite sides of the recess. A shaft 40 extends into said bore and carries a gear 41 fixed thereon and positioned in the recess 37. The gear may be fixed on the shaft in any suitable manner by driving the end of the shaft through the gear positioned in the recess. This gear 41 meshes with crown gear 27 to drive the grinding wheel C.

Opposite end of shaft 40 is connected by a separable coupling 42 to shaft 43 of motor B. The end of the shaft projecting from the opposite end of the motor extends through a toothed member 44 rotatable on the shaft and guided between the plates 15, 16 of member 14. One of the spacer plates 18 is correspondingly toothed at 45 for engagement by the rotating member 44. A bearing member 44' on the shaft also serves to guide the shaft in member 14.

The motor casing and member 21 are longitudinally movable between the standards 1, 1 along the bar 2 and sub-frame 14, and are connected by a rigid member 46 having a handle 46', so as to facilitate operation of the grinding wheel and strengthen the movable assembly. The motor is here shown as an electric motor having leads 47.

The handle D shown in Figures 7 and 8 is provided for releasably engaging one of the standards to hold the frame in position. The body 50 of this handle is formed of hollow metal construction with a fixed curved jaw 51 integral therewith. This fixed jaw is bifurcated as seen in Figure 8 to receive an opposed movable jaw 52. A pintle pin 53 extends through openings 54, 55 in the fixed and movable jaws to enable the movable jaw to be moved toward the fixed jaw for engaging one of the standards. The opposite end of the movable jaw member extends along the body 50 and is curved upwardly therefrom, so that pressure of the hand will straighten the bowed portion to pivot the movable jaw towards the fixed jaw. A coil spring 56 extending from the body 50 engages the bowed portion to maintain the jaws in open position.

The movable jaw has a plurality of openings 55 so that the spacing of the jaws may be adjusted by selecting the proper opening to receive the pintle. At the opposite end the movable jaw carries a shoulder hook portion 57 adapted to engage in one of several openings 58 to keep the bowed portion from separating from the body. These openings correspond in position to the openings, for the pintle pin.

The motor provided may be either adapted for regular line voltage or for battery voltage. In the latter case, the grinding machine may be carried into the field for use whenever needed without returning to the source of power. However, the machine is so constructed that the usual hand drill may be used in place of the motor. For this purpose the motor is uncoupled at 42, the upper portions 11 of the standards are removed and the sub-frame 14 is fastened directly to the lower sections 10 of the standards. The hand drill chuck may then engage the shaft 40 to rotate a grinding wheel.

In operation, the mower knife is positioned along the ground with the edges of the knife sections facing in one direction clear of the guards, so that the grinding wheel can freely engage the edges. Then the grinding machine is positioned with the frame extending along one

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of the edges to be sharpened, and the frame is adjusted on the feet A' by means of slots 5 and wing nuts 7 to align the surface 25 of the grinding wheel C with the beveled edge of the knife section. With the grinder properly aligned, the wheel may be moved along the knife edge by means of handle 46', the frame being held properly positioned by grasping the standards 1 as by use of the separable handle D. In this way, one edge of each knife section is sharpened and then the knife is moved to expose the opposite edges which are sharpened by the same procedure. In this manner, the mower knife can be accurately sharpened without removing the knife from the machine, and without the consequent delay and inconvenience.

The structure shown is for the purpose of illustrating one embodiment of this invention. It is obvious that other specific embodiments may be designed without departing from the essential characteristics of the invention, which are defined in the claim below.

I claim:

A portable, hand operable grinder for sharpening a cutting instrument having a plurality of angularly disposed cutting edges, comprising a grinding wheel having a peripheral grinding surface, a motor, and a normally upstanding, substantially rectangular frame, comprising two generally vertical side members, a lower horizontal bar and an upper horizontal member, the latter member comprising two substantially parallel spaced plates jointly defining a laterally extending rectangular opening, said horizontal member being provided with a laterally extending rack, each end of said horizontal member being affixed to the upper end portion of one said vertical side members, a plurality of laterally spaced feet having openings to receive adjustable attaching means, forwardly extending members provided with respective enlarged portions, each of said enlarged portions being swivelly connected with the lower portions of each of said vertical side members, a substantially vertical motor shaft extending through and beyond each side of said motor, the upper extension of said shaft bearing a coaxial rotatable guide member engaging the rectangular opening and bearing a toothed pinion engaging the rack in said upper horizontal member, the lower extension of said motor shaft being provided with a spur gear, said grinding wheel being mounted on a shaft journaled in a carrier member provided with a laterally extending bore for slidably receiving said horizontal bar, said grinding wheel shaft being disposed at right angles to said motor shaft, said grinding wheel shaft being provided with a crown gear meshing with said spur gear, whereby said grinding wheel and said motor may be moved in a lateral direction within said frame, and said frame together with said grinding wheel and motor may be tilted manually with respect to a particular cutting edge of said cutting instrument.

References Cited in the file of this patent

UNITED STATES PATENTS

817,226	Davis	Apr. 10, 1906
1,390,501	Clarke	Sept. 13, 1921
1,968,609	Madsen	July 31, 1934
2,476,594	Gingrich	July 19, 1949
2,530,479	Pater et al.	Nov. 21, 1950
2,613,483	Lewis et al.	Oct. 14, 1952
2,736,601	Hoffmann	Feb. 28, 1956
2,845,753	Lavond	Aug. 5, 1958