

No. 648,648.

Patented May 1, 1900.

H. ALLEN.
MOWER KNIFE GRINDER.

(Application filed Aug. 15, 1898.)

(No Model.)

4 Sheets—Sheet 1.

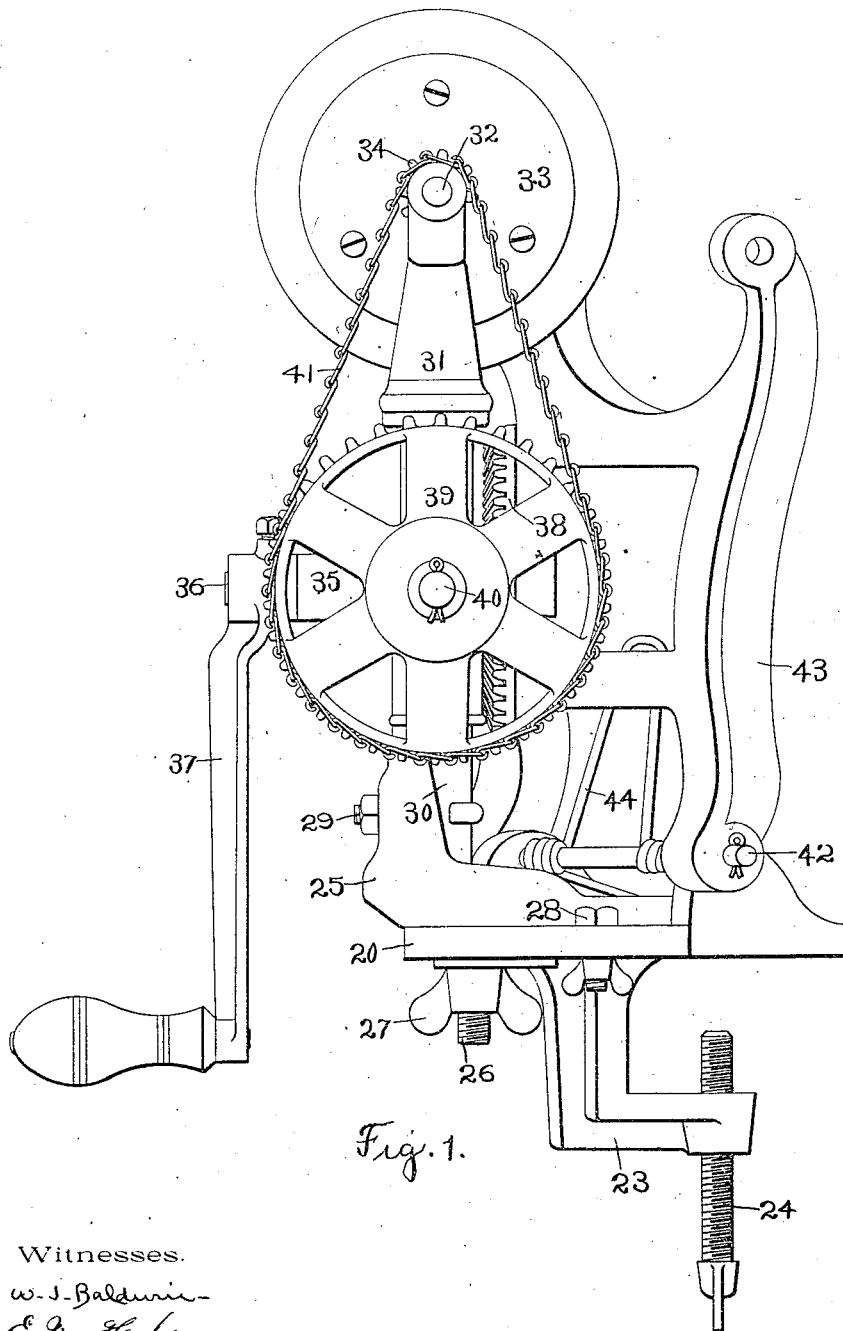


Fig. 1.

Witnesses.
W. J. Baldwin
E. M. Healy

Inventor.
H. Allen.
By
Smithgate & Smithgate
Attorneys

No. 648,648.

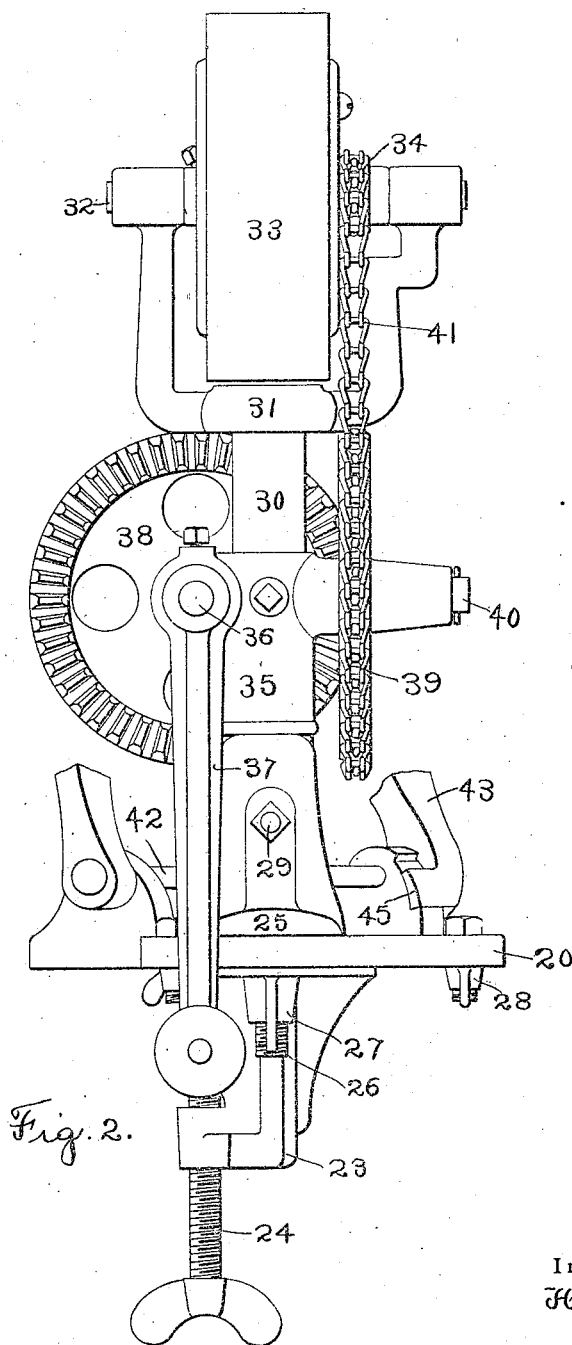
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4 Sheets—Sheet 2.



Witnesses.

W. J. Balsani-
E. M. Kelly.

Inventor.

H. Allen.

By

Smithgate & Smithgate
Attorneys.

No. 648,648.

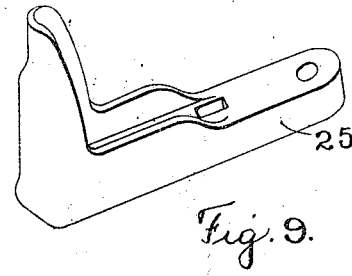
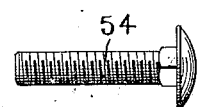
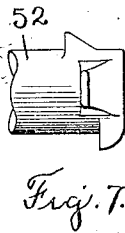
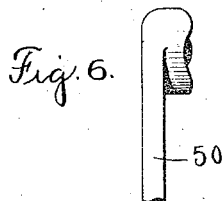
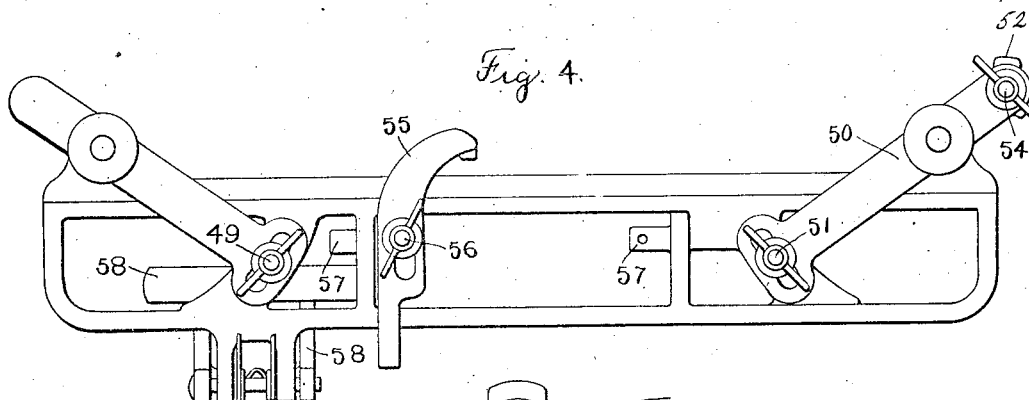
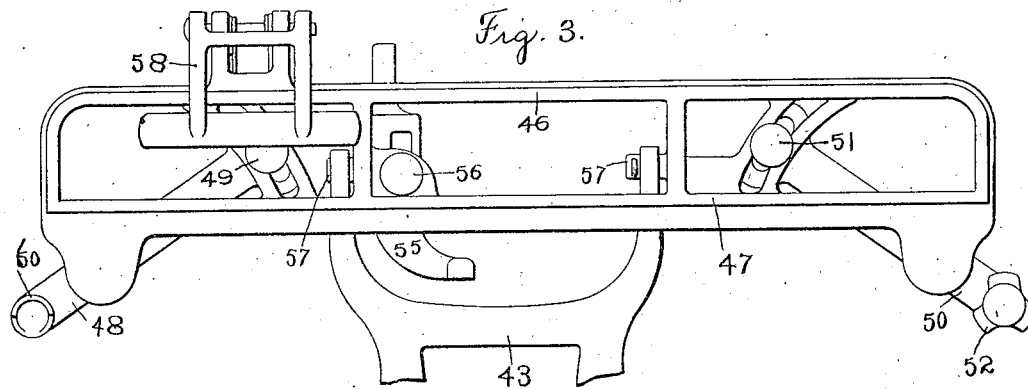
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(No Model.)

4 Sheets—Sheet 3.



Witnesses.
W. J. Baldwin
E. M. Hardy

Inventor.
H. Allen.
By
Smithgate & Smithgate
Attorneys.

No. 648,648.

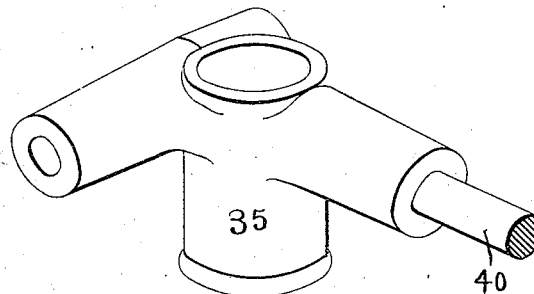
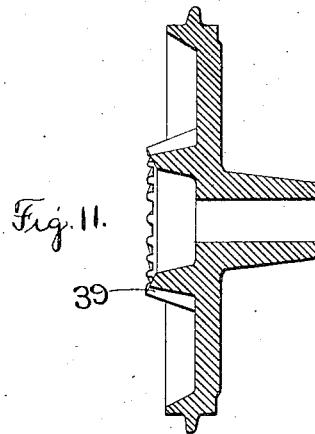
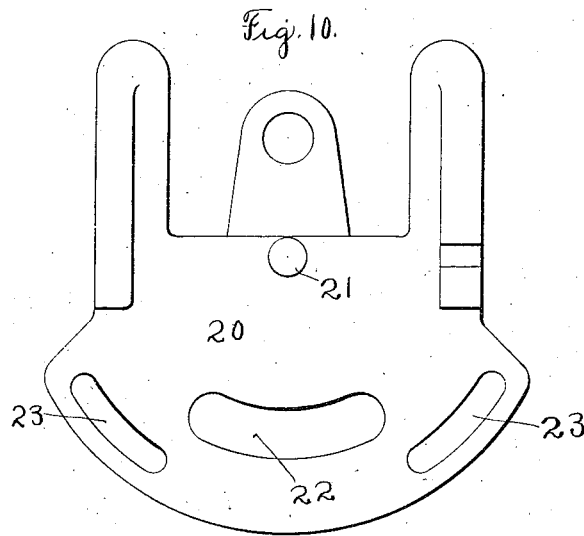
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4 Sheets—Sheet 4.



Witnesses.

W. J. Baldwin
E. M. Kelly

Inventor.

H. Allen

By

Smithgate & Smithgate
Attorneys.

UNITED STATES PATENT OFFICE.

HARDING ALLEN, OF BARRE, MASSACHUSETTS.

MOWER-KNIFE GRINDER.

SPECIFICATION forming part of Letters Patent No. 648,648, dated May 1, 1900.

Application filed August 15, 1898. Serial No. 688,568. (No model.)

To all whom it may concern:

Be it known that I, HARDING ALLEN, a citizen of the United States, residing at Barre, in the county of Worcester and State of Massachusetts, have invented a new and useful Mower-Knife Grinder, of which the following is a specification.

My invention relates to that class of grinders which are designed to sharpen the teeth or sections of mowing-machine knives; and the object of my invention is to improve and simplify the mower-knife grinder shown and claimed in United States Letters Patent No. 583,443, granted to me June 1, 1897.

The especial objects which I have had in view in designing a mower-knife grinder according to my present invention are to provide a simple and steady construction for setting and clamping the grinding-wheel at the desired angles; to provide improved driving connections for the grinding-wheel, to provide an improved construction for securing different forms of mower-knives in the holder of the machine, to provide a supplemental support for steadying the mower-knife when sections near its end are being ground, and to improve upon the details of construction of the machine, as hereinafter described, and more particularly pointed out in the claims at the end of this specification.

In the accompanying four sheets of drawings, Figure 1 is a side view of a mower-knife grinder constructed according to my invention, the knife holder or frame being omitted. Fig. 2 is a front view of the same. Fig. 3 is a front view of the knife holder or frame. Fig. 4 is an inverted rear view of the same. Figs. 5 to 8, inclusive, are detail views of an adjustable bottom support adapted to cooperate with mower-knives having different widths of base-sections. Fig. 9 is a detail perspective view of the angle-piece which carries the spindle or upright. Fig. 10 is a detail plan view of the base-piece of the machine. Fig. 11 is a detail sectional view of the driving-sprocket, and Fig. 12 is a detail perspective view of the adjustable piece or bracket for supporting the driving connections.

A mower-knife grinder constructed according to my present invention preferably com-

prises a base piece or casting, a bracket hinged thereon for supporting the knife holder or frame, and an elbow-piece carrying the grinding-wheel and its driving connections, with elbow-piece can be turned and rigidly clamped to set the grinding-wheel at the desired angle with respect to the knife-holder.

Referring to the drawings and in detail, 20 designates the base piece or casting, preferably having an elbow 23 cast integrally therewith for receiving a clamping-screw 24, by means of which the machine may be secured upon any suitable support. As shown most clearly in Fig. 10, the base piece or casting 20 comprises integral rearwardly-extending arms and a curved front part.

Secured in or formed integrally with the base-piece 20 is an upright or pin 21, which forms the pivot about which the grinding mechanism may be adjusted and clamped, as hereinafter described. A slot 22 is formed in the base-piece 20 about the pin or upright 21 to receive the clamping-screw for securing the grinding mechanism in place. 23 designates short curved slots, also having the pin 21 as a center, to receive adjustable stops for limiting the adjustment of the grinding mechanism.

Pivotally mounted on the pin or stud 21 is an elbow-piece 25, which is illustrated most clearly in Fig. 9. The elbow-piece 25 may be turned on the pin 21 as a center and may be secured in its adjusted position by means of a clamping-screw 26, which extends down through the slot 22 in the base-piece and has a wing-nut 27 threaded thereon. To form stops for limiting the adjustment of the elbow-piece 25, I preferably provide small bolts 28, which extend down through the slots 23 in the base-piece 20 and may be secured in their adjusted position by means of wing nuts threaded thereon.

Secured in the elbow-piece 25 by means of a hooked bolt 29 is a spindle or pipe-section 30. Fastened on the upper end of the spindle or pipe-section 30 is a yoke-piece 31. Journalled in the yoke-piece 31 is a grinding arbor or shaft 32, carrying the grinding-wheel 33 and driven sprocket 34. The driving connections for turning the driven sprocket 34

and the grinding-wheel 33 are preferably carried on a piece 35, adjustably secured upon the pipe or spindle 30.

As illustrated, the driving connections of the machine preferably comprise a shaft 36, journaled in the adjustable piece 35. An operating crank or handle is secured on the front end of the driving-shaft 36, and a bevel-gear 38 is secured on the rear end thereof. The bevel-gear 38 meshes with a bevel-gear section, preferably formed integrally with the driving sprocket-wheel 39, as shown most clearly in Fig. 11. A driving-chain 41 is mounted on sprocket-wheels 34 and 39.

By loosening the clamping wing-nut 27 the elbow-piece 25 may be turned or adjusted to different relative angular positions on the base-piece 20 and may be then rigidly clamped in place, and by securing the parts together in this manner the driving-wheel and its connections may be rigidly supported in their adjusted positions, so that a comparatively-heavy pressure may be exerted upon the grinding-wheel by the knife-sections which are being ground without causing the wheel to chatter or run unevenly. It is also to be noted that the grinding-wheels when thus rigidly supported are less likely to wear unevenly and have longer life than when journaled in supports which permit them to speedily run out of true.

The driving connections, as above described, which I preferably employ for turning the grinding-wheel, are arranged to gear down, so that the grinding-wheel will be driven at comparatively-high speeds.

By adjusting the bracket or support 35 on the main spindle 30 the tension of the driving-chain 41 may be readily adjusted, and in the construction illustrated it will be noted that the bevel-gears and greater part of the driving connections are located but a short distance up from the base-plate of the machine, so that they will be firmly supported, and the rotations of the operating handle or crank 37 will have comparatively little tendency to vibrate or shake the grinding-wheel, so as to cause the same to chatter.

My frame or holder for the mowing-machine knives is adapted to support a mower-knife so that the same can be pushed or slipped along to present its successive sections to the grinding-wheel, and my knife holder or frame herein illustrated has been especially designed to support mower-knives in which the teeth or sections are riveted upon back-pieces of different relative depth and thickness.

A shaft 42 is secured in lugs in the base-piece 20, and pivotally supported on the shaft 42 is a bracket 43, which is controlled or pressed forward by a double torsional spring 44. To limit the motion of the bracket 43, one leg thereof may be provided with a stop-section 45, as shown most clearly in Fig. 2.

As shown, the knife-holder comprises a substantially-rectangular frame, which is pivotally supported in the bracket 43 by means of

integral lugs or pintles 57, as shown most clearly in Fig. 3.

The holder or frame 46 is provided with a ledge 47, and the holder is designed so that the back section of the mower-knife being operated upon will be held up in contact with and guided by the overhanging ledge 47.

To support the mower-knife, I preferably employ at one end of the frame 46 a lever 48, journaled on a stud extending from the rear of the frame 46. The lever 48 is provided with a foot-piece 60, and the lever 48 may be turned and clamped in its adjusted position by means of a wing-nut threaded onto a clamping-screw 49. Journaled on a stud extending from near the opposite end of the frame or holder 46 is a similar lever 50, which may be clamped in its adjusted position by means of a wing-nut threaded onto a clamping-screw 51. The lever 50 is preferably provided with an adjustable supporting-piece 52, which may be turned to cooperate with mower-knives having back-sections of different thicknesses. As illustrated most clearly in Figs. 5 to 8, the supporting-piece 52 has retaining projections or guides for holding the mower-knives back in place under the ledge 47 of the knife holder or frame 46. In the construction illustrated the supporting-piece 52 has three such retaining projections.

The inner face of the supporting-piece 52 is preferably corrugated, and the lever 50 has a corresponding corrugated face, so that when the adjustable supporting-piece 52 has been turned to present the desired retaining projection in position to cooperate with the mower-knife it can be rigidly clamped in place by means of a wing-nut threaded onto a clamping-screw 54.

In addition to the supports carried by the adjustable levers 48 and 50 at the opposite ends of the knife holder or frame 46 I contemplate employing a supplemental support for holding the end of a mower-machine knife up to the grinding-wheel when the end sections thereof are being sharpened. When the central sections or sections in an intermediate part of the knife are being sharpened, the supports at the end of the knife holder or frame 46 are sufficient to support the mower-knife; but when the extreme end sections are being sharpened but one of the supports at the end of the frame could be used, and it is necessary to provide some form of intermediate support. To accomplish this purpose, I preferably provide a vertically-adjustable supporting-piece 55, which is slotted, so that it can be moved up and down and secured in the desired adjusted position by means of a wing-nut threaded onto the clamping-screw 56.

The mower-knife while being ground is held back in place on the frame 46 by means of a spring-guide 58, substantially as described in my prior patent before referred to.

In using a mower-knife grinder constructed according to my invention the grinding-wheel is turned to one side and clamped at the de-

sired angle. A mower-knife is then adjusted in its holder or frame, when the operating-handle may be turned by one hand and the knife-holder operated by the other. The pivoted bracket 43, supporting the knife-holder, permits it to be swung toward and away from the grinding-wheel, so that the mower-knife can be brought into contact with the wheel or may be moved out of engagement, while at the same time the connection of the knife-holder with the pivoted bracket 43 permits the holder to be rocked, so that one side of a tooth or section of the mower-knife will be ground or operated upon from its point to the base. The mower-knife may then be pushed along to present one edge of successive teeth to the grinding-wheel; and after one side of all the teeth has been sharpened the grinding-wheel can be turned to a relatively-opposite angular position, so as to sharpen or grind the opposite sides of the teeth.

I am aware that changes may be made in the construction of my mower-knife grinder by those who are skilled in the art without departing from the scope of my invention as expressed in the claims. I do not wish, therefore, to be limited to the form which I have shown and described; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. In a machine of the class described, the combination of an upright spindle, a grinding-wheel journaled in the upper end thereof, and means for driving the grinding-wheel comprising a crank-actuated driving-shaft, a driving sprocket-wheel, and a bevel-gear connection between the driving-shaft and driving sprocket-wheel, said parts being supported part way down on the spindle, a driving-chain, and a driven sprocket-wheel connected to the grinding-wheel, substantially as described.

2. In a machine of the class described, the combination of a spindle or support, a wheel fork upon the upper end thereof, an adjustable piece or bracket secured on the body portion of the support, and means for driving the grinding-wheel, comprising an operating crank or handle, a driving-sprocket, bevel-gears connecting the operating-handle and driving-sprocket, said parts being journaled in the adjustable piece, a driving-chain, and a driven sprocket connected to the grinding-wheel, substantially as described.

3. In a machine of the class described, the combination of a base plate or casting, an elbow-piece pivotally mounted on the base-plate, stops for limiting the motion of the elbow-piece, means for clamping the elbow-piece in its adjusted position, a spindle or support carried by the elbow-piece, a grinding-wheel, and driving connections carried on said spindle, substantially as described.

4. In a machine of the class described, the combination of a base piece or casting 20, an elbow-piece 25 pivotally mounted on the base piece or casting, stops cooperating with said

elbow-piece, means for clamping the elbow-piece in its adjusted position, a pipe 30 secured in said elbow piece, a yoke 31 upon the upper end of the pipe 30, a grinding-wheel 33 and driving sprocket-wheel journaled in said yoke, a piece 35 adjustably secured on the body of the pipe, and driving connections comprising an operating handle or crank 37, a driving-sprocket 39, a driving-chain 41 connecting the sprocket-wheels, and a bevel-gear connection between the operating handle or crank and the driving-sprocket, substantially as described.

5. In a machine of the class described, the combination of a base-piece, a bracket hinged thereon, and a knife holder or frame having pintles or projections for engaging eyes in the upper end of the bracket to form a hinged connection between the bracket and knife-holder, substantially as described.

6. In a machine of the class described, the combination of a knife holder or frame, a support therefor and an adjustable piece 52 for a mower-knife having retaining projections for cooperating with mower-knives of different thicknesses, substantially as described.

7. In a machine of the class described, the combination of a knife holder or frame, a supporting-piece 52 having retaining projections for cooperating with mower-knives of different thicknesses, and means for clamping the support 52 in its adjusted position, whereby the support 52 can be turned and clamped in place to adapt the holder to receive different forms of mower-knives, substantially as described.

8. In a machine of the class described, the combination of a knife holder or frame, supports for normally holding a mower-knife therein, and an adjustable supplemental support normally out of engagement with the mower-knife, and arranged to be moved into position to support the same when sections or teeth near the end of the mower-knife are being sharpened, substantially as described.

9. In a machine of the class described, the combination of a knife holder or frame, and an adjustable end support comprising a supporting-piece 50 having retaining projections for cooperating with mower-knives of different thicknesses, and means for clamping the supporting-piece 52 in adjusted positions to cooperate with different forms of mower-knives, said supporting-piece 52 having a corrugated clamping-face to prevent the same from turning, substantially as described.

10. In a machine of the class described, the combination of a knife holder or frame, an end lever 50 adjustably pivoted thereon, and a supporting-piece 52 having retaining projections for cooperating with mower-knives of different thicknesses adjustably mounted on the lever 50, substantially as described.

11. In a machine of the class described, the combination of a knife holder or frame 46, levers 48 and 50 pivotally mounted near opposite ends of said frame, clamping-bolts and

wing-nuts for securing the respective levers in their adjusted position, a supporting-piece 52 having retaining projections for cooperating with mower-knives of different thicknesses, and means for clamping the supporting-piece 52 in its adjusted position on the lever 50, whereby the support 52 can be turned and clamped in place to adapt the holder to receive different forms of mower-knives, substantially as described.

12. In a machine of the class described, the combination of a base piece or casting 20, an elbow-piece 25 pivotally mounted on the base-piece, a support or spindle extending up from the elbow-piece and carrying a grinding-wheel and driving connections, a single clamping-screw 26 extending from the elbow-piece 25 through a curved slot in the base-piece 20, and a wing-nut 27 threaded onto the clamping-screw 26 for securing the grinding-wheel at different relative angular positions, substantially as described.

13. In a machine of the class described, the combination of a base piece or casting 20 having an upwardly-extending pin 21, an elbow-piece 25 pivotally mounted on the pin 21, a spindle or pipe carrying a grinding-wheel and grinding connections, a hooked bolt 29 for fastening the spindle in the elbow-piece, a clamping-nut 26 extending from the elbow-piece 25 down through a curved slot 22 in the base-piece, and a clamping wing-nut 27 threaded onto the screw 26, substantially as described.

14. In a machine of the class described, the combination of a base piece or casting, an

elbow-piece pivotally mounted thereon, a spindle or support extending up from the base-piece and carrying a grinding-wheel and driving connections, means for clamping the elbow-piece in its adjusted position, and stop-bolts for limiting the movement of the elbow-piece extending down through slots in the base-piece, and having wing-nuts threaded thereon, substantially as described.

15. In a machine of the class described, the combination of a base piece or casting, an elbow-piece pivotally mounted thereon, means for clamping the elbow-piece in its adjusted position, a spindle or support extending up from the elbow-piece, a grinding-wheel journaled in a fork at the upper end of said support, and an adjustable piece 35 secured on the body of the upright or support, a driving-shaft journaled in a socket in the adjustable piece, an operating-crank and bevel-pinion secured on relatively-opposite ends of the driving-shaft, a driving-sprocket secured on a stud extending at right angles to the driving-shaft, said driving-sprocket having an integral bevel-gear section meshing with the bevel-gear on the driving-shaft, a driven sprocket connected to the grinding-wheel, and a driving-chain mounted on the sprocket-wheels, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HARDING ALLEN.

Witnesses:

PHILIP W. SOUTHGATE,
FREDERICK B. MARLOW.