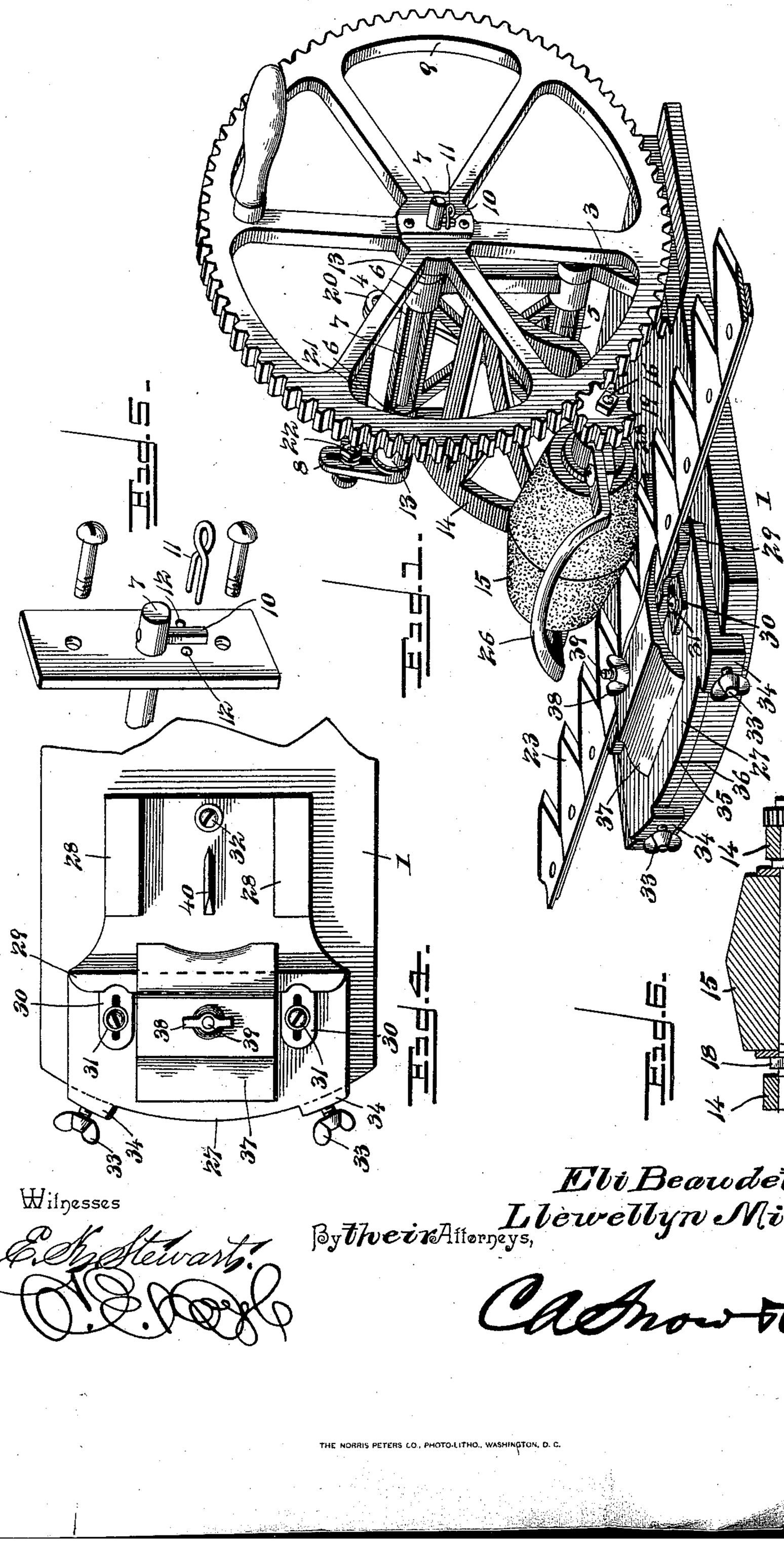
(No Model.) 2 Sheets—Sheet 1.

E. BEAUDETTE & L. MILLER.

APPARATUS FOR GRINDING SICKLES.

No. 598,843. Patented Feb. 8, 1898.



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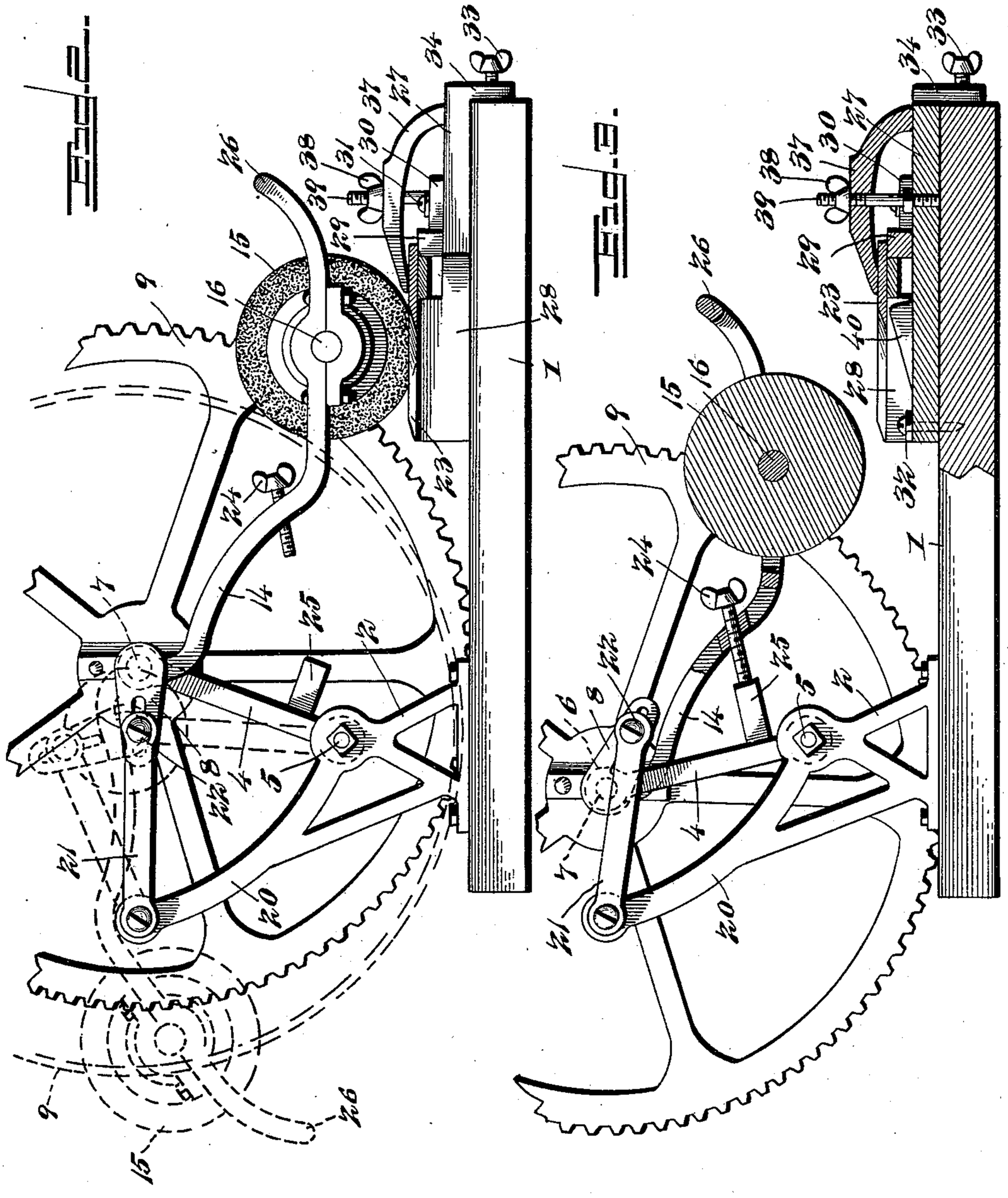

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UNITED STATES PATENT OFFICE.

ELI BEAUDETTE AND LLEWELLYN MILLER, OF CHIPPEWA FALLS, WISCONSIN.

APPARATUS FOR GRINDING SICKLES.

SPECIFICATION forming part of Letters Patent No. 598,843, dated February 8, 1898.

Application filed November 3, 1896. Serial No. 610,980. (No model.)

To all whom it may concern:

Be it known that we, ELI BEAUDETTE and LLEWELLYN MILLER, citizens of the United States, residing at Chippewa Falls, in the county of Chippewa and State of Wisconsin, have invented a new and useful Apparatus for Grinding Sickles, of which the following is a specification.

Our invention relates to an apparatus for grinding sickles, and has for its object to provide improved means for securing a directly reciprocatory movement of the grinding or emery wheel, in addition to its rotary movement, to insure perfectly straight edges of uniform bevel upon the knives or blades of the sickle-bar; to provide means for communicating rotary motion without reciprocation to the grinding or emery wheel in order to grind out "gaps" in the edges of the knives; to provide improved means for removing the grinding or emery wheel from the knives at the end of each stroke to prevent the surface thereof from injuring the points of the knives; to provide means for adjusting the grinding or emery wheel to adapt it for use in grinding scythes and other tools than sickles, and to provide improved means for supporting the sickle whereby the same may be adjusted angularly and is held from displacement during the grinding operation.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of a grinding apparatus constructed in accordance with our invention. Fig. 2 is a side view showing in full lines the parts in operative position for grinding sickles and in dotted lines with the grinding or emery wheel swung to the rear and adapted for grinding other tools. Fig. 3 is a side view, partly in section, showing the positions of the parts when the grinding or emery wheel is elevated from the points of the sickle-knives. Fig. 4 is a plan view of the sickle-supporting devices. Fig. 5 is a detail view in perspective of the lock for securing the driving-gear to the main shaft, showing the key detached. Fig. 6 is a detail sectional view to show the means for mounting the emery-wheel.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

Rising from the base 1 are standards 2 and 3, between which is mounted an oscillatory frame 4, which is fulcrumed by means of a transverse rod or spindle 5, secured terminally in said standards. This oscillatory frame is provided at its upper end with transversely-alined bearings 6, in which is mounted the main shaft 7, provided at one end with a crank-arm 8 and having mounted upon its opposite end the driving-wheel 9, which in the construction illustrated consists of a master-gear. In connection with the driving-wheel we employ a clutch or locking device for securing the same to the main shaft, and in the construction illustrated the same consists of a lateral pin 10 on the projecting extremity of the shaft, adapted to be engaged by a bifurcated spring-key 11, of which the extremities are fitted in spaced sockets 12 in the wheel, said arms of the key straddling said pin and thereby preventing independent rotary movement of the wheel.

Swiveled upon the oscillatory frame, as by bearing-eyes 13, mounted upon the main shaft contiguous to the bearings 6, is a swinging carrier-frame 14, upon which is mounted the grinding or emery wheel 15 of the usual double conical shape. This grinding or emery wheel is provided with a spindle 16, upon which it is secured by means of a shoulder 17 at one end and a nut 18 at the opposite end, said emery-wheel being clamped between the nut and the shoulder. The spindle extends beyond one side of the carrier-frame and is fitted with a pinion 19 for engagement with the driving-gear, or is otherwise connected therewith for simultaneous rotary motion, which is adapted to be communicated irrespective of the position of the carrier-frame, owing to the fact that said frame is mounted concentrically with the driving-wheel.

Rising from the standard 2 is a fixed arm 20, and connecting the upper extremity thereof with the crank-arm 8 is a pitman 21, said crank-arm being preferably slotted for en-

gagement by the wrist-pin 22 at different distances from the axis of the main shaft, whereby in operation the throw of the oscillatory frame 4 may be varied.

From the above description it will be seen that when the driving-wheel is locked to the main shaft to communicate rotary motion thereto the rotation of the emery-wheel is accompanied by a reciprocatory movement thereof, and the path followed by the emery-wheel in its reciprocation is governed solely by the plane in which the sickle-blades 23 are arranged, the carrier-frame being held in its depressed or operative position by gravity, and hence maintaining the surface of the emery-wheel yieldingly in uniform contact with the edges of the knives which are being ground. In order, however, to prevent the emery-wheel from passing over the points of the sickle-knives and thereby impairing the shape thereof, we employ a stop 24 on the carrier-frame, which is arranged to engage a fixed part of the oscillatory frame, as a stud or projection 25 thereof, said stop being preferably adjustable and consisting in the construction illustrated of a set-screw threaded in the carrier-frame. This stop limits the swinging movement of the carrier-frame toward the plane of the oscillatory frame, and it is obvious that when the stop comes in contact with the fixed part of the oscillatory frame the further movement of the oscillatory frame, due to the movement of the crank-arm, will produce the elevation of the free end of the carrier-frame, as indicated in Fig. 3. In other words, when the relative movement of the carrier and oscillatory frames ceases the carrier-frame will be moved simultaneously with the oscillatory frame, and hence the emery-wheel will be elevated from the plane of the sickle-knives. The carrier-frame terminates at its free end in a transverse handhold 26, by which additional pressure may be applied to the emery-wheel when gravity is insufficient and by which said emery-wheel may be elevated from contact with the sickle-knives at an intermediate point of its reciprocatory movement. Furthermore, this handhold serves as a means whereby the operator may control the position of the emery-wheel upon the knives in grinding out gaps when a uniform reciprocation thereof is not desired. Under these circumstances the driving-wheel is disconnected from the main shaft and rotary motion only is communicated by the driving-wheel to the emery-wheel.

The sickle-bar-supporting devices include an angularly-adjustable supporting-plate 27, having spaced upholding-rests 28, and an adjustable back-rest 29, which is provided with slotted ears 30, engaged by set-screws 31. This angularly-adjustable supporting-plate is fulcrumed, as at 32, to the base-plate and is capable of angular adjustment to suit irregularities of the sickle-knives and enable more pressure to be applied to one side than to the other thereof in the grinding operation, said plate being secured at the desired adjustment by means of set-screws 33, mounted in depending ears 34 and adapted to engage the front end of the base. The supporting-plate and the base are provided with registering indicating marks or points 35 and 36, which are adapted to be alined to secure the accurate central adjustment of the supporting-plate; also, a clamp 37 is employed to hold the sickle in place upon the rests, said clamp being held in place by means of a thumb-screw 38, threaded upon a vertical bolt 39, rising from the supporting-plate. In order to adjust the sickle upon the rests in an accurately central position, we employ a knife-edge index 40, which is arranged upon the supporting-plate between the upholding-rests 28, and the angle of intersection of the contiguous edges of sickle-knives is adapted to be arranged over this index.

The base-plate is provided with a curved end surface concentric with the pivot 32 of the supporting-plate 27 for engagement by the set-screws 33, carried by the depending ears 34, said curved or segmental end surface being traversed by the ears. Furthermore, the set-screws are located contiguous to the lateral edges of the supporting-plate, whereby the supporting-plate is capable of an adjustment through an arc of approximately one hundred and eighty degrees without swinging the set-screws beyond a position in which one of them may be engaged with said curved or segmental surface. In the extreme angular positions of the supporting-plate it is obvious that only one set-screw is in position to engage this curved surface; but by using spaced set-screws of which either is adapted to hold the supporting-plate in a locked position the range of adjustment of said plate is increased to the extent above mentioned without extending the curved or segmental surface beyond the side lines of the base-plate. Thus the range of adjustment of the supporting-plate is in excess of the length of the curved or segmental surface with which the set-screws engage to enable the edge of a sickle-knife to be arranged approximately at right angles to the vertical plane of movement of the emery-wheel. This enables us to so dispose a sickle-knife as to bring the peripheral angular portion of the surface of the emery-wheel into position to enter a notch or portion of the edge of a knife which has been broken out and thereby sharpen the broken portion of the edge of the knife to form an edge on a bevel corresponding with that of the main or unbroken portion of the knife. This enables us to render a niched knife efficient and thus prolong the term of usefulness thereof by avoiding its immediate replacement by a new knife.

From the above description it will be seen that when the driving-wheel is clutched to the main shaft the rotary movement of the emery-wheel is accompanied by a reciprocation thereof parallel with the sickle-blades,

said emery-wheel being held in operative relation with the sickle by means of gravity, and in order to facilitate adjustment of the sickle and at the same time adapt the emery-wheel for use in grinding other tools we have so arranged the parts that the carrier-frame may be folded back, as indicated in dotted lines in Fig. 2, to rest upon the upper end of the fixed arm 20. Furthermore, it will be seen from the foregoing description that while we have provided means for automatically reciprocating the emery-wheel upon the surfaces of the knives being dressed we have so arranged the actuating devices as not to interfere with the reciprocation of said wheel in a path governed wholly by the plane of the edges of the sickle-knives. In other words, the emery-wheel is held in contact with the edges of the knives by gravity and must travel in a path in which the surface of the wheel is permanently in contact with the knives. In order to accomplish this object, we have found it necessary, as hereinbefore described, to attach the oscillating means to the oscillatory frame, instead of attaching the same to the carrier-frame or that frame upon which the emery-wheel is directly mounted. This leaves the carrier-frame free to swing in an arc concentric with the driving-wheel and to be maintained in contact with the knife-edges by gravity or any other yielding force.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described our invention, what we claim is—

1. In a machine of the class described, the combination of an oscillatory frame, a driving-wheel mounted upon the oscillatory frame, a carrier-frame fulcrumed upon the oscillatory frame and supporting an emery-wheel operatively connected with said driving-wheel, and means connected to the oscillatory frame and actuated by said driving-wheel, for vibrating the oscillatory frame without affecting the free swinging movement of the carrier-frame, substantially as specified.

2. In a machine of the class described, the combination of an oscillatory frame, a driving-wheel mounted upon the oscillatory frame, a carrier-frame fulcrumed upon the oscillatory frame and supporting an emery-wheel operatively connected with said driving-wheel, a crank-arm mounted upon the oscillatory frame and connected to the driving-wheel to receive rotary motion therefrom, and a pitman connecting said crank-arm with a fixed object whereby the operation of the crank-arm imparts a vibratory movement to the oscillatory frame, substantially as specified.

3. In a machine of the class described, the combination of an oscillatory frame fulcrumed at its lower end, a main shaft mounted in bearings at the upper end of the oscillatory frame and having a crank-arm, a driving-wheel mounted upon the oscillatory frame and operatively connected with the main shaft, a carrier-frame mounted at one end upon the oscillatory frame concentrically with the driving-wheel and supporting an emery-wheel which is operatively connected with the driving-wheel, a fixed arm, a pitman connected at one end to said fixed arm, and an adjustable connection between the other end of the pitman and said crank-arm, whereby the point of attachment of the pitman to the crank-arm may be arranged at different distances from the axis of the shaft to vary the throw of the oscillatory frame, substantially as specified.

4. In a machine of the class described, the combination of an oscillatory frame, a main shaft mounted upon said frame, a carrier-frame swiveled upon the oscillatory frame, an emery-wheel mounted upon the carrier-frame, means for communicating simultaneous rotary motion to said shaft and emery-wheel, means for imparting a vibratory movement to the oscillatory frame, and a stop to limit the movement of the carrier-frame toward the plane of the oscillatory frame whereby the emery-wheel is elevated at the limit of its linear movement in one direction, substantially as specified.

5. In a machine of the class described, the combination of an oscillatory frame, a driving-wheel mounted upon said frame, a carrier-frame mounted coaxially with the driving-wheel and carrying an emery-wheel which is operatively connected with the driving-wheel, means actuated by the driving-wheel for communicating vibratory movement to the oscillatory frame, and an adjustable stop on the carrier-frame, for engaging the oscillatory frame, to limit the independent swinging movement of the carrier-frame toward the plane of the oscillatory frame, and cause the elevation of the emery-wheel at the limit of its linear movement in one direction, said stop being adjustable as to its projection from the plane of the carrier-frame to vary the extent of the said independent swinging movement thereof, and thereby cause the elevation of the emery-wheel at different points in its path, substantially as specified.

6. In a machine of the class described, the combination of an oscillatory frame, a main shaft mounted upon said frame, a carrier-frame swiveled concentrically with the main shaft and supporting an emery-wheel, means connected with the main shaft for imparting vibratory movement to the oscillatory frame, a driving-wheel mounted upon said shaft and operatively connected with the emery-wheel, and a clutch or locking device for securing the driving-wheel to the main shaft, substantially as specified.

7. In a machine of the class described, the combination of an oscillatory frame, a main shaft mounted upon said frame, a carrier-frame swiveled concentrically with the main

shaft and supporting an emery-wheel, means connected with the main shaft for imparting vibratory movement to the oscillatory frame, a driving-wheel mounted upon said shaft and operatively connected with the emery-wheel, a clutch or locking device for securing the driving-wheel to the main shaft, the same consisting of a lateral pin on said shaft arranged contiguous to the face of the driving-wheel, and a bifurcated key adapted to straddle said pin and engage spaced sockets in the wheel, substantially as specified.

8. In a machine of the class described, the combination of an oscillatory frame arranged in an approximately vertical position and fulcrumed at its lower end, a main shaft mounted in said frame at its upper end, a carrier-frame swiveled concentrically with the main shaft and supporting an emery-wheel adapted to be held in its operative position by gravity, said carrier-frame normally extending forwardly from the oscillatory frame, means for imparting simultaneous rotary movement to said shaft and emery-wheel and adapted to operate the latter independently of the former, devices connected with the shaft for imparting vibratory movement to the oscillatory frame, said carrier-frame being adapted to be swung rearwardly to occupy a position upon the opposite side or in rear of the oscillatory frame, and means arranged in the path of the rearward-swinging movement of the carrier-frame to limit said movement and hold the frame in an approximately horizontal position, substantially as specified.

9. In a machine of the class described, the combination with standards, of an oscillatory frame fulcrumed at its lower end upon said standards, a carrier-frame swiveled upon the oscillatory frame near its upper end and supporting an emery-wheel, a main shaft mounted upon the oscillatory frame and having a crank-arm, a fixed arm rising from one of said standards, a pitman connecting said crank-arm with the fixed arm and arranged in the path of the carrier-frame whereby it is adapted to support the latter in an approximately horizontal position when swung to the rear of the plane of the oscillatory frame, and means for communicating rotary motion to the said shaft and emery-wheel and adapted to operate the latter independently of the former, substantially as specified.

10. In a machine of the class described, the combination with grinding devices including an emery-wheel and means for operating the same, of spaced upholding rests 28 for supporting contiguous sickle-knives, a back-rest 29 capable of independent adjustment and provided with slotted ears and set-screws to accomplish the same, and an independent clamp for holding a sickle in operative position upon said upholding rests and in contact with said back-rest and provided with securing devices, substantially as specified.

11. In a machine of the class described, the combination with a base, and grinding devices including an emery-wheel and means for operating the same, of a supporting-plate pivotally mounted upon the base and capable of swinging movement in a horizontal plane, said plate being provided with pendent ears operating contiguous to a segmental or rounded edge of the base-plate concentric with the pivotal point of said supporting-plate, means carried by said ears for securing said plate at the desired adjustment, upholding rests carried by the plate, a back-rest adjustably mounted upon the supporting-plate to bear against the rear edges of the sickle-knives, and a clamp for securing a sickle in contact with said rests, substantially as specified.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

ELI BEAUDETTE.
LLEWELLYN MILLER.

Witnesses:
A. B. PORTER,
JOHN O. PUTNAM.