2 Sheets—Sheet 1.

H. S. STEVENS.

SICKLE-GRINDER.

No. 183,987. Patented Oct. 31, 1876.

Fig. 2.

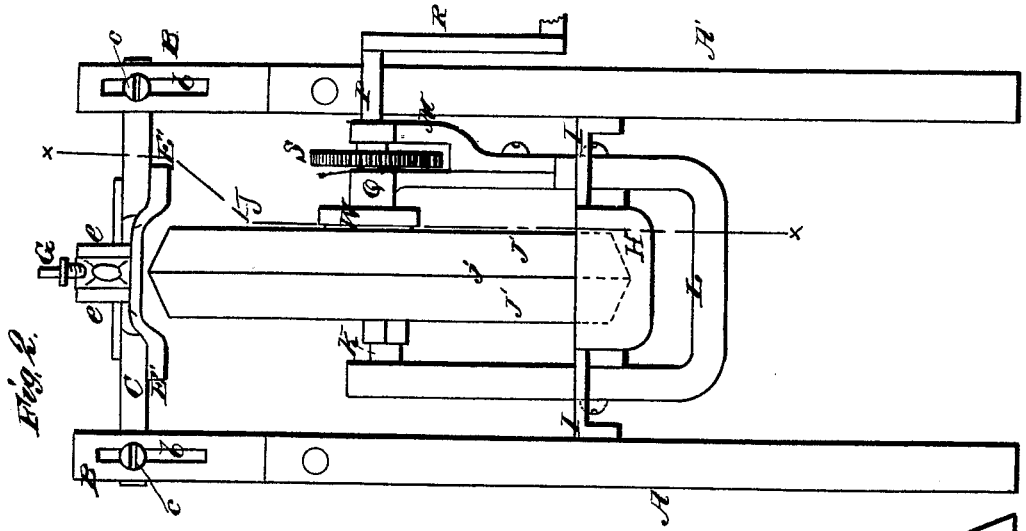


Fig. 1.

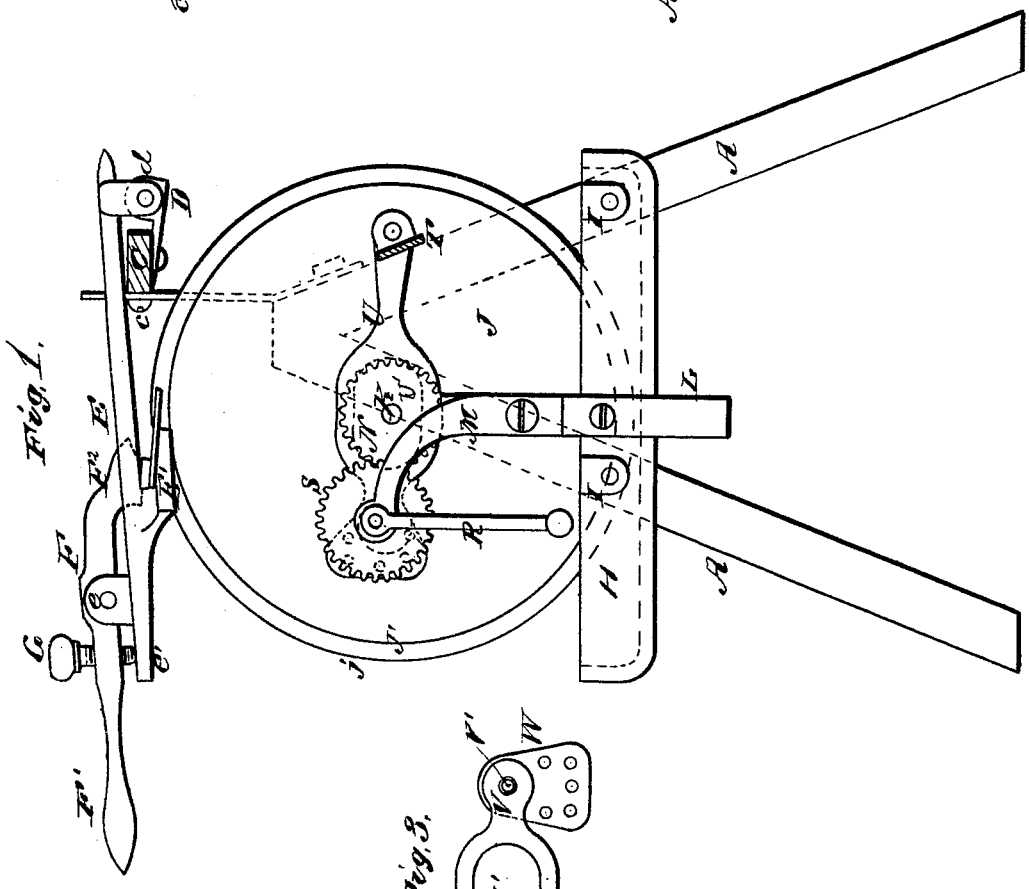
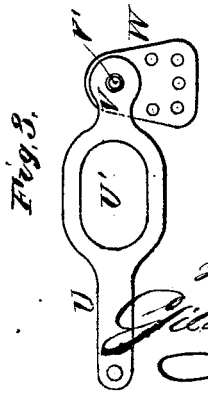


Fig. 3.



WITNESSES

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Gilmore & Smith

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2 Sheets—Sheet 2.

H. S. STEVENS.

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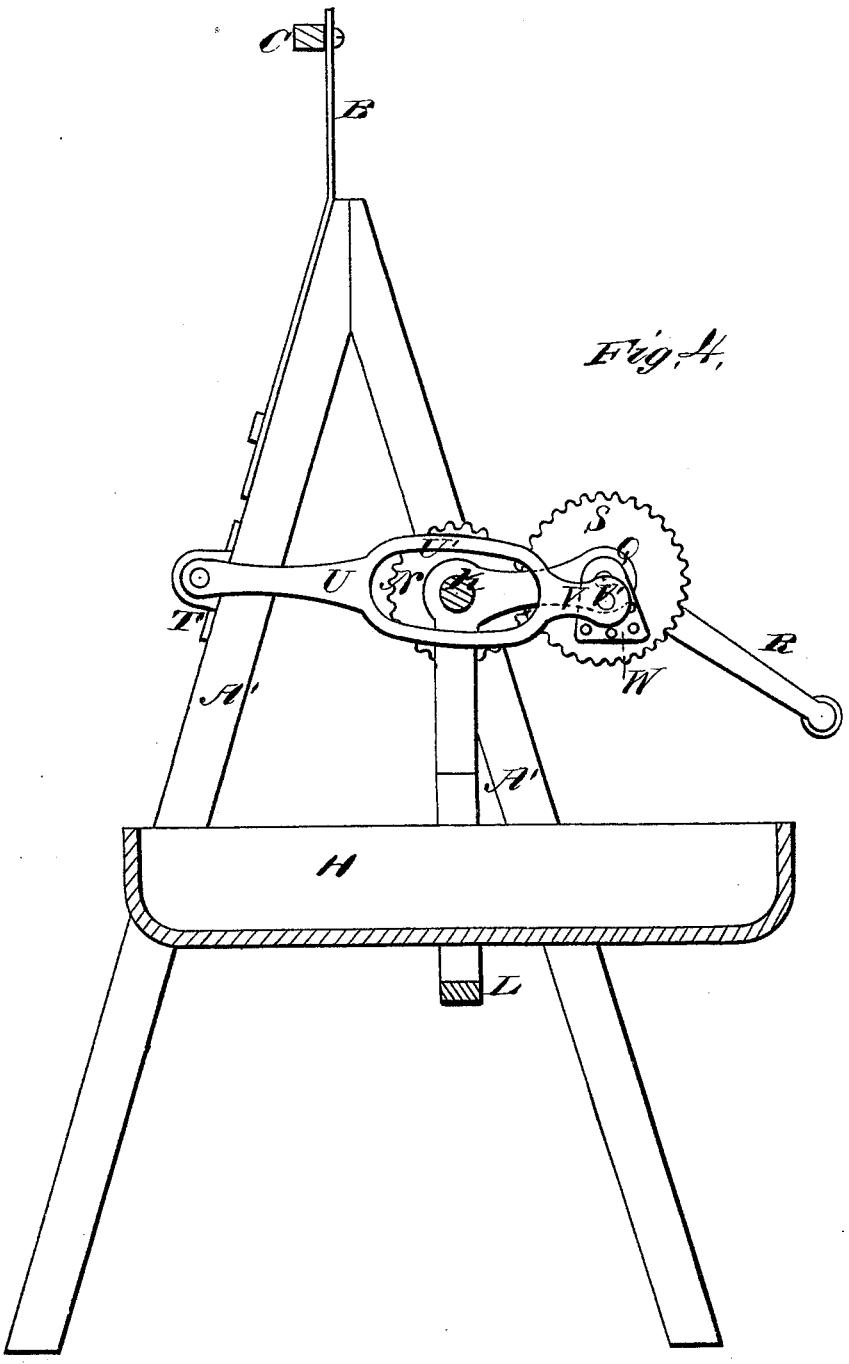

Fig. 4.

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UNITED STATES PATENT OFFICE.

HOMER S. STEVENS, OF WAUKEGAN, ILLINOIS, ASSIGNOR OF ONE-HALF HIS RIGHT TO JOHN F. POWELL, OF SAME PLACE.

IMPROVEMENT IN SICKLE-GRINDERS.

Specification forming part of Letters Patent No. **183,987**, dated October 31, 1876; application filed September 2, 1876.

To all whom it may concern:

Be it known that I, HOMER S. STEVENS, of Waukegan, in the county of Lake and State of Illinois, have invented a new and valuable Improvement in Sickle-Grinders; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a side elevation of my sickle-grinder, and Fig. 2 is a front elevation of the same. Fig. 3 is a detail view thereof. Fig. 4 is a vertical section through the line *x x*, Fig. 2.

This invention relates to devices for operating grindstones used in sharpening the knives or cutting-blades of harvester-sickles; and it consists in the employment of special devices, whereby an oscillatory and rotary motion is at the same time imparted to a grindstone, as will be hereinafter more particularly described and claimed.

In the annexed drawings, A A designate two inclined and upwardly-converging standards or supporting-beams, forming one side of the frame of my device. A′ designates two similar standards on the opposite side of the same frame. Each pair of said standards is rigidly secured together at their upwardly-converging ends. On the top of each of said side supports A and A′ is secured one of two upright and vertically-slotted metal plates, B B. Said plates support a cross-piece, C, which is secured to the said plates B B by clamp-screws *c c*, by which said cross-piece is adjusted vertically, as said clamp-screws are allowed to slide up and down in slots *b b* of said plates B B, said screws being tightened at any point desired. To the under side of said cross-piece C is rigidly secured a metal plate or casting, D, which has on its rear end upright perforated lugs *d*, between which lugs is pivoted the rear end of a sickle-holder, E. Said sickle-holder may be thrown upward and backward out of operation or turned forward and downward, so as to hold the blades of the sickle immediately above a grindstone hereinafter described. Said holder is constructed with sickle-supporting arms E′ E′ extending backward from the forward end of said holder on either side thereof. It is also provided with lugs *e e* and a projecting lip, *e′*. Between said lugs *e e* is pivoted, by the middle of its length, a clamping-bar, F, which is provided in front with a handle, F^1, and at it rear end with a presser-foot, F^2. Said clamping-bar is screw-tapped in front of its pivotal point to receive a vertical adjusting thumb-screw, G, which bears against the surface of lip or flange *e′*. By screwing said thumb-screw up through said clamp-bar F the said presser-foot F^2 is raised, so as to allow the harvester-sickle to be introduced below it and upon supporting-arms E′ E′, said arms being a little below the plane of said holder E. By screwing said thumb-screw down through said screw-tapped clamp-bar F, said presser-foot F^2 is forced tightly down upon the said sickle-blade, clamping it against the said supporting-arms E′ E′. The handle F^1 is convenient for throwing the presser-bar or clamp-bar and holder back out of operation, as already stated. H is a metal water-trough rigidly secured to supporting-frame A A′ by means of brackets or short L-shaped arms I. J designates a grindstone, turning so as to keep its lower side in said trough, and journaled by short axle K in the upper ends of U-shaped metal tilting frame L. Said frame is pivoted somewhat below its center of gravity to fixed trough H. One of the sides of said frame is provided with an arm, M, which is rigid therewith, and is curved outwardly, upwardly, and forwardly, as shown. Said outward or lateral curve of arm M is for the purpose of allowing the free rotation of cog-wheel N, which is fast on one end of axle K, and which rotates grindstone J. The forward and upward curve of said rigid arm M is for the purpose of providing a bearing for horizontal laterally-extending rotating shaft P, which turns in a perforation of said arm. An additional bearing for said rotating shaft is furnished by the perforated end of an additional arm or bar, Q, rigidly connected to the upper end of tilting frame L near (though above) the point of attachment of said arm M, and extending horizontally forward. Said rotating shaft is operated by a crank, R, and carries a cog-wheel, S, which meshes with cog-wheel N, and communicates motion there-

to. By means of the above-described devices, when the said crank is turned the said grindstone is made to rotate, dipping into the water in tank H below, and grinding the sickle held by holder E and clamp-bar F above.

The periphery of said grindstone J is constructed with a central ridge, *j*, from which slope bevels J′ J′ toward its sides. This shape enables it to sharpen two of the pointed sickle-blades or cutting-knives at the same time, since the ridge *j* sharpens the meeting parts of said pointed blades at the deepest part of the notch intervening between any two of said blades, and the diverging bevels J′ J′ conform to and sharpen the contiguous diverging edges of said blades or cutting-knives.

As said sickle and its blades are held in a horizontal or nearly horizontal position, it becomes desirable to give to said grindstone an oscillatory as well as a rotary motion; otherwise, said blades would be ground at the point where they would touch the highest part of the periphery of said grindstone; but nowhere else. To obviate this difficulty and produce said oscillating motion of said grindstone, I employ the following devices: T designates an inwardly-extending bracket, rigidly secured to inclined standards A′ of the supporting-frame, and U designates a bar pivoted thereto by its rear end, extending horizontally forward, and ending in an oblong longitudinal loop, U′, which surrounds grindstone-axle K. V designates a projecting-plate or prolongation of the bar U provided with a lateral pivot-pin, on which is pivoted a triangular or other eccentric plate, W. To said plate W is eccentrically secured the end of rotating shaft P. The construction of said plate W causes the rotation of shaft P to become eccentric, and thereby, through its supporting-arms, communicates an oscillating motion to the said tilting frame, which supports the said grindstone. This causes the said grindstone to oscillate as it rotates upon its axis. The result of this compound oscillating and rotating motion is that the said grindstone is brought in contact with every part of the edges of each of said sickle-blades, and sharpens them properly.

If cog-wheels N and S were of the same diameter, the periphery of said grindstone would be unevenly worn, since the same part of said periphery would come into contact (during the rearward and upward part of the oscillation) with the knives at each rotation of said wheel, while the remainder of said periphery would undergo less friction or none at all. Thus, there would be a point of greatest wear and an opposite point of no wear, or very slight wear; and the intervening parts of the wheel would be worn in regular gradation from the former point toward the latter. To obviate this I make cog-wheel S somewhat larger than cog-wheel N, so that when the shaft P is rotated once, the wheel N and grindstone J will be turned once and somewhat more. Thus the said grindstone is made to present a new part of its periphery to receive the greatest wear at each oscillation. As these changes recur in a regular cycle the periphery of said grindstone will be worn almost perfectly even. The same result will be attained by making cog-wheel N larger than cog-wheel S; but as the grindstone will then revolve less rapidly, the grinding will be rather less effective in proportion to the number of turns of said crank.

Bar U prevents the said grindstone J, axle K, and the devices attached thereto from falling backward and forward. The pivotal attachment of said bar allows it to yield vertically, and thereby prevents axle K from binding in loop U′. This yielding motion causes the pivot-pin V′ of eccentric plate W to move up and down in an arc while the shaft P is being rotated, so that said shaft does not rotate or revolve about said pivot-pin, but about a point not far from the middle of the arc so described. Water-trough H is made long enough to allow the backward and forward movement of grindstone J in the course of its oscillation above described. Cross-piece C prevents sickle-holder E from falling too far forward and downward. Said sickle-holder is capable of yielding, in an upward direction, to prevent injury to the sickle from the said oscillating movement of the said grindstone J.

Various modifications may be introduced without departing from the spirit of my invention—for instance, shaft P may be turned by any form of gearing instead of a crank; pulleys and a connecting-band may be substituted for cog-wheels N and S; eccentric W may be oblong instead of triangular, or may have any other suitable shape; screw-threaded rods and clamping-nuts may be used for adjusting cross-piece C; and the materials used may be varied in any way which does not impair the efficiency of the devices.

What I claim as new, and desire to secure by Letters Patent, is—

1. The U-shaped tilting frame L, surrounding and pivoted to the water-trough near its lower end, and having bearings at its upper end for the grindstone-axle, in combination with the pivoted arm U, having loop U′, whereby the grindstone is allowed to rotate and oscillate in the water-trough, substantially as described.

2. The tilting frame L, carrying the grindstone-axle K, in combination with the pivoted arm U, having loop U′, and eccentric plate W, operated by suitable mechanism, substantially as described, and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

HOMER S. STEVENS.

Witnesses:
JOHN F. POWELL,
D. M. ERSKINE, Jr.