No. 650,035. Patented May 22, 1900.

A. R. CLIZBE.

GRINDING MACHINE.

(Application filed Aug. 12, 1899.)

(No Model.) 4 Sheets—Sheet 1.

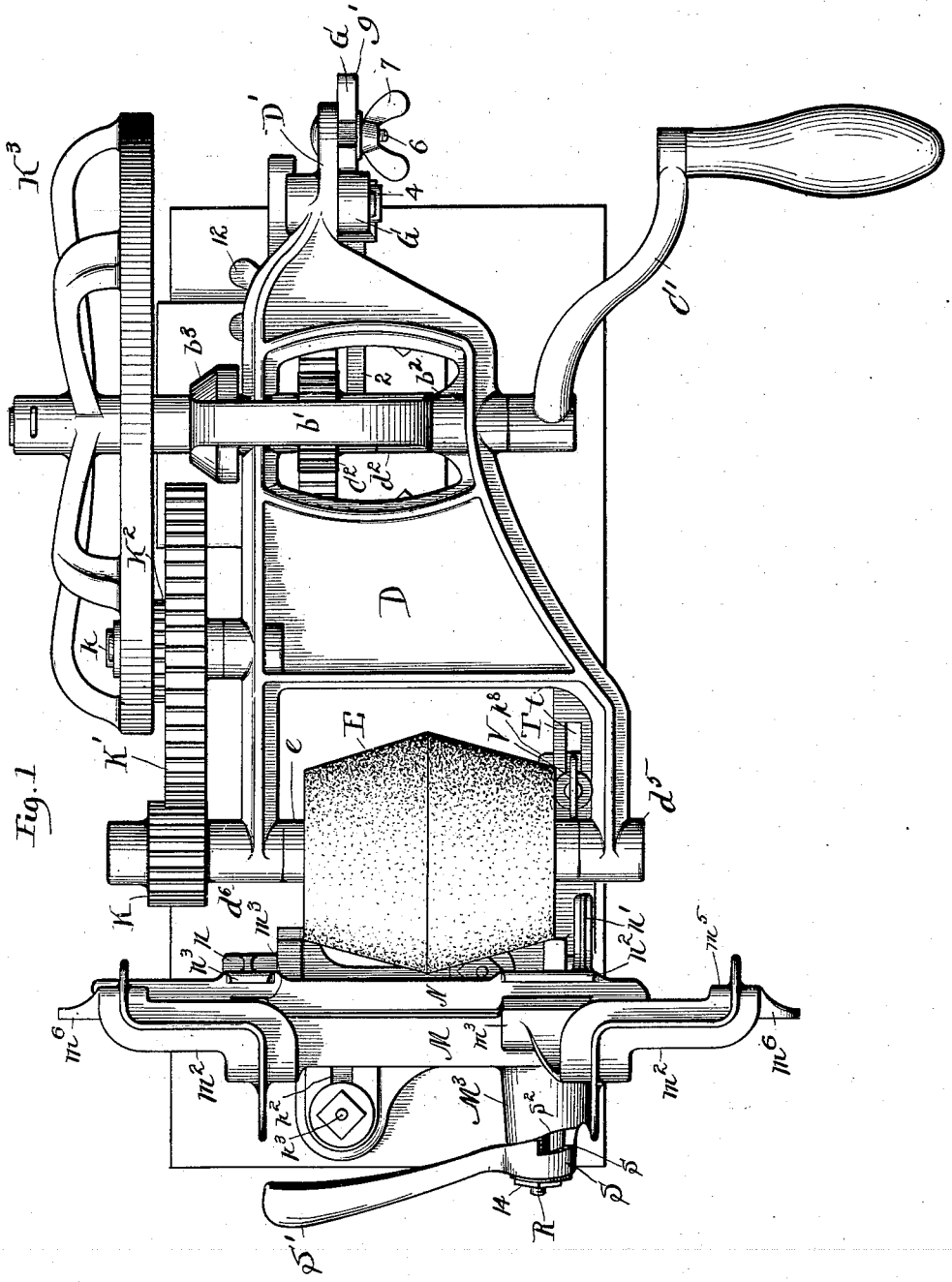

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

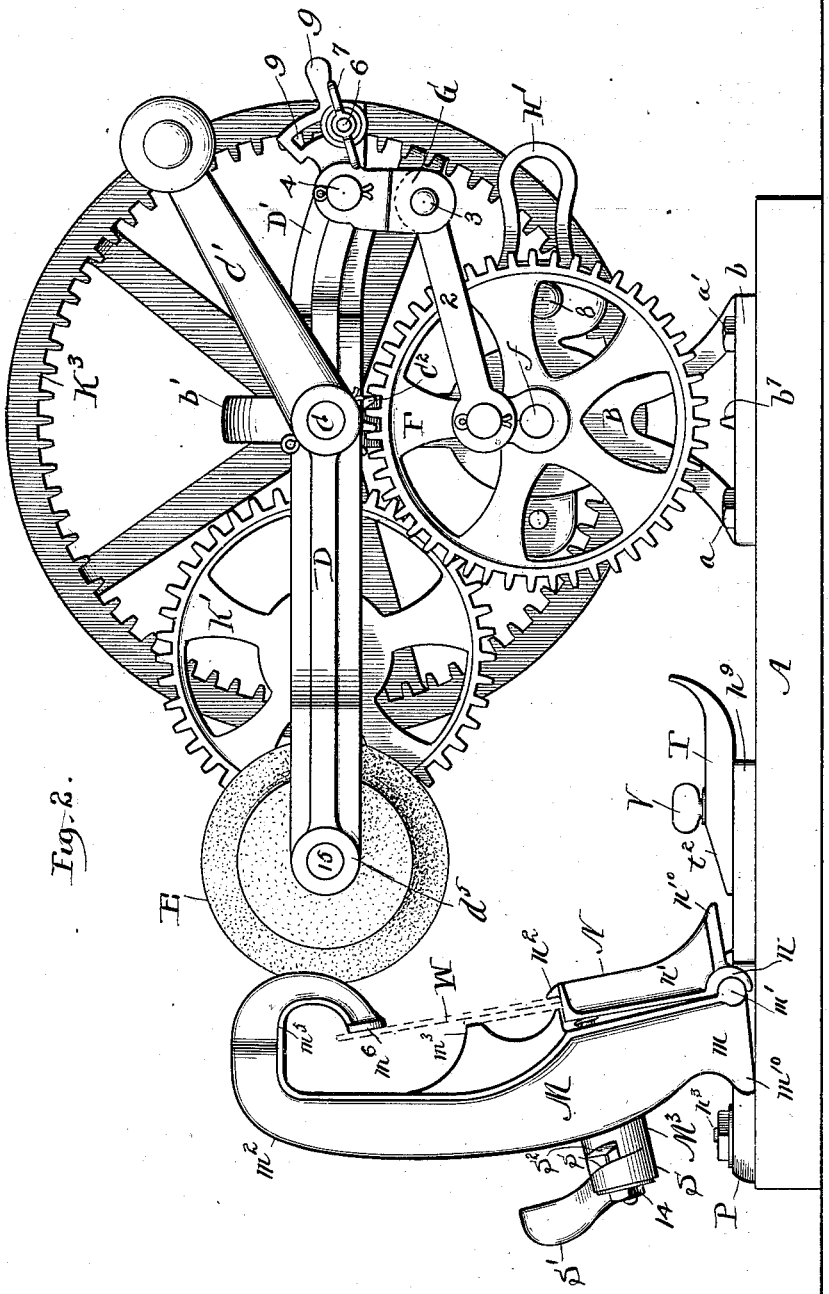

Fig. 2.

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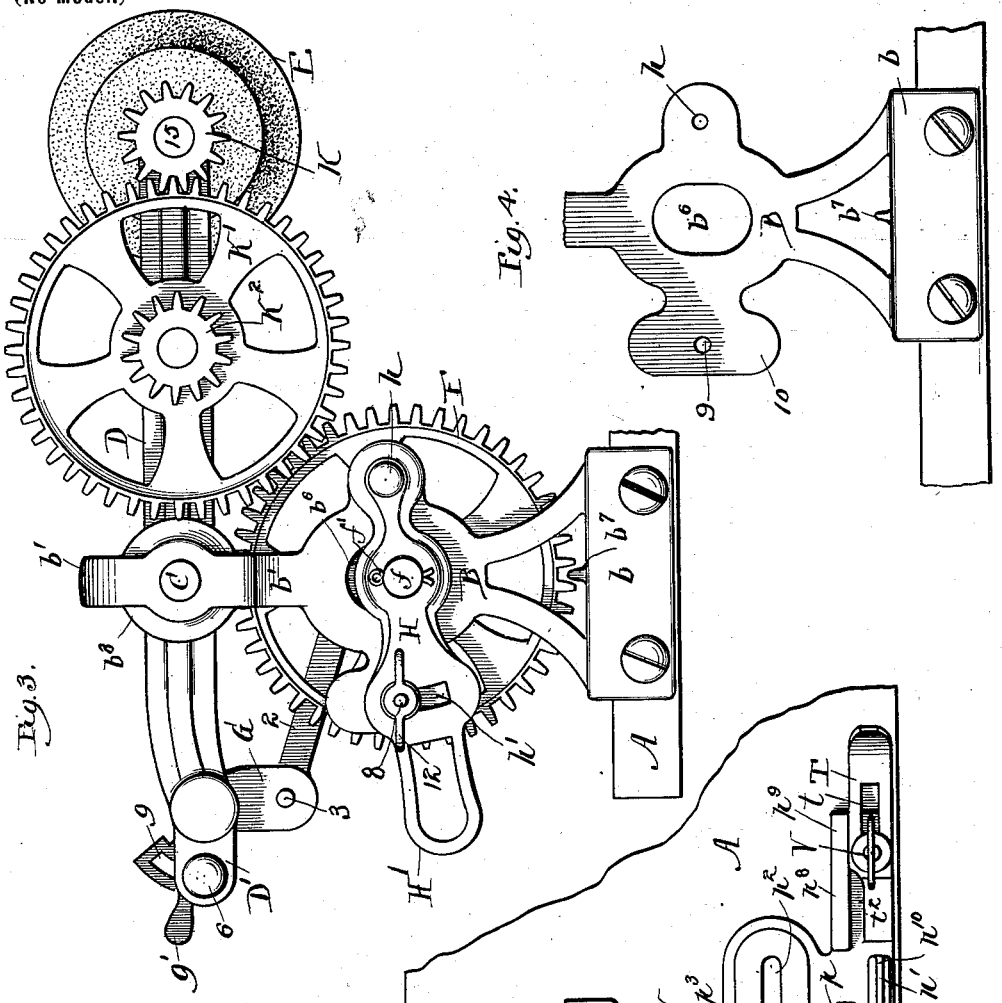
GRINDING MACHINE.

(Application filed Aug. 12, 1899.)

(No Model.) 4 Sheets—Sheet 3.



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GRINDING MACHINE.

(Application filed Aug. 12, 1899.)

(No Model.) 4 Sheets—Sheet 4.

Fig. 8.

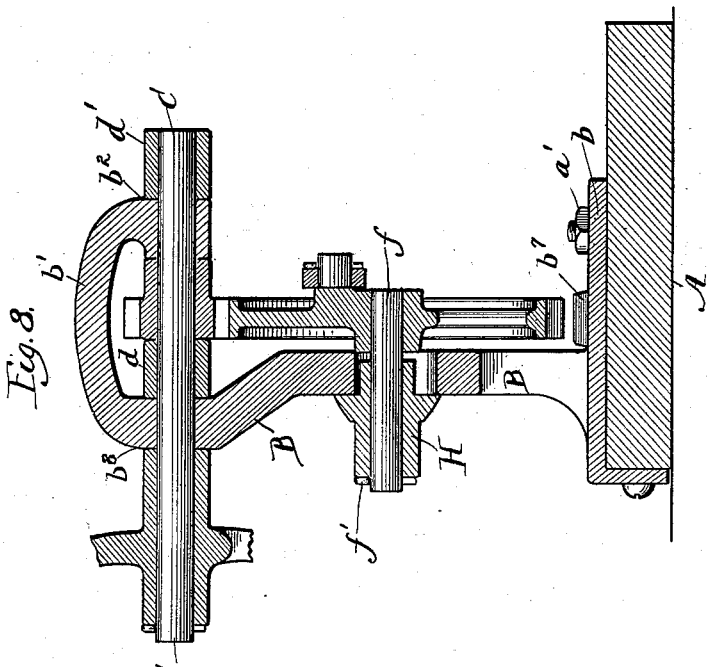


Fig. 6.

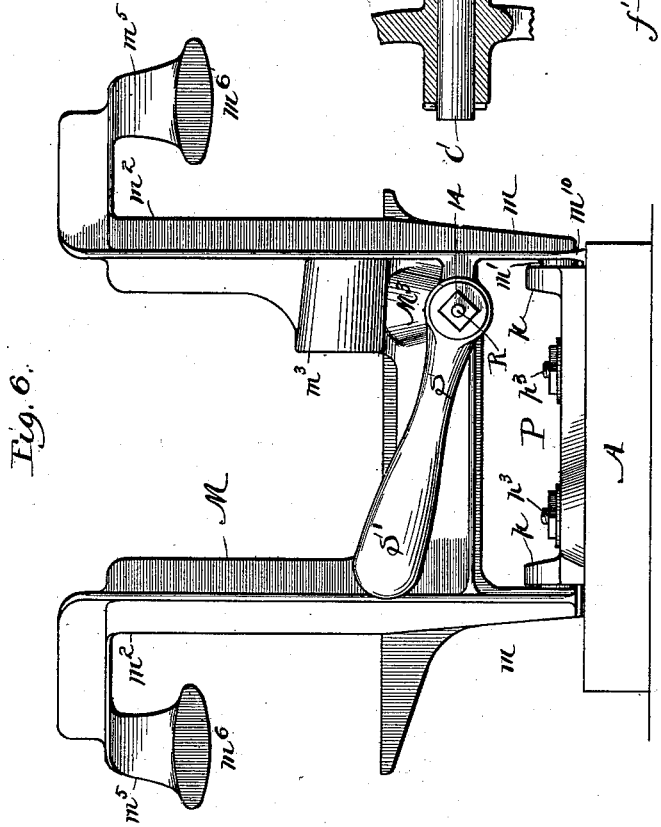
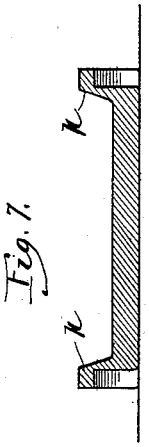


Fig. 7.



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UNITED STATES PATENT OFFICE.

ADELBERT R. CLIZBE, OF CHICAGO, ILLINOIS.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 650,035, dated May 22, 1900.

Application filed August 12, 1899. Serial No. 727,022. (No model.)

To all whom it may concern:

Be it known that I, ADELBERT R. CLIZBE, a resident of Chicago, in the county of Cook and State of Illinois, have invented certain Improvements in Grinding-Machines, of which the following is a full, clear, and exact description.

This invention has relation more particularly to that class of grinding-machines designed for the grinding of harvester-knives. In grinding-machines of this character the grinding-wheel is carried upon a vibratory frame, the knife to be ground being sustained by a suitable knife holder or support.

One of the objects of this invention is to provide improved means whereby the arc of vibration of the grinding-wheel may be readily varied. In this class of machines it is frequently desirable to hold in rigid position the frame that carries the grinding-wheel; and a further object of the invention is to provide improved means for this purpose.

A still further object of this invention is to provide an improved construction of knife holder or support; and the invention has also for its object to improve and simplify the machine in various particulars in order to enable the parts to be more readily manufactured and assembled as they come from the foundry and in order to avoid as far as possible machine-work and labor upon the parts.

With these several objects in view the invention consists in the novel features of construction hereinaftor described, illustrated in the accompanying drawings, and particularly pointed out in the claims at the end of the specification.

Figure 1 is a plan view of the grinding-machine embodying my invention. Fig. 2 is a view in side elevation. Fig. 3 is a view in side elevation of the vibratory knife-carrying frame, its support, and gearing, the main drive-wheel being omitted from the drive-shaft. Fig. 4 is a detail view showing the lower part of the main standard or support. Fig. 5 is a view in horizontal section through the knife-holder. Fig. 6 is a front view of the knife-holder. Fig. 7 is a detail view showing the manner of connecting the lower part of the knife-holder to its base. Fig. 8 is a view in central vertical section on line 8 8 of Fig. 3.

In the accompanying drawings, A designates the base of the machine, that may be of wood or other suitable material. To this base A is suitably bolted, as at a a', the base-plate b of the support or standard B. (See Fig. 8.) The upper part of the standard or support B, which is preferably of cast metal, is formed with an overhanging arm b', forming a journal-bearing b^2 for the main drive-shaft C, this shaft being journaled also, as at b^3, in a bearing formed in the upper part of the standard B. The purpose in forming the standard B with the overhanging arm carrying a journal-bearing is to give as broad a bearing as possible to the main drive-shaft. Upon the main drive-shaft C is mounted the vibratory frame D, that carries at its forward end the grinding-wheel E. Preferably the vibratory frame D is arranged upon the drive-shaft C in manner shown—that is to say, one of the bearings d of the vibratory frame being arranged between the bearings b^2 and b^3 of the standard B, while the other bearing d' of the vibratory frame is arranged outside of the bearing b^2 of the standard B. The main drive-shaft C has revolution imparted thereto by a crank-handle C′ or by a drive-pulley or other suitable means, and upon the drive-shaft C is fixed the drive-pinion C^2, that meshes with a gear-wheel F beneath it. The drive-wheel F serves to impart a swinging movement to the vibratory frame D through the medium of a pitman-rod 2, that is adjustably connected with the rearwardly-extending arm or part D′ of the frame D.

The manner of adjustably connecting the vibratory frame with its drive mechanism is preferably that next to be described and more particularly shown in Figs. 1, 2, and 3 of the drawings. The rear end of the pitman-rod 2 is pivotally connected, as at 3, to the lower end of an adjusting-lever G, that is preferably of angular shape, this lever being pivotally sustained upon a stud 4, that projects from and is preferably cast with the rear arm or extension D′ of the vibratory frame. Through the rear end D′ of the vibratory frame passes a headed bolt 6, that extends through a segmental slot g, formed in the rear arm or portion of the adjusting-lever G, and the threaded end of this bolt 6 is furnished with an adjusting wing-nut 7 and washer, whereby the

lever G may be adjustably connected at different points to the rear end D′ of the vibratory frame. In order to permit the lever G to be shifted, it is conveniently formed with a handle g'. It will thus be seen that when it is desired to vary the arc of vibration of the wheel-carrying frame F it is only necessary for the operator to loosen the wing-nut 7 and shift the adjusting-lever G so as to lengthen or shorten the connection between the rear end D′ of the vibratory frame and the gear-wheel F, whereby motion is imparted to said frame. Then by tightening the nut 7 the lever G will be held in the required position. The adjusting mechanism described affords a very simple and effective means whereby the arc of vibration of the vibratory frame may be readily varied even while the machine is in operation.

As it is frequently desirable when grinding straight-edge knives, or when considerable grinding is required at some particular point of a knife, to hold the grinding-wheel frame in rigid position, I have provided the improved mechanism next to be described, whereby this result may be quickly and effectively accomplished.

From the gear-wheel F (and preferably cast therewith) extends the stud f, that passes through a long slot b^6 in the support or standard B and through a hole or bearing in the shifting lever H. This lever H is held upon the stud f by a cotter-pin f' and is pivoted, as at h, (see Figs. 3 and 4,) to a projecting part of the standard B. The lever H is formed with a segmental slot h', through which passes a bolt 8, that is attached, as at 9, to an extension 10 of the standard B, and the threaded portion of the bolt 8 is furnished with a wing-nut 12, whereby the adjusting-lever may be held either in raised or lowered position. Preferably the shifting lever H is furnished with a handle H′, whereby it may be conveniently manipulated. When the parts are in normal position, (shown in Figs. 2 and 8 of the drawings,) the lever H is in raised position, the gear-wheel F being at such time in mesh with the drive-pinion C^2. Hence when the drive-shaft is revolved a vibratory motion will be imparted to the grinding-wheel frame through the mechanism hereinbefore described. If now it is desired to hold the grinding-wheel frame in rigid position for the purpose of grinding a straight-edge knife or for the purpose of using the grinding-wheel for a considerable time at any one point of a knife, the operator will simply loosen the nut 8, so as to allow the shifting lever H to swing downward until the gear-wheel F is disengaged from the drive-pinion C^2. This downward movement of the gear-wheel F will promptly throw out of action the mechanism by which the grinding-wheel frame is vibrated. As the gear-wheel F thus passes from engagement with the drive-pinion C^2 its teeth will engage with a lug or projection b^7, that is preferably cast in piece with the base-plate b of the standard or support B. (See Fig. 3.) This lug b^7 will prevent the turning of the gear-wheel F, and consequently will serve to hold the grinding-wheel frame at any desired elevation.

The grinding-wheel E is preferably mounted upon a sleeve e, suitably keyed to a shaft 15, that passes through this sleeve e and also the journal-bearings d^5 and d^6, that are formed at the ends of the front arms of a grinding-wheel frame D. (See Fig. 1.) The outer end of the grinding-wheel shaft 15 has keyed thereto a gear-pinion K, that meshes with a gear-wheel K′, journaled upon a stud k, that projects laterally from the frame D. Preferably the stud k is a steel stud and is cast with the frame D. Upon the stud k is also mounted a gear-pinion K^2, that is preferably cast integral with the gear-wheel K′, and this pinion K^2 meshes with an internally-toothed gear-wheel K^3, that is keyed to one end of the main drive-shaft C. From the construction of parts as thus far defined it will be seen that when revolution is imparted to the main drive-shaft by the handle C′ or by other convenient means revolution will be given to the grinding-wheel E through the train of gearing consisting of the pinion K, the gear-wheel K′, the pinion K^2, and the gear-wheel K^3, and the proportions of these several gear wheels and pinions are such that a very rapid speed of revolution will be given to the grinding-wheel. At the same time movement will be imparted from the drive-shaft C through the pinion C^2, gear-wheel F, pitman-rod 2, and adjusting-lever G to the vibratory grinding-wheel frame D, if the parts be in position shown in Fig. 2 of the drawings, and the grinding-wheel while rapidly revolved will also be swung by the vibratory frame D across the face of the knife to be ground.

In order to hold the harvester or other knife, I prefer to provide the improved construction of knife-holder next to be described. This knife-holder comprises two main parts or sections M and N, that serve to support the knife in such manner that it can be properly exposed to the action of the grinding-wheel. The section M of the knife-holder is formed with legs m, having pivot-lugs m' extending laterally therefrom, and over these pivot-lugs fit bearing-lugs n, projecting laterally from the legs n' of the section N. The pivot-lugs m' and bearing-lugs n set within the open-ended bearings p of the knife-holder base-plate P. It will be readily seen that in this way an exceedingly simple, cheap, and effective means is provided for pivotally supporting the knife-holder. The sections M and N are simple castings, and to assemble them it is merely necessary to set the pivot-lugs m' in the pivot-bearings n and then insert these parts in the open bearings p of the base-plate P, that is fastened to the base A of the machine. The upper portion of the knife-holder section N is formed upon its inner edge with clamping-lugs n^2 and n^3, adapted to engage

the lower edge of the knife to be ground. The knife-holder section M has upwardly-extending arms m^2, upon the inner face of which are formed suitable bearing-lugs m^3, that cooperate with the lugs n^2 in clamping the knife to be ground. The upwardly-extending arms m^2 of the knife-holder section M are preferably formed with the laterally and downwardly extending parts m^5, that are formed with the expanded bearing ends or fingers m^6, these bearing ends m^6 serving as bearing guides or supports for the teeth of the knife. Through the section N of the knife-holder extends the clamping-screw R, (see Figs. 1, 2, and 5,) that also passes through an extension M^3, formed at the front of the knife-holder section N.

The threaded outer end of the bolt R passes through the end of the clamp S and carries a threaded nut 14. The clamp S is formed on its inner side with one or more inclined or cam surfaces s, and the outer end of the extension M^3 is similarly inclined or cam-faced, as at s^2. Hence it will be seen that if a harvester-knife W be placed in the position indicated by dotted lines in Fig. 2 and the clamp S be turned by means of its handle S′ the sections M and N of the knife-holder will be drawn together because of the bearing of the cam-faces s and s^2, thereby causing the knife to be firmly held between the lugs n^2 m^3 and the fingers m^6. By manipulating the handle S′ the knife can be released from time to time to permit it to be advanced, so that its teeth shall be successively presented to the action of the grinding-wheel E. The handle S′ serves not only as a means for operating the clamp mechanism, but by this handle also the knife-holder can be rocked about its pivot-points in order to properly effect the grinding of the teeth. The base-plate P of the knife-holder is formed with slots p^2, through which pass the bolts p^3, and by these bolts the knife-holder can be set at the desired position with respect to the grinding-wheel. In order to limit the tilting action of the knife-holder, I provide an adjustable stop-block T, through the slot t of which passes an adjusting-bolt V, having turning wings at its upper end and having its lower threaded end within a threaded hole p^6 in extension p^9 of the base-plate P, and a stud p^8, that rises from the base-plate P and enters the slot t, insures the right-line position of the block T. The forward end of the block T is inclined, as at t^2, to engage one of the rearwardly-extending feet n^{10} of the knife-holder section N, and it is obvious that by moving the block T under this foot n^{10} more or less the extent of tilting movement of the knife can be easily controlled. The feet m^{10} on the knife-holder section M limit the tilting action of the knife-holder in forward direction.

Preferably a spring X (see Fig. 5) is interposed between the knife-holder sections M and N, this spring serving to force the sections apart when the clamp-handle is turned to admit a knife to be ground or to relieve the pressure upon the knife, so that it may be advanced to bring its teeth successively opposite the grinding-wheel.

It is manifest that the precise details of construction above set out may be varied without departing from the spirit of the invention, and I do not wish the invention, therefore, to be understood as limited to such details.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a grinding-machine of the character described, the combination with a suitable standard or support, of a grinding-wheel frame pivoted thereto and having a part extending rearwardly beyond its pivotal point, suitable means for vibrating said frame and adjustably-connecting mechanism between the rearward extension of said frame and the means whereby said frame is vibrated.

2. In a grinding-machine of the character described, the combination with a suitable standard or support and with a vibratory frame for the grinding-wheel and with suitable gearing for operating said wheel and said vibratory frame, of a connection between said frame and its operating mechanism and an adjusting-lever for varying the vibratory movement of said frame.

3. In a grinding-machine of the character described, the combination with a suitable standard or support and with a vibratory frame for the grinding-wheel and with suitable gearing for driving said wheel and vibrating said frame, of a connection between said frame and its operating mechanism, an adjusting-lever for varying the vibratory movement of said frame and means for locking said lever in different positions.

4. In a grinding-machine of the character described, the combination with a suitable standard or support and with a vibratory frame for the grinding-wheel and with suitable gearing for driving said wheel and vibrating said frame, of a pitman-rod adjustably connected to the gearing whereby the vibratory frame is operated, a pivoted lever interposed between said pitman-rod and the vibratory frame and adjusting mechanism connected to said lever.

5. In a grinding-machine of the character described, the combination with a suitable standard or support and with a vibratory frame for the grinding-wheel, of a gear-wheel and pinion for operating said vibratory frame, a pitman-rod connected to said gear-wheel, an adjusting-lever pivotally connected to said vibratory frame and an adjusting screw-bolt between said adjusting-lever and the vibratory frame whereby said lever may be set in different positions.

6. In a grinding-machine of the character described, the combination of a standard or support having a journal-bearing near its upper end and having a laterally-extended arm

or portion also provided with a journal-bearing, of a shaft extending through said journal-bearings of the standard, a driving-pinion mounted upon said shaft, a vibratory frame also mounted upon said shaft, a gear-wheel engaging said driving-pinion and a pitman-rod connecting said vibratory frame and said gear-wheel.

7. In a grinding-machine of the character described, the combination with a suitable support or standard, of a vibratory frame for the grinding-wheel pivoted to said support or standard and provided at its front with arms and a shaft passing through said arms and carrying the grinding-wheel and provided at the opposite side of its pivotal point with a rearward extension, a drive-shaft whereon said vibratory frame is pivotally mounted, a drive-pinion on said drive-shaft, a gear-wheel connected to said pinion, a pitman-rod connected to said gear-wheel and also connected with the rear end of the vibratory frame and a train of gearing leading from said drive-shaft to the grinding-wheel shaft.

8. In a grinding-machine of the character described, the combination with a suitable support or standard and with a vibratory frame for the grinding-wheel, of gear mechanism for operating said vibratory frame comprising a vertically-movable gear-wheel whereby said frame may be thrown into or out of action.

9. In a grinding-machine of the character described, the combination with a suitable support or standard, of a vibratory frame for the grinding-wheel, gear mechanism for operating said vibratory frame comprising a movable gear-wheel and a shifting arm or lever whereby said gear-wheel may be moved to throw the gearing that operates the vibratory frame into and out of action.

10. In a grinding-machine of the character described, the combination with a suitable support or standard and with a vibratory frame for the grinding-wheel, of gear mechanism for imparting movement to said vibratory frame comprising a vertically-movable gear-wheel, a shifting lever or arm whereby said gear-wheel is supported and means for holding said shifting lever or arm in different positions.

11. In a grinding-machine of the character described, the combination with a suitable support or standard, of a vibratory frame for the grinding-wheel, a drive-pinion and gear-wheel for imparting movement to the vibratory frame, said gear-wheel being shiftable to permit it to be thrown into and out of engagement with said pinion, a shifting arm or lever whereby said gear-wheel is carried and a screw-bolt whereby said shifting lever may be held in raised position when said gear-wheel and pinion are to be engaged.

12. In a grinding-machine of the character described, the combination with a standard or support having a drive-shaft journaled in its upper end and having a vibratory frame for the grinding-wheel mounted upon said drive-shaft, of a driving-pinion and gear-wheel for operating said vibratory frame, a shifting lever pivoted to said standard or support and carrying said gear-wheel and means whereby said pivoted shifting lever may be clamped to the standard or support in order to hold said gear-wheel and driving-pinion in engagement.

13. In a grinding-machine of the character described, the combination with a suitable standard or support and with a vibratory frame for the grinding-wheel pivoted thereto, of gearing for imparting movement to said vibratory frame comprising a vertically-movable gear-wheel and means whereby said gear-wheel may be thrown into and out of action and a stop at the base of the machine with which said gear-wheel will engage when it is thrown out of action.

14. In a grinding-machine of the character described, a knife-holder comprising clamping-sections formed with interlocking pivot-lugs and bearings and a base having bearing-seats to receive said pivot-lugs and bearings.

15. In a grinding-machine of the character described, a knife-holder comprising clamping-sections formed with interlocking pivot-lugs and bearings having open-sided bearings adapted to admit said bearing lugs and seats and thus hold the sections of the knife-holder together while allowing them to turn in forward and backward direction.

16. In a grinding-machine of the character described, a knife-holder formed of two clamping-sections, one of said sections having bearing-lugs cast integral therewith and the other of said sections having bearing-seats cast integral therewith, and a bolt and clamp for drawing said knife-holder sections together.

17. In a grinding-machine of the character described, a knife-holder comprising two clamping-sections formed respectively with interlocking pivot-lugs and bearing-seats and with forwardly and rearwardly extending feet and suitable clamping mechanism for drawing said sections together.

18. In a grinding-machine of the character described, a knife-holder comprising separate sections between which the knife will be clamped, a bolt extending from one of said sections and provided with a cam-faced clamp and a forward extension upon said other section provided with a cam-shaped end to engage said clamp.

19. In a grinding-machine of the character described, a knife-holder provided with one or more rearward feet or extensions and an adjustable stop-block adapted to be moved more or less under one of said feet or extensions in order to limit the tilting movement of the knife-holder.

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