(No Model.) 2 Sheets—Sheet 1.

J. M. HAIGIS.

GRINDING MACHINE.

No. 286,429. Patented Oct. 9, 1883.

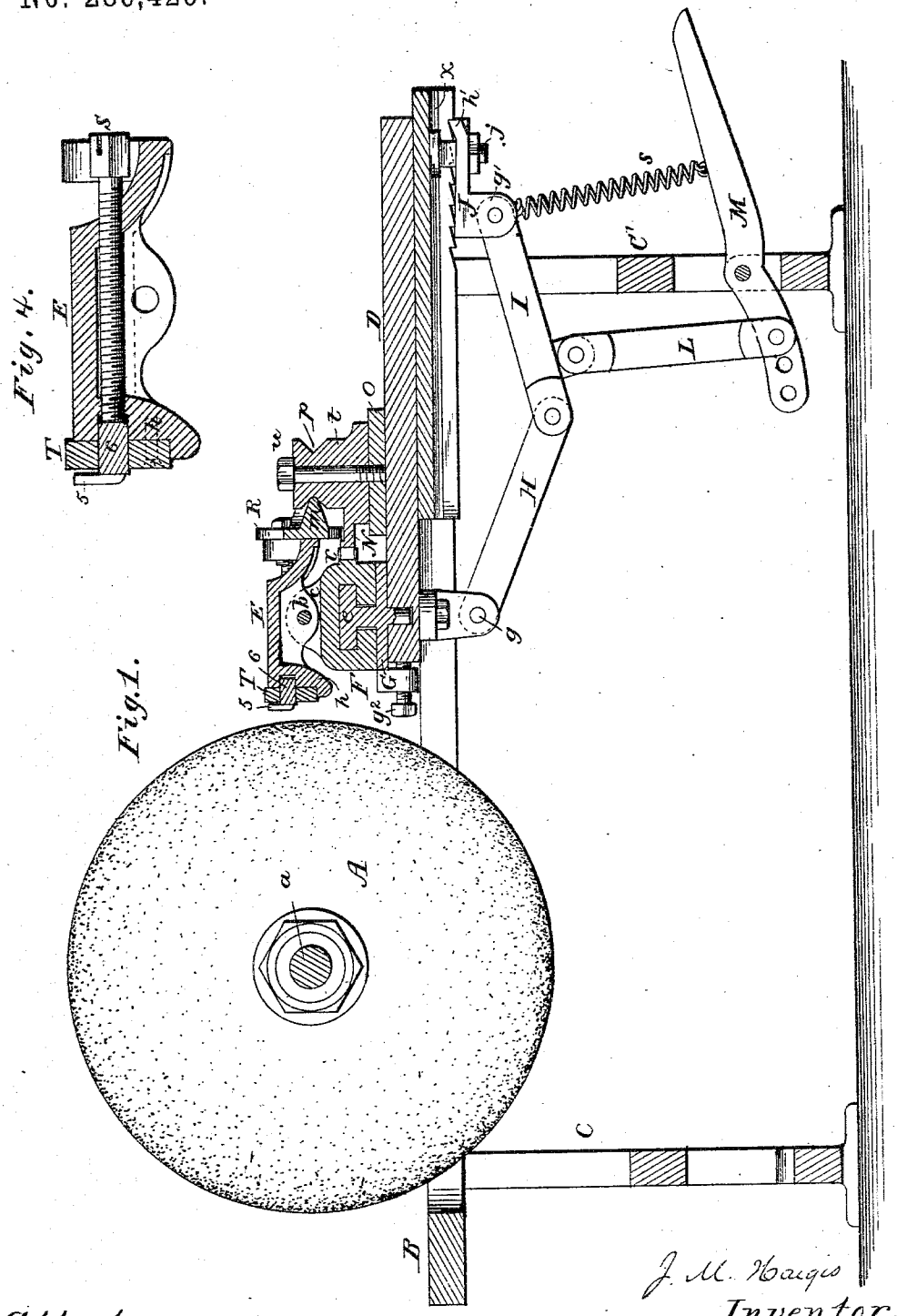

Fig. 4.

Fig. 1.

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F. E. Hansmann.

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By his attys
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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

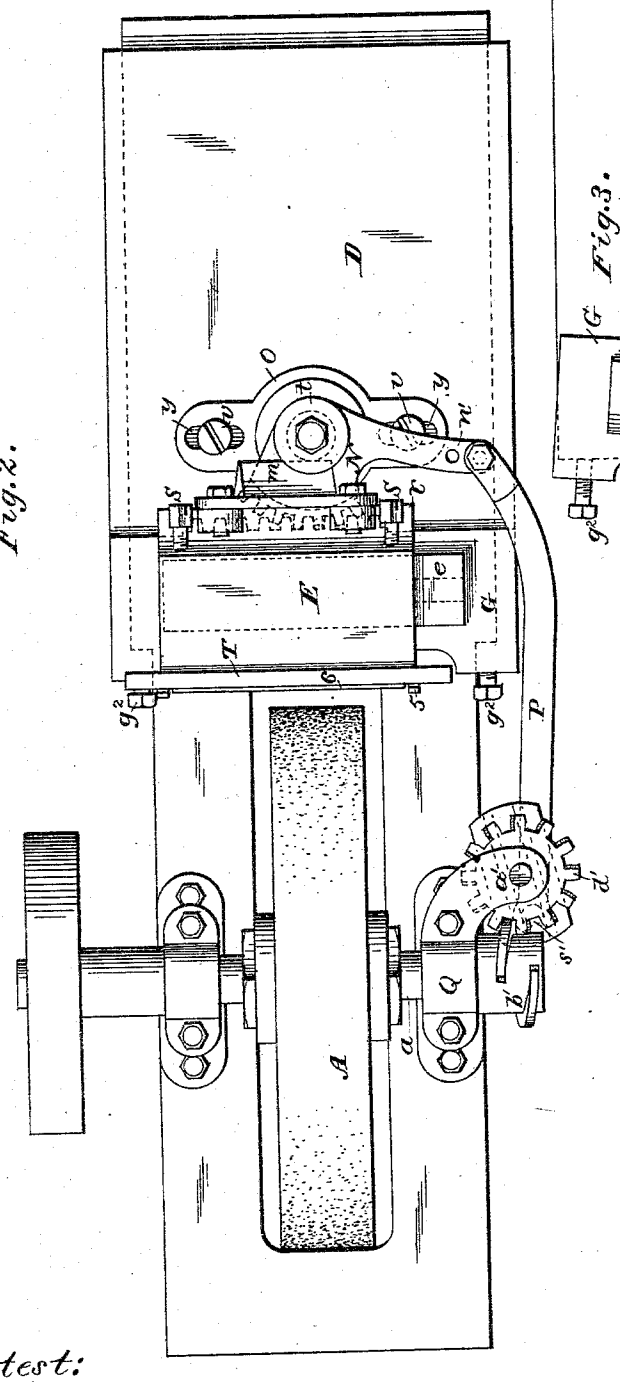


Fig. 3.

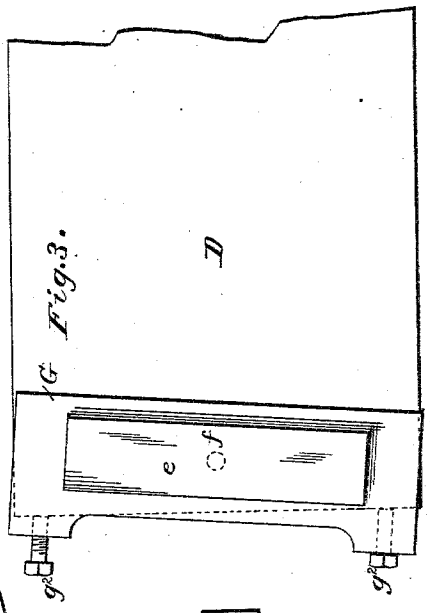


Fig. 5.

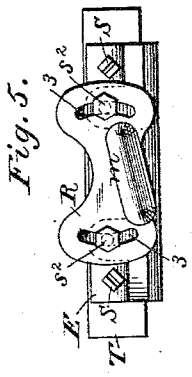
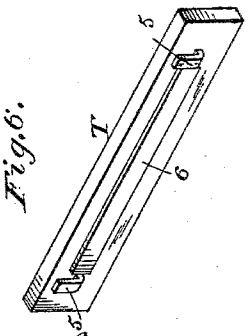


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN M. HAIGIS, OF BEAVER FALLS, PENNSYLVANIA.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 286,429, dated October 9, 1883.

Application filed June 23, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. HAIGIS, of Beaver Falls, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification.

My invention relates to that class of grinding-machines in which the object to be ground is carried back and forth in front of the curved edge of a grindstone; and my improvement consists in constructing the parts, as fully described hereinafter, to set and carry the blank in any desired position, and facilitate adjustments and increase the efficiency of the machine.

In the drawings, Figure 1 is a sectional elevation of the grinding-machine with my improvements. Fig. 2 is a plan view. Fig. 3 is a plan of the bed. Fig. 4 is a section of the holder. Fig. 5 is a rear view of the holder, and Fig. 6 is a perspective view of an attachment of the holder.

The frame of the machine is constructed in any manner suitable to support the shaft *a* of the grindstone A and the devices for holding and moving the knife or other object to be ground, and consists, in the present instance, of a platform, B, and legs C C'. Upon the platform slides a bed, D, suitably guided so as to move to and from the edge of the grindstone, and carrying the holder, together with devices whereby the latter may be set and carried past the face of the stone at any desired angle to grind the blank to a taper, and with other devices whereby it may be rocked to grind the blank to a curve.

As shown, the holder consists of a plate, E, pivoted by a transverse pin, *b*, to ears *c* upon a slide, F, the latter moving upon a guide, *e*, upon plate G, which occupies a position at the inner end of the bed D. The plate G swings upon a central pivot, *f*, and may be set at any desired angle to the bed D by means of set-screws g^2, which pass through ears on the edge of the plate and bear against the edge of the bed. By this means the holder may be caused to traverse back and forth in front of the grindstone at any angle thereto necessary to secure the desired taper. I do not limit myself to the mode of adjustment described, as the plate G may be secured to the bed, and the guide *e* may be adjustable upon the plate G.

The article to be ground—for instance, a knife-blade—is suitably clamped to the forward edge or flange, *h*, of the holder E, and the latter is moved up to position by means of toggle-levers H I, pivoted one to a stud, *g*, at the under side of the bed D, and another to a stud, *g'*, upon a plate, J, which is secured by a bolt adjustably to the under side of the bed D. For instance, the bolt *j* may have a head fitting a groove, *x*, at the under side of the bed, so as to move longitudinally therein and yet support the plate J, and a flange, *h'*, at the end of the latter may fit teeth or notches at the under side of the bed, as shown in Fig. 1. By this means such an adjustment may be secured that when the levers H I are brought in line the blank will be carried to the proper extent toward the stone, while the adjustment may be varied from time to time as the stone wears away. The ready operation of the levers is effected by a treadle, M, connecting-rod, L, and spring *s*, arranged as shown. The traverse of the holder past the face of the grindstone is effected by means of a toothed segment, N, gearing with a rack, *r*, upon the slide F, said segment forming part of a hub, *t*, turning upon a bolt, *u*, secured to or forming part of a plate, O. The plate O has longitudinal slots *y*, through which screws *v* pass into the bed D, thereby permitting the plate to be set toward or from either edge of the bed when the holder E must be carried to operate at one side or the other of the stone, as is necessary sometimes when only one end of the blank is to be ground. The segment is oscillated by means of a pitman, P, connected to an arm, *n'*, of the segment, and at the opposite end to a crank-pin, *s'*, upon a vertical shaft, *a'*, turning in the bracket Q, which supports the bearings of the shaft *a'*. A rotary motion is imparted to the shaft *a'* by a worm, *b'*, on the shaft *a*, gearing with a worm-wheel, *d'*, upon the shaft *a'*, as shown.

The throw of the segment, and consequently the length of the traverse imparted to the holder E, may be varied by connecting the end of the pitman P to the arm *n'* at different points.

The rocking motion of the holder E may be imparted by providing the holder at the rear

edge with an inclined rib or wing, *m*, which extends into a groove, *p*, in the hub *t*, so that as the holder passes back and forth in front of said hub it will be elevated or depressed, rocking upon the pin *b* in proportion to the inclination of the rib *m*.

As it is desirable to vary the rocking motion of the holder, and in some cases to avoid it altogether, the rib *m* is made adjustable in any suitable manner upon the holder. For instance, the rib is secured to or forms part of a plate, R, connected by bolts S^2 S^2 to the holder, which bolts pass through curved slots 3 3, so that the rib *m* may be brought to a horizontal position and inclined to any desired angle. Any other suitable mode of connecting the rib adjustably to the holder may be adopted. It is necessary in many cases for the lower edge of the blank to rest upon a ledge, which supports it under the action of the grindstone. As this ledge, in the case of knife-blades and other thin blanks, must be very narrow, it is rapidly ground away, so as to fail to provide the proper support. To obviate this I provide the holder E with the usual hooks or supports, 5, and with a slot in which fits a thick block or strip, 6, held in position by frictional contact with the sides of said slot, and capable of being moved in and out to and from the stone, and screw-bolts S are extended through the holder E to bear against the block 6, which may thus be set out to project beyond the face of the holder to constitute the desired ledge, and projected from time to time as it wears away. As the support will vary with the character of the blanks or articles to be ground, I prefer to connect the hooks 5 and the adjustable block 6 with a strip or plate, T, secured detachably to the flange or clamp of the holder E by screws. (Shown in dotted lines, Fig. 4.) The strip T and its adjuncts will conform to the shape of the article to be ground, so that different articles may be operated upon by merely changing the strip T without any alteration of the holder.

Without limiting myself to the precise construction and arrangement of parts set forth, I claim—

1. The combination, in a grinding-machine, of a grindstone, a pivoted holder, E, for the article to be ground, a slide, F, pivoted plate G, provided with a way on which said slide moves, a bed, D, supporting the holder and appurtenances, suitable levers for moving the bed to and from the stone, means for reciprocating the holder past the face of the stone and simultaneously rocking the holder, substantially as set forth.

2. The combination, with the holder and bed supporting the same, of the toggle-levers H I, operating appliances, and adjustable plate J, substantially as set forth.

3. The combination of the holder E, bed D, slide supporting the holder, and centrally-pivoted guide, having adjusting-screws, whereby it is connected adjustably to the bed, substantially as set forth.

4. The combination of the bed D, slide F, supporting the holder, segment N, gearing with teeth upon the slide, and appliances for rocking the segment, substantially as set forth.

5. The combination of the reciprocating holder, segment N, grindstone A, supported by a shaft, *a*, provided with a worm, *b'*, worm-wheel *d'* upon a shaft provided with a crank-pin, *s'*, and pitman P, connecting the crank-pin with an arm of the segment, substantially as set forth.

6. The pivoted holder, provided with an adjustable rib, *m*, in combination with a standard having a groove, *p*, adapted to receive said rib, whereby the holder is tilted in respect to the face of the stone, substantially as set forth.

7. The combination of the bed, reciprocating slide, holder pivoted thereto, provided with a rib, *m*, segment N, gearing with teeth upon the slide, and provided with a grooved hub, *t*, substantially as set forth.

8. The combination, with the reciprocating slide F, having the holder pivoted thereto, of a slotted plate, R, secured adjustably to the holder, and provided with a rib, *m*, adapted to a groove in a standard, substantially as set forth.

9. The holder slotted at the side adjacent to the grindstone, and provided with a block, 6, fitting the slot, and with adjusting devices, substantially as specified.

10. The combination, with the holder, of a slotted plate, T, provided with hooks 5 and adjustable block 6, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN MARTIN HAIGIS.

Witnesses:

ALEXANDER OW,

THOMAS WM. BEEGLE.