F. WELKER.

GRINDING MACHINE.

APPLICATION FILED FEB. 3, 1910.

977,060. Patented Nov. 29, 1910.

2 SHEETS—SHEET 1.

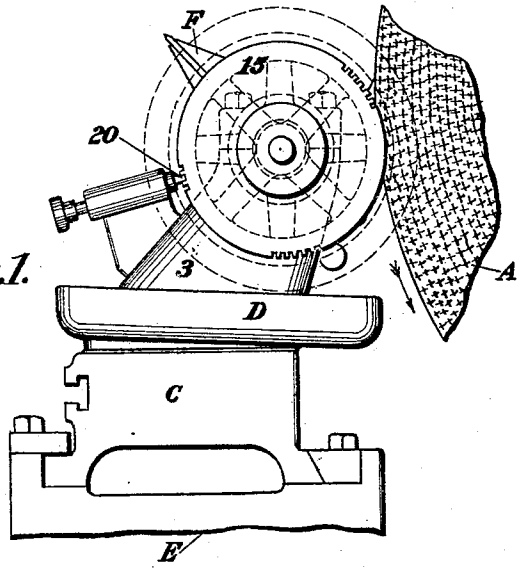

Fig. 1.

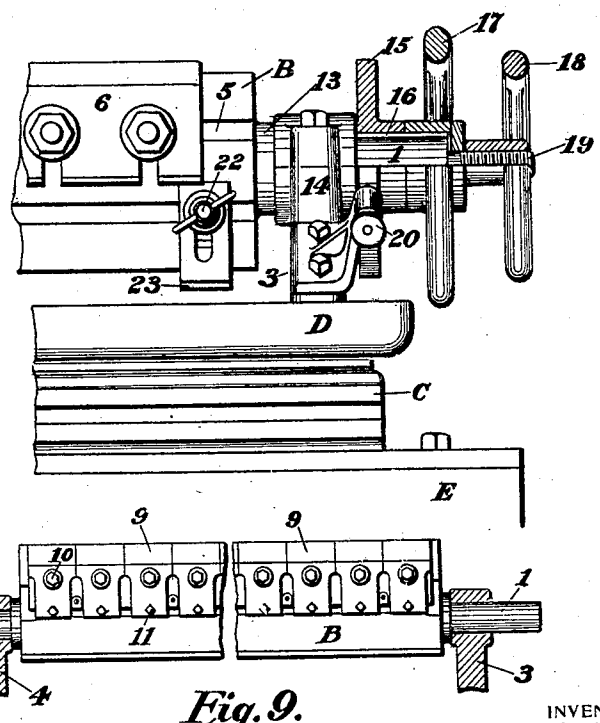

Fig. 2.

Fig. 9.

WITNESSES

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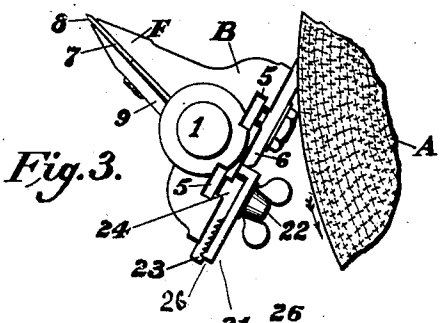

Fig. 3.

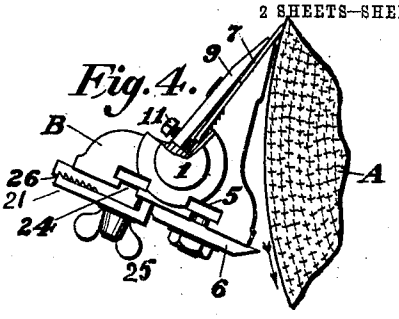

Fig. 4.

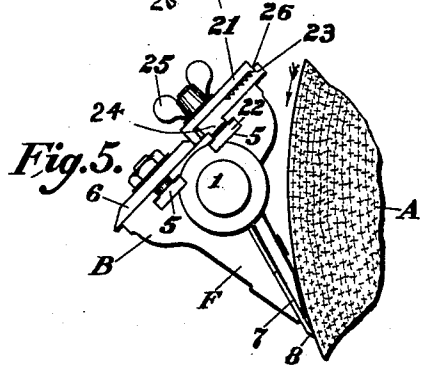

Fig. 5.

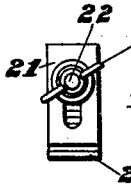

Fig. 6.

Fig. 7.

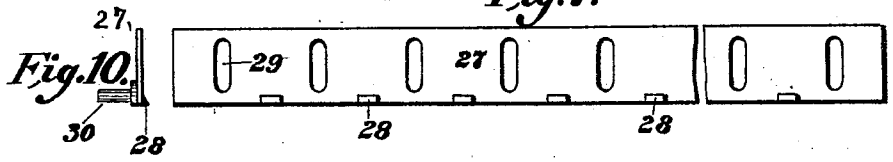

Fig. 10.

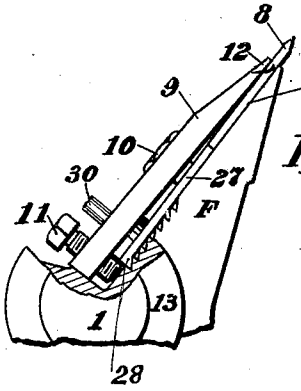

Fig. 8.

WITNESSES

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UNITED STATES PATENT OFFICE.

FREDRICK WELKER, OF WILLIAMSPORT, PENNSYLVANIA, ASSIGNOR TO AMERICAN WOOD WORKING MACHINERY CO., OF ROCHESTER, NEW YORK, A CORPORATION OF PENNSYLVANIA.

GRINDING-MACHINE.

977,060. Specification of Letters Patent. Patented Nov. 29, 1910.

Application filed February 3, 1910. Serial No. 541,825.

To all whom it may concern:

Be it known that I, FREDRICK WELKER, a citizen of the United States, residing at Williamsport, in the county of Lycoming and State of Pennsylvania, have invented certain Improvements in Grinding-Machines, of which the following is a specification.

My invention relates to work supporting devices for machines for grinding knives, and it consists principally in constructing the knife holding bar so as to accommodate the ordinary slotted knives used on wood planing machines, and also to carry plain knives made of thin strips of steel, some of which are required to be ground on both sides at different angles; and it further consists in devices for adjusting and holding knives of different shapes and dimensions.

In the drawings, Figure 1 is an end elevation of my invention; Fig. 2 is a side elevation of a portion of the knife holder showing the indexing and clamping details in partial section. Figs. 3, 4 and 5 are end elevations of the knife holder each showing a different relative position of the knives against the grinding wheel. Fig. 6 is a plan view of a stop plate and securing device; Fig. 7 is a plan view of a different stop plate detached; Fig. 8 is an elevation, partly broken away, showing a plain knife-support and clamp; Fig. 9 is an elevation of a knife-holding bar, partly broken away, showing a series of clamping plates on a knife-supporting wing; and Fig. 10 is an end view of a stop plate.

A in all the drawings is the grinding wheel having the direction of motion indicated by the arrows in each case.

B is the knife holding bar having journals 1—2, which have bearings in uprights 3—4, Fig. 9. These uprights are rigidly secured to a traveling table C, which is fitted to reciprocate on suitable ways upon the main frame E of the machine. A water pan D extends the entire length of the knife holder B, and is arranged to catch water and grit from the wheel and convey it away. Knife holder B is provided on one face with one or more slots 5 which are preferably made T shaped as indicated, for the purpose of clamping ordinary slotted knives 6.

Above described parts are not essentially different from grinding machines now in use in several forms. The knife bar B in addition to the slotted face described, has a projecting wing F which I prefer to locate substantially opposite the slotted face and nearly at right angles thereto, but other approximate positions might be found desirable for some kinds of grinding. The wing F is made quite thin at its extreme outer edge so that it may be swung up close to the face of the wheel A, as indicated in Figs. 4 and 5. One face 7 of this wing is dressed true to receive plain knife strips 8, and a clamping jaw 9 is provided which is held by screws 10, Figs. 8 and 9, threaded into the wing F. Fulcrum screws 11 are threaded through the inner edge of the clamp 9, which may be adjusted so as to produce a strong pressure at the edge 12 of the clamp when the screws 10 are driven down. This action pinches the knife strips 8 firmly against the face 7 of wing F, and thus prevents vibration through the cutting action of the wheel A. This clamp may be made integral the whole length of the holding bar, or it may be made in sections as shown in Fig. 9, with a clamp screw 10 and a fulcrum screw 11 in each section.

It will be seen by reference to Figs. 3, 4 and 5 that by revolving the knife bar B sufficiently on its journals, ordinary slotted knives 6 can be ground at a required angle, and when it is desired to grind plain knife strips they may be clamped by jaw 9 and wing F, and the bar B swung over so as to grind either or both edges without in any way interfering with the slotted face of the knife bar: the revolution of the knife bar is usually done when the traveling carriage C is moved either to the right or left extreme position, and therefore out of the range of the revolving wheel A, which otherwise would interfere with such revolution, but it may also be done by adjusting the wheel A and its bearings diametrically away from the bar B by means of a cross feed screw such as usual in this class of machines.

In order to clamp the knife bar B at any required angular position I provide a collar 13, Fig. 2, made rigid on the knife bar, and shouldered against box 14 on upright 3; against the opposite face of this box a disk 15 rests, which is fitted to slide freely on the

journal 1, and is held from revolving thereon by a spline or feather 16. 17 is a hand wheel likewise fitted to slip on journal 1 and be retained by the same spline. This is used to revolve the knife bar when required.

18 is a clamp wheel, the hub of which is threaded upon a projecting shank 19 of the journal 1, and it presses against the hubs of wheel 17 and disk 15; as a consequence the latter is clamped tightly against the box 14 opposite the collar 13, and the knife bar B, held rigidly in whatever position it is set by the wheel 17.

On the periphery of disk 15, Fig. 1, I cut groups of notches at three or more points, the center notch of each group being located approximately to correspond with the three positions of the knife bar indicated in Figs. 3, 4 and 5, the first group positioning the knife bar for grinding a standard bevel on an ordinary slotted knife, as in Fig. 3, the second group for the outside bevel of a thin knife, as in Fig. 4, and the third for the inside or "back level" of the same when it is desired to make a scraping or blunt edge, as in Fig. 5. Each way from the center notch in each group I provide as many others as seem to be required to position the knife for different bevels. The object of this arrangement of notches is to guide the operator so that he can quickly adjust the disk and knife bar to the approximate position for grinding, and afterward find the right notch in each group to produce the required bevel.

A spring lock 20, or some equivalent device, is attached to the upright 3 to hold the disk in position while being clamped by the wheel 18.

For the purpose of positioning ordinary knives on the bar substantially parallel to the grinding line, I provide adjustable stops 23, Figs. 2, 3, 5 and 6, consisting of a stop plate 21, slotted to receive the clamp bolt 22, the head of which moves easily in the slot 5 in the knife bar, and an inner plate 23, having a ledge or rib 24, fitting into said slot 5.

Bolt 22 passes through the ledge 24, and a thumb nut 25 clamps the plates together and to the bar B. The inner face of the plate 23 is corrugated transversely and a projecting tooth 26 fits into the corrugations, so that by slacking the thumb nut the outer plate may be shifted to any notch. The back of the knife to be ground rests against the end of stop plate 21, and the ledge 24 and tooth 26 thus prevent its being pushed back by the action of the grinding wheel: when a knife has been worn narrow the stop plates 21 are pushed out as many notches as are required, and as two or three of these stops are placed along the knife bar, the cutting edge is thus ground parallel with the back.

For gaging plain knives in the clamping jaws 7, 9, I provide a stop plate 27, Figs. 7 and 8, extending substantially the whole length of the bar B, and having along its inner edge projecting teeth 28 corresponding to the tooth 26 on plate 21. These teeth are fitted into corrugations in the rear portion of jaw 7, similar to those on plate 23, and the adjusting operation is the same. On account of the inherent weakness of thin knife strips it is necessary to support them for nearly their entire length, so as to insure parallel grinding. Slots 29 in the stop plate 27 permit bolts 10 to pass through and allow the adjustment above described; for convenience in adjusting the plate 27 pins 30 are secured to it, which project through the spaces between the sections of the clamp 9, and are thus easily manipulated.

The traveling carriage C may be reciprocated in any practical and convenient way, and the grinding wheel A mounted on a driving arbor according to well known methods in this class of machine, the details of which are not a part of my present invention.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a knife grinding machine, a work holding bar comprising in its construction means for securing ordinary slotted knives on a flat face on one side of the bar, and separate means opposite the flat face and comprising a separate knife-bearing-face of the bar, and a clamp overlying said latter face for clamping plain knives, for the purposes set forth.

2. A work holding bar for a knife grinding machine comprising in its construction means for holding ordinary slotted knives on a flat face, separate means opposite the flat face and at an angle thereto and comprising a separate face of the bar and a coöperating clamp for clamping plain knife strips, and means for adjusting said work holder to the required grinding positions.

3. A work holding bar for a knife grinding machine, comprising a flat face with means for securing ordinary slotted knives thereon, journals at the ends thereof, bearings mounted on a reciprocating carriage, and permitting a partial or entire revolution of said bar, a plain knife clamping device located substantially opposite the flat face thereof and at an angle thereto, whereby plain knife strips may also be secured and brought into position to be ground on one or both sides.

4. In a knife grinding machine, a knife holding bar having a plurality of bearing faces, and separate knife-attaching devices for holding knives in three or more positions with reference to the grinding wheel, journals for revolving and supporting said bar, an index disk secured to one journal having as many groups of notches on its periphery

as there are positions required for said grinding contact, whereby a grinding position is quickly found.

5. A work holding bar for a knife grinding machine, comprising a flat face with provision for attaching slotted knives, a thin knife supporting wing and clamp projecting substantially opposite said flat face and at an angle thereto, journals on said bar, and an index plate secured to one journal whereby the bar may be positioned and locked at the required grinding point.

6. In a knife grinding machine, the combination of a knife holding bar having journals permitting its partial or entire revolution, a shoulder or collar at the inner end of one journal, a hand wheel secured to said journal or an extension thereof, but sliding longitudinally thereon, clamping means acting to force said hand wheel or a sleeve next thereto, against the journal box, whereby the knife bar is rigidly clamped in position.

7. In a knife grinding machine a flat faced knife holding bar having one or more T slots in its face, a knife clamping wing projecting from said bar substantially opposite the flat face thereof, a clamping plate suitably attached to said wing, whereby thin bars of steel may be rigidly clamped for grinding on either side.

8. In a grinding machine, a knife holding bar journaled to permit of a partial or entire revolution, a knife clamping wing projecting from said bar, means for clamping a knife against one face of said wing, and adjustable means located between said clamping jaws for back stopping said knife.

9. In a knife grinding machine, a back stop or knife gage, comprising a base plate with a retaining tongue to enter a slot in the holding bar, an adjustable outer plate arranged to receive the back of the knife, and one or more teeth in its inner face fitted to enter corresponding notches in the base plate, and means for clamping both plates to the flat face of the knife holding bar.

10. In a knife grinding machine, clamping jaws for thin knives, a gage plate or stop located between the jaws of the clamp and provided with one or more projections fitted to engage with notches provided on the inner face of the stationary clamping jaw for the purposes set forth.

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

FREDRICK WELKER.

Witnesses:

HUGH GILMORE,

ALBERT T. LEHMAN.