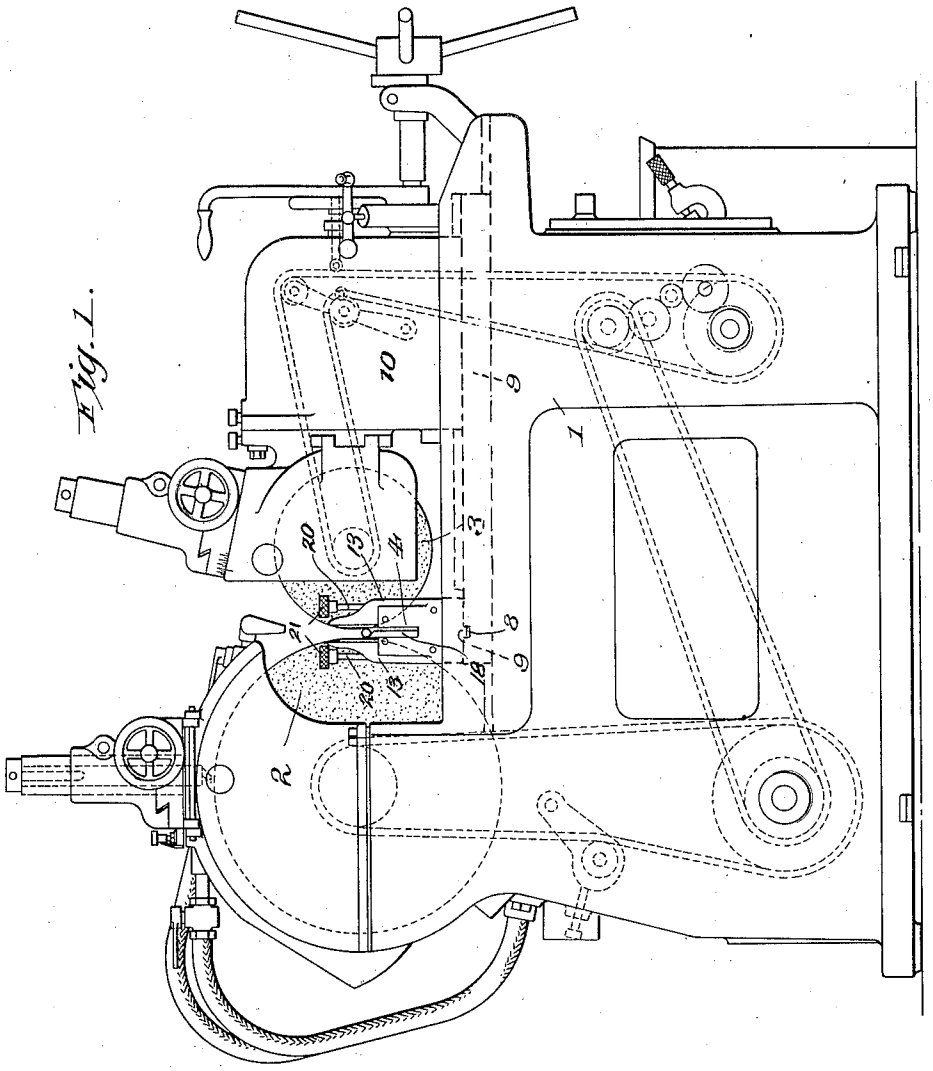
March 2, 1926. 1,575,557

S. EINSTEIN ET AL

WORK REST AND GUIDING DEVICE FOR GRINDING MACHINES

Filed Jan. 18, 1924 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

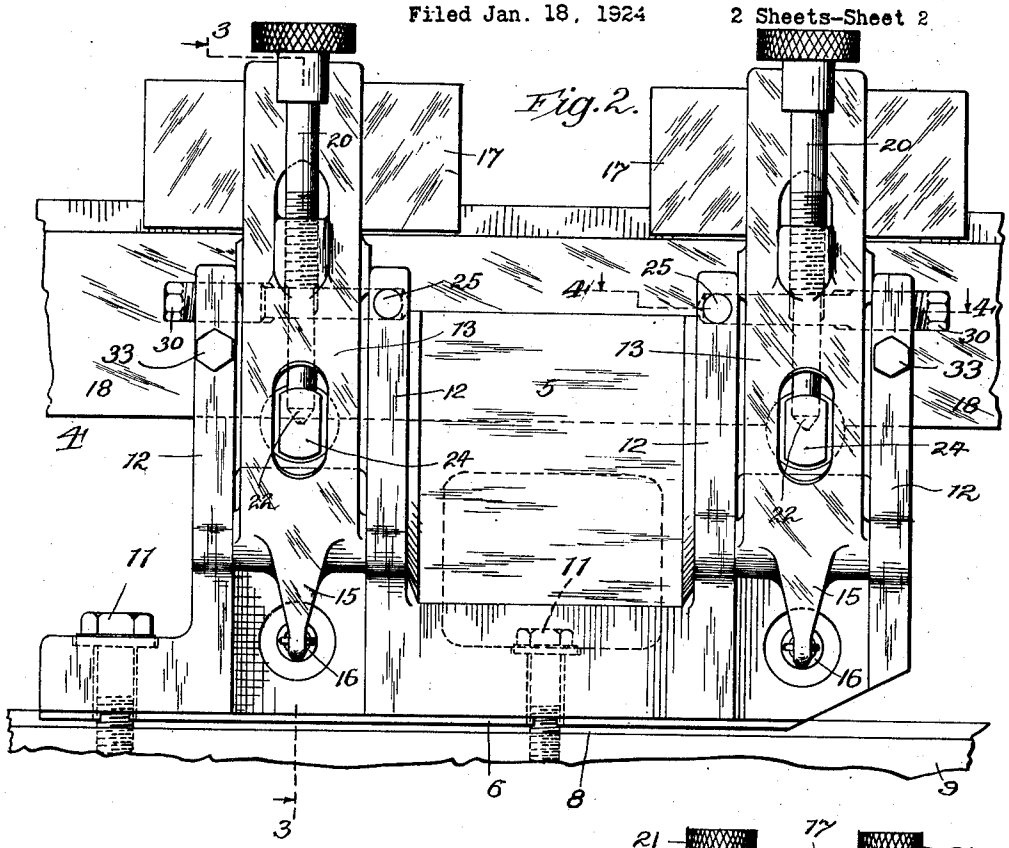


Fig. 3.

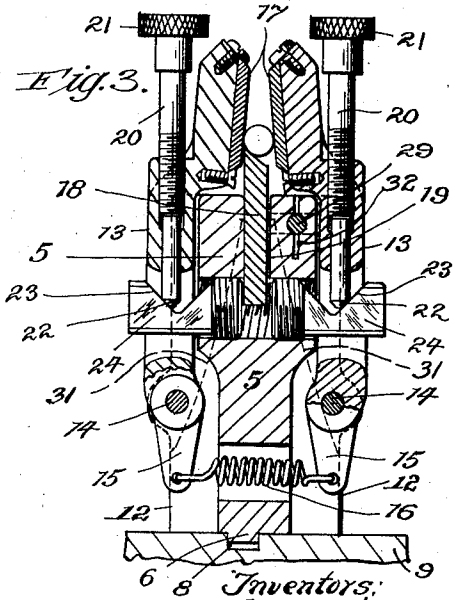
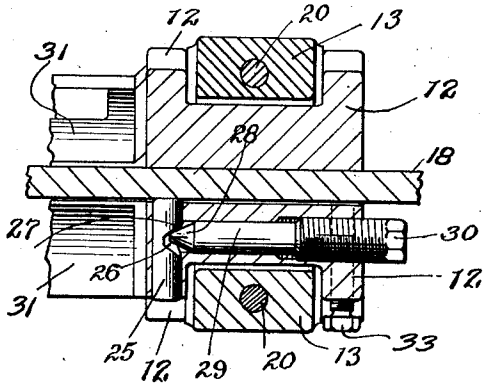


Fig. 4.



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UNITED STATES PATENT OFFICE.

SOL EINSTEIN AND LESTER F. NENNINGER, OF CINCINNATI, OHIO, ASSIGNORS TO THE CINCINNATI MILLING MACHINE COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

WORK REST AND GUIDING DEVICE FOR GRINDING MACHINES.

Application filed January 18, 1924. Serial No. 687,082.

To all whom it may concern:

Be it known that we, SOL EINSTEIN and LESTER F. NENNINGER, citizens of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Work Rest and Guiding Devices for Grinding Machines, of which the following is a specification.

This invention relates to a work rest and work guides for use in connection with grinding machines, and the structure is designed with special reference to convenience in introducing, adjusting, substituting, clamping, and releasing interchangeable work-supporting bars, blades or elements of varying forms appropriate to objects of differing form and dimensions.

A special object of the invention is to enable all placements, adjustments, and substitutions to be made quickly, accurately, and safely, and without carrying the hands or fingers of the operator or attendant into dangerous proximity to the grinding and governing wheels or elements of the machine.

Though primarily intended for use with centerless grinding machines, and preferably with such as employ a rotary grinding element and a rotary governing element, which latter effects or controls, or effects and controls the rotation, or rotation and axial feed, of the object ground, the structure here described may be used with grinding machines of other types, and it is to be understood that such general application and use are contemplated, and that the claims appended hereto are to be read and interpreted accordingly.

The invention is illustrated in a preferred form in the accompanying drawings, wherein—

Fig. 1 is a side elevation of a grinding machine of known construction, equipped with the improved work rest and guides;

Fig. 2 is a face elevation of the work rest and guides;

Fig. 3 is a transverse vertical section through the same on the line 3—3 of Fig. 2 looking in the direction indicated by arrows;

Fig. 4 is a fragmentary horizontal section, taken on the line 4—4 of Fig. 2 and looking downward.

Referring first to Fig. 1, the numeral 1 indicates the main frame of a grinding machine, equipped with a grinding wheel 2, and a governing or control wheel 3, here shown as in common plane or in peripheral opposition on opposite sides of the work rest, which as a whole is designated by the numeral 4.

Said wheels are mounted upon arbors or spindles carried in sleeves or bearings above the top plate or bed of the machine, and are rotated in proper direction and at suitable speed by belts, in well known manner.

The work rest supports the object to be ground, and assists in guiding the same if it is to be axially fed or traversed upon the rest, during the grinding operation.

One wheel of the couple, the governing wheel preferably, is capable of adjustment toward and from the grinding wheel and work rest to assist, as does the grinding wheel, in holding the work in place on the rest, to press it into contact with the grinding wheel, and to effect or control, or effect and control, the rotation of the object while being ground. If desired, it may also, acting in conjunction with the grinding wheel and work rest, effect a spiral feed, or rotation and axial advance of the work lying on and guided by the rest. By limiting the approach of the governing and grinding wheels, the diameter to which the object shall be ground may be accurately gauged and determined, as is usual in grinding machines of this class.

Referring now to Figs. 2, 3, and 4, the construction of the work rest and guides will be described and explained in detail.

The work rest comprises, first, a main body or casting 5, the base of which is advisably formed with a longitudinal rib 6 to enter a groove or seat 8, formed in the upper face of the part to which the rest is secured, which is preferably a slide 9 placed upon the bed or top plate of the machine frame, movable upon guides or ways thereon, and itself provided with guides or ways on its upper face, upon which is mounted and guided a movable shell or carrier 10, which carries the bearing or bearings of the governing or control wheel shaft or arbor. Suitable provision is made for moving the slide, the carrier or both, toward and from the grinding wheel, the slide being so moved

to position the work rest 4 in proper relation to the grinding and governing wheel, and the carrier being so moved to space the governing wheel at a proper distance from the grinding wheel, to gauge the grinding space and the grinding of the work located therein.

To permit the body or casting 5 to extend well up into the space between the peripheral faces of the wheels 2 and 3 its midportion is cut away on both faces over a width somewhat greater than that of the peripheral faces of said wheels, as shown at 31 in Fig. 4, thus permitting said faces to approach each other quite closely without contacting with the casting.

The base of casting or body 5 is of sufficient width to give it steadiness, and is firmly secured to the slide or other support by substantial tap bolts 11, the threaded ends of which enter holes in the underlying support, tapped and threaded to receive them.

The end portions of the body or casting 5, at opposite sides of the wheel-receiving recesses, are quite thick and substantial, giving to the casting the rigidity necessary to prevent vibration, and consequent chattering of work supported by it.

These relatively thick end portions are vertically grooved on each side, the margins of the grooves being defined by vertical ribs 12. The grooves offer space for the upright pivoted arms 13, of which there are four arranged in opposed pairs. The arms 13 are offset inwardly at their upper ends so as to overhang the top of casting 5, as clearly shown in Fig. 3. Each arm is carried on a corresponding horizontal pivot pin 14, which extends through it and the two adjacent ribs 12.

Each arm 13 is formed or furnished with a downward extension 15, and the extensions of the two arms of each pair are connected by a coiled spring 16, tending to draw together said extensions and hence to swing outward and apart the upper ends of the arms 13.

Detachably secured to the inner face of the overhanging upper end of each arm 13, is a guide plate 17, advisably of tempered steel to resist wear, since the objects ground contact therewith and tend to wear away their faces.

Between the guide plates 17 is located a blade, plate, or bar 18, which forms the immediate support or rest for the objects ground. It is seated in a vertical or substantially vertical slot 19 formed in the top of casting or body 5, and extending lengthwise thereof, and may be of length and form suited to the objects to be ground. In practice, a series of such blades or plates will be supplied, varying in their several dimensions or any of them, and in the shape or configuration of their upper edge or face to accord with the dimensions and forms of objects treated or ground.

The adjustment of arms 13 and their guide plates 17 is such as to cause the latter to stand close to opposite sides of the work or object ground, but to afford clearance sufficient to prevent any interference with its free motion between them.

To readily effect and to maintain adjustment of the arms 13 and guide plates 17, there is provided the means illustrated in Figs. 2, and 3, which will there be seen to comprise for each arm, an upright threaded stem or screw 20, having a milled or knurled head 21 and conical end or point 22, which latter bears upon an inclined face 23 of a stud or plug 24, carried by the body or casting 5, and projecting horizontally therefrom, through an opening in the arm.

For convenience of manufacture, and to permit adjustment and renewal, the studs or plugs 24 are formed separate from the casting 5 and are threaded and screwed into tapped holes therein, as illustrated in Fig. 3. By turning a screw 20 in the direction to move it downward, its conical end riding downward upon the inclined face 23 of the associated stud or plug 24, will cause the screw, the arm 13 which carries it, and the guide plate 17 of said arm to move inward toward the work rest 18, against the pull or tension of its spring 16, the companion arm 13 of the pair remaining unaffected. In like manner, each arm 13 and its guide plate 17 may be quickly and accurately adjusted, and this may be accomplished while the machine is in operation, and without danger or risk, as the screws 20 are set well away from the grinding and control wheels.

For the purpose of clamping and releasing the blade or plate 18, an analogous construction is adopted. This is illustrated in Figs. 2, and 4, which show one of the devices, of which two are advisably used, one near each end of the casting 5 and on the side of casting 5 nearest the governing wheel 3. Each consists of a longitudinally movable pressure stem 25, seated and movable in a horizontal hole in casting 5, opening into the blade-receiving slot 19, said stem having at or near its mid-length a notch 26, having an inclined face 27, against which bears the conical end 28 of a stem 29, movable in a horizontal hole in casting 5, substantially perpendicular to the stem 25 and its receiving seat or hole. The outer portion of stem 29 is larger in diameter than its pointed section, and is threaded to fit an internally threaded socket, forming a continuation of the hole in which the pointed section is seated and guided. The head 30 of stem 29 is polygonal in form to receive a wrench, or is otherwise adapted for turning the stem to cause it to screw inward or outward and to force inward or to release the pressure stem

25, the inward movement causing the pressure stem to force and firmly hold the work-supporting blade or bar 18 against the opposite wall of slot 19.

To guard against loosening of screw stem 29 through vibration or from other cause, the metal through which it passes may be split or slotted as shown at 32 (Fig. 3) from the top down to and below the hole in which stem 25 is seated, a bolt or screw 33 being provided to draw together the walls of the slot and thus to clamp and firmly hold stem 29.

The foregoing description is predicated upon the construction illustrated in the drawings, in which the axes of wheels 2 and 3 are in common horizontal plane; but as it is entirely practicable to arrange said axes in any other plane it will be understood that the parts will maintain their relative positions, but may be in correspondingly altered positions relatively to the horizon; in other words may be inclined or tipped from vertical or horizontal positions herein indicated.

The projecting studs 24 are flattened in their outer portions, and the openings in the swinging arms 13 through which they pass are of such dimensions as to preclude the turning of the stems in their sockets to any material extent, thus precluding any displacement of the inclined faces relatively to the conical ends of the adjusting screws.

What is claimed is:—

1. A combined work-rest or support and guide, comprising a body or casting having in its upper portion a longitudinal slot; a work-rest in the form of a blade, bar or plate, seated within said slot; pressure stems extending through a side wall of the slot and provided each with an inclined face; screw stems provided with conical ends arranged perpendicular to the pressure stems and bearing at their conical ends against the inclined faces thereof; upright swinging arms pivoted on opposite sides of the work-supporting bar and pivotally connected near their lower ends to the body or casting; guide-plates carried by the free ends of said arms; springs connecting opposed swinging arms in pairs and tending to separate said arms and their guide-plates; horizontally-projecting studs carried by the body or casting and having each an inclined face; and screws carried by said swinging arms, having conical ends to bear upon the inclined faces of the studs, and provided with heads by which to turn them and thus to force them down the inclined faces, and thereby to cause the arms to swing inward toward the work-supporting blade.

2. In a work-rest or support for grinding machines, the combination of a main body or casting having in its upper portion a longitudinal slot open at its top, a work-supporting blade or bar seated in said slot, and one or more clamping devices for said bar, each comprising a pressure stem movable in a hole extending through a side wall of the supporting body or casting and opening into the slot, each stem provided with an inclined face; and a screw stem seated in a hole or opening substantially perpendicular to the pressure stem and its seat, and having a conical end arranged to bear upon the inclined face of the stem, and to move said stem longitudinally when the screw stem is turned in the proper direction; whereby the pressure stem is caused to bear forcibly against the work-supporting bar and to hold it firmly in place.

3. In a work-rest or support for grinding machines, the combination of a main body or casting having in its upper portion a longitudinal slot open at its top; a work-supporting blade or bar seated in said slot; one or more clamping devices for said bar, each comprising a pressure stem movable in a hole extending through a side wall of the supporting body or casting and opening into the slot, each stem provided with an inclined face; a screw stem seated in a hole or opening substantially perpendicular to the pressure stem and its seat, and having a conical end arranged to bear upon the inclined face of the stem, and to move said stem longitudinally when the screw stem is turned in the proper direction; and means for binding the screw stem to prevent accidental rotation.

4. A work-rest or support for grinding machines, comprising an upright body or casting provided at its top with a work-supporting blade or bar; an upright arm pivotally connected near its lower end with said body or casting and overhanging in its upper portion said body or casting; a guide-plate carried by the upper end of said arm on the side nearest the work-supporting bar; a stud carried by the casting and having an inclined face; and a concial-pointed stem extending downward through said swinging arm and threaded to screw into a threaded seat or socket in said arm, and provided with a head by which said stem may be turned to screw the stem downward through said arm and force its conical end downward in contact with the inclined face of the stud; whereby said swinging arm is moved inward toward the work-supporting bar.

5. A work-rest or support for grinding machines, comprising an upright body or casting provided at its top with a work-supporting blade or bar; an upright arm pivotally connected near its lower end with said body or casting and overhanging in its upper portion said body or casting; a guide-plate carried by the upper end of said arm on the side nearest the work-supporting bar; a stud carried by the casting and having

an inclined face; a conical-pointed stem extending downward through said swinging arm and threaded to screw into a threaded seat or socket in said arm, and provided with a head by which said stem may be turned to screw the stem downward through said arm and force its conical end downward in contact with the inclined face of the stud; and a spring arranged to act upon the swinging arm and tending to move it outward or away from the work-supporting bar.

6. A work-rest for grinding machines, comprising a casting or body slotted in its upper portion to receive a work-supporting blade or bar; a work-supporting blade or bar seated in said slot; a pair of swinging arms pivotally connected near their lower ends with the supporting body or casting and located on opposite sides thereof, said arms overhanging the top of the casting and provided on their opposing faces with guiding plates; a spring connecting said arms at a point below their pivots and tending to separate their upper ends: horizontal studs carried by and adjustable in sockets on opposite sides of the supporting body or casting, each provided with an inclined face; and cone-pointed screws, one for each swinging arm, extending downward through the arms and having their conical ends arranged to bear upon the inclined faces of the studs, said screws being provided with heads whereby they may be screwed upward or downward to force the arms toward the interposed work-supporting bar, or to permit their movement away from said bar under the stress of the connecting spring.

7. The herein described work-rest and guide, comprising a supporting body or casting 5 provided with a slot 19; a work-supporting blade or bar 18 seated in said slot; a clamping stem 25, one or more, movable through an opening in a wall of the slot and arranged to bear against a face of the work-supporting bar, said stem being provided with an inclined face 27; a cone-pointed screw stem 29, the point of which bears against said inclined face and serves to move the stem 25 inward against the work-supporting bar, and to press the same against the opposite wall of the slot; swinging arms 13 pivoted near their lower ends to opposite sides of the supporting body or casting and at their upper ends overhanging the same; guide-plates 17 carried by said arms; a spring 16 connecting said arms at a point below their pivots; studs 24 projecting from opposite sides of the casting or body 5, each provided with an inclined face 23; and conical-pointed screw stems 20 extending downward through the swinging arms and having their conical ends arranged to bear upon the inclined faces of the studs, said screws being provided with heads whereby they may be turned.

In testimony whereof we have signed our names to this specification.

SOL EINSTEIN.
LESTER F. NENNINGER.