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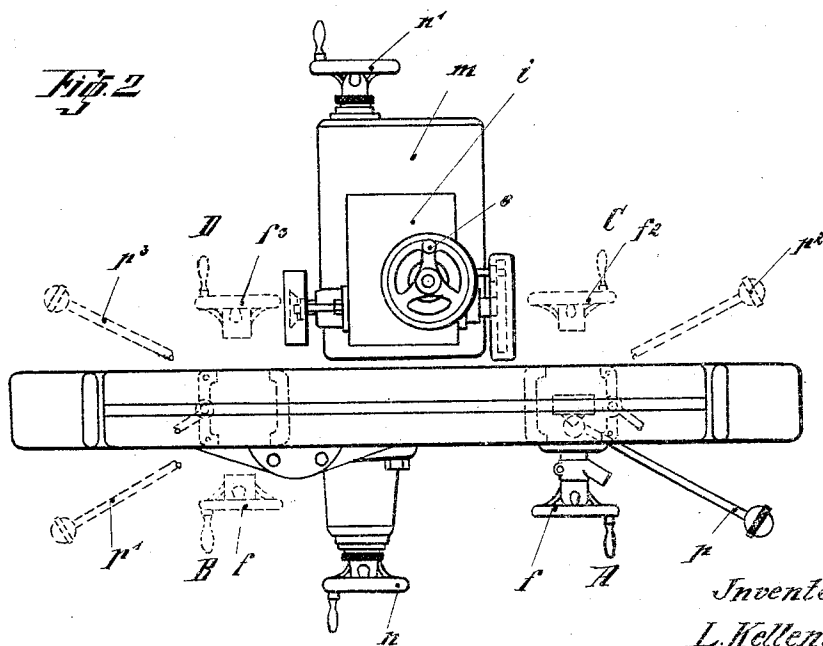
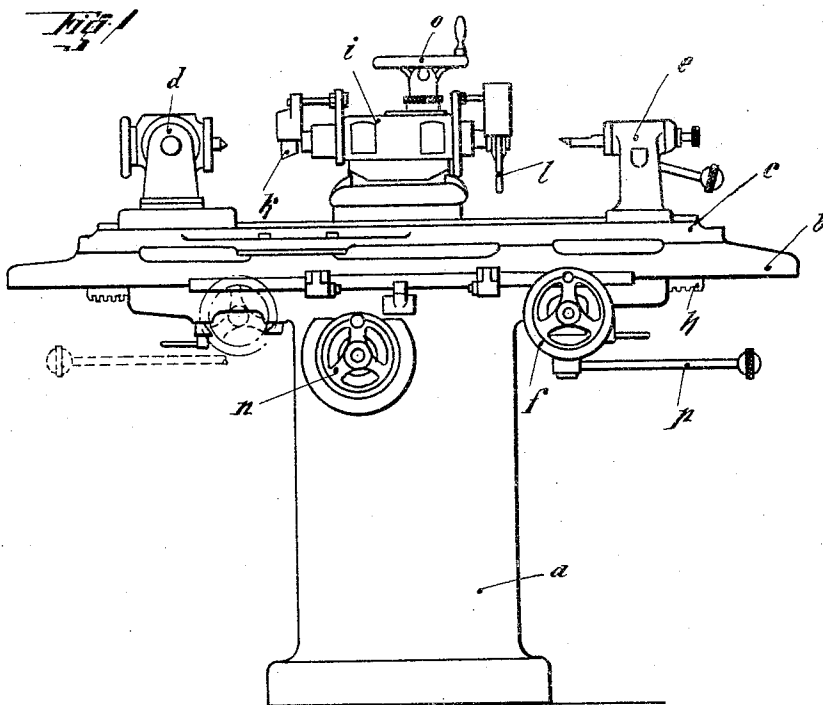
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TOOL GRINDING MACHINE

Filed Oct. 27, 1930

2 Sheets-Sheet 1



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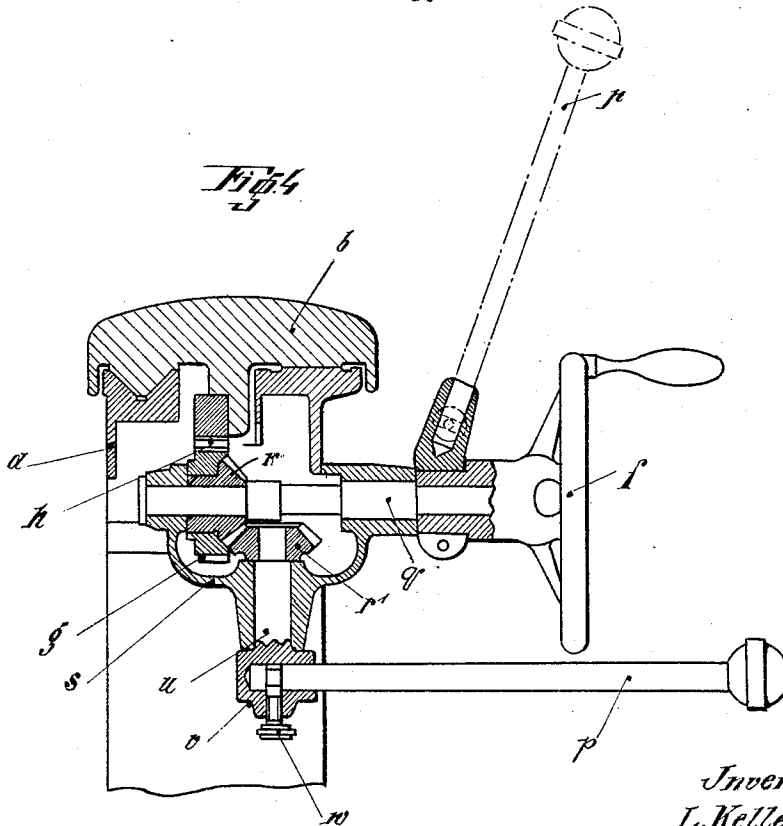
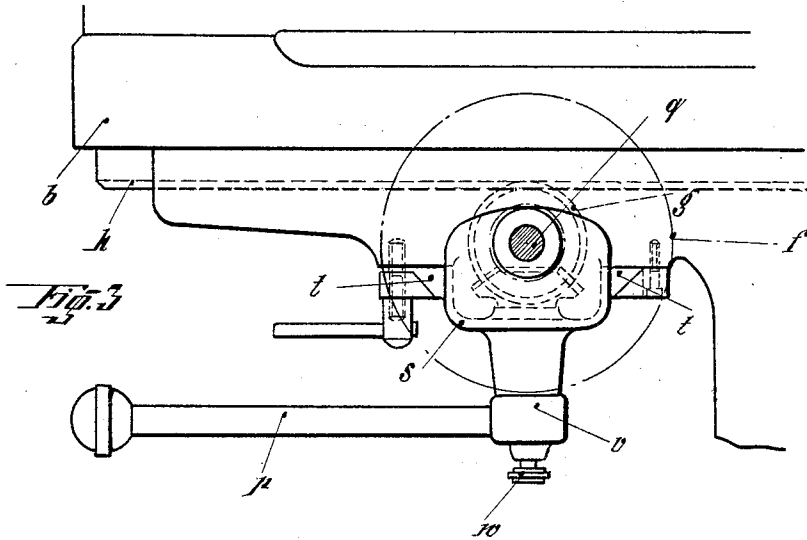
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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

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## TOOL GRINDING MACHINE

Application filed October 27, 1930, Serial No. 491,611, and in Germany November 5, 1929.

The object of this invention is to simplify the attendance of tool grinding machines in order to increase the performance thereof. With this improved machine it is possible to effect the three feeding movements requisite with tool grinding machines, viz. the longitudinal movement of the work table, the transverse movement of the grinding rest and the vertical movement of the same, including the grinding disk, wherever the workman may have his place in front, or at the back, of the machine, and he may change over from any one of said movements to any other thereof without leaving his place, as well as without interrupting the grinding work.

The tools, the shape, size and material of which is extraordinarily different, conditions a very great many-sidedness of the clamping possibilities, also different shapes and sizes of the grinding disks, which latter must be able to operate in vertical and in horizontal position, as well as in inclined ones. In view of the great accuracy required for the grinding of tools, it is necessary, that the operator can continually watch the grinding operation from a suitable place that must be chosen with respect to the particular tool to be ground. The places are, thus, very different, also with respect to the clamping device employed in the one or the other case, and also the height in which the grinding operation is effected can considerably vary so that in one case the operator must sit while that operation proceeds and in another case he must stand. It will be obvious that the performance of a grinding machine will be the greater, the less the operator need change that place from which he can best watch the grinding, as every change necessitates an interruption of the work.

Now, in contradistinction to the known tool grinding machines, the present improved machine enables the man at the machine to operate it in sitting, as well as in standing position from any place at the front and at the rear of the machine, that is to say, he can effect the three feed movements mentioned in the preceding paragraph without any necessity to change or leave his place and to interrupt the grinding work; there are, for

this purpose, provided so many actuation members for the machine parts concerned, and in such a position with respect to the range of the operator wherever his place at the machine may be, that the operator can actuate each of those members from that place.

While, with the known tool grinding machines, the operator cannot help to change his place now and then in order to actuate another of the feeding members which not only means an interruption of the work, but also compels the man to look thereafter at the respective work piece under another angle of view, which always causes also a certain loss of time, this angle is now, with the present improved machine, always the same which is very useful for the accuracy of the work and means an increase of the same.

Another feature of the invention is this that, in order to reduce the manufacturing costs of the machine, the members for effecting the longitudinal movements of the table are assembled in a casing which is common to them and can be detached very easily as a whole or unit from the place where it just had been, and can be attached to another place at the front or at the rear of the machine. Therefore, instead of providing, for instance, four sets of actuating members only one set thereof is necessary, whereby a considerable saving in the manufacturing costs of the machine is attained.

The thus improved machine is illustrated diagrammatically and by way of example on the accompanying drawings on which Figure 1 is a front-view of a tool grinding machine designed according to this invention; Figure 2 is a plan of the same, Figure 3 is a front-view of the attachable and detachable feeding mechanism for the longitudinal movement of the table, and Figure 4 is a vertical section through this mechanism.

The stationary standard *a* (Fig. 1) supports in known manner the table *b* which is longitudinally movable. The clamping table *c* proper which can be adjusted horizontally in known manner under various angles is so attached to the table *b* as to take part in

the movements of the same. On the table *c* is mounted the headstock *d* and the tailstock *e*.

The table *c* is moved lengthwise in the usual manner by means of a hand-wheel *f*, a pinion *g* (Figs. 3 and 4) and a rack *h*. There are provided, according to this invention, three more feeding mechanisms also intended for the longitudinal movement of said table and being provided in turn with hand-wheels *f*<sup>1</sup>, *f*<sup>2</sup> and *f*<sup>3</sup>, as indicated in dotted lines in Fig. 2. The grinding rest *i* can be adjusted vertically in known manner by means of the hand-wheel *o*, and can also be turned by 180°. The hand-wheel *o* is feasibly practically arranged in the middle of the machine in such a position that it is within the range of the workman from every place he may have assumed at the front or at the rear of the machine.

In the grinding rest is supported in known manner the grinding spindle which is driven by an electromotor and carries two grinding disks *k* and *l*.

The said rest is supported in turn upon a slide *m* and can be adjusted transversely in known manner at the front, as well as at the rear of the machine by means of hand-wheels *n* and *n*<sup>1</sup>. These two wheels are so arranged that they are within the reach of the workman wherever he may have his place at the front or at the rear of the machine.

In Fig. 2 A, B, C and D denote four places where the workman may stand or sit; two thereof are at the front of the machine, two at the rear, and one of each of these pairs is located lefthand and the other righthand from the middle transverse axis of the machine. The workman can move the working table longitudinally from any of the four places A, B, C and D, by actuating the nearest of the hand-wheels *f*, *f*<sup>1</sup>, *f*<sup>2</sup> and *f*<sup>3</sup> (of which *f*<sup>1</sup>, *f*<sup>2</sup> and *f*<sup>3</sup> are indicated merely by dotted lines in Fig. 2), or he may make use of one or the other of the hand levers *p*, *p*<sup>1</sup>, *p*<sup>2</sup> and *p*<sup>3</sup> (of which *p*<sup>1</sup>, *p*<sup>2</sup> and *p*<sup>3</sup> are indicated merely in dotted lines in Fig. 2) which are provided by way of supplement to simplify moving said table lengthwise, the arrangement of these members being such that the workman can use them selectively in standing or in sitting position. Also the transverse movement of the slide *m* can be effected from any of the four places A, B, C and D by means of the hand-wheels *n* and *n*<sup>1</sup>, and the same is true of the vertical movements of the head-stock which can be operated from any of said places by means of the handwheel *o*, the workman remaining, thus, standing or sitting at his place and the grinding work proceeding without the least interruption.

Now, in order to enable attending to the machine from any of the said places without necessitating the employment of four driving members like *f*, *f*<sup>1</sup>, *f*<sup>2</sup> and *f*<sup>3</sup> and of the four driving members like *p*, *p*<sup>1</sup>, *p*<sup>2</sup> and *p*<sup>3</sup>,

the entire driving mechanism for the longitudinal movement of the table is assembled in a casing *s* so as to constitute a kind of unit which can be easily attached to, and detached from any of the places concerned. Figs. 3 and 4 show that unit. *g* denotes a horizontal shaft provided at its outer end with the hand-wheel *f* and at its inner end with a bevel-wheel *r*, as well as with a pinion *g* which meshes with a rack *h* that is firmly connected with the table *b*; thus, by turning the hand-wheel *f* the table will be longitudinally moved in the corresponding direction. The table can, however, be moved in the respective direction also by means of the lever *p* when it is in the position shown in dotted lines in Fig. 4, this lever being then firmly connected with the hub of the wheels *f*. The bevel-wheel *r* meshes with a similar wheel *r*<sup>1</sup> affixed to a short vertical shaft *u* forming at its lower end a sort of hub *v* into which the lever *p* can be inserted and secured in this position by means of a screw *w*. This position of the lever *p* is that shown in full lines in Fig. 4. In this position the lever can be turned in a horizontal plane, while when being coupled with the hub of the hand-wheel *f* it can be turned in a vertical plane. In Fig. 3 in which the lever is attached to the hub *v* it has been turned horizontally by 90° relatively to Fig. 4.

All these members are assembled in, and held by, the casing *s* which is provided with a dove-tail guide *t* (Fig. 3), and can be easily shifted with this guide into the counter-guide of the standard without any preliminary labor that may be necessary for that change.

I claim:

A tool-grinding machine, comprising, in combination with the tool-grinding means proper, a plurality of means for effecting the longitudinal movements of the work-table, these means being provided in such a number and in such positions that the operative can actuate them from any place he may have assumed at the front or at the rear of the machine without interrupting the grinding operation, and being assembled in a casing which is common thereto and attachable to, and detachable from the machine at respective places, substantially as set forth.

In testimony whereof I affix my signature.  
LEONHARD KELLENBERGER.