No. 676,413. Patented June 18, 1901.

C. V. BOYS.

TOOL GRINDING APPLIANCE.

(Application filed June 19, 1900.)

(No Model.) 3 Sheets—Sheet 1.

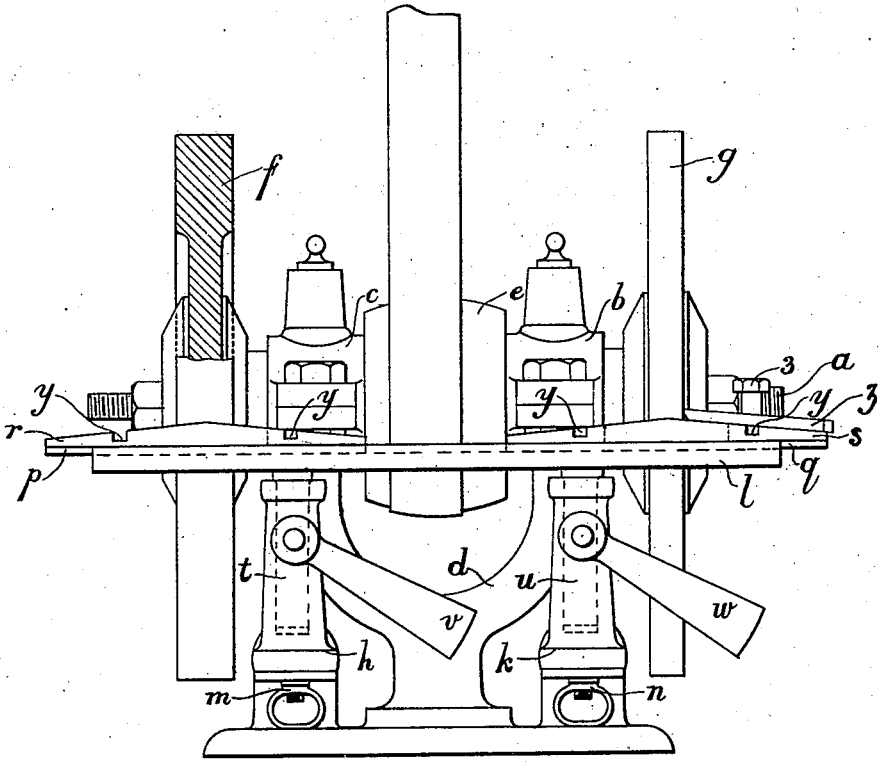

Fig. 1.

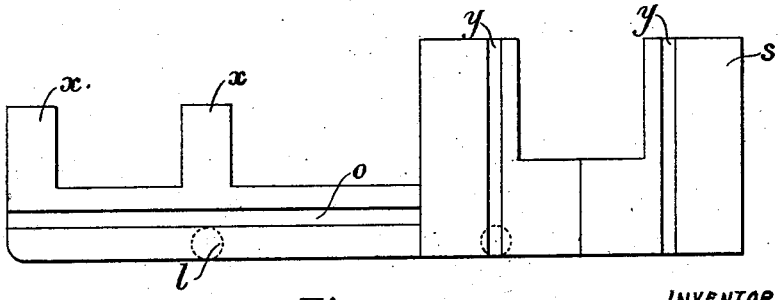

Fig. 2.

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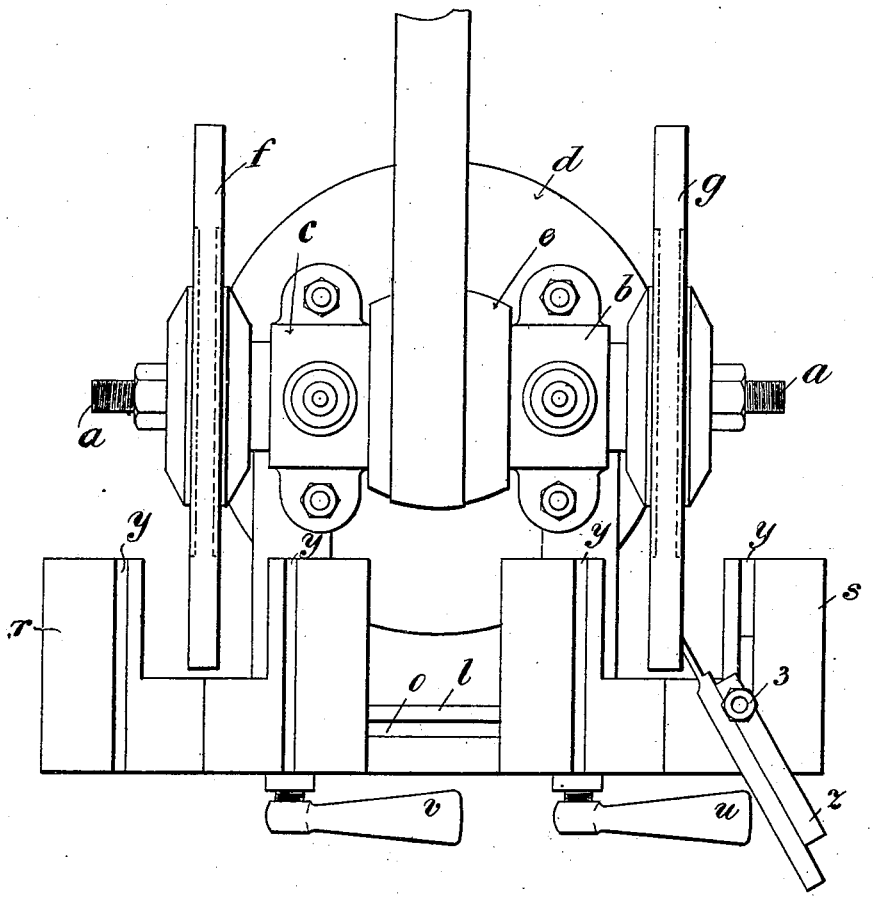

Fig. 3.

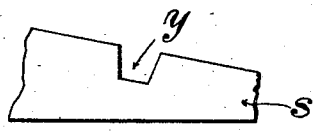

Fig. 8.

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(No Model.) (Application filed June 19, 1900.) 3 Sheets—Sheet 3.

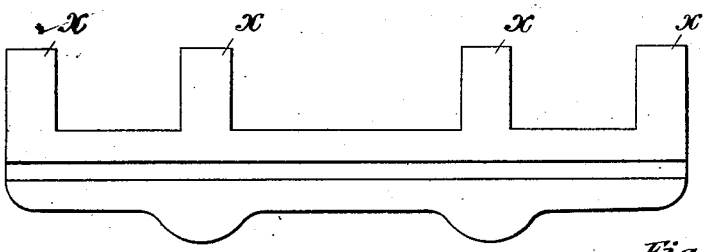

Fig. 4.

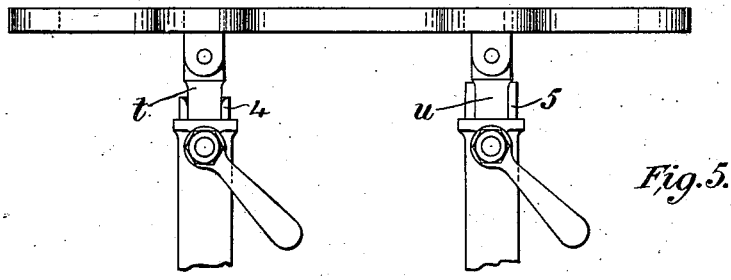

Fig. 5.

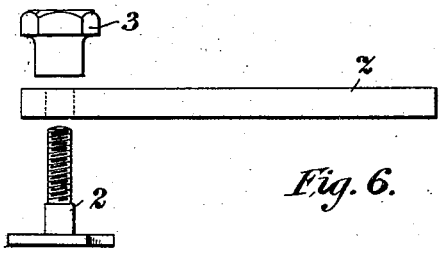

Fig. 6.

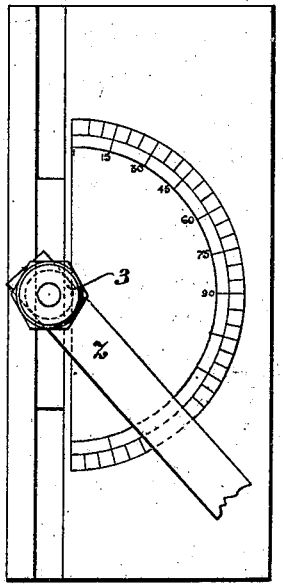

Fig. 7.

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INVENTOR
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ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES VERNON BOYS, OF LONDON, ENGLAND.

TOOL-GRINDING APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 676,413, dated June 18, 1901.

Application filed June 19, 1900. Serial No. 20,866. (No model.)

To all whom it may concern:

Be it known that I, CHARLES VERNON BOYS, F. R. S., metropolitan gas referee, a subject of the Queen of Great Britain and Ireland, and a resident of 66 Victoria street, Westminster, London, S. W., England, have invented a certain new and useful Improvement in Tool-Grinding Appliances, (for which I have made application for Letters Patent in Great Britain, No. 8,822, bearing date May 12, 1900,) of which the following is a specification.

My invention relates to appliances for attachment to tool-grinding heads, and has for its object to enable tools such as are used in lathes and planing and other similar machines to be ground with extreme perfection and accuracy with an inexpensive appliance and without requiring skilled labor.

My invention consists in providing in front of the grinding-wheels a guide-plate support having projections passing partly along both sides of the grinding-wheel. On this support I place a guide-plate adapted to be guided in a horizontal plane and parallel to the wheel-axle. The upper plate has two inclined surfaces, each of these being inclined to the surface of the tool-support at the fixed angle required for clearance of the tool. The upper plate has also projections which pass on each side of the grinding-wheel. Where the tool-nose is to be ground at a definite profile-angle, I provide on each of the two inclined upper surfaces a tool guide-bar capable of being set at any angle and provided with guiding means, so that the guide-bar can be freely moved back and forth in a direction parallel to the face of the grinding-wheel.

Referring to the accompanying drawings, which illustrate my invention according to one form, Figure 1 is an elevation showing a grinding-head having two grinding-wheels fitted with my tool-grinding attachment. Fig. 2 is a plan of a guide-plate support with one guide-plate in position. Fig. 3 is a plan of Fig. 1. Figs. 4 and 5 show plan and elevation, respectively, of a modified form of guide-plate support. Fig. 6 shows an elevation of a guide-bar. Fig. 7 shows a form of protractor for setting the guide-bar. Fig. 8 shows the form of groove in the guide-plate surfaces which I prefer for the convenience of manufacture.

a is a spindle running in bearings *b* and *c* on a bracket *d* and driven by means of a belt-pulley *e*. Grinding-wheels *f* and *g* are fastened to opposite ends of the spindle and are held in position by means of nuts and washers in the usual manner. Carriers *h* and *k* (of the well-known form as used in the wood-turning lathes) are provided for carrying the guide-plate support *l*, which is provided with pins *t* and *u*, which project perpendicularly to the support, slide freely in the carriers *h* and *k*, and are clamped in position by screws *v* and *w*.

A groove *o* is provided on the face of the guide-plate support, which plate runs parallel to the spindle and receives projections *p* and *q*, attached to the guide-plates *r* and *s*, so that the guide-plates may move freely in a horizontal plane and in a line parallel to the spindle *a*. Lugs *x* project from the support *l* on either side of the grinding-wheels *f* and *g*. The two guide-plates *r* and *s* have inclined surfaces, the inclined surfaces of plate *r* making equal angles with the horizontal plane, and the inclined surfaces of plate *s* making equal angles with the horizontal plane, only each making an angle of about one degree less than the surfaces of plate *r*. The guide-plate *r* is placed opposite the rough grinding-wheel *f*, while the guide-plate *s* is placed opposite the fine grinding-wheel *g*. A portion is taken out of the center of each of the plates *r* and *s*, so that more or less space, as required, can be left between the projecting portions and the faces of the wheels.

Grooves *y* are cut in the inclined faces in lines parallel to the working faces of the wheels to accommodate the guide-bars *z*, one of which is shown in detail in Fig. 6 and consists of a bar which is locked in position by means of a bolt 2 and nut 3, the head of the bolt 2 being oblong and sliding in the grooves *y* of the inclined surfaces. These guide-bars may be set to degree-lines drawn on the inclined surfaces or they may be set on a separate protractor, such as is shown in Fig. 7, provided with a groove to receive the head of the bolt 2, so that the guide-bar *z* may be set to the desired angle and locked by means of the nut 3.

To grind a tool with this attachment, it is first taken to the roughing-wheel *f* and placed

on one of the inclined surfaces of the guide-plate *r* and against a guide-bar *z*, which is set to the desired angle. The tool is then moved back and forward, the edge being kept in contact with the flat surface of the wheel until it is sufficiently ground. The inclined surface of the guide-plate serves to give the clearance-angle to the tool, while the guide-bar fixes the profile-angle of the cutting edge. The tool is then taken, with its guide-bar *z*, to the finishing-wheel *g* and placed on the corresponding inclined surface of the guide-plate *s*, as shown in Fig. 1. The tool is then ground as before; but as the inclined surface of the guide-plate *s* makes an angle of about one degree less with the horizontal plane than the inclined surfaces of plate *r* the edge only of the tool is fine ground and a slightly-smaller clearance-angle is there formed.

If the tool has cutting edges on both sides, the second edge can be ground by placing the tool on the other inclined surfaces of the plates *r* and *s* and a second guide-bar *z*, similarly used.

If it is desired to grind screw-cutting tools and the like, a pivoted guide-support, as shown in Figs. 4 and 5, is used. The pins *t* and *u* are hinged to the support *l*, which may thus be set to any desired angle. Thus tools may be ground with the proper clearance-angle for cutting any pitch of screw. Horseshoe-washers or distance-pieces 4 and 5 of different thicknesses may be inserted between the guide-support and the support-carriers to give the clearance-angles for common pitches of thread, and thus eliminate the effect of the slope of the thread.

By means of this attachment machine-tools can be ground with extreme accuracy without the necessity of skilled labor.

Different angles of guide-plates may be used for different clearance-angles.

I prefer to use grinding-wheels having thickened working faces, as shown at *f*, Fig. 1, so that the working face may remain flat in spite of wear.

It is obvious that my invention, which I have shown as applied to a grinding-head with two wheels, may be used with a single wheel.

I would point out that the width of the gap shown between the parts *x x*, Fig. 2, and of the corresponding gaps in the guide-plates is considerably greater than the thickness of the grinding-wheels, so that cranked tools may be accommodated.

It will be evident that guide-bars are only required where definite profile-angles have to be ground.

Guide-bars may be made to the definite profile-angles commonly required—as, for instance, to the thirty degrees required for the Sellars screw-thread. Adjustable guide-bars may then be unnecessary.

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

1. In tool-grinding machines, in combination, a guide-plate support adapted to be clamped to the machine, guide-plates adapted to slide on said guide-plate support, inclined faces on each guide-plate, and guide-bars adapted to slide on said inclined faces, substantially as described.

2. In tool-grinding machines, in combination, a guide-plate support, adapted to be clamped to the machine, said support having projections acting as supports for the guide-plates on either side of the grinding-wheel, guide-plates, having inclined surfaces and corresponding projections, sliding upon the guide-plate support and being guided by a groove therein substantially as described.

3. In tool-grinding machines, in combination, a guide-plate support adapted to be clamped to the machine, guide-plates adapted to slide on said guide-plate support, inclined faces on each guide-plate, said inclined faces on one guide-plate making slightly-greater angles with the guide-plate support than the inclined faces of the other substantially as described.

4. In tool-grinding machines, in combination, a guide-plate support adapted to be clamped to the machine, guide-plates adapted to slide on said guide-plate support, inclined faces on each guide-plate, and guide-bars adapted to slide on said inclined faces, means for setting said guide-bars at any required angle, substantially as described.

5. In tool-grinding machines, in combination, a guide-plate support adapted to be clamped to the machine, guide-plates adapted to slide on said guide-plate support, inclined faces on each guide-plate, and guide-bars adapted to slide on said inclined faces, said guide-bars being permanently formed to definite angles most frequently required substantially as described.

6. In tool-grinding machines, in combination, a guide-plate support adapted to be clamped to the machine, by means permitting of its angular displacement in a vertical plane, guide-plates adapted to slide on said guide-plate support, inclined faces on each guide-plate, and guide-bars adapted to slide on said inclined faces, substantially as described.

7. In tool-grinding machines, in combination, a guide-plate support adapted to be clamped to the machine by means permitting of its angular displacement in a vertical plane, by two sockets with pivot ends having shoulders adapted to rest on distance-pieces, for setting the angle of the support, guide-plates adapted to slide on said guide-plate support, inclined faces on each guide-plate, and guide-bars adapted to slide on said inclined faces, substantially as described.

8. In tool-grinding machines, in combination with the grinding-wheel, a guide-plate support having a recessed portion adjoining the edge of the peripheral edge of the grinding-wheel and projections adjacent to the opposite side faces of the wheel, guide-plates

having corresponding projections and inclined surfaces and guide-bars adapted to slide on said inclined surfaces, substantially as described.

9. In tool-grinding appliances, in combination, a guide-plate support adapted to be clamped to the machine, guide-plates adapted to slide on said guide-plate support, inclined faces on each guide-plate, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

CHARLES VERNON BOYS.

Witnesses:
WALTER J. SKERTEN,
MATTHEW ATKINSON ADAM.