July 29, 1952 J. R. EVANS 2,604,739

CONCENTRIC GRINDING UNIT FOR USE ON SURFACE GRINDERS AND THE LIKE

Filed May 29, 1950

FIG. 1.

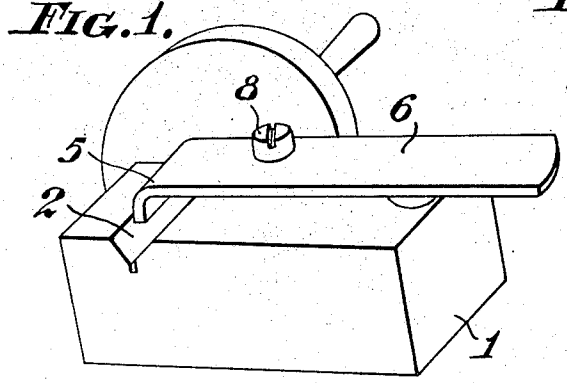
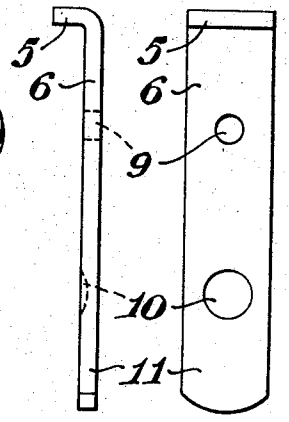


FIG. 2. FIG. 3.



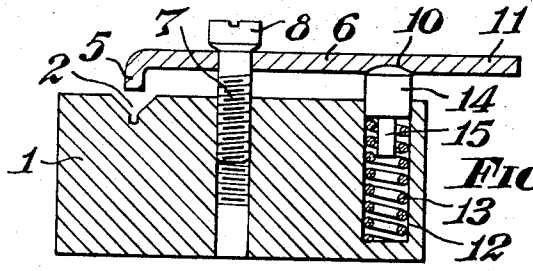


FIG. 4.

FIG. 5.

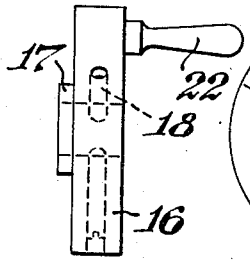


FIG. 6.

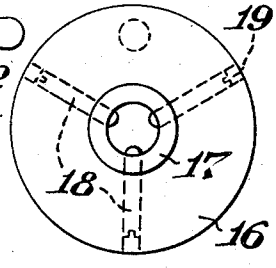


FIG. 7.

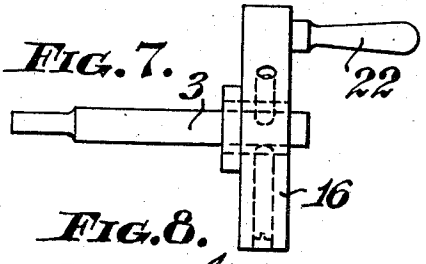


FIG. 8.

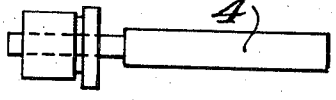
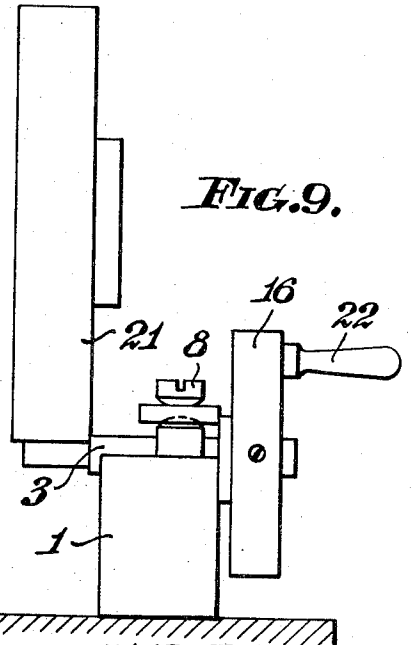


FIG. 9.



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Patented July 29, 1952

2,604,739

UNITED STATES PATENT OFFICE

2,604,739

CONCENTRIC GRINDING UNIT FOR USE ON SURFACE GRINDERS AND THE LIKE

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Application May 29, 1950, Serial No. 164,920
In Great Britain May 30, 1949

2 Claims. (Cl. 51—236)

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This invention relates to a device for grinding cylindrical components.

The main object of the invention is to bring to engineering workshops a speedy and cheap means of obtaining many high class ground components, such as press tool piercing punches, plug gauges, D-bits, drill jig bushes, special reamers, counterbores and the like, where a costly universal grinder is not available, but such means which gives the facility of accurate centering in a simple manner, thereby relieving bottlenecks in production and providing for relief in workshops where a universal grinder is installed but loaded to capacity with work.

The device provided by the invention is constructed as a portable unit for holding the component to be ground in appropriate position for accurate grinding by a conventional grinder, but which if so desired can be built into a small self-contained grinding machine so that its usefulness can be extended to the smaller type of workshop where grinding equipment is limited or has no work feeding facilities.

According to the invention there is provided a grinding unit for concentric grinding of cylindrical components comprising a work holder having a U-channel for locating the component, resilient pressure applying means for rotatably holding the component in the channel and means for rotating the component in the channel.

Preferably, the pressure applying means is a bar which is pivotally mounted between its ends so as to lie at right angles to the V-channel, one end of the bar lying over the channel and the opposite end being acted upon by a spring which causes the component engaging end to pass resiliently on to a component located in the channel.

According to a simple construction, the work holder is a rectangular block which is capable of being held by the magnetic or other chuck or on the cross slide of a grinding machine, said block having the V-channel extending transversely between opposite sides and adjacent one end thereof and a socket formed towards the opposite end to receive a coil spring and plug which presses against the underside of the pressure bar, the bar pivot being disposed between the socket and the channel and being formed by a screw which screws into the work holder to provide for vertical adjustment of the pivot in relation to the work holder.

In order that the invention may be readily understood and carried into effect reference will

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now be made to the accompanying drawing which shows a simple unit construction, and in which:

Figure 1 is a general pictorial view of the unit for application to the chuck or worktable of a grinding machine,

Figures 2 and 3 show in side and front elevation respectively the pressure bar incorporated in the unit,

Figure 4 is a vertical longitudinal section through the unit,

Figures 5 and 6 are side and front elevations of the handwheel for rotating the component in the work holder of the unit,

Figure 7 shows a typical component mounted in the handwheel,

Figure 8 shows a composite component which can be ground by the use of the unit and

Figure 9 shows in side elevation the unit in operative position with a grinding wheel.

As shown, the unit comprises a rectangular work holder block 1 of hardened steel across the top face and adjacent one end of which extends between and square with opposite sides a V-channel 2 in which may be seated and located the component, such as 3 or 4 (Figures 7, 8, 9) to be ground. The component is held in the V-channel by the lipped end 5 of a pivotal pressure bar 6 which is mounted longitudinally of the block at right angles to the V-channel by means of a screw 7 the head 8 of which forms the pivot for the bar and which screws into the top face of the block to provide for vertical adjustment of the pivot and thereby adjustment of the lip 5 of the pressure bar relative to the V-channel to provide for engagement of a range of components of different diameters. The shank of the screw 7 passes through a hole 9 drilled intermediately between the ends of the pressure bar 6 and in line with a recess 10 on the underside of the bar disposed towards the outer end 11 of the bar which overhangs the end of the work holder block remote from the V-channel 2 so that the pressure bar can be conveniently depressed by an operator to rock about its pivot point 8 and thus lift the component engagement end 5 clear of the V-channel. In vertical alignment with the recess 10 in the pressure bar, a socket 12 is formed in the work holder block 1, which socket houses a coil spring 13 and a plug 14, the head of which engages in the bar recess 10, the plug being located by a spigot 15 of reduced diameter inserted into the end of the spring. The component to be ground, such as 3 or 4, is laid in the V-channel, after first de-

pressing the hand engaging end 11 of the bar 6 which extends beyond the end of the block opposite the channel to lift the lip 5 clear of the channel, and the bar is then released, whereupon the spring pressing upwardly under the end 11 through the plug 14, causes the lipped end 5 to engage the component with a pressure sufficient to locate it accurately seated in the V while permitting the component to be rotated while it is being ground. The distance between the pivot head 8 of the screw bearing against the periphery of the opening 9 and plug 14 engaging in recess 10 is greater than the distance between the lip 5 and opening 9 in order to insure that a jolt of considerable magnitude is necessary to disturb the component in the V-channel while at the same time the tail portion 11 of the bar 6 which projects beyond the block in its relation to 8—9 reduces the downward pressure necessary to raise the lipped end of the bar.

For the purpose of rotating the component, a suitable handle is provided, which conveniently takes the form of a handwheel 16 having an integral centre boss 17 in which the end of the component can be inserted, and a device for securing the component in the bush, which device in the simple form shown consists of grub screws 18 each mounted in one of three equiangularly spaced tappings 19 extending radially from the centre boss 17 to the periphery of the wheel.

The unit with the component 3, which is a typical punch, in position, is shown in Figure 9 held down on to the table 20 of a grinding machine, with the component end, which is to be worked upon, engaged by the grinding wheel 21 of the machine. While the grinding wheel rotates, the component is also rotated by the operator rotating the handwheel using the handle 22 thereon, the grinding wheel being fed down until the desired diameter is obtained; the result is concentric to the axis of the component due to the location of the V-channel and the pressure bar while the component is rotated between them.

The grinding machine may include any usual means such as a magnetic chuck for holding down the workholder and will include the normal cross slide by which the holder 1 may be traversed relatively to the grinding wheel in accordance with the length of the ground diameter required.

Bushes and sleeves may be readily ground in a similar manner by the employment of the mandrel 4 (Figure 8) which may have previously been ground by means of the unit, on to one end of which the bush or sleeve is fitted, the other end of the mandrel being secured in the boss 17 of the hand wheel 16.

The unit according to the invention may be built into a self-contained bench or stand machine, by including the work holder as part of a frame which carries a grinding wheel, means being provided for traversing and downward feeding of the holder or the wheel, and an electric motor preferably being incorporated in the machine for driving the wheel.

I claim:

1. A grinding unit for concentric grinding of cylindrical components, comprising, in combination, a work holder block having a V-channel at one end across its upper face for locating a work component and also having a vertically disposed medially located threaded hole and a vertically opening socket adjacent the end opposite the channel, a pressure bar having a downward component engaging lip at one end located over the channel and having an intermediate opening for receiving the shank of a screw adjustably fitted in said threaded hole, the head of said screw constituting a pivot for the bar, said bar having a recess in its underside and also having a rearwardly extending hand engaging tail portion extending beyond the end of the block opposite the channel, a spring pressed plug in said socket and bearing in the recess in the underside of the bar between the terminus of its tail portion and the head of the screw which forms the pivot, the distance between the plug and the head of the screw being greater than the distance between the lip and the head of the screw to provide leverage to tightly hold the component in the V-channel while the extended length of the tail portion of the bar provides a hand engaging portion beyond the plug and sufficiently remote from the head of the screw to reduce the manual pressure necessary to raise the lip end of the bar to release the component.

2. A grinding unit for concentric grinding of cylindrical workpieces, comprising, in combination, a workholder consisting of a rectangular block having a V-channel extending transversely between opposite sides and adjacent one end thereof and a socket formed towards the end thereof remote from said channel, a handwheel adapted to be mounted on a workpiece positioned in said channel, a screw threaded into said block between said channel and said socket, a pressure bar pivotally mounted between its ends on said screw and located at right angles to said channel, one end of said bar lying over said channel and being formed with a vertical lip centrally disposed with respect to and directed towards said channel, and a plug and coil spring located within said socket, said plug being pressed by said spring against said pressure bar whereby said lip is pressed into contact with said workpiece.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
160,686	Kingman	Mar. 9, 1875
1,330,514	Brooks	Feb. 14, 1920
1,342,375	Dunham	June 1, 1920
1,572,165	Smith et al.	Feb. 9, 1926
2,179,714	Davis	Nov. 14, 1939