Oct. 18, 1949. M. F. PORCELLO 2,485,311

GRINDING WHEEL DRESSER

Filed May 8, 1945 3 Sheets-Sheet 1

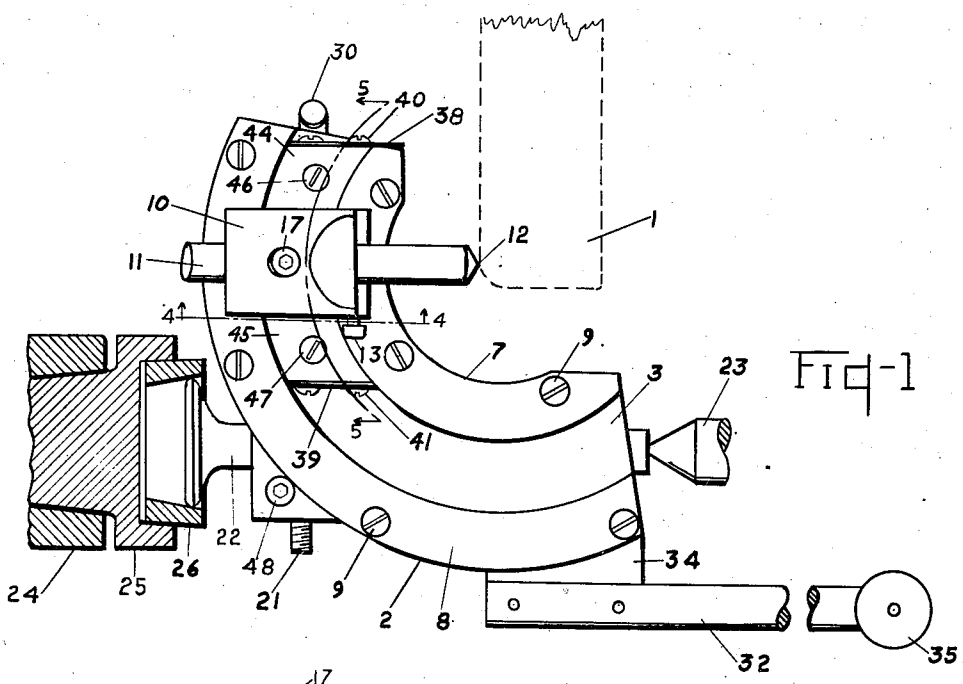


Fig-1

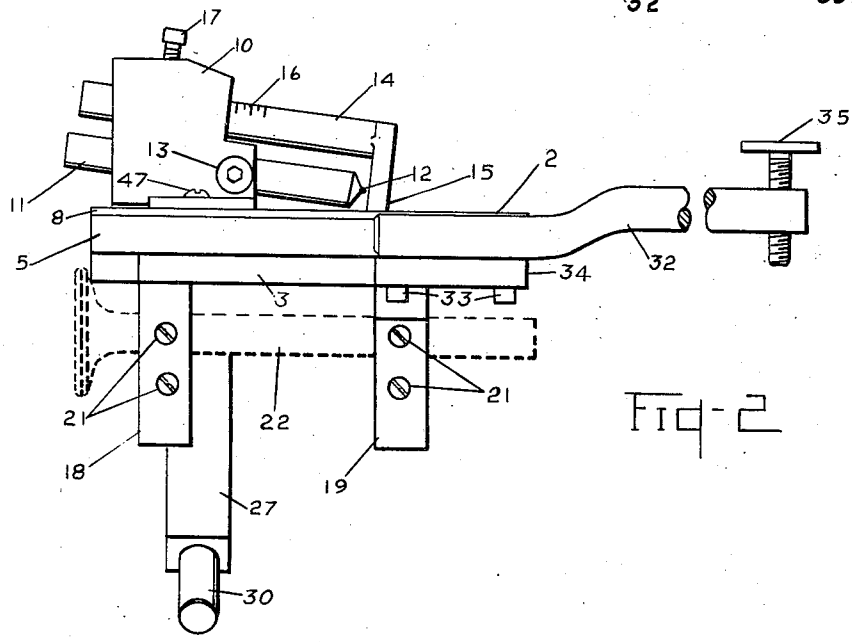


Fig-2

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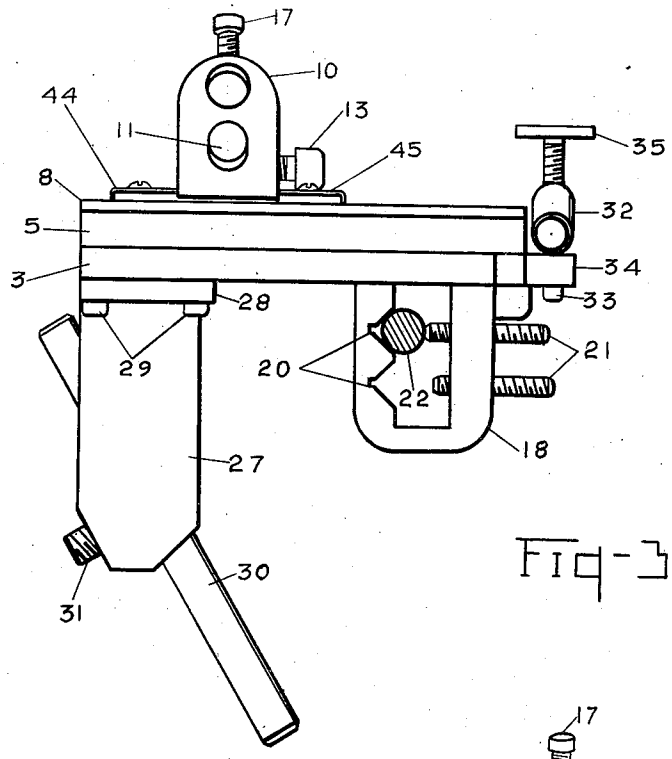


Fig-3

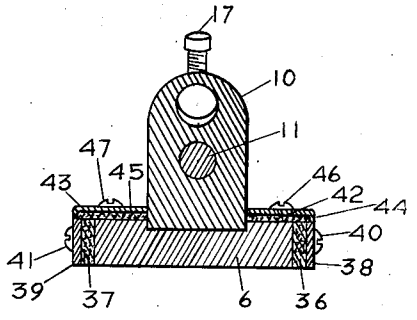


Fig-5

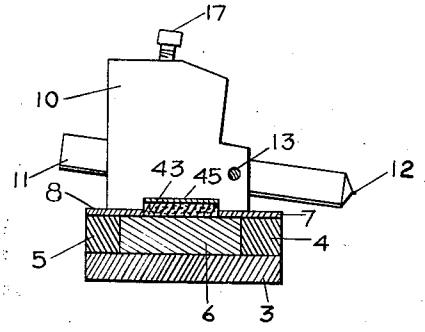


Fig-4

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GRINDING WHEEL DRESSER

Filed May 8, 1945 3 Sheets-Sheet 3

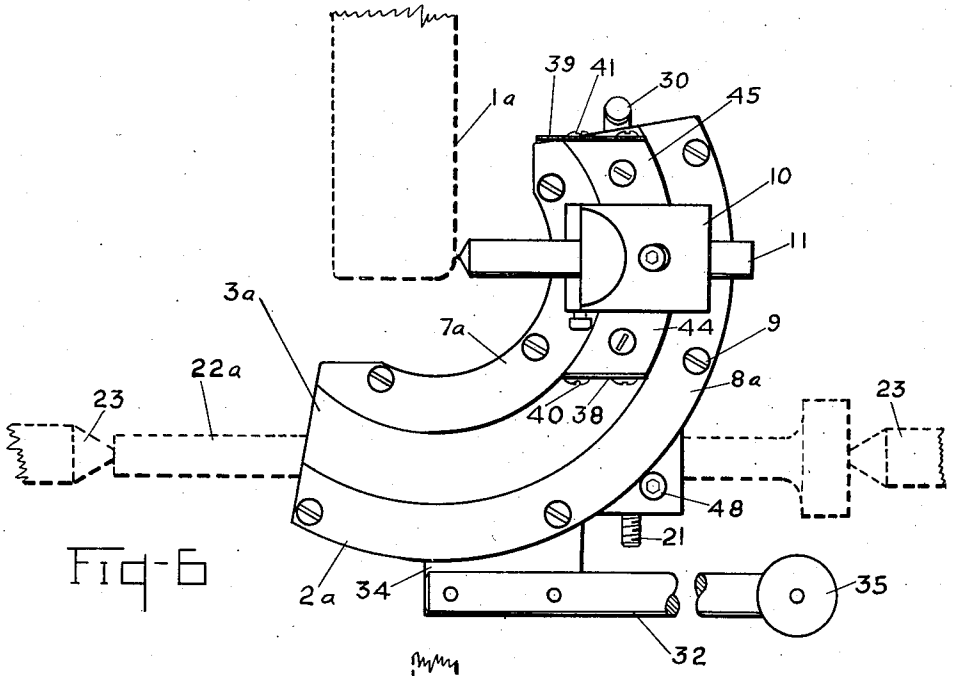


Fig-6

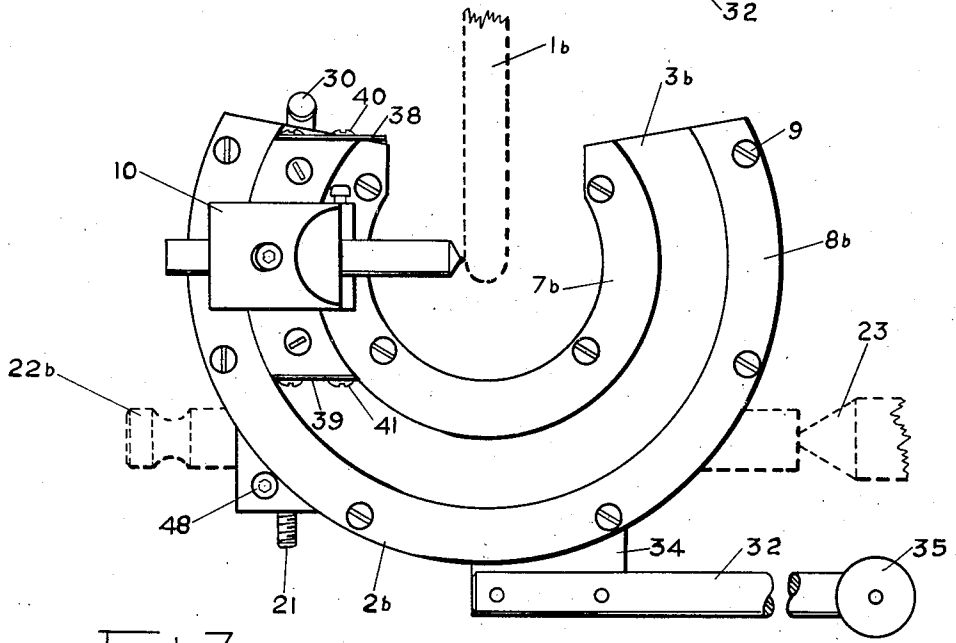


Fig-7

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2,485,311

UNITED STATES PATENT OFFICE

2,485,311

GRINDING WHEEL DRESSER

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Application May 8, 1945, Serial No. 592,603

5 Claims. (Cl. 125—11)

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The present invention relates broadly to devices for dressing grinding wheels, and in its specific phases to an apparatus for use in forming or truing a radius or curved face on the periphery of a grinding wheel.

In the past the forming or truing of a radius on the periphery of a grinding wheel has involved "cut and try" hand procedures with or without a template, or the use of low accuracy or crude apparatus, or highly complex apparatus so slow and cumbersome that it is unsuitable for high production work. It was a knowledge of those difficulties and shortcomings, based on actual experience, which led to the discovery and development of the present invention.

Accordingly among the objects of the present invention is the provision of a simple and thoroughly practical device for curved face dressing of the grinding wheel of a grinding machine.

Another object is to provide a grinding wheel dressing device for producing curved profiles, wherein the device is quickly mountable, simple to use, and readily demountable from the grinding machine so as to use relatively little time for the whole dressing operation.

Another object is to provide an improved dressing device in which the diamond dresser is moved back and forth manually in a predetermined curved path.

Another object is to provide a highly accurate and stabilized apparatus for dressing a curved or arcuate surface on the periphery of the grinding wheel of a grinding machine.

Another object is to provide a grinding wheel dressing device which is mountable on the grinding machine in the place of the workpiece.

A further object is to provide a grinding wheel dressing device which is readily adjustable for dressing the periphery of the grinding wheel to various radii.

A further object is to provide an apparatus suitable for the dressing of a radius on the periphery of the grinding wheel of a grinding machine having centers for holding the workpiece to be ground.

A still further object is to provide a highly simplified, quick acting, curved profile grinding wheel dressing apparatus adapted to be readily operated even by an operator having little training in the curved profile grinding wheel dressing art.

Still further objects and advantages will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims, the annexed drawings and the following description setting forth in detail certain means for carrying out the invention, such disclosed means illustrating, however, but several of various ways in which the principle of the invention may be used.

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In the annexed drawings:

Figure 1 shows a plan view of a preferred form of the present invention.

Figure 2 shows a front elevation of the assembly illustrated in Figure 1.

Figure 3 shows a left end elevation of the assembly illustrated in Figure 1.

Figure 4 shows a sectional view taken along line 4—4 of Figure 1 looking in the direction of the arrows.

Figure 5 shows a sectional view of a carrier member taken along line 5—5 of Figure 1 looking in the direction of the arrows.

Figure 6 shows a modified form of the apparatus of Figure 1 arranged for dressing the right hand edge of the periphery of a grinding wheel.

Figure 7 shows a modified form of the present invention which is adapted for dressing a curved profile on either or both sides of the periphery of a grinding wheel.

For convenience of setting forth the present invention, it will be described in terms of an apparatus mountable upon a grinding machine adapted for grinding the curved under face of the head portion of a valve. The grinding wheel dressing apparatus, however, is not limited to use on that specific form of grinding machine since the principle involved is broadly usable on many types of apparatus, and especially those where the workpiece to be ground is mounted between centers, or a center and a chuck type means.

Referring more particularly to Figure 1 of the drawing, 1 indicates a fragmentary portion of a grinding wheel to be dressed by means of the apparatus of the present invention. The wheel dressing assembly 2, in preferred form, comprises a base member 3 on which are mounted inner and outer guide ribs 4 and 5, Figure 4, which are machined to a uniform arc with parallel equally spaced faces. Mounted in the channel between the inner and outer guide ribs is a closely fitting slide member 6. Joined to the upper face of the guide ribs are inwardly extending inner and outer plates 7 and 8 which are fastened in place by means of screws 9, or the equivalent. Those plates in turn are machined so as to have their adjacent edges substantially equally spaced. Guide ribs 4 and 5, instead of having vertical inner faces, may tilt inward to form ways, and

slide member 6 may have corresponding shape sides. The showing in Figure 4 is intended to also diagrammatically illustrate this type of construction.

Fixedly mounted in conventional manner on slide member 6, is a carrier member 10. That carrier member is preferably provided with two substantially parallel openings therethrough, the lower of which is adapted to have a dressing tool 11, with diamond point 12, extend therethrough. This dressing tool may be locked in place in conventional manner, for instance by means of a set screw 13.

A removable gage 14, Figure 2, with depending end 15 and scale 16, is arranged to be passed through the upper opening of carrier member 10, and when adjusted in place, it may be locked against further movement by means of set screw 17. The apparatus is set at the desired radius before this set screw is tightened, and then when the dressing tool 11 is passed through its opening in carrier member 10, it can be extended until it contacts the inner face of depending end 15, which acts as a backstop. Screw 13 can then be tightened to lock dressing tool 11 in place, following which set screw 17 may be loosened and gage 14 removed thus leaving the dressing tool in position for use as will be hereinafter explained.

Fastened in conventional manner, for instance by means of screws 48, to the under face of base member 3, are a pair of mounting members 18 and 19 which are preferably U-shaped and provided with a plurality of grooves 20 to facilitate adjustment of the assembly to different heights for dressing purposes. Set screws 21 are placed opposite grooves 20, Figure 3, so that the supporting member 22 may be gripped in place in either groove to meet the grinding wheel dressing requirements.

Where the grinding machine is adapted for dressing the underface of valve heads, the convenient type of supporting member 22 is a valve of the same size as is to be ground on the machine. The tail stock 23, Figure 1, and head stock 24 in that case will be equipped to shift directly from the grinding of valves to the mounting of the grinding wheel dressing assembly, and vice versa. In order to make the valve grinding machine more flexible as to valve sizes, it is preferable to have a tapered chuck-like member 25 adapted to fit a correspondingly tapered opening in the head stock. The head of chuck-like member 25, in turn, may have an outwardly tapering hollow space therein adapted to receive a reducing adaptor 26 which in turn is hollow and outwardly tapered at its free end so as to receive and hold the head of a valve in position concentric with the rotatable portion of the head stock. This makes the machine flexible in use since the reducing adaptor may be quickly removed or changed to other sizes with little delay in the operation of the machine.

In order to make the apparatus relatively rigid in use it is preferably provided with a pair of supporting members, one of which, as is typically shown in Figure 3, consists of a depending holder 27 having flanges 28 in its upper end suitably drilled to receive cap screws 29 which threadedly engage base member 3. Depending holder 27 is angularly drilled for the slidable reception of supporting rod 30 which can be adjusted endwise so that its lower end rests on the grinding machine, following which set screw 31 can be tightened to hold the supporting rod in place. Under actual operating conditions member 30, after being adjusted and locked in place, acts to prevent the assembly from rotating in a counterclockwise direction about supporting member 22, as viewed in Figure 3. The other supporting member consists of a bar 32 which may be fastened in conventional manner to base member 3, for instance by means of cap screws 33 passing through an extending wing 34 which is preferably a portion of base member 3. The free end of bar 32 may be vertically drilled and threaded for the reception of an adjusting screw 35. Bar 32 is not only made relatively rigid but sufficiently long to reach to an adequate supporting spot against which screw 35 can be tightened to prevent the apparatus from moving in clockwise direction, as viewed in Figure 3.

Some types of grinding machines have the head and tail stock mounted on a table which may be moved both endwise and crosswise of the machine while the grinding wheel rotates in fixed location. On other machines the opposite is true, in that the head and tail stock are used to fixedly hold the article to be ground, while the grinding wheel is movable both endwise and crosswise of the machine. The present invention is adapted for use on either of these types of machines.

In order to make the apparatus capable of very accurately dressing a grinding wheel, the slide member 6, Figures 4 and 5, fits the channel between inner and outer guide ribs 4 and 5 with a very close tolerance, and in order to keep grit, or other foreign matter, from getting between slide member 6, base member 3, and guide ribs 4 and 5, felt wiper pads 36 and 37 are mounted on the ends of slide member 6 and held in place by means of retainer plates 38 and 39, which in turn are fastened to slide member 6 by means of screws 40 and 41. In order to keep grit, or other foreign matter, from working its way between the sliding parts from the top of the assembly, same may be provided with felt pads 42 and 43 held in place by retainer plates 44 and 45, which in turn are held on slide member 6 by means of screws 46 and 47. The felt pads are preferably saturated with grease or oil so as to automatically lubricate the path of travel of slide member 6 while permitting a tight sliding fit between the felt and the adjacent surfaces in manner permitting the wiping of foreign matter out of the way.

The assembly typically illustrated in Figures 1, 2, and 3 is primarily designed for rounding the left hand portion of the periphery of grinding wheel 1. If the machine has been grinding the radius on the under side of a head of a valve and the profile of the grinding wheel 1 has gradually worn out of shape or near to the outer tolerance limits, the valve can be removed and the present invention, which is preferably supported on a like size valve, quickly slipped in place, the diamond dressing tool 11 adjusted to the desired radius and then the grinding wheel and wheel dressing assembly moved relative to each other, with the grinding wheel still running until they are in dressing position, whereupon carrier member 10 may be gripped by the operator and slid back and forth in its arcuate path on base member 3. This will move the diamond point 12 of diamond dressing tool 11 in the proper arc and will cause the dressing of the edge of the wheel to take place as the two are brought closer and closer together in prescribed position.

In actual operation supporting rod 30 will be adjusted the first time it is used on a particular machine, and after having been locked in place, it will normally remain there each time the tool is used on the same grinding machine. The nor-

mal adjustments of the assembly will then be taken care of by means of adjusting screw **35**. After installing the dressing assembly, the dressing of the grinding wheel **1** takes but a few minutes, whereupon the assembly can be removed from the machine which is still all set up and adjusted for immediate insertion of a valve and the starting of grinding the radius on the under face of the valve head.

While in Figure 1 the dressing of the periphery and the left hand edge of the grinding wheel **1** is shown, the present invention is not limited to that specific apparatus. Figure 6, for instance, shows a like apparatus of the type suited for dressing the periphery and right hand edge of a grinding wheel **1**. This figure also shows the modification wherein the member to be ground is mounted between a pair of centers **23** and the diamond dressing assembly is likewise mounted on a member of substantially like size permitting the assembly to be quickly mounted or removed as desired.

Another form of the present invention, as shown in Figure 7, utilizes a horse shoe shaped assembly, preferably mounted on a workpiece as before, and adapted for the diamond dressing of a grinding wheel on its periphery including both of its side edges.

It is thus to be seen that the device of the present invention is quickly mountable and demountable, is adapted for accurately dressing a curved profile on a grinding wheel, does away with the need of cams, levers, gearing, et cetera, for moving the diamond dressing tool, and thus avoids the inherent complexities and difficulties incident thereto. At the same time the carrier member **10** is readily grasped and manually moved back and forth by the operator, thus completely simplifying the grinding wheel dressing procedure while making possible quick and accurate dressing at the same time.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In a grinding machine for grinding the curved under face of the head portion of a valve member, and having a headstock and a tailstock for supporting the member to be ground, the combination with such headstock and tailstock, of a member to be ground extending from said headstock to said tailstock and supported by same, a dressing device having means mounting said device on said member, said dressing device comprising means thereon to mount a dressing tool for movement in an arcuate path relatively to the grinding wheel, and means supplementing the mounting of said dressing device by said member and preventing turning of the device on the axis passing through said member, headstock and tailstock.

2. In a grinding machine for grinding the curved under face of the head portion of a valve member, and having a headstock and a tailstock for supporting the member to be ground, the combination with such headstock and tailstock, of a member to be ground extending from said headstock to said tailstock and supported by same, a dressing device, means joined to said dressing device for mounting same at various elevations on said member, said dressing device comprising means thereon to mount a dressing tool for movement in an arcuate path relatively to the grinding wheel, and means supplementing the mounting of said dressing device by said member and preventing turning of the device on the axis passing through said member, headstock and tailstock.

3. In a grinding machine for grinding the curved under face of the head portion of a valve member, and having a headstock and a tailstock for supporting the member to be ground, the combination with such headstock and tailstock, of a member to be ground, a dressing device having means mounting said device on said member, said dressing device comprising means thereon to mount a dressing tool for movement in an arcuate path relatively to the grinding wheel, supporting means on one side of the axis of said headstock and tailstock for support on the grinding machine, and a supporting means on the device on the other side of said axis extending laterally beyond the adjacent end of said device for support on the grinding machine in spaced relation to the latter end.

4. In a grinding machine for grinding the curved under face of the head portion of a valve member, and having a headstock and a tailstock for supporting the member to be ground, the combination with said headstock and tailstock, of a member to be ground, a dressing device having bracket means depending therefrom mounting said device on said member with the ends of the member projecting beyond the bracket means, said dressing device comprising means to mount a dressing tool for movement in an arcuate path relatively to the grinding wheel, supporting means on one side of the axis of said headstock and tailstock adjustable as to height for support on the grinding machine, and a supporting means on the device on the other side of said axis extending laterally beyond the adjacent end of said device for support on the grinding machine in spaced relation to the latter end.

5. In a grinding machine according to claim 1, wherein the means to mount the dressing tool has an opening therein parallel to the axis of said tool and above said tool, a gage having a rod disposed in said opening and provided with a backstop extending angularly therefrom in front of the tool, and means to secure the gage in the latter position.

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