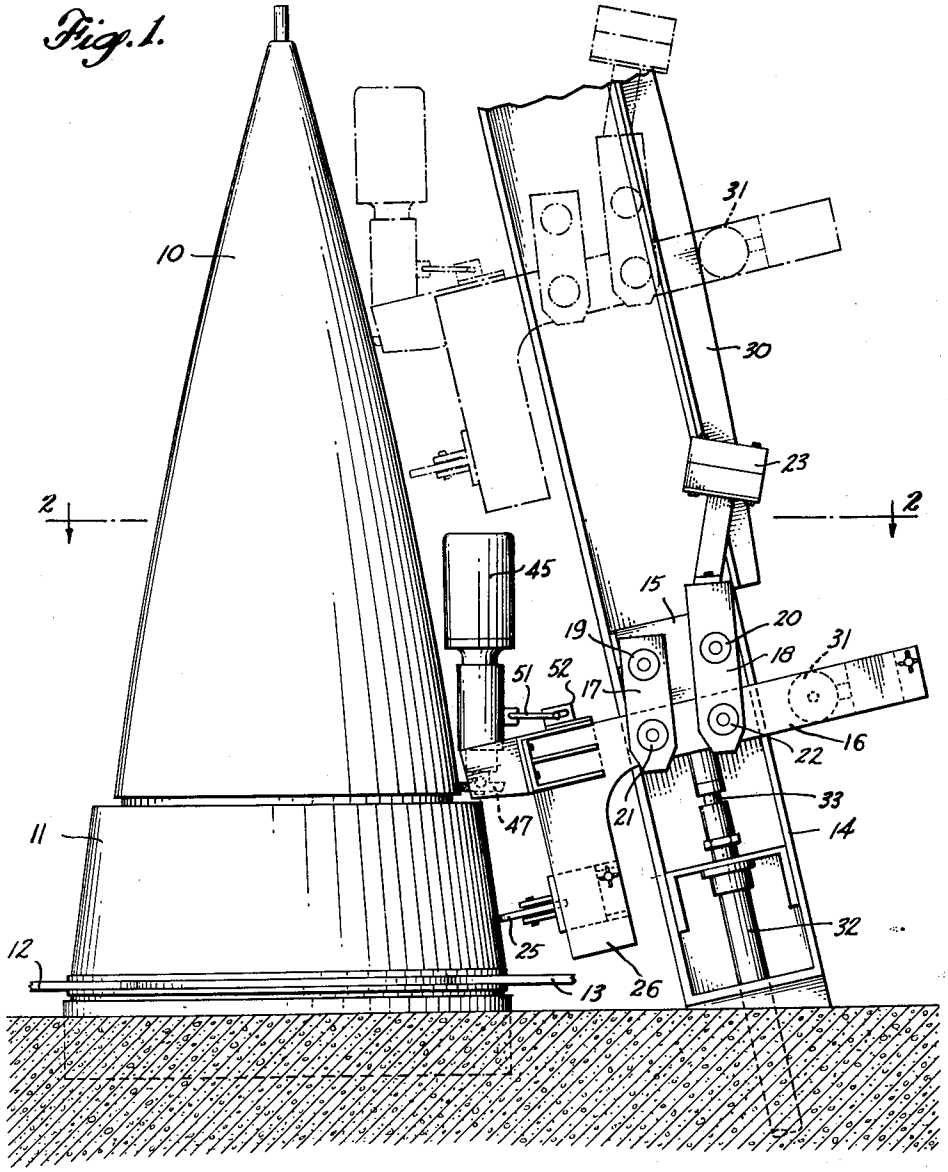
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MACHINE TOOL

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Fig. 1.



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Fig. 2.

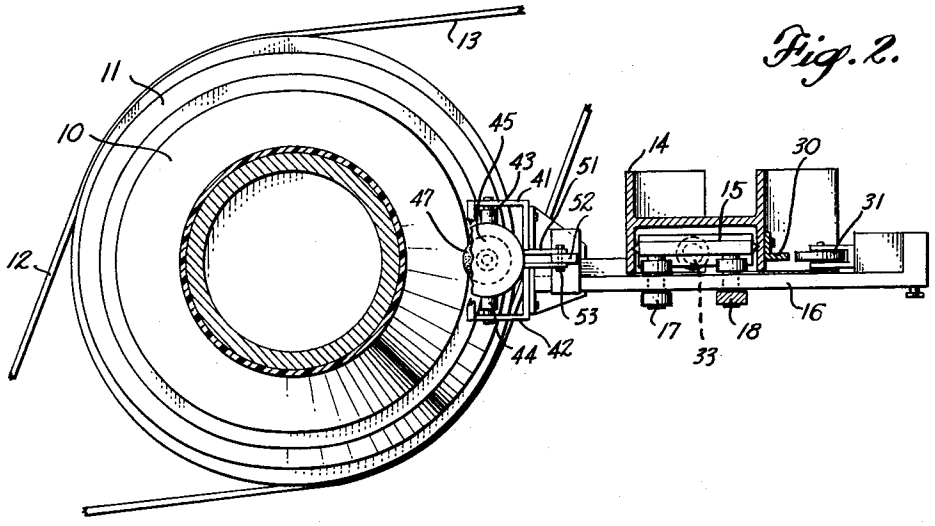


Fig. 3.

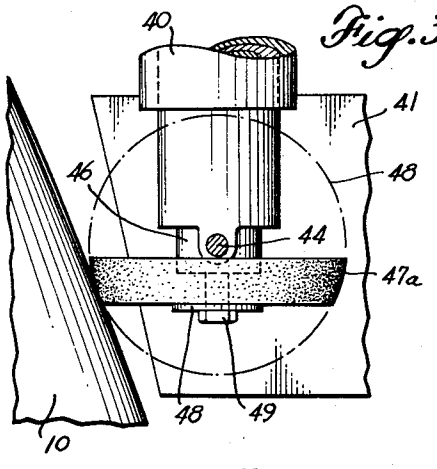
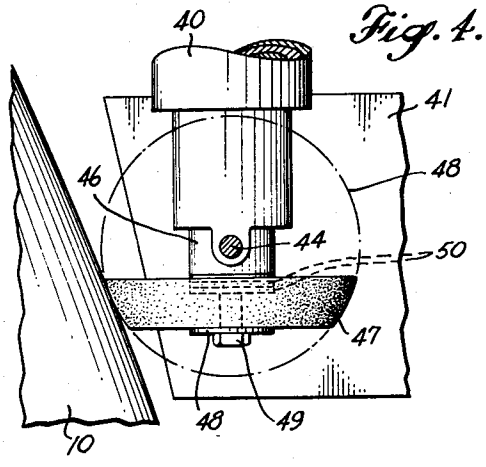


Fig. 4.



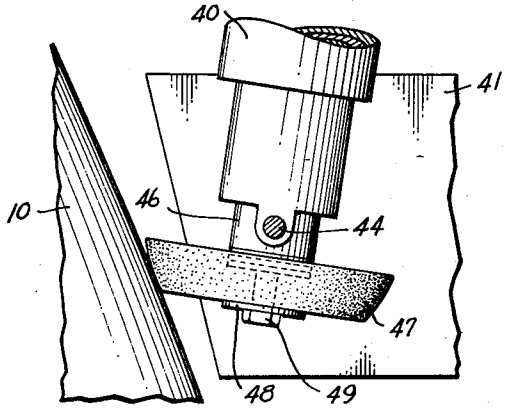


Fig. 5.

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MACHINE TOOL

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Filed Dec. 1, 1958, Ser. No. 777,300
1 Claim. (Cl. 51—35)

This invention relates to a machine tool and more particularly to a grinding mechanism.

An object of this invention is to provide a new and improved grinding mechanism in which a constant working diameter for the grinding wheel is achieved.

Another object of this invention is to provide a grinding mechanism having a shaft adapted to support a grinding wheel having a spherical segmental shape with the grinding surface coincident with the surface of a theoretical sphere of which it is a segment, and means for varying the position of said wheel in a direction longitudinally of said shaft to maintain the grinding surface of said wheel coincident with the surface of the sphere as the grinding wheel is reduced due to wear thereof.

Another object of the invention is to provide a grinder mechanism comprising, a carriage movable in a path generally parallel to a surface to be ground and having a template follower, a template, means urging the carriage into following relation with said template, a grinder mount mounted on said carriage for pivoting about an axis and having a driven shaft adapted to support a grinding wheel with a spherical segmental shape and the grinding surface coincident with a sphere, said axis coinciding with the center of the sphere, means for spacing the grinding wheel longitudinally of the driven shaft to maintain the grinding surface coincident with the sphere as the surface wears, and means for adjusting said grinder mount about said axis to distribute the wear on said grinding surface.

Further objects and advantages will become apparent from the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a fragmentary front elevational view of the grinding mechanism shown in association with an article to be ground and showing the supporting carriage in a full line position and a second broken line position;

FIG. 2 is a plan section taken generally along the line 2—2 in FIG. 1;

FIG. 3 is a diagrammatic view showing the grinding wheel in one position of adjustment thereof and in association with a work piece;

FIG. 4 is a view similar to FIG. 3 showing the grinding wheel in a different adjusted position; and

FIG. 5 is a view similar to FIGS. 3 and 4 showing the grinding wheel in a position of tilted adjustment.

While this invention is susceptible of embodiments in many different forms, there is shown in the drawings and will herein be described in detail an embodiment of the invention with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claim.

The grinder mechanism of this invention is shown in association with apparatus generally of the type disclosed in the application of Edward T. Strickland and Homer C. Amos, Serial No. 756,189 filed August 20, 1958, in which an article **10** to be machined is supported on a rotary turntable **11** driven by drive belts **12** and **13**. A frame leg **14** extends upwardly alongside the article **10** and generally parallels the surface of the article to be ground by the mechanism disclosed herein.

The frame leg **14** slidably mounts a base member **15** having a carriage **16**. The carriage is mounted on the base by a parallelogram system including arms **17** and **18** pivotally mounted to the base **15** by bearings **19** and **20**, respectively, and to the carriage arm by bearings **21** and **22**, respectively. A weight **23** is connected to the mounting arm **18** in a position to urge the carriage toward the left as viewed in FIG. 1 to subject the position of the carriage to the control of a template.

Two different template and template follower mechanisms are disclosed. If the lower surface of the article **10** is not to be symmetrical about its axis, the turntable **11** is used as a template whereby a template follower **25** mounted on a downturned leg **26** of the carriage **16** engages the turntable surface to control the position of the carriage. When the surface of the article **10** above a certain point is to be symmetrical about the axis thereof, the control of the carriage position is obtained by the template **30** attached to the frame leg **14**. If the entire surface of article **10** is to be symmetrical then a longer template **30** may be used without the use of a turntable template. A template follower roller **31** mounted on the carriage **15** coacts with the template **30** to control the position of the carriage as shown in broken line in FIG. 1.

The carriage **16** is caused to move along the frame leg **14** by hydraulic piston and cylinder mechanism including a cylinder **32** secured to the frame leg and a piston rod **33** extending from the cylinder and connected to the base member **15**.

The carriage **16** supports a grinder mount **40** by a pair of spaced apart plates **41** and **42** which receive a pair of oppositely extending pins **43** and **44**, respectively, extending outwardly from the grinder mount **40**. The grinder mount **40** carries a drive motor **45** which drives a drive shaft **46** adapted to carry a grinding wheel **47**. The grinding wheel is secured to the lower end of the drive shaft **46** by a washer **48** and a nut **49** threadably attached to the lower end of the drive shaft.

The grinding wheel **47** has a spherical segmental shape with the bases of said segment extending normal to the length of the drive shaft **46**. Referring to FIGS. 3 and 4, it will be noted that the surface **47*a*** of the grinding wheel **47** is coincident with a broken line **48** representing the surface of a theoretical sphere with the center of the sphere coincident with an axis defined by the pivot mounting pins **43** and **44** of the grinder mount **40**.

In the position of the parts shown in FIG. 3, a full-sized grinding wheel **47** is shown in which the wheel is adjacent the pivot pin **44** and the surface **47*a*** of the wheel is coincident with the surface of the sphere **48**. After use of the grinding wheel and reduction in size thereof, the surface of the wheel is no longer coincident with the surface of the theoretical sphere. An effective constant working diameter is achieved by lowering the grinding wheel longitudinally of the drive shaft **46** to again make the grinding surface **47*a*** coincident with the surface of the sphere **48**. This repositioning of the grinding wheel is accomplished by placing a shim **50** between the upper side of the grinding wheel and the drive shaft **46**.

This adjustment contributes to a substantial degree of accuracy in the mechanism since the distance between the template **30** and the pivot pins **43** and **44** for the grinder mount is maintained constant and the distance between the surface of the grinding wheel and the pivot pins **43** and **44** is maintained constant.

To provide for even wearing of the face **47*a*** of the grinding wheel, the grinder mount **40** may be adjusted about an axis coinciding with the center of the sphere **48** by a link **51** connected to the grinder mount **40** and releasably attached to a bracket **52** carried on the carriage **16**. The link **51** is attached to the bracket **52** by bolt means **53**.

Adjustment of the grinder mount **40** about an axis coincident with the center of the sphere **48** moves the grinding surface along the contour of the sphere **48** and distributes the wear across the entire surface *47a* of the grinding wheel. Different positions of adjustment may be noted by comparing FIGS. 3 and 5.

The wheel may be dressed whenever required, and this may be accomplished by hinging a dressing tool for movement about an axis extending through the center of the sphere **48**.

I claim:

A grinder mechanism comprising, a carriage movable in a path generally parallel to a surface to be ground and having a template follower, a template, means urging said carriage into following relation with said template, a grinder mount mounted on said carriage for pivoting about an axis and having a driven shaft, a grinding wheel operably mounted on said shaft having a spherical segmental shape and a grinding surface coincident with a theoretical sphere, said axis and shaft passing through the center of the sphere, means for accurately spacing the grinding wheel longitudinally along the driven shaft to maintain the grinding surface coincident with the sphere as the surface wears, and means for pivotally adjusting said grinder mount about said axis to move the grinding surface along the contour of the sphere insuring engagement with the surface to the ground and to distribute the wear on said grinding surface.

References Cited in the file of this patent

UNITED STATES PATENTS

1,352,790	Danielsson	Sept. 14, 1920
1,660,890	Schramm	Feb. 28, 1928
2,391,733	Moreland	Dec. 25, 1945
2,497,217	Hall	Feb. 14, 1950
2,600,815	Turner	June 17, 1952
2,646,651	Wilson	July 28, 1953