Oct. 31, 1950 B. J. TROCKI 2,527,778

GRINDING FIXTURE

Filed Jan. 15, 1946 2 Sheets-Sheet 1

FIG. 1.

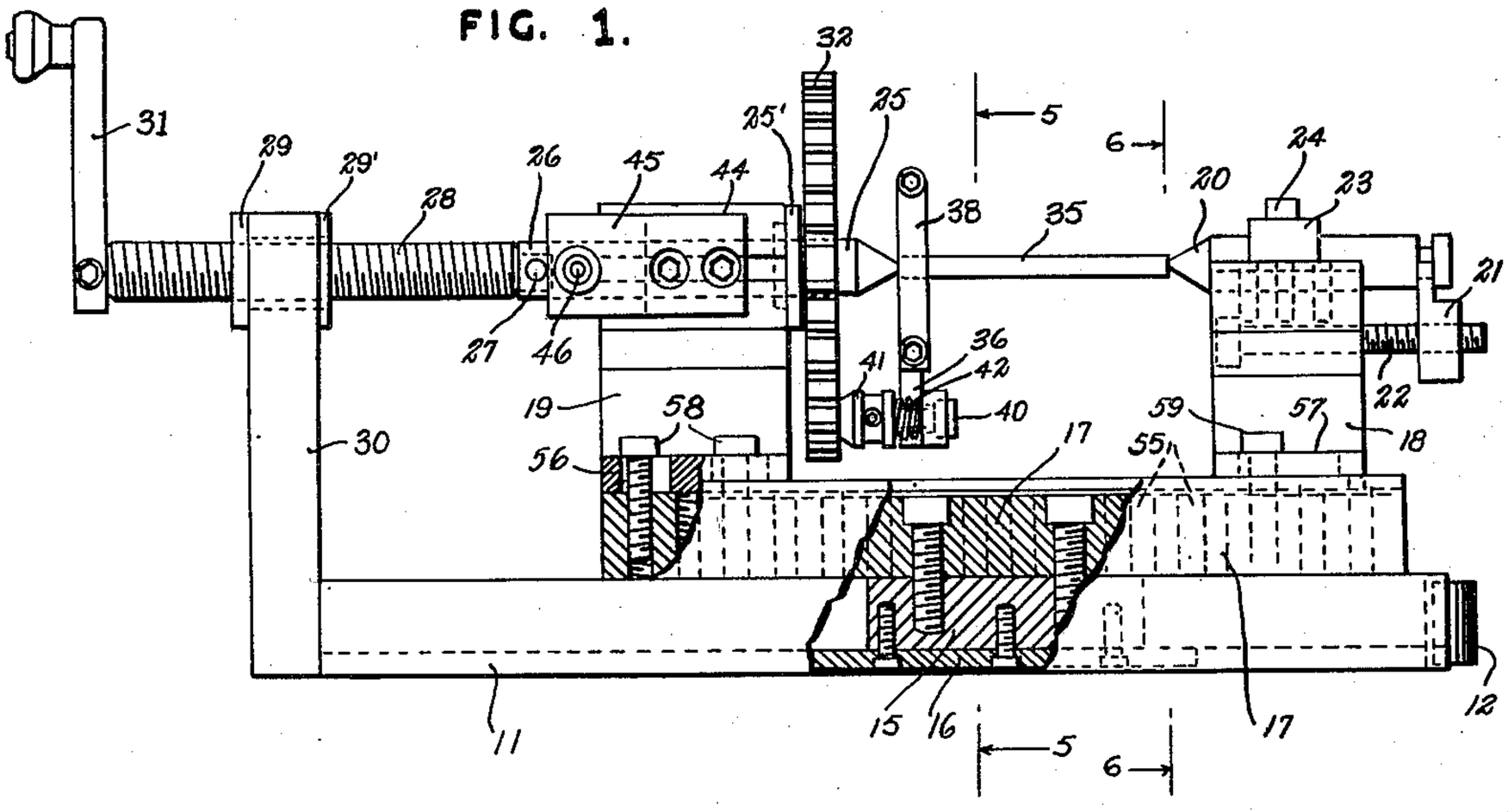

FIG. 2.

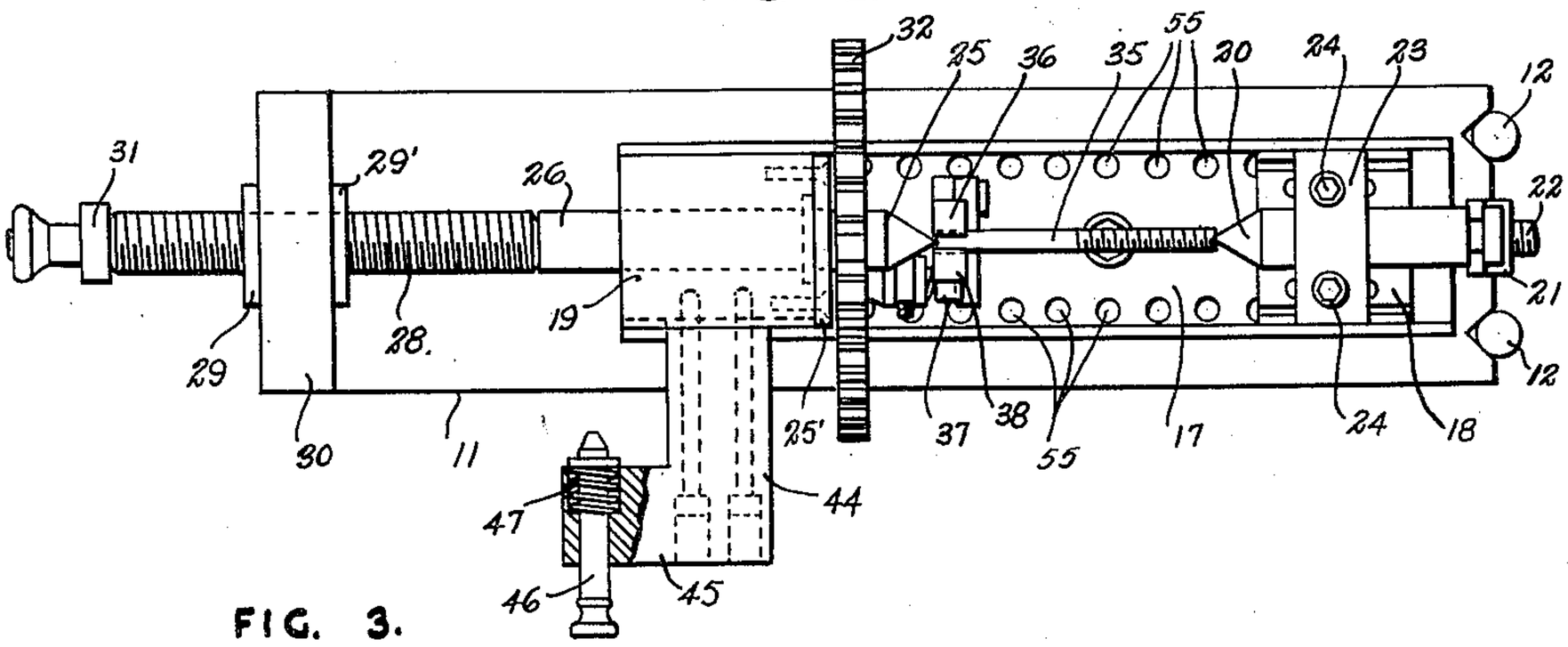

FIG. 3.

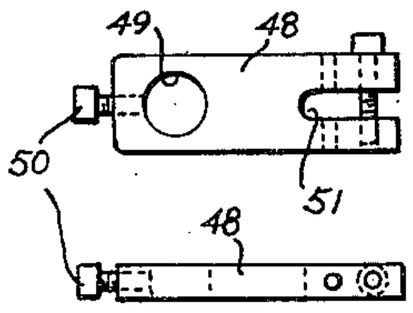

FIG. 4.

Inventor

BERNARD J. TROCKI,

By McMorrow, Berman & Davidson

Attorneys

Oct. 31, 1950

B. J. TROCKI

2,527,778

GRINDING FIXTURE

Filed Jan. 15, 1946

2 Sheets-Sheet 2

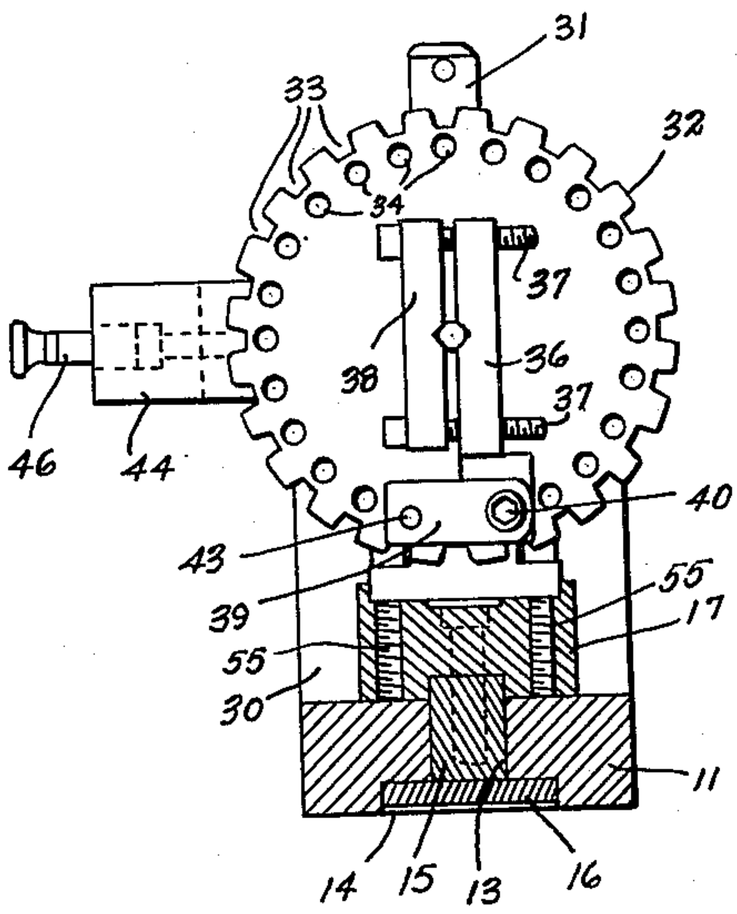

FIG. 5

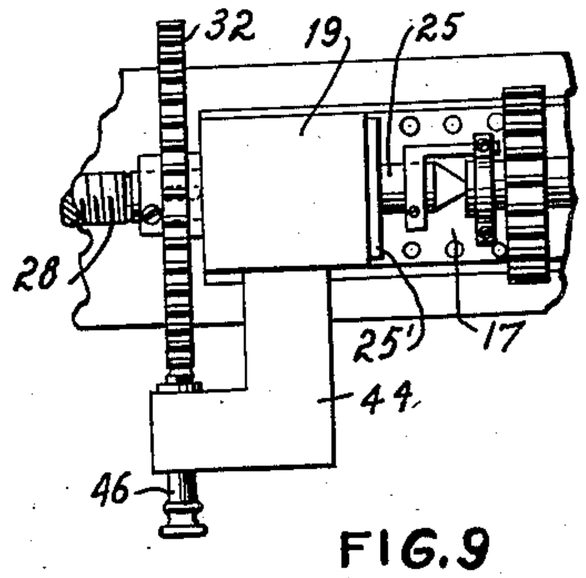

FIG. 9

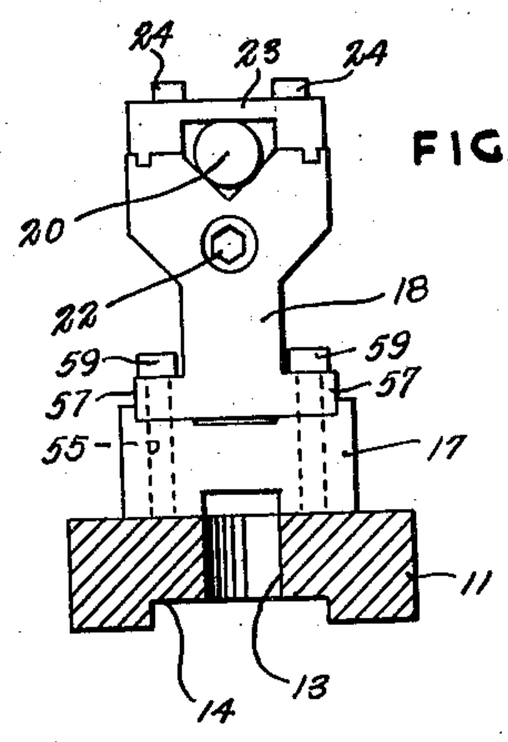

FIG. 6

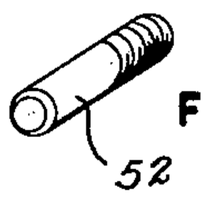

FIG. 7

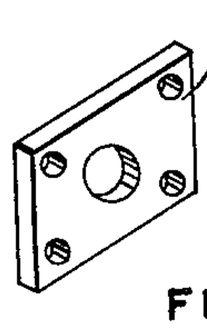

FIG. 8.

Inventor

BERNARD J. TROCKI,

By McMorrow, Berman & Davidson

Attorneys

Patented Oct. 31, 1950

2,527,778

UNITED STATES PATENT OFFICE

2,527,778

GRINDING FIXTURE

Bernard J. Trocki, Erie, Pa.

Application January 15, 1946, Serial No. 641,225

1 Claim. (Cl. 51—232)

1

This invention relates to grinding machines, and more particularly to a fixture employed for grinding precision screw-threads, splines, gears, and the like.

A main object of the invention is to provide a novel and improved grinding fixture of very simple construction, which is easy to use and may be employed to accurately grind a wide variety of machine elements such as screw-threads, gears, splines, and the like.

A further object of the invention is to provide an improved work holding fixture for a surface grinding machine which enables the machine to be employed for precision thread grinding and for other precision grinding work.

Other objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a side elevational view, partly in cross-section, of a grinding fixture constructed in accordance with the present invention.

Figure 2 is a top plan view of the grinding fixture of Figure 1.

Figure 3 is a side elevational view of an arm employed at times to rigidly connect the work to the live center of the fixture of Figure 1.

Figure 4 is a plan view of the arm of Figure 3.

Figure 5 is a transverse cross-sectional view taken on line 5—5 of Figure 1.

Figure 6 is a transverse cross-sectional view taken on line 6—6 of Figure 1.

Figure 7 is a perspective detail view of a connecting pin member employed with the arm of Figure 3.

Figure 8 is a perspective view of a plate member employed to secure the live center of the grinding fixture of Figure 1 in position.

Figure 9 is a top plan view of the grinding fixture of Figure 1, with the index plate positioned on the live center member for forming gear teeth.

Referring to the drawings 11 designates the base of the fixture, said base being adapted to be positioned on and secured to the work supporting table of a surface grinder, as by a conventional magnetic chuck arrangement. Base 11 is provided with guide roller elements 12, 12 at its right end, as viewed in Figures 1 and 2, for setting base 11 at a desired angle with respect to a reference shoulder on the grinder work supporting table, as, for example, by the use of a sine bar.

Base 11 is formed with an upper longitudinal groove 13 and a bottom longitudinal groove 14 which is wider than groove 13 and communicates

2

therewith to form an inverted T-shaped groove. Positioned in groove 13 is a longitudinally slidable key member 15 having secured to the bottom thereof a wider key member 16 which is longitudinally slidable in bottom groove 14. Secured to key member 15 and longitudinally slidable on the upper surface of base 11 is a wide carriage block 17 to the right end of which, as viewed in Figures 1 and 2, is secured a tail stock 18 and to the left end of which is secured a head stock 19. The carriage block has two spaced-apart, substantially parallel series of uniformly spaced-apart holes 55 therein which series of holes extend longitudinally of the carriage block substantially from one end to the other end thereof. The head stock and the tail stock are provided at their lower ends with apertured flanges 56 and 57, respectively, and cap screws or bolts 58 and 59 extend respectively through the head stock and tail stock flanges and are selectively engageable in the holes 55 to position the head and tail stocks at various selected distances apart. Rotatably mounted in tail stock 18 is a dead center member 20, said member 20 being engaged at its end portion by a clamp element 21 which is threadedly engaged by a bolt member 22 passing through tail stock 18, whereby adjustment may be made of the pressure with which dead center member 20 engages the work piece. An adjustable bracket member 23 overlies dead center member 20 and engages the dead center member with a frictional force determined by the tightness of its adjusting bolts 24, 24.

Rotatably mounted in head stock 19 is a live center member 25, said live center member being held in position by a suitably apertured plate member 25' and having a hollow outer end 26 which is adapted to be rigidly secured as by a drift pin 27 to the shank of a selected screw member 28 having the screw thread pitch which it is desired to grind on the work piece. Screw member 28 is threadedly supported in a suitable bushing 29 removably secured by a nut 29' to a vertical arm 30 which is rigidly carried by base 11. Secured to the end of screw member 28 is a crank member 31 having a suitable handle.

Normally secured, as by set screws, to the inner end of live center member 25 in the position shown in Figures 1 and 2 is a circular index plate 32. Index plate 32 is formed with a plurality of equally spaced peripheral notches 33 and with a number of tapped holes 34, likewise equally spaced around plate 32 adjacent its periphery. Engaging the work piece, which may be a rod which is to be threaded such as rod 35 in Figures

1 and 2, is a clamp device comprising a notched arm **36** having adjustably secured thereto by bolts **37**, **37** a notched jaw member **38**, the work piece being clamp in the opposing notches of arm **36** and jaw member **38**. Arm **36** carries at its lower end a transversely extending member **39**. Member **39** is formed with an opening positioned under the main body portion of arm **36** in which is mounted a bolt member **40** carrying a plug element **41** having its end portion formed to enter any one of the openings **34** in index plate **32**. A spring **42** biases plug member **41** toward its forward position. Transverse member **39** is formed with a threaded opening **43** whose purpose will be subsequently described.

In grinding a thread on to the work piece **35**, base **11** is first positioned at the proper angle with respect to the plane of the grinding wheel. The grinding wheel is dressed to form the proper thread shape. The grinding wheel is then set so that its center is vertically aligned with the central axis of the work piece and is fed down on to the work. Crank **31** is then revolved clockwise, which moves the work in a manner corresponding to the threads on screw member **28**, and thus forms similar threads on the work piece.

Where a multiple thread is to be ground, the first thread is formed as by the above described process. The work piece is then returned to its starting position and plug **41** is shifted from its original aperture **34** of plate **32** to a suitable succeeding aperture of plate **32** corresponding to the angular displacement of the second thread with respect to the first thread at a given axial position on the work piece. The second thread may then be formed in the same manner as the first thread. Any desired number of threads may be formed on the work piece provided the number of apertures **34** is an integral multiple of the desired number of threads.

In forming gear teeth, screw member **28**, Figure 2, is disconnected and index plate **32** is detached from the inner end of live center member **25**, Figure 9, and is secured to the outer end of said live center member. Head stock **19** carries rigidly secured thereto a bracket member **44** having an arm **45** which is parallel to live center member **25**. Arm **45** carries a plunger member **46** which is biased by a spring **47** into locking engagement with an opposing peripheral notch **33** of index plate **32** when said plate is secured to the outer end of the live center member **25**. An arm **48**, shown in Figures 3 and 4, is provided, said arm having an opening **49** adjacent one end thereof, which fits over the inner end of live center member **25** in place of index plate **32** and is adapted to be clamped thereto by a set screw **50**. Arm **48** is formed with a slot **51** which receives a pin member **52**, shown in Figure 7, said pin member being threaded into opening **43** of transverse member **39**. The gear blank is rigidly secured to a suitable shaft which is firmly held between the live center member **25** and the dead center member **20** by the clamping members **36** and **38**. The grinding wheel is appropriately dressed to form the desired gear teeth and base **11** is set at the proper angle with respect to the plane of the grinding wheel. The grinding wheel is then fed across the periphery of the gear blank to form the first gear tooth groove. Plunger **46** is released and index

plate **32** is rotated one or more notches (depending upon the desired width of the gear teeth) and plunger **46** is re-engaged therewith. The grinding process is then repeated to form the next gear tooth groove. In this manner all the gear tooth grooves are ground in the blank. It will be understood that the total number of notches in index plate **32** must be an integral multiple of the number of notches advanced for grinding each gear tooth groove.

The above described procedure may also be employed in grinding splines on shafts, equally spaced flats on cylindrical work, and the like.

The procedure mentioned above for grinding multiple screw threads may also be employed in grinding cutters. In grinding single threads, multiple threads, cutters and the like, it will be understood that a screw member **28** and bushing **29** will be selected so as to have the required pitch to conform with the thread to be ground.

While specific embodiments of a grinding fixture have been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore it is intended that no limitations be placed on the invention other than as defined by the scope of the appended claim.

What is claimed is:

A portable work-holding fixture for mounting on a magnetic grinding machine table comprising a flat, elongated base having a slot of T-shaped cross section extending longitudinally thereof, an elongated carriage block slidable on the top surface of said base and having two spaced-apart, substantially parallel series of uniformly spaced-apart, screw threaded holes therein extending longitudinally from one to the other end thereof, a T-shaped key slidable in said slot and secured to said carriage block to maintain the latter in operative assembly with said base, a head stock and a tail stock mounted on said carriage block, bolts engaging said head and tail stocks and selectively engageable in the holes in said carriage block to position said head and tail stocks at various selected distances apart, a live center member journalled in said head stock, and a dead center member carried by said tail stock opposed to and in longitudinal alignment with said live center member.

BERNARD J. TROCKI.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
286,663	Wheeler	Oct. 16, 1883
986,688	Catucci	Mar. 14, 1911
1,147,214	Cross	July 20, 1915
1,230,111	Callaway	June 19, 1917
1,231,283	Mooney	June 26, 1917
1,238,935	Olson	Sept. 4, 1917
1,402,473	Bickford	Jan. 3, 1922
1,662,078	Severson	Mar. 13, 1928
1,669,919	Trbojevich	May 15, 1928
2,251,885	Indge	Aug. 5, 1941
2,367,957	Metcalfe	Jan. 23, 1945