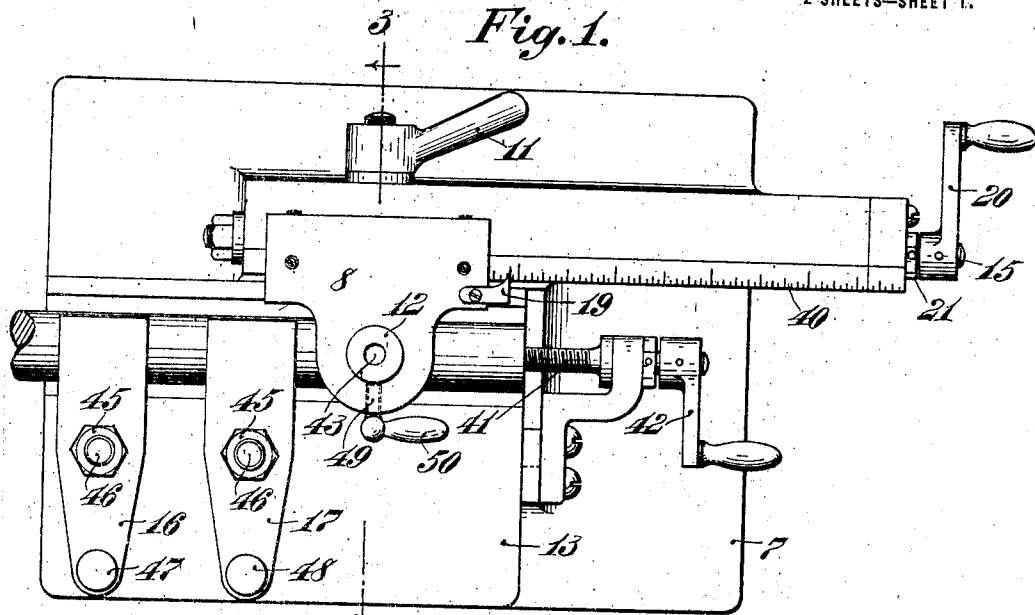
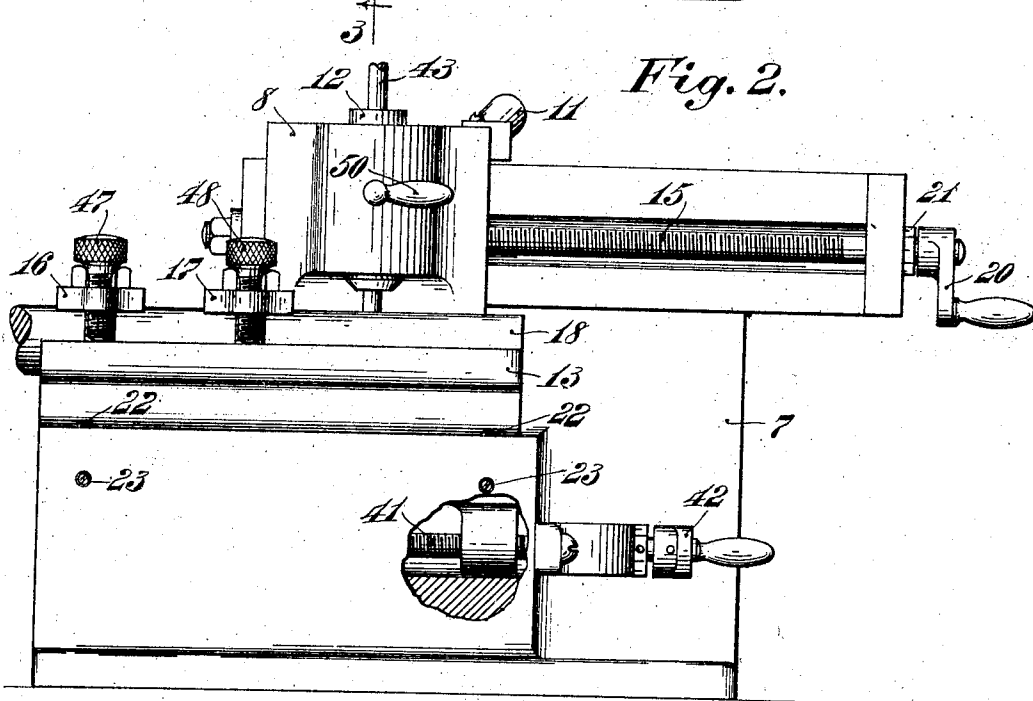


G. J. COSTELLO,
 DRILL PRESS ATTACHMENT.
 APPLICATION FILED APR. 28, 1910.

1,189,667.

Patented July 4, 1916.
 2 SHEETS—SHEET 1.



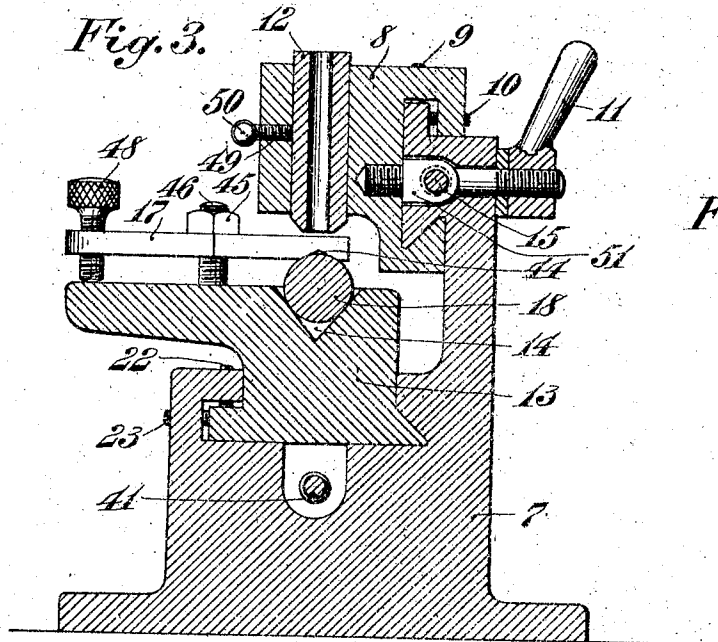
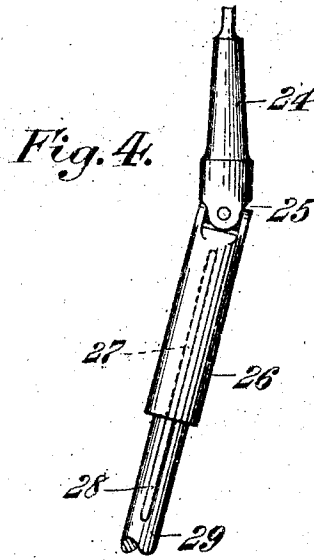
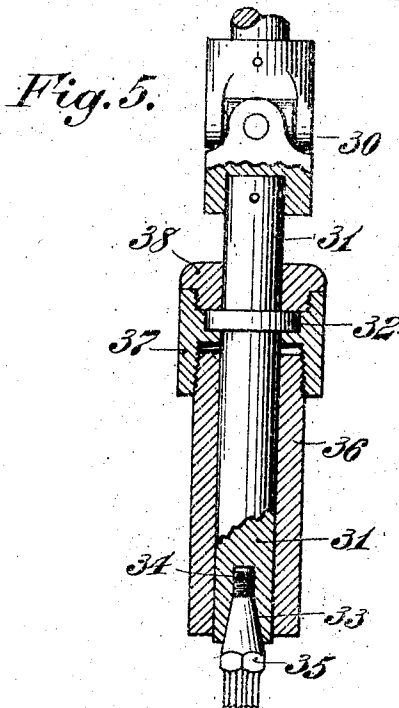
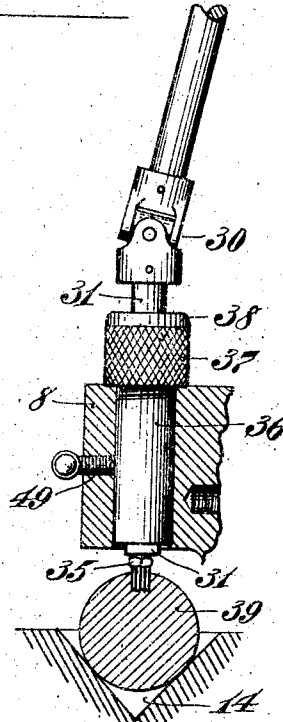
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UNITED STATES PATENT OFFICE.

GEORGE J. COSTELLO, OF PHILADELPHIA, PENNSYLVANIA.

DRILL-PRESS ATTACHMENT.

1,189,667.

Specification of Letters Patent.

Patented July 4, 1916.

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To all whom it may concern:

Be it known that I, GEORGE J. COSTELLO, a citizen of the United States, residing in Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Drill-Press Attachment, of which the following is a specification.

My invention relates to improvements in portable keyseating machines or jigs.

10 My object is to provide improved means for cutting holes, slots, keyways, etc., in shafts, rods, etc.

This device is designed for the purpose of making possible the rapid and accurate 15 drilling or working of a hole, slot, or keyway of any desired dimensions, in a length of shafting, such as engine shafts, piston rods, pump rods, valve stems, boring bars, etc., and for keyseating shafts and studs of various kinds. It is intended to be used in 20 connection with an ordinary drill press, to the table or bed of which the device is secured, or upon which it may rest. It is therefore essentially a jig for holding the shaft, rod, etc., firmly in position while the 25 work is being done, and for guiding the drill or other cutting tool used, accurately to the work, and absolutely to the longitudinal axis thereof, if desired. It may be used 30 for working keyways in power transmission shafting in shops, by clamping the device to the shafting at the point where the keyway is to be cut, and driving the cutting tool by hand or by a portable power drill. This is 35 of great value when, in a shop, it is necessary to shift a pulley along a shaft to a new location.

Referring to the drawings which illustrate as an example a preferred embodiment of my invention, Figure 1 is a plan 40 view of my device. Fig. 2 is an elevation of same. Fig. 3 is a vertical section on line 3-3 of Fig. 1. Fig. 4 is an elevation of a special attachment for applying my invention for work on shafts of large diameter. 45 Fig. 5 is a sectional elevation of the lower portion of said attachment on an enlarged scale.

Similar numerals refer to similar parts 50 throughout the several views.

The device as illustrated in the drawings, consists of a metal frame 7 ordinarily adapted to rest upon or to be secured to the table or bed of the drill press. This frame 7 55 carries a sliding bracket or guide member 8

gibbed to it, and provided with take-up screws 9 and 10. The bracket or guide member 8 may be clamped to the frame 7 by means of a lock-dog 11 at any point of its travel along 7. Lock dog 11 is threaded 60 on a threaded extension of lug 51 which is tapped into bracket 8. Bracket 8 is bored out to receive a bushing 12 preferably of hardened steel, of the proper diameter and bore to take the drill or tool 43 to be used; 65 the latter having a close "working fit" in the bushing 12. This bushing thus acts as a positive guide for the drill or tool as close to the work as possible.

The supporting base or frame 7 carries a 70 sliding bracket or work support 13 which has a V-shaped groove 14 carefully machined parallel to feed screw 15. The clamps 16 and 17 serve to hold the shaft 18 or other object firmly in the V-groove while 75 work is being done upon it. The hole containing the bushing 12 lines up at all times perpendicular to the longitudinal axis of the shaft 18 or other work to be machined, so that slots, holes or keyways will always be 80 cut along the longitudinal axis, excepting when the work is thrown out of line by inserting a liner along one of the sides of the V-groove, which may be done if it is desired to cut a hole of any kind "off the center." 85 This parallelism of the V-groove 14 to the line or travel of the sliding bracket 8 is of the utmost importance, and is obtained by so fitting 8 on the housing 7 that 8, and therefore the tool carried in the bushing 12 90 will, at all times, plumb the intersection of the planes of the sides of the V-groove 14 at the bottom thereof. From this it will result that the longitudinal axis of the tool 95 will at all times intersect the longitudinal axis of the work operated upon, or in case the work is spherical in form, the longitudinal axis of the tool may be brought into 100 alinement with the center of said spherical body. By the use of this bushing as shown, the tool is held firmly and centrally to the work at all times eliminating all spring of drill or tool while working slots, grooves, 105 etc.

For accurately spacing the travel of the 110 tool along the work, the top surface of the housing 7 is graduated as at 40, and the pointer or indicator 19 for reading the travel of 8 is arranged on top of the bracket 8. The feed screw 15 may have for exam-

ple twenty threads per inch and is operated by the crank 20 at one end. The collar 21 connected with this crank is provided with sub-divisions on its circumference for example, five in number. Hence the movement of the crank handle 20 through one-fifth of a turn or one-tenth for example, will give a longitudinal travel to bracket 8 and hence to the tool along the work, of one one-hundredths or one two-hundredths respectively. The feed screw may have any number of threads per inch desired and the micrometer sleeve or collar may be arranged for feeds of fractions or decimals of an inch as desired. By this means the holes, slots, or keyways may be accurately cut to dimensions desired, down to one one-thousandths.

Among the advantages of this device are first, the time saved in "laying off" work; second, the time saved in adjusting the tool to closely drawn limit lines on work; third, milling of slot or keyway by use of "cutter drill" made by grinding to proper shape a piece of drill rod of right length and tempering it.

While I have shown the bracket or V-block clamping member 13 slidably mounted in the supporting base or frame 7 and operated by the feed screw 41 actuated by the crank 42, it will be understood that in some cases this bracket 13 may be integral with the housing or frame 7. Among the advantages of having it movable with respect to the frame 7, are first to facilitate the preliminary adjustment of the work to be operated upon, and second to move the work so as to increase the range of operation of the bracket 8.

When the bracket 13 is slidably mounted as shown the take-up screws such as 22 and 23 may be provided. The clamping device consists of the flat members 16 and 17 being recessed as at 44. Said recesses being preferably V-shaped having the line of intersection of its two inclined walls in the same vertical plane as the line of intersection of the walls of the V-groove 14. These members 16 and 17 are clamped down into place upon the work, or shaft 18, by the nuts 45 on the bolts 46. A further tightening is then secured by the knurled set-screws 47 and 48.

The bushing 12 is held in place by the set-screw 49 provided with an operating handle 50. It will be understood that interchangeable bushings are used to suit the different sizes of tools used. The bracket 8 is provided with the lug 51 tapped into the bracket having a threaded opening for co-operation with the feed screw 15.

When work is to be done with the jig upon shafts of such size that it would not be practicable to slide the jig upon the bed plate or the table of the drill press or to slide the V-groove carrying the shaft while working upon the latter, I provide an at-

tachment such for example as is shown in Figs. 4 and 5. This device consists of the tang 24 having a taper to fit that of a socket of the drill press spindle. The tang 24 is connected by the universal joint 25 to a hollow shaft 26 in which is cut a keyway 27. By means of this keyway 27 and a key 28 on shaft 29 the shaft 29 has a slidable engagement in hollow shaft 26, but is constrained to turn therewith. Shaft 29 is connected by the universal joint 30 to the spindle 31. Spindle 31 is provided with the integral collar 32 and also at its lower end with the tapered aperture 33 terminating in the threaded portion 34 for receiving the cutting tool 35. The sleeve 36 surrounds the spindle 31 and is threaded at its upper extension. 37 is a knurled feed nut threaded to receive the sleeve 36 and also threaded to receive the collar 38 which performs the function of a lock nut.

The operation of this device is as follows: The shaft 39 having been properly secured in the V-groove 14 of the jig, the sleeve 36 is inserted in the opening in bracket 8 in the place of the bushing 12, and secured in place by the set-screw 49, that is to say, 36 becomes the bushing in the boss of bracket 8, and on turning the knurled feed nut 37 in one direction or the other, the desired feed of the cutting tool 35 is secured. Now, by turning the crank handle 20 of the feed screw 15 the bracket 8 is operated to secure the longitudinal feed of the cutter 35 to secure the work desired. It will be understood that the universal joints make it possible to transmit to spindle 31, and hence to the cutter, the revolutions of the spindle of the press, although the cutter has moved out of vertical alinement with the spindle. It will also be understood that any flexible connection between the power and the tool, that may be found convenient, may be used, and also that different sizes and styles of cutters may be used according to the work in hand.

What I claim is:—

1. In an apparatus for forming recesses in shafting or the like, the combination of a frame, a work support having a slidable engagement therewith parallel with the longitudinal axis of the work, an apertured bracket and a support therefor rigidly connected with the frame, the bracket having a slidable engagement with its support parallel with the longitudinal axis of the work, a bushing within the aperture in the bracket, and means for changing the relative position of the bracket and the work support to bring the bushing and the work into any position of relative adjustment.

2. In a device for forming recesses in shafting or the like, the combination of a work support, a movable body for carrying the tool along the work, the work support and movable body having a normally con-

stant relative relationship with respect to the longitudinal axis of the work, and locking means for said body.

3. In a drill press attachment, the combination of a clamp for securing the work to the attachment, a movable tool guiding body, a feed therefor and locking means connected with the tool guiding body and a stationary part of the attachment.

4. In a drill jig, the combination of a frame, a work engaging element movably mounted thereon, a tool-guiding body, a support therefor projecting from the frame to one side of the work engaging element, and a tool, the tool-guiding body and the work engaging element each being capable of relative movement at right angles to the axis of rotation of the tool and having a fixed relationship during said movement, at right angles thereto and to the said tool axis.

5. A drill jig comprising a clamp for the work, a support for the clamp, the clamp and support having slidable relationship, a bracket provided with a space for a removable bushing, a bushing within said space and adapted to extend close to the work, a bracket support, the bracket and support having a slidable relationship to permit of relative movement therebetween parallel with the work, means for causing relative movement between bracket and support and means for clamping the bracket and the support in immovable relative relationship.

6. In a device for forming recesses in shafting or the like, the combination of a supporting base, a work-engaging element slidably mounted thereon, a tool-guiding body, and a support therefor projecting from said base, the tool-guiding body and

the work-engaging element having a normally constant relative relationship with respect to the longitudinal axis of the work and one of the same being movable with respect to the other in line with said axis.

7. In a device for forming recesses in shafting or the like, the combination of a relatively broad flat base having an upwardly extending bracket-supporting portion, a work-engaging portion slidably mounted on said base, and a tool-receiving bracket slidably connected with said upwardly directed portion, said bracket overhanging the work-engaging portion and relatively movable with respect thereto.

8. In a device for forming recesses in shafting or the like, the combination of a supporting base, a work-engaging element, the base provided with a slotted extension, an apertured bracket having a portion slidably in said slot, and having a tool receiving portion in line with the V-element, and means for maintaining the bracket in desired position of relative adjustment along the slot.

9. In a device for forming recesses in shafting or the like, the combination of a supporting base provided with a slotted extension, a work-engaging V-element, means for securing the work therein, a tool-receiving bracket overhanging the V-element and slidably connected with said slotted extension, and means operatively connected with the slotted extension for moving the bracket along the same.

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