Dec. 20, 1938. M. HANNA 2,140,957

MILLING ATTACHMENT

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Fig. 1.

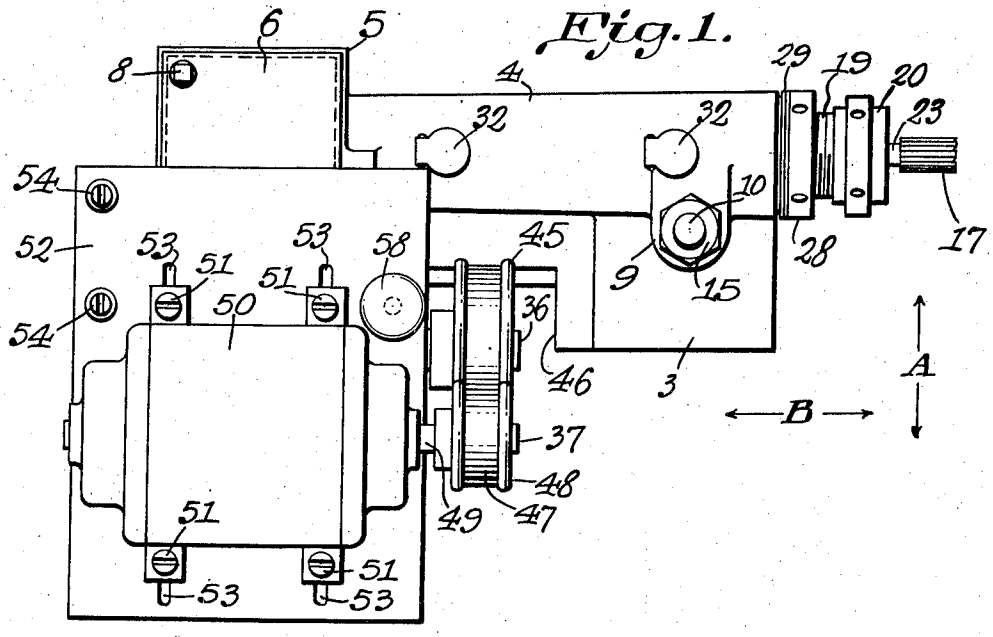
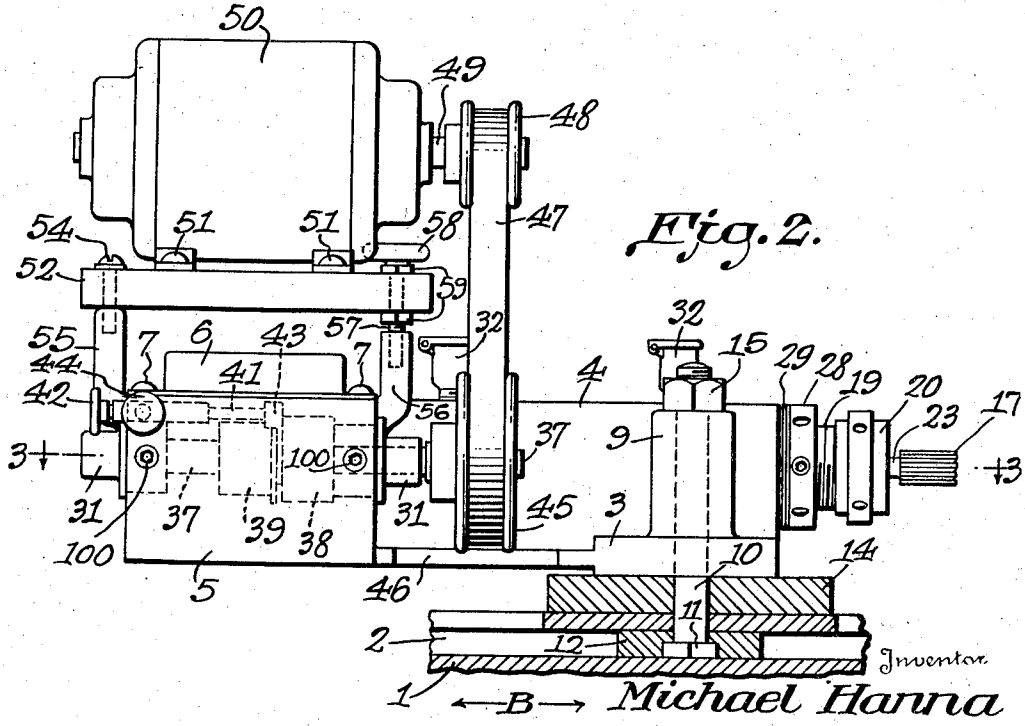


Fig. 2.



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Fig. 3.

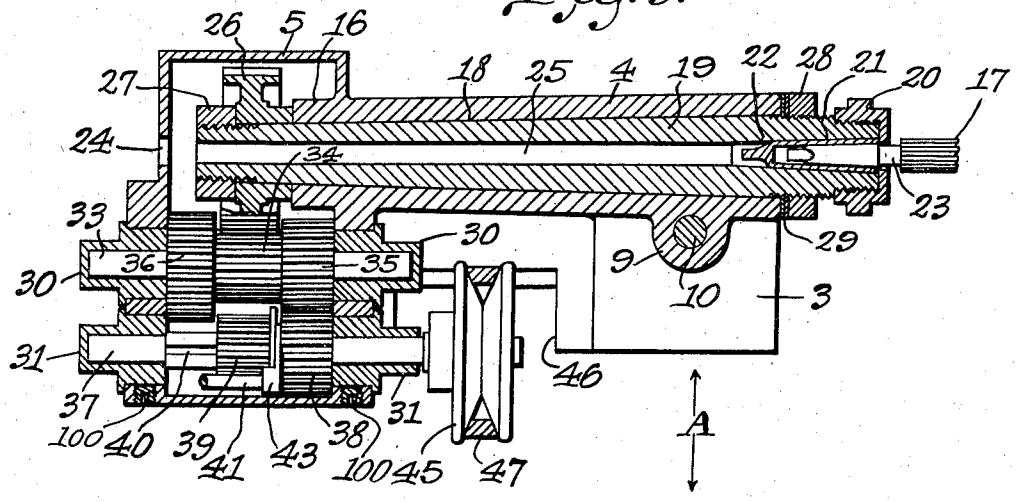
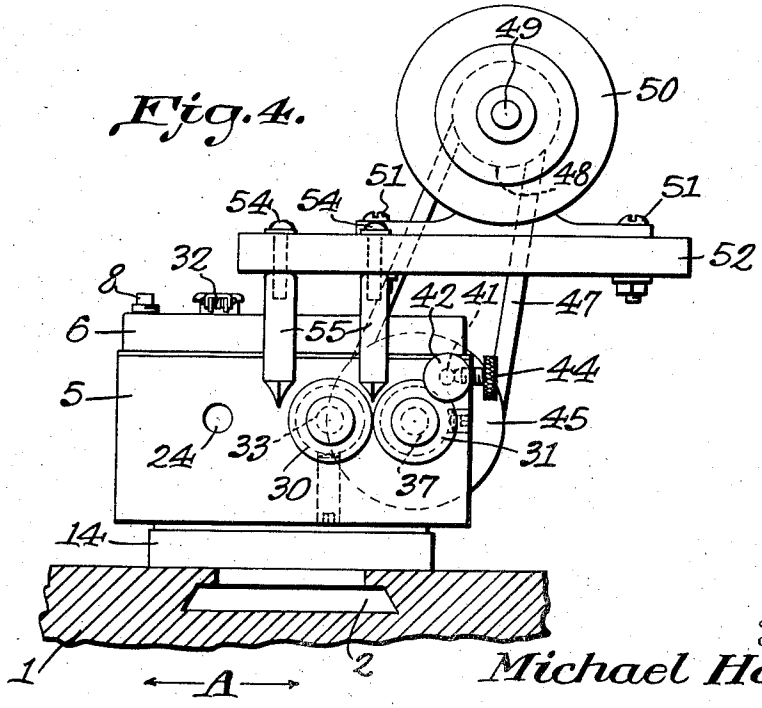


Fig. 4.



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2,140,957

MILLING ATTACHMENT

Michael Hanna, Glen Rogers, W. Va.

Application June 17, 1937, Serial No. 148,777

1 Claim. (Cl. 90—11)

This invention aims to provide a simple milling attachment, capable of being assembled with a lathe, for the purpose of cutting keyways in shafts, and for many other uses which will suggest themselves readily to a mechanic.

The invention aims to provide novel means for assembling the device with a lathe, to provide novel means for mounting and driving the cutter and, generally, to improve and to enhance the utility of devices of that type to which the invention appertains.

In the accompanying drawings:

Fig. 1 shows in top plan, a device constructed in accordance with the invention;

Fig. 2 is an elevation wherein parts appear in section;

Fig. 3 is a horizontal section on the line 3—3 of Fig. 2;

Fig. 4 is an end elevation, parts appearing in section.

In order that the operation and the mounting of the device forming the subject matter of this application may be understood, it is necessary to refer to a well known lathe construction, which need not be shown in the drawings. Actuated by hand, or power driven, a lathe carriage moves in the direction of the arrows A, parallel to the axis of the lathe centers. On the lathe carriage is mounted a slide 1 which may carry the tool post. The slide 1 is adjusted by a cross feed mechanism, in the direction of arrows B, transversely of the axis of the lathe centers. The slide 1 has a guideway 2, in which the tool post is mounted. The tool post is removed, and its place is taken by the device forming the subject matter of this application.

In carrying out the invention, there is provided a base plate 3. An elongated, horizontal, tubular bearing 4 is located on top of the base plate 3 and is formed integrally therewith. One end 16 of the bearing 4 projects into and is formed integrally with a box-like gear casing 5, located at the outer end of the base plate 3 and formed integrally with the base plate. The gear casing 5 extends transversely of the axis of the bearing 4, as Fig. 3 will show. The gear casing includes a removable lid 6, held in place by securing elements 7, the lid having a filling plug 8, enabling a lubricant to be introduced into the gear casing. A vertical post 9 is formed integrally with the base plate 3 and with the bearing 4, and extends from one side of the bearing, as shown in Fig. 1.

A securing device 10, preferably a bolt, passes through the post 9, axially thereof, and through the upper wall of the slide 1 (Fig. 2). The head 11 of the bolt 10 is received in a foot 12, located in the guideway of the slide or support 1. A nut 15 is threaded on the upper end of the bolt 10 and engages the upper end of the post 9. When the nut 15 is set up, the base plate 3 and parts carried by it are secured to the slide 1; but by loosening the nut, the base plate and associated parts can be swung horizontally on the bolt 10, thereby to adjust the position of the cutter 17 (hereinafter described more fully) in an arc whereof the axis of the bolt 10 is a center. In order to adapt the device to lathes of different sizes, having different heights from the compound rest to the lathe center, one or more spacers 14 may be mounted on the bolt 10, between the base plate 3 and the upper portion of the slide 1.

The elongated bearing 4 has a tapered bore 18, in which a hollow, tapered shaft 19 of high grade steel, properly finished to run accurately, is mounted for rotation. The shaft 19 is provided with an axial longitudinal passage 25, leading to a tapered seat 22 in the inner end of the shaft 19. A tapered adapter 21 is received in the seat 22 and is held therein by a retaining ring 20, threaded on the inner end portion of the shaft 19 and overlapping the exposed end of the adapter 21. A standard B. and S. taper shank end milling tool 17 is provided, and the shank 23 thereof is seated in the adapter 21 and held therein against relative rotation with respect to the adapter. A hole 24 is formed in the outer wall of the gear casing 5, and is in alignment with the axial passage 25 of the shaft 19. If the adapter 21 becomes lodged tightly in the seat 22, a rod may be inserted through the hole 24 and through the passage 25 of the shaft 19, for the purpose of driving out the adapter.

A gear wheel 26 is mounted on one end of the shaft 19 and is located within the gear casing 5. The hub of the gear wheel 26 abuts against the inner end 16 of the bearing 4, under the impulse of a nut 27 threaded on the end of the shaft 19 and bearing against the hub of the gear wheel 26.

A collar 28 is threaded on the inner end of the shaft 19, and spacing washers 29 are interposed between the collar and the inner end of the bearing 4. In the event that wear occurs within the tapered bore 18 of the bearing 4, and if wear exists at the place where the end of the hub of the gear wheel 26 engages the part 16 of the shaft 4, this wear may be taken out by releasing the collar 28 slightly and setting up on the nut 27, the shaft 19 being moved to the left in Fig. 3 within the tapered bore 18. Dope cups 32 on the bearing 4 may be employed as a convenient means for lubricating the shaft 19.

The gear casing 5 carries oppositely disposed bearings 30 and oppositely disposed bearings 31, the bearings being driven to place in the gear casing, as shown in Fig. 3 of the drawings and held by Allen screws 100. A shaft 33 is provided and has its ends received in the bearings 30. An intermediate pinion 34 is journaled on the shaft 33 and meshes with the gear wheel 26. Gear wheels 35 and 36 are mounted on the shaft 33,

on opposite sides of the pinion 34, and are connected with the pinion 34, to rotate therewith on the shaft 33. If desired, the intermediate pinion 34 and the gear wheels 35 and 36 may be secured to the shaft 33, the shaft 33 being mounted to rotate in the bearings 30, the showing of the drawings remaining the same, in either event.

A second shaft 37 is located parallel to the first shaft 33 and is journaled in the bearings 31. A pinion 38 is mounted on the shaft 37 and is adapted to mesh with the gear wheel 35 on the shaft 33. A pinion 39 is connected to the pinion 38, to rotate therewith, and both of these pinions are splined at 40, to the shaft 37, for movement longitudinally of the shaft.

A gear shift rod 41 is mounted for longitudinal reciprocation in the gear casing 5 and is provided at its outer end with a button 42, whereby the gear shift rod may be moved longitudinally. A transverse arm 43 is secured to the gear shift rod 41, within the gear casing 5, and engaged between the pinions 38 and 39. The gear shift rod 41 is held against longitudinal movement, at the will of an operator, through the instrumentality of a set screw 44, threaded into the gear casing 5 and engaging the rod 41, as will be understood clearly when Fig. 4 of the drawings is noted.

One end of the second shaft 37 projects outwardly through one of the bearings 31, a pulley 45 being secured to the exposed end of the shaft. As shown at 46 in Fig. 1, the base plate 3 is cut away, to facilitate the mounting of a belt 47 on the pulley 45. The belt 47 is engaged with a pulley 48 on the shaft 49 of an electric motor 50.

The motor 50 is held by securing members 51, such as bolts, on a horizontal table 52, the table having slots 53, receiving the securing members 51, the slots being parallel to the belt 47. The slots 53 permit motors of different sizes to be mounted on the table 52, and they also permit a shifting of the motor 50, parallel to the belt 47, for the purpose of tightening the belt initially, although a means (hereinafter described) is provided for tightening the belt 47 finally. At one end, the table 52 carries depending studs 54, received for tilting movement in upstanding brackets 55 carried by the end wall of the gear casing 5. The opposite end wall of the gear casing 5 has an upstanding bracket 56 receiving the lower end of an adjusting screw 57, threaded into that part of the table 52 which is adjacent to the belt 47, the adjusting screw being supplied at its upper end with a hand wheel 58. Nuts 59 are threaded on the screw 57 and engage the upper and lower surfaces of the table 52, to hold the adjusting screw in any position to which it may have been moved vertically.

In practical operation, the piece of work in which a key seat is to be formed, for example, is held at its ends between the centers of a lathe (not shown). The base plate 3 is adjusted vertically by introducing or removing spacers of the kind shown at 14, and, thus, the device is adapted to the particular lathe on which it is used. The nut 15 may be loosened, and the entire structure may be moved in the direction of the arrows B, on the slide 1, to position the end cutter 17 properly with respect to a vertical plane passing through the work. The nut 15 is tightened, to hold the parts in the positions shown in Fig. 2. If the slide 1 is moved on the lathe carriage, in the direction of the arrow B, by instrumentalities commonly provided for that purpose, the end cutter 17 is positioned properly with respect to the work. If the end cutter 17 is rotated, and if the lathe carriage is moved in the direction of the arrows A in Fig. 1, it is clear that the end cutter 17 will form a key seat in the part that is held between the stocks of the lathe. For some kinds of work, the base plate 3 and parts carried by it may be swung horizontally for adjustment on the bolt 10, as has been mentioned hereinbefore.

Assuming that the parts are arranged as shown in Figs. 2 and 3, the motor 50 drives the shaft 49 and the pulley 48 operates the belt 47. The belt 47 rotates the shaft 37 by way of the pulley 45. When the shaft 37 is rotated, the pinion 38, meshing with the gear wheel 35, rotates the intermediate pinion 34, and the pinion 34, cooperating with the gear wheel 26, rotates the shaft 19 and the end cutter 17.

The gear wheels 35 and 36 of Fig. 3 are of different diameters, and if a speed change is desired, the set screw 44 is backed out a little, thereby setting gear shift rod 41 free for longitudinal movement. If the gear shift rod 41 is moved to the left in Fig. 3, the pinion 38 will be moved out of mesh with the gear wheel 35, and the pinion 39 will be moved into mesh with the gear wheel 36, the speed of rotation of the shaft 19 being changed accordingly.

In the event that it is desired to tighten the belt 47, the adjusting screw 58 may be threaded downwardly in the table 52, the right hand end of the table in Fig. 2 being raised accordingly.

The speed change gearing disclosed in Fig. 3 turns in oil, introduced into the gear casing 5 by removing the filling plug 8 of Fig. 1. The hole 24 in the gear casing 5 is at such an elevation that an ample supply of lubricant will be maintained at all times in the gear casing 5.

Although the operation hereinbefore mentioned consists in cutting keyways in shafts and the like, it will be understood that the machine is capable of accomplishing other results, and any appropriate tool may be substituted for the milling cutter 17.

What is claimed is:

In a device of the class described, a plate-like base, means for adjusting the base about a fixed vertical axis and for securing the base on the tool carriage of a lathe, an elongated tubular bearing connected integrally throughout its length directly to the base, a gear housing at one end of the base and formed integrally with said end of the base and with one end of the bearing, the housing projecting substantially at right angles to the axis of the bearing, a tool shaft journaled in the bearing, a driven shaft journaled in the housing and disposed parallel to the tool shaft, speed change gearing in the housing and connecting the shafts, a table above the housing, a motor on the table, a driving connection between the motor and the driven shaft and including a belt, a lid for the housing, and means carried by opposite sides of the housing for supporting the table tiltably, thereby to effect a tightening of the belt, said means being spaced to receive the lid therebetween.

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