March 11, 1952 W. S. KLINGENBERG 2,588,932

POSITIONING MECHANISM

Filed Dec. 16, 1949 2 SHEETS--SHEET 1

Fig. 1.

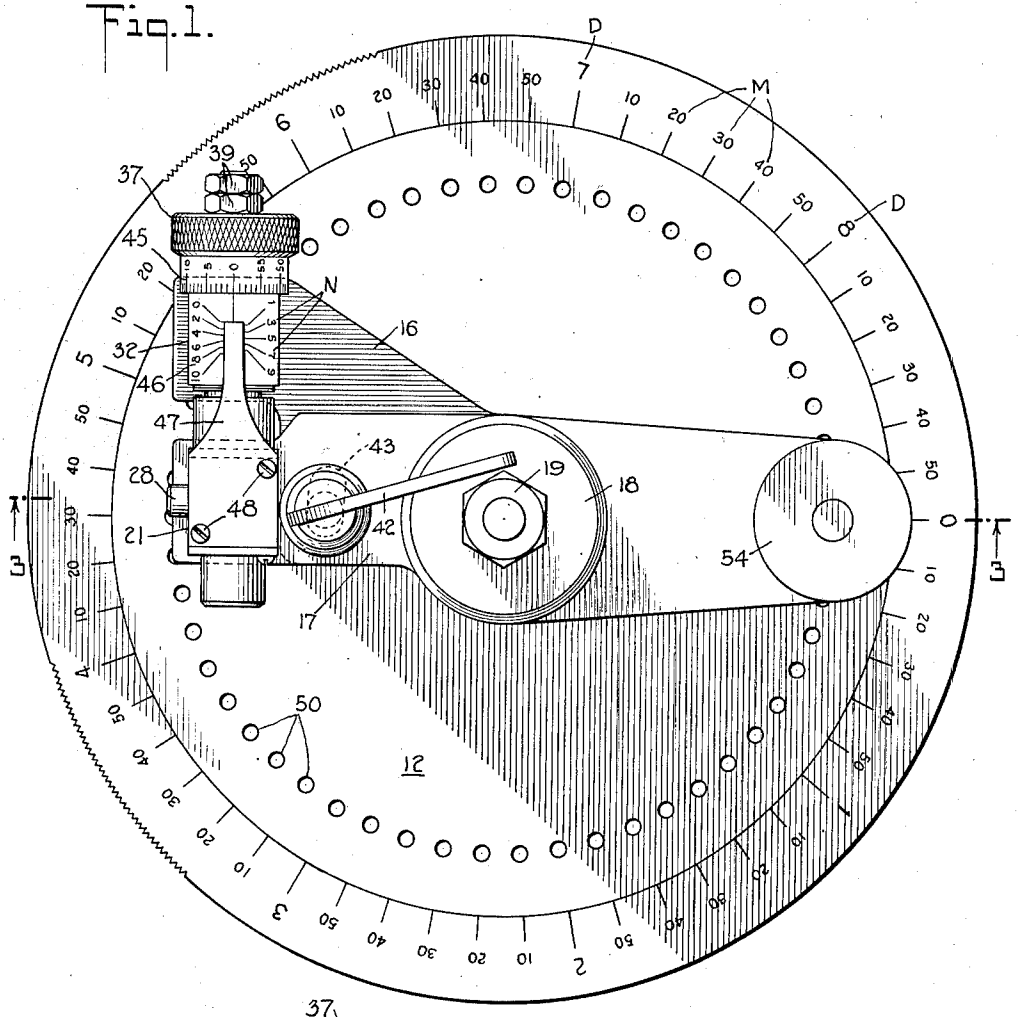
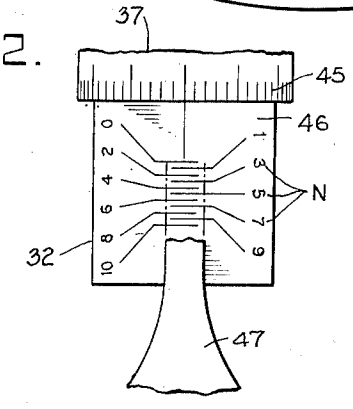


Fig. 2.



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Fig. 3.

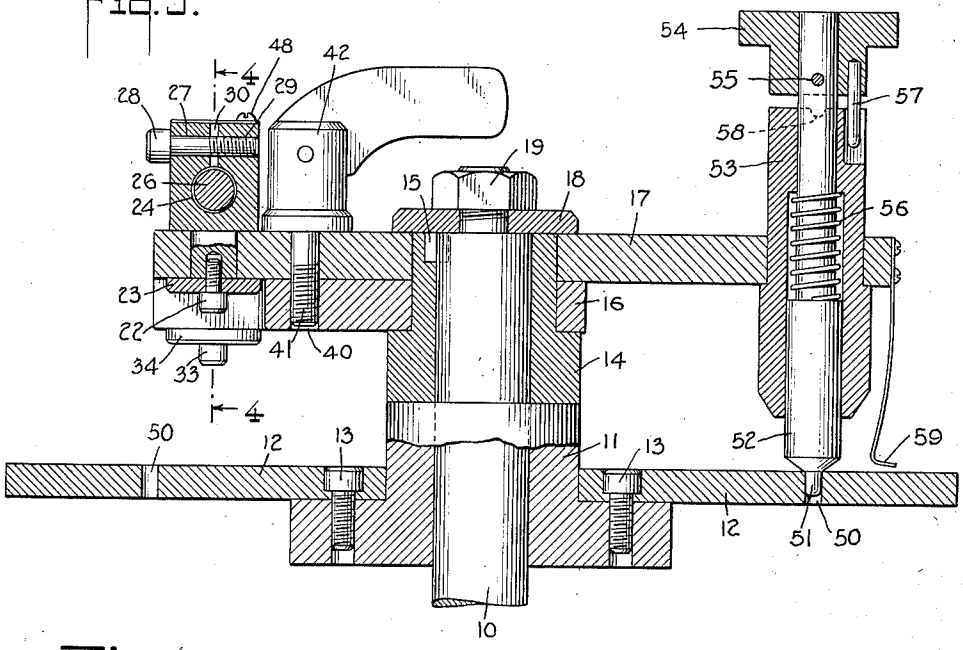
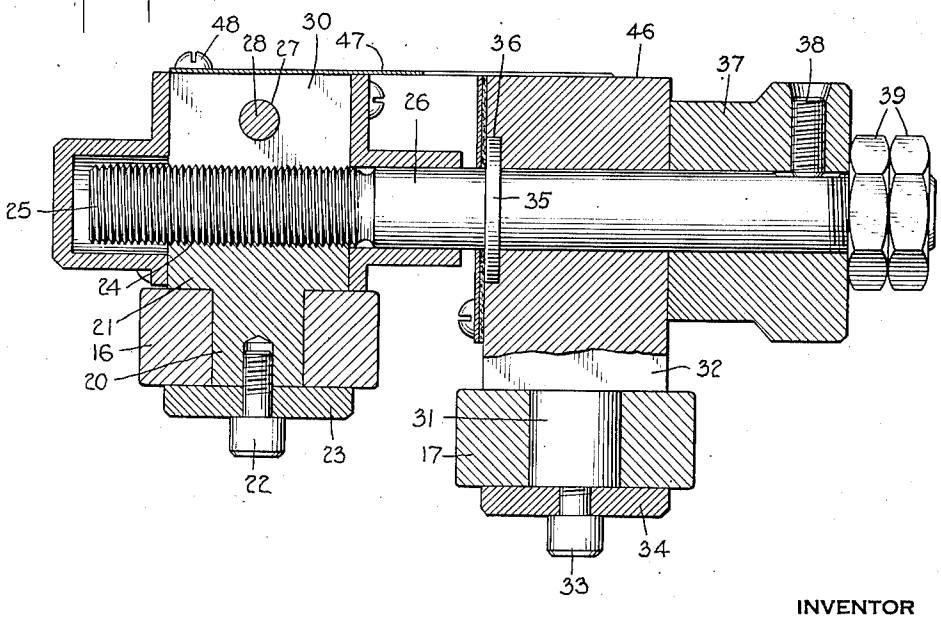


Fig. 4.



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POSITIONING MECHANISM

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3 Claims. (Cl. 33—1)

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This invention relates to mechanism for setting into particular positions a part of a machine, as for example, a machine tool.

It is the object of my invention to contribute a setting mechanism that is extremely simple and effective, and yet will allow the positioning of one part of a machine in very accurate relation to the remainder of machine.

As a feature of my invention whereby the objects thereof are attained, I utilize a rotating positioning shaft to which is secured an operating element for rotating the shaft. This operating element is in turn secured to an adjusting member so that the adjusting member and operating element rotate together with the shaft to position the shaft.

As a feature of my invention, the adjusting member is secured through adjusting means relatively to the operating element whereby to vary the relation therebetween. As a further feature of this part of the invention, the adjusting member is adapted to be located in a fixed position relatively to a dial or other part of the machine, whereupon the actuation of the adjusting means between the adjusting member and the operating element with be effective to rotate the positioning shaft. It is the feature of this part of the invention that this adjustment may be of a very fine character, as for example, seconds of a degree where the adjustment is angular.

I have thus outlined rather broadly the more important features of my invention in order that the detailed description thereof that follows may be better understood, and in order that my contribution to the art may be better appreciated. There are, of course, additional features of my invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception on which my disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of my invention. It is important, therefore, that the claims to be granted me shall be of sufficient breadth to prevent the appropriation of my invention by those skilled in the art.

Referring now to the drawings, Fig. 1 is a plan view looking downwardly on the assembly of my invention. Fig. 2 is an enlarged view of part of Fig. 1. Figure 3 is a vertical section taken along lines 3—3 of Fig. 1. Figure 4 is a section taken along lines 4—4 of Fig. 3.

Referring now more particularly to the drawings, reference numeral 10 indicates the positioning shaft of my invention mounted for rotation relatively to a base bearing 11 and a dial 12 secured to the base bearing by studs 13. The dial 12 may be graduated in degrees D and minutes M, as best shown in Fig. 1. Thus, because I use a 40 to 1 reduction gearing between the positioning shaft 10 and the mechanism positioned thereby, the dial 12 is shown graduated to 9°, it being understood that 40 complete rotations of the shaft 10 relatively to the dial will rotate the mechanism positioned by the shaft 10 a distance of 360°.

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Mounted above the shaft 10 is a truncated sleeve 14 keyed to the shaft at 15 so as to be rotatable integrally therewith. An arm 16 forming the operating element for the shaft 10 has a drive fit relatively to the sleeve 14 so as to be rotatable integrally therewith and therefore integrally with shaft 10.

Fitting freely about the upper end of the sleeve 14 is a further arm 17 forming the adjusting member of my invention. It is quite obvious that the arm 17 will rotate with arm 16 on the axis of shaft 10 if means are provided for securing the arm 17 to the arm 16. Such means will be described presently, but at this point it will be well to note that the two arms 17 and 16 will be maintained in position relatively to the shaft 10 and sleeve 14 by a washer 18 held in place by a nut 19.

As is probably best seen in Fig. 4, the free end of the arm 16 is formed with an opening for the insertion of the end 20 of a block 21. Block 21 is fastened in place relatively to the arm 16 by a stud 22 threaded into the block 21 and holding in position a washer 23 that presses against the lower surface of the arm 16. Block 21 is threaded at 24 for the threaded end 25 of an adjusting screw 26. Preferably, the block 21 is drilled at 27 for a stud 28 that is in screw-threaded relation thereto at 29. The block 21 is slotted at 30 with the slot 30 extending to the threaded bore 24 in which the end 25 of the screw 26 is housed. By rotating the stud 28, as is clearly apparent from Fig. 3, the pressure relationship between the block 21 and the screw 26 may be adjusted to increase or decrease the resistance to the rotation of the screw 26.

The left end of the arm 17, as seen in Fig. 3, is formed with an opening similar to that found in arm 16. This opening, as best shown in Fig. 4, is adapted to house a lug portion 31 of a block 32. A stud 33 holds the block 32 and its portion 31 in assembled relation to arm 17 through the intermediary of a washer 34 as is quite apparent. A washer 35 is fitted onto the shaft 26 and fits in a depression 36 of the block 32 so as to prevent

movement of the shaft 26 toward the right in Fig. 4. Shaft 26 is secured at its right hand to an adjusting finger piece 37 by a stud 38, the stud holding the finger piece 37 against rotation relatively to the shaft 26. A pair of lock nuts 39, threaded on the right hand end of the shaft 26, co-act with the finger piece 37 to hold the shaft in proper end relation to the block 32.

It is now quite obvious that rotation of the finger piece 37 will effect rotation of the shaft 26, and since the shaft 26 cannot move relatively to block 32, will affect movement of adjustment of block 21 relatively to block 32. It will further be appreciated that at all times the two arms 16 and 17 will be rotatable together through the connection between the two arms effected by the screw 26 and the blocks 21 and 32.

For locking the two arms 16 and 17 to one another and for integral movement, arm 16 is formed with a threaded bore 40 within which fits the threaded bolt portion 41 of a finger piece 42. The upper end of the threaded bolted portion 41 lies within a slot 43 in the arm 17 as best illustrated in Fig. 1. Therefore, the bolt 41 acts to limit the relative movement between the arm 16, 17. Rotation of the finger piece 42 acts to draw the two arms toward one another so as to lock them against relative movement when adjustment therebetween has been effected.

Finger piece 37, as best illustrated in Fig. 1, is formed with a calibrated annular dial 45, the numerals on the dial representing seconds of a degree. Engraved on the upper surface 46 of the block 32 are numerals N, the space between consecutive numerals designating one minute. Numerals representing ten minutes are engraved on the surface 46, as best seen in Fig. 2, because ten minutes represents the maximum movement of adjustment between arms 16 and 17. An indicator pointer 47 is fixed by screws 48 to the upper surface of the block 21 and co-acts with the numerals N, on the surface 46, as is quite clearly apparent in Figs. 1 and 2.

Those skilled in the art will now appreciate that by rotation of the finger piece 37 through a partial revolution, the two arms 16, 17 will be rotated relatively to one another a distance representing seconds of rotation of the shaft 10. This movement will be measured by the figures in the annular dial 45. In other words, were we to hold in fixed position the arm 17, the rotation of the finger piece 37 through one revolution would effect the rotation of the shaft 10 sixty seconds or one minute. This one minute will, of course, be indicated through movement of the pointer 47 relatively to the numerals N engraved on the surface 46 of block 32. Further, the maximum adjustment of the two arms 16, 17 relatively to one another represents 10 minutes movement of the shaft 10 relatively to the base bearing 11 and the dial 12.

For locking the arm 17 relatively to the base 11 and dial 12 whereby to make possible fine adjustments of the shaft 10 by finger piece 37, the dial 12 is formed with a series of bores 50 positioned ten minutes apart. The several bores 50 are adapted to co-act with the lower end 51 of a detent pin 52 carried by a sleeve 53 that is fixed to the arm 17. The upper end of the detent pin 52 carries a finger piece 54 fixed thereto at 55. Finger piece 54 is adapted to lift the detent pin 52 against the pressure of a spring 56, after which a holding pin 57, by entry into a groove 58, may hold the pin 57 upwardly and away from the dial 12. An indicating spring 59 is

utilized to indicate just what is the position of the arm 17 relatively to the dial 12.

It will now be well to outline just how the mechanism of my invention acts in a machine tool. Thus, if it is desired to rotate the shaft 10 a distance of several degrees, some minutes, and some seconds, the finger piece 54 is first moved upwardly to move detent pin portion 51 from out of one of the bores 50 of the dial 12. It is then possible to rotate the arm 17, and through the arm 17 the arm 16 and shaft 10. During such rotation the adjusting mechanism will be in the position of Figure 1 with the arms 16, 17 locked together by the finger piece 42 and its threaded bolt portion 41.

Rotation of the shaft 10 takes place until the pointer spring 59 indicates the number of degrees and ten minute intervals thereof nearest the predetermined setting of the shaft 10 required. At this point the holding pin 57 will be raised out of the depression 58 and the detent pin 52 allowed to drop under the influence of spring 56 until its lower end 51 enters a bore 50. Thereafter the finger piece 42 is rotated counterclockwise to release the arms 16, 17 for movement relatively to one another within the limits of the slot 43. It is then possible to rotate finger piece 37 to adjust the position of the arm 16 relatively to the arm 17, arm 17 being held firmly against movement relatively to the dial 12. This movement of adjustment is measured by pointer 47 relatively to the numerals N engraved on surface 46, and also by the annular dial 45. Further, any movement of adjustment that takes place between the arms 16, 17 effects movement of the shaft 10 through the number of minutes and seconds of movement of adjustment measured by dial 45 and pointer 47.

I believe it is now quite clearly apparent that through use of the mechanism I have devised it is possible to obtain effective, accurate movement of adjustment of the shaft 10.

I now claim:

1. In a combination of the class described, a positioning shaft, a bearing member for said shaft including a dial relatively to which said positioning shaft is rotated, an adjusting member rotatable in the axis of said shaft and relatively to said shaft, an operating element secured to said shaft for rotating said shaft and underlying said adjusting member, a screw threaded shaft rotatably mounted in said overlying adjusting member, a block projecting upwardly from said underlying operating element and having a screw threaded bore within which is threadedly mounted said screw threaded shaft, and means for fixing said adjusting member relatively to said dial and bearing member.

2. In a combination of the class described, a positioning shaft, a dial relatively to which said positioning shaft is rotated, an adjusting member rotatable in the axis of said shaft and relatively to said shaft, an operating element secured to said shaft for rotating said shaft, a stud secured block extending upwardly from said adjusting member, a stud secured block extending upwardly from said operating element, screw threaded means extending between said blocks for adjusting said operating element relatively to said adjusting member, and means for securing said adjusting member against rotation relatively to said dial.

3. In a combination of the class described, a positioning shaft, a dial relatively to which said positioning shaft is rotated, an adjusting arm mounted for free rotation about the axis of said

shaft, an operating arm secured to said shaft for rotating said shaft, a stud secured block extending upwardly from said adjusting arm, a stud secured block extending upwardly from said operating arm, calibrated screw threaded means extending between said blocks for securing said adjusting arm to said operating arm whereby rotation of said adjusting arm rotates said shaft through the intermediary of said operating arm, detent means for fastening said adjusting arm to said dial, and said calibrated screw threaded means determining the positioning of said operating arm relatively to said adjusting arm and thereby the degree of rotation of said shaft relatively to said dial by said calibrated screw threaded means.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
273,451	Brainard	Mar. 6, 1883
1,391,016	Slider et al.	Sept. 20, 1921
1,592,700	McDougal	July 13, 1926
1,879,941	McCabe	Sept. 27, 1932
2,012,859	Vocke	Aug. 27, 1935
2,136,958	Tyson	Nov. 15, 1938
2,228,583	Parsons	Jan. 14, 1941
2,357,329	Hansen	Sept. 5, 1944
2,439,102	Rothweiler	Apr. 6, 1948
2,452,544	Brodie	Nov. 2, 1948
2,463,649	Sheffield	Mar. 8, 1949
2,467,899	Lowkrantz	Apr. 19, 1949