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C. B. ALVIS

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CENTERING TOOL

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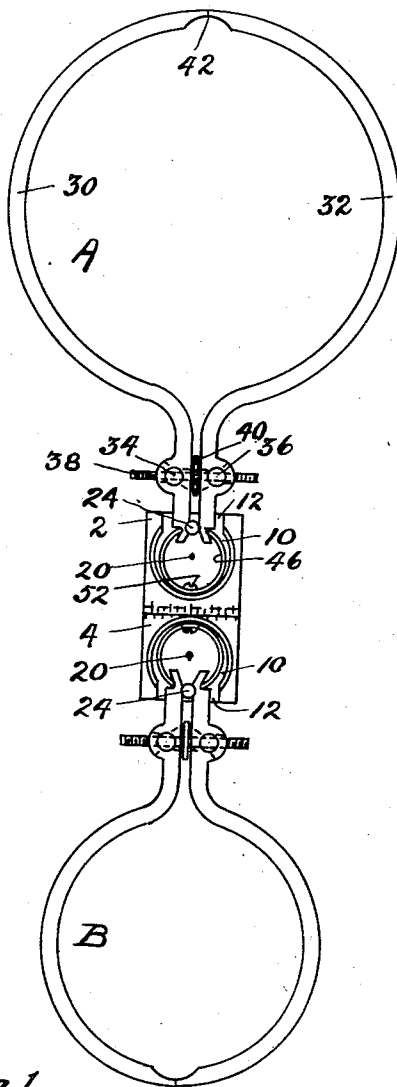


Fig. 1.

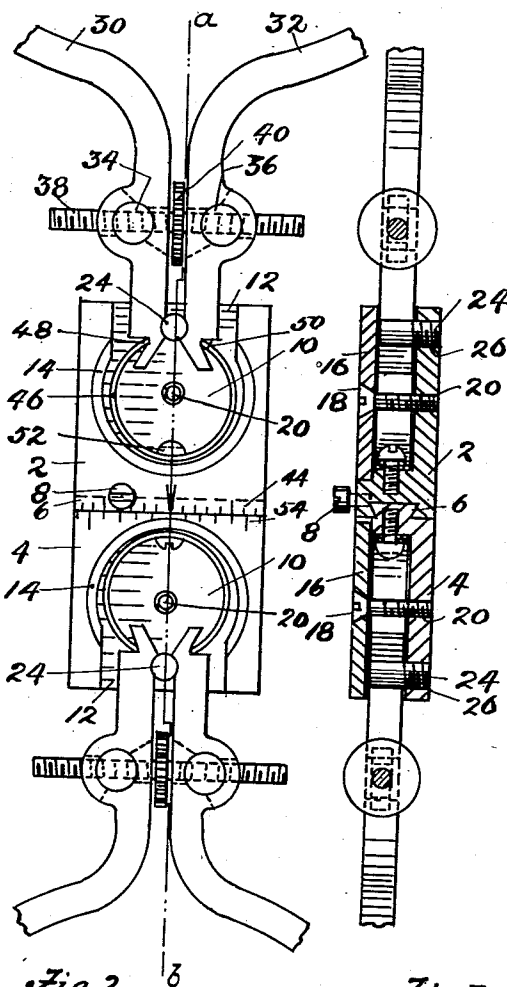


Fig. 2

Fig. 3.

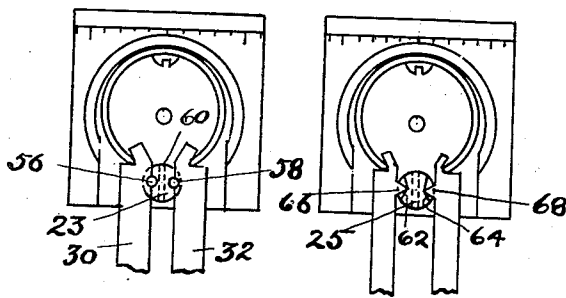


Fig. 4

Fig. 5

INVENTOR.

BY Charles B. Alvis.

Arthur Scrivener,
Att'y.

UNITED STATES PATENT OFFICE

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CENTERING TOOL

Charles B. Alvis, Richmond, Va.

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6 Claims. (Cl. 33-185)

My invention relates to centering tools, and particularly to tools for setting up work on a milling machine, or in line with a cutter. It has for its object the production of a tool which shall be inexpensive, simple, durable, and rugged enough to stand rough usage. A further object is to produce a tool which may be readily taken apart, and which may be packed in a small space when not in use.

My centering tool comprises two pair of spring calipers, mounted in line with one another on adjustable blocks, which blocks are fitted slidably together, either by a dovetail or by other suitable means. The contacting edges of the two blocks are graduated so that the alignment of the two blocks, and consequently of the two pair of calipers, may be readily seen and adjusted.

In the drawing:

Figure 1 shows the centering tool in plan; or this Figure 1 may be considered as a front elevation, a position in which the tool is generally held for use.

Figure 2 is a view, to larger scale, of the central part of the tool and showing the adjusting parts.

Figure 3 is a vertical section on line *a-b* in Figure 2.

Figure 4 is partial view in elevation showing an alternate construction of one of the adjusting parts; and

Figure 5 is a partial view in elevation showing a second alternate of the same adjusting part.

In each of the Figures 1, 2, and 3 the blocks 2 is shown slidably connected with the block 4 by means of the dovetail 6. A locking screw 8 is used, when necessary, to lock the two blocks in relative position when adjusted for use. On loosening screw 8 we shall have two blocks which may be slid apart, each block with its own pair of calipers. These two separate calipers may then be packed in a small space; or they may even be used as separate and individual tools; for instance, for laying off work on flat surfaces; and in other ways.

In each of the blocks 2 and 4 there is sunk a cylindrical hollow 10, which hollow is opened to the outside of the block at 12. In the rim of each hollow there is cut a rebate 14, in which is seated a cap 16 (Figure 3); which cap is held to its seat by a screw 18 threaded into the bottom of the block at 20. This cap 16 is shown seated in the rebate 14 in Figure 3. In other figures it is not shown so that the parts lying within the block may be seen. The threaded hole 20, however, is shown in these other figures.

In the open mouth 12 of each block, and on its

center line, is set a post or stud 24. In Figures 4 and 5 this post or stud is indicated by the numerals 23 and 25. This post or stud is screwed into the bottom of the block at 26, Figure 3; and a screw slot is preferably cut in the end of the post for seating and adjusting purposes.

The two pairs of calipers A and B are alike, though they may differ in size, as shown. Obviously the tool may be used with the smaller caliper uppermost, or the larger one.

In describing the calipers and their adjustment I will refer particularly to the pair marked A. These calipers consist of the arms 30 and 32, shown pivoted on the post 24. In the arms 30 and 32 are set the cylindrical blocks 34 and 36, respectively, each one adapted to turn in its seat in the arm. These two blocks 34 and 36 are threaded, one with a right hand thread and the other with a left hand thread. A right hand and a left hand threaded screw 38 engages with the threads in the blocks; and the screw 38 is provided with a milled head 40 by which it may be turned in the threaded blocks 34 and 36 to bring the arms 30 and 32 closer together or to spread them farther apart.

The general construction of the calipers is well known; they are open at 42; but instead of being connected at the end remote from the opening 42, the arms 30 and 32 are separately pivoted on a post 24, against which they are held by a spring 46. This spring bears against the free ends of the arms and slightly off the center of the post 24, so that any lost motion that there may be between the screw 38 and the threaded blocks 34 and 36 may be taken up. To prevent slipping the ends of the spring 46 are seated in notches 48 and 50 in the arms 30 and 32 respectively.

The spring is held in position by means of the screw 52, passing freely through an orifice in the spring and threaded into the body of the block 2.

A graduated scale 44 with vernier 54 is engraved on the abutting edges of the two blocks 2 and 4; the said scale being useful to show when the caliper settings are out of line, and by how much. A vertical line may also be engraved through the center of each of the caps 16. The details of caliper B are similar to those of caliper A, except that the standard scale is engraved on one of the blocks 2 and 4, and the vernier is engraved on the other.

To describe the use of the tool: let us suppose that we are to center the work, say a piece of shafting, with the milling machine cutter for the purpose of milling a key-seat. The shaft is fastened to the machine bed by clamps, or by a

vise or between centers, or by any other suitable means. One of the calipers, usually the smaller one, B, is now adjusted to grasp the cutter by turning the right and left hand screw 38. The other caliper, A, is now adjusted to the work; in this case the shafting to be key-seated. The two calipers are now brought into line with one another by sliding one of the blocks 2 and 4 on the other; the locking screw 8 is set; and the machine table is moved until the work is brought to a center line with the cutter.

The perpendicularity of the instrument may be readily checked with a steel square; one leg on the machine-tool table, and the other leg held against the side of one or other, or both, of the blocks 2 and 4.

Or it may be that it is desired to check the center of a cylindrical piece of work, or of a cutter, with a specified line on the table. I then slide the blocks 2 and 4 apart, and use only one of the calipers, let us say A, standing the block 2 on the flat surface, and setting the central graduation V, Fig. 2, or any other desired graduation, on the specified line. The machinist would note the difference between the standard scale on block 2 and the vernier on block 4.

Other uses may be seen and found for my instrument, with the calipers used singly or together.

To take down the instrument for packing: the blocks 2 and 4 are separated; and the arms 30 and 32 may be slipped off the posts 24.

There may be cases when the caliper opening 42 is out of line with the center of the block to which it is attached. Such a "set" may be quickly corrected by adjusting the relative positions of the arms 30 and 32. To make such an adjustment I pivot the two arms separately, as shown in Figures 4 and 5. Referring to Figure 4: the upper part of the post 24 (Fig. 3) is removed, leaving the stub 23 (Fig. 4), in which are set the two pins 56 and 58. The arms 30 and 32 are pivoted on these pins; suitable notches being cut in the sides of the arms for that purpose. To adjust the relative positions of the arms the post 23 is turned the necessary amount, which will be very little; the turning being aided by a screwdriver engaged in the slot 60 cut in the back end of the post.

In Figure 5 I show a post 25 in which notches are cut in the sides of the post at 62 and 64; and in these notches bear the points 66 and 68 projecting from the arms 30 and 32. Adjustment is made by turning the post 25.

I claim:

1. A centering tool, having in combination a block having an even base and a front face substantially normal to and contiguous to the base; a pair of caliper arms fulcrumed on a post set in the front face of the block, and with their medial line standing normal to the base; spring means so mounted on the front face as to engage the adjacent ends of the said caliper arms to hold them against the fulcrum and to hold the medial line of the said arms in normal relation to the base of the block; means for adjusting the opening of the caliper; and indicating means on the front face of the block and in cooperative relation with the medial line of the caliper arms.

2. The structure defined in claim 1 characterized by the fact that the block shall also have a vertically disposed side face forming a right angle with the base.

3. The structure defined in claim 1 characterized by the fact that the block has a vertically disposed side face forming a right angle with the base and also forming a right angle with the front face.

4. A centering tool having in combination a block having an even base and a front face substantially normal to and contiguous to the base; a second and a similar block so arranged in relation to the said first block that their bases contact and are slidably adjustable one upon and in line with the other, and so that their front faces shall lie substantially in one and the same plane; on each block a pair of caliper arms fulcrumed on a post set in the block on its front face and extending directly from the line of contact between the bases, and with their medial lines standing normal to the said bases; also on each block, spring means on its front face cooperating with the caliper arms to hold the medial line of the pairs of arms in normal relation to the said bases; and means on the contiguous edges of the two blocks to indicate the cooperative relation between the medial line of one pair of calipers and the medial line of the other pair.

5. The structure defined in claim 4 characterized by the fact that the blocks shall have a side face forming a right angle with their bases.

6. The structure defined in claim 4 characterized by the fact that the blocks shall have a side face forming a right angle with their bases and also a right angle with front faces.

CHARLES B. ALVIS.