March 3, 1936. A. P. STEINER 2,032,856

COMPARATOR

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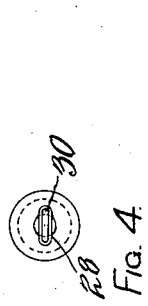


Fig. 4

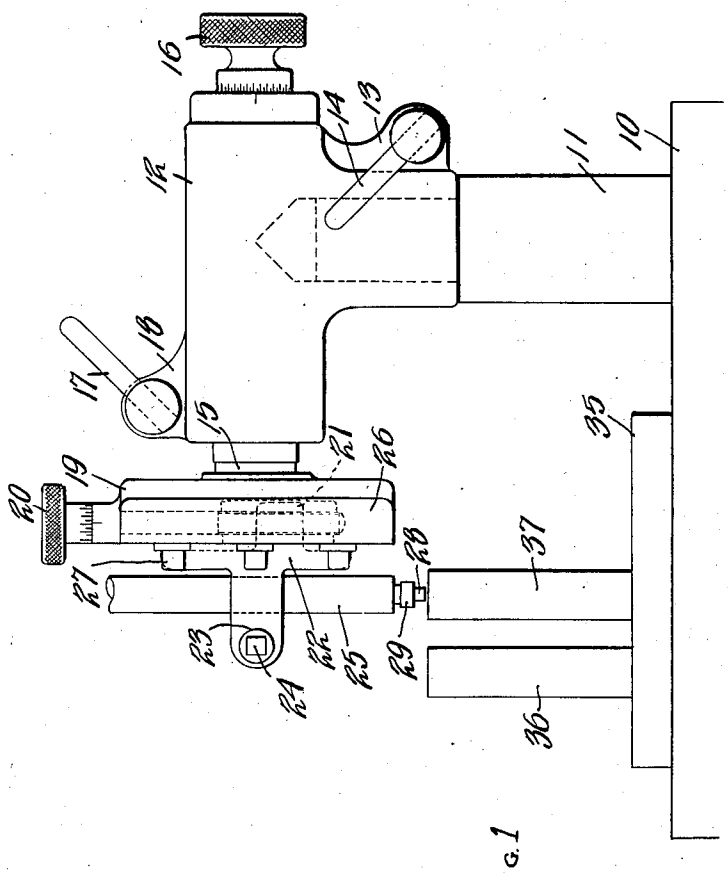


Fig. 1

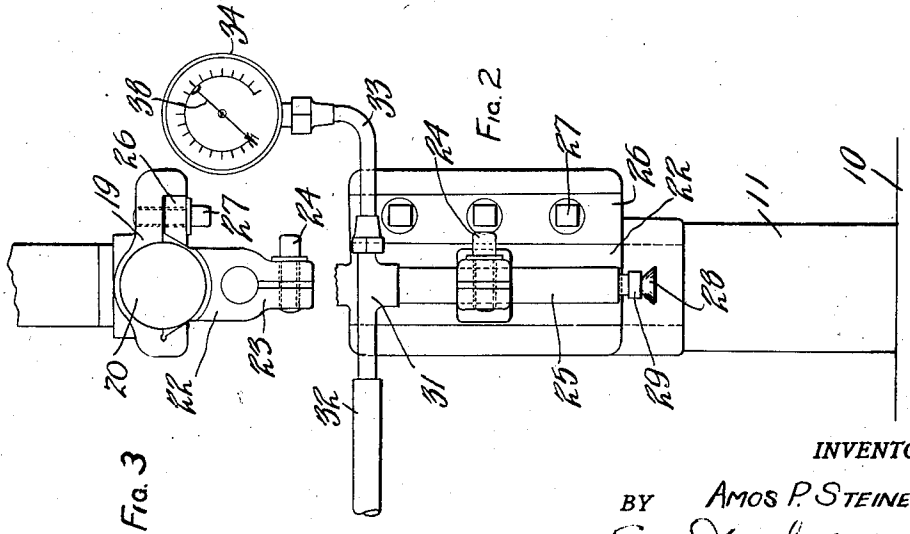


Fig. 2

Fig. 3

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2 Claims. (Cl. 33—174)

This invention relates to mechanism for detecting variations in the size of objects and is particularly designed with a view to its use in comparing a work piece of unknown or approximately correct dimension with one known to be of correct size.

A further object is to make a comparing device of this character in which there will be no contact between parts of the instrument and the piece to be gauged.

Further objects will become apparent as the description proceeds.

Referring to the accompanying drawing, which is made a part hereof and on which similar reference characters indicate similar parts,

Figure 1 is an end elevation of the device,

Figure 2, a front elevation of the device,

Figure 3, a plan view, and

Figure 4, a view of the nozzle looking upward.

In the drawing numeral 10 indicates the base upon which the machine is mounted, this base having a post 11 upon which is mounted a cross arm 12. The arm 12 is mounted to swing horizontally about the post 11 and may be secured in any position by means of a screw operated by means of a handle 14 which screw passes through lugs 13 on the lower portion of the arm 12. On one end of the arm 12 is a slide bracket 19 which has a cylindrical projection 15 which fits in a bore in the cross arm 12. The bracket 19 may be adjusted longitudinally of the arm 12 by means of a manually operable screw 16 and may be held in adjusted position by means of a screw 17 threaded through lugs 18. Mounted on the bracket 19 is another manually operable screw 20 which engages a threaded portion 21 on a slide 22 to move the slide vertically. The slide 22 has an arm 23 which has a split portion on its outer end through which a screw 24 is threaded. The slide 22 is held in the bracket by means of a block 26 secured by screws 27. A pipe 25 is mounted to slide vertically in a bore of the arm 23 and secured in adjusted vertical position by means of the screw 24. A nozzle 28 is carried in the lower end of the pipe and is secured by a nut 29. The nozzle 28 as shown best in Figure 4 has a thin elongated slot 30. To the upper end of the pipe 25 is attached a T-coupling 31, to one end of which is secured a pipe 32 and to the other end a pipe 33, the outer end of the pipe 33 being connected to a pressure gauge 34. The pipe 32 at its outer end may be connected to a source of pressure fluid which pressure fluid is either above or below atmospheric pressure. Shown at 35 is the work support which may be a block and 36 and 37 indicate pieces of work mounted upon the support. One of these, as 36, denotes a piece of work which is a known size or a correct size and 37 indicates a piece, the size of which is to be compared with that of 36.

The operation of the device is as follows:

Assume that the pipe 32 is connected to a volume of fluid under a constant pressure and assume that this is a pressure above atmospheric, although the machine will operate on a pressure below atmospheric just as well. With a given pressure in the pipe 32 and with the nozzle 28 a given distance from the surface of the work 37 there will be a constant pressure on the pressure gauge 34 to hold the hand 38 on the pressure gauge at a noted point on the gauge. As the work 37 is moved about beneath the nozzle 28 any variation in the thickness of the work will vary the distance of the nozzle 28 from the work. Variation in the distance between the nozzle and the work will affect the pressure in the pipe 33 and this variation in pressure will be registered on the gauge 34. To compare work of unknown size with one of known size the nozzle 30 is placed on the work of the known size and the instrument adjusted so that the hand 38 on the guage will register for example intermediate the high and the low point with a given pressure in the line 32 and with the nozzle always at this same distance from the work piece the hand will remain in the same position. The work is then moved about beneath the nozzle. The bracket 19 may be projected by means of the thumb screw 16 to move the nozzle about the surface of the work of unknown size or work may be moved about under the nozzle. If this work is not as thick as that of the known size the distance between the end of the nozzle and the block to be measured will be increased, and this will allow pressure fluid in line 32 to issue faster through the nozzle and will therefore reduce pressure on the gauge 34, which reduction in pressure will be indicated on the face of the gauge. If the work to be tested is larger than that of the standard size the distance between the end of the nozzle and the top of the work will be decreased, and fluid therefore will be restricted as it issues from the line 32 through the nozzle. This will cause a greater pressure within the gauge 34 which increased pressure will be registered on the face of the gauge. The operator therefore may know whether his work is below or above the required size. The opening in the nozzle 28 is preferably in the form of a long narrow slot. The purpose of this is to enable

the operator to use the device to compare the size of cylindrical work of unknown size with cylindrical work of a known size.

Tests made by this device indicate that it is so sensitive that a difference of a thousandth of an inch in the work being compared will deflect the hand on the gauge about 30°.

It will be obvious to those skilled in the art that various changes may be made in my device without departing from the spirit of the invention, and therefore I do not limit myself to what is shown in the drawing and described in the specification, but only as indicated in the appended claims.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:

1. A device for comparing work of unknown size with work of known size comprising a base, a work support carried thereby on which the work may be placed for comparison, a nozzle and means for supporting said nozzle over said work support including means whereby said nozzle may be shifted in a plane parallel to the plane of the surface of the work support in any direction within the limit of the work support and separate precision means for adjusting the nozzle toward and from the work support in a direction transverse of said plane of movement and for holding said nozzle in a fixed position, a conduit for pressure fluid connected to said nozzle and a gauge for indicating variations in the pressure of the fluid in said conduit.

2. A device for comparing work of unknown size with work of known size, comprising a base, a work support on which the work may be placed for comparison, a post carried by said base at one side of said work support, an arm mounted on said post to swing about the center thereof and in a plane parallel with the surface of the work support, means for securing said arm in a set position on said post, a bracket, means secured to said bracket and slidable longitudinally in said arm in a line parallel with the face of the work support, a slide mounted on said bracket and shiftable in a line perpendicular to the work support, a nozzle fixed to said slide, precision means for shifting said slide on said bracket and for holding said slide in a set position thereon and means for adjusting the position of said bracket supporting means in said arm, a conduit for pressure fluid connected to the nozzle and a gauge for indicating variations in the pressure of the fluid in said conduit.

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