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ANGULARLY ADJUSTABLE SURFACE PLATE

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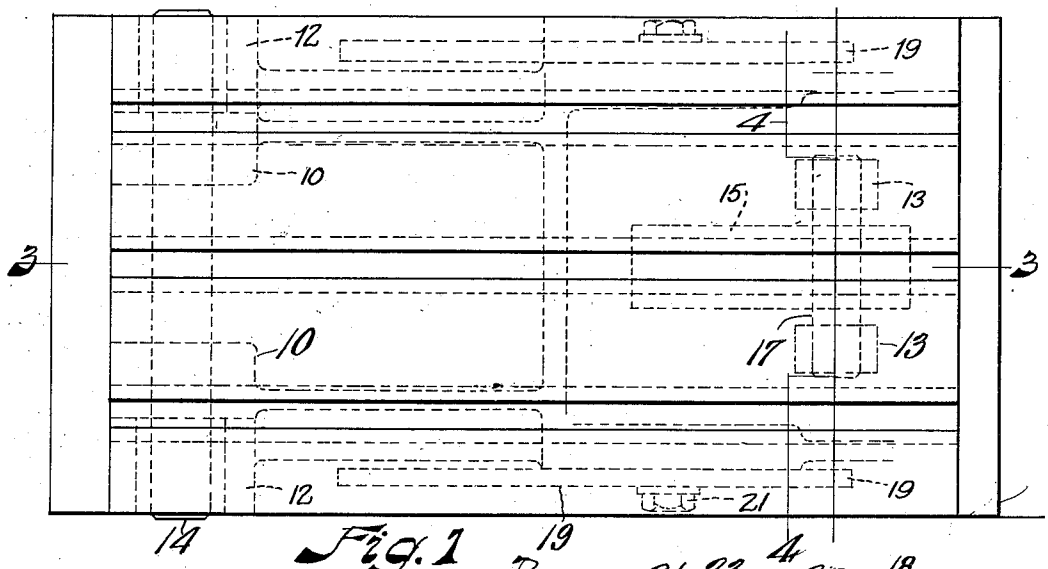


Fig. 1

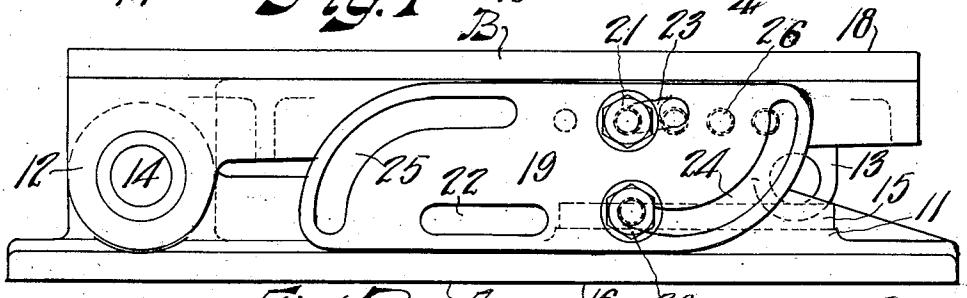


Fig. 2

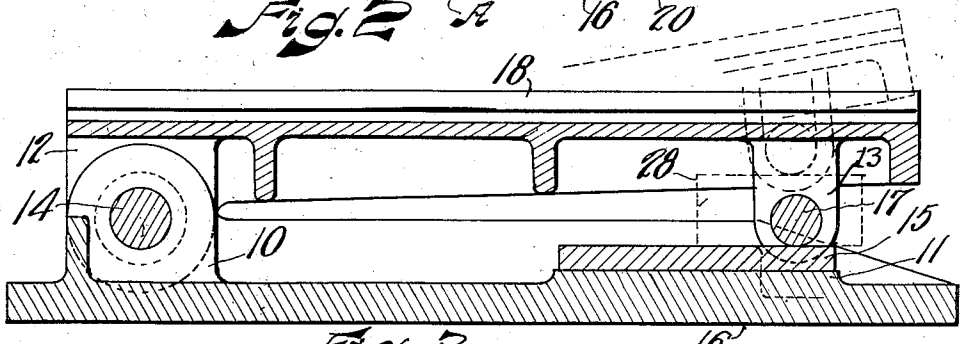


Fig. 3

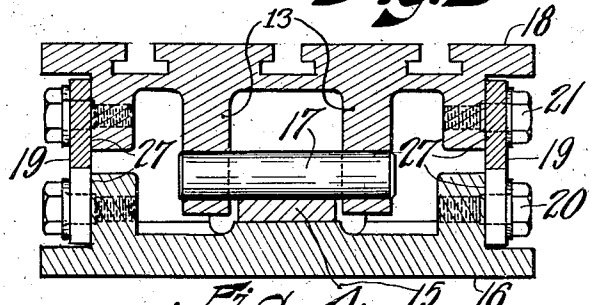


Fig. 4

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ANGULARLY ADJUSTABLE SURFACE PLATE

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2 Claims. (Cl. 33—174)

Our invention relates to improvements in surface plates which can be adjusted to any angular position with the base thereof.

Objects of our invention are to provide a surface plate which can be adjusted to any degree of angularity with the base thereof; which can be locked in any adjusted position thereof; and wherein standard thickness gages are used to attain correct adjustment.

We attain our objects by the mechanism illustratively shown in the accompanying drawing wherein:

Fig. 1 is a plan view of an angularly adjustable surface plate embodying our invention.

Fig. 2 is a side view of Fig. 1.

Fig. 3 is a longitudinal section taken on the line 3—3 of Fig. 1.

Fig. 4 is a transverse section taken on the line 4—4 in Fig. 1.

Similar reference characters refer to similar parts throughout the views.

Our invention is based on the triangulation formula that the side opposite an angle of a triangle is found by multiplying the hypotenuse by the sine of that angle.

The base or bed A, as shown, has the upstanding ears 10 near one end thereof and the padrest 11 near the other end thereof.

The surface plate B, as shown, has, near one end thereof, the downwardly extending ears 12 sidewise outwardly adjacent to the ears 10 and the downwardly extending ears 13 near the other end thereof.

The object of so locating the ears 10 and 12 is to retain the plate B in sidewise relation to the base A.

The shaft 14, as shown, extends through the ears 10 and 12 and forms a pivot pin for the plate B to swivel on.

The abutment member or pad 15, as shown, is secured to the base A and is hardened and ground so that the top surface thereof is parallel with the axis of the shaft 14 and exactly parallel with the bottom face 16 of the base A.

The abutment member or shaft 17, as shown, extends through the ears 13 and abuts the pad 15 when the top face 18 of the plate B is exactly parallel with the face 16 of the base.

The locking or clamping plates 19, as shown, are carried on each side of the device by the screws 20 tapped into the base and the screw 21 tapped into the plate and bear against the faces 27 as shown. The slots 22, 23, 24, and 25 extend through the locking plates; the slot 22 being substantially parallel with the faces 16 and 18; the slot 23 being angular or inclined thereto; the slot 24 being arcuate and the slot 25 being arcuate in opposite arcuation to the slot 24.

The locking or clamping plates are spaced inwardly of the sides of the device so that the heads of the screws 20 and 21 do not project outwardly beyond the side of the plate so that the device may be set on a side thereof without interference by the clamping screws.

The additional tapped holes 26 are provided so that the screws 20 and 21 can be changed from one to the other as occasion may require.

The object or intent of the slots in the locking plates and the changeability of the screws 20 is to lock the surface plate to the base when it is set to any angle or when the faces 16 and 18 are parallel. The particular formation of the slots as shown can be varied; the only condition imposed is that there is a means which does not hamper the swivelling of the surface plate but which can be rigidly clamped onto the base and the plate after the same are adjusted so that the plate will be held rigidly, as adjusted, against the faces 27 with no part thereof projecting beyond the faces 16 and 18 in any position of the plate. The plates 19 are reversible and shiftable as plate adjustment may require.

The locking or clamping plates 19 do not pivot on or at any particular point and are laterally movable relative to the screws 20 and 21 when the same are screwed into any of the holes provided for that purpose. When the screws 20 and 21 are loosened, previous to adjustment of the plate B, the plates 19 may assume any position against the side of the device and tightening of the screws 20 and 21 will hold the plates 19 in assumed position as well as lock or hold the plate B in adjusted relation to the base A.

Reversing of the plates 19 may be resorted to when the plates 19 as shown do not meet requirements to lock the plate B and the base A in relatively adjusted position.

Vertical reversal of the plates 19, to wit: place against the base A and the plate B that face thereof which is shown in the drawing as being on the outside, will result in the slots 24 and 25 being located with the arcuation directionally different from their positions shown to hold the plate B to the base A when the slot layout shown can not be used for such holding.

End for end or horizontal reversal of the plates 19 will result in the slots 24 and 25 being located with the arcuation directionally different from their positions shown and different from that in the vertical reversal.

The object of reversability of the plates 19 is to provide all possible means to hold the plate B to the base A in any adjusted position thereof and to confine the plates 19 to within the outline or boundaries of the device when the plate thereof is adjusted to any position so that the device can rest on its bottom or on either side thereof or on either end thereof.

The spaces or setting blocks 28, indicated in dotted lines in Fig. 3, are of a thickness equivalent to the quotient derived from the formula given above.

To set the top face 18 at an angle with the bottom face 16 it is only necessary to loosen the screws 20 and 21, lay a block 23 of required thickness onto the pad 15, abut the shaft 17 on the block 28 by swiveling the plate B on its pivot 14, and tighten the screws 20 and 21.

In the device shown and described, the hypotenuse is 10 inches, the drawing being half size, or in other words, the distance between the axes of the shafts 14 and 17 is 10 inches hence the hypotenuse of 10 inches multiplied by the sine of the angle to which the plate is to be set will give the thickness of the block 28 to be inserted between the pad 15 and the shaft 17. The device as shown has the faces 16 and 18 parallel with each other with indication in Fig. 3 showing an angular position of the member B or the face 18.

We prefer to make the center distance between the shafts 14 and 17 ten parts or units of a scale, as ten inches for instance to simplify multiplication since an operator can then merely glance at a table of sines and move the decimal period one numeral to the right and read the result directly and correctly.

The use of the round shaft or pin 17 always provides a one line contact on the pad 15 or on a gage member 28 and, irrespective of the degree of angular adjustment of the plate B, the hypotenuse remains the same and the side opposite will always be located at right angles to the gage members and be the radius of the round pin.

The device shown and described carries thereon all parts or elements necessary for an angularly adjustable surface plate except the gage blocks 28 which usually can be standard gages usually carried in shops.

We are aware that changes in structure and arrangement of parts can be made in the device shown and described within the spirit and intent of our invention and of the appended claims; therefore, without limiting ourselves to the precise structure and arrangement of parts as shown and described we claim:

1. In an angularly adjustable angle plate device, a base, ears upstanding from said base near one end thereof, a surface plate above said base, ears extending downwardly from said surface plate near one end thereof, the ears of said base being in sidewise contact with corresponding ears of said surface plate to retain said base and said plate in sidewise relation to each other, a diametrically uniform pin extending through all of said ears and thereby forming a hinge joint between said base and said plate to adjustably swivel said plate angularly relative to the bottom of said base, a releasable clamping means engaging said base and said plate near the other end thereof to retain said base and said plate in an adjusted relation, said clamping means being confined to within the sides of said base and of said plate so that the device can be set on its side, and said clamping means including a releasable clamping plate having arcuately formed oblong screw receiving slots through the same to render said clamping means effective for various adjustments of said surface plate relative to said base.

2. In an angularly adjustable angle plate device, a base, ears upstanding from said base near one end thereof, a surface plate above said base, ears extending downwardly from said surface plate near one end thereof, the ears of said base being in sidewise contact with corresponding ears of said surface plate to retain said base and said plate in sidewise relation to each other, a diametrically uniform pin extending through all of said ears and thereby forming a hinge joint between said base and said plate to adjustably swivel said plate angularly relative to said base, a releasable clamping means engaging said base and said plate near the other end thereof to retain said base and said plate in an adjusted relation, said clamping means being confined to within the sides of said base and said plate so that the device can be set on its side, said clamping means including a releasable clamping plate having arcuately formed oblong screw receiving slots through the same to render said clamping means effective for various adjustments of said surface plate relative to said base, screws extending through certain of said slots, one of said screws being tapped into said base and another one being tapped into said surface plate, and a head on each of said screws to engage said clamping plate to releasably clamp said clamping plate to said base and to said surface plate.

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