June 16, 1953 J. J. GUNDLACH 2,641,845

ANGLE GAUGING DEVICE FOR USE WITH SHEARS

Filed Jan. 13, 1950

FIG. 1.

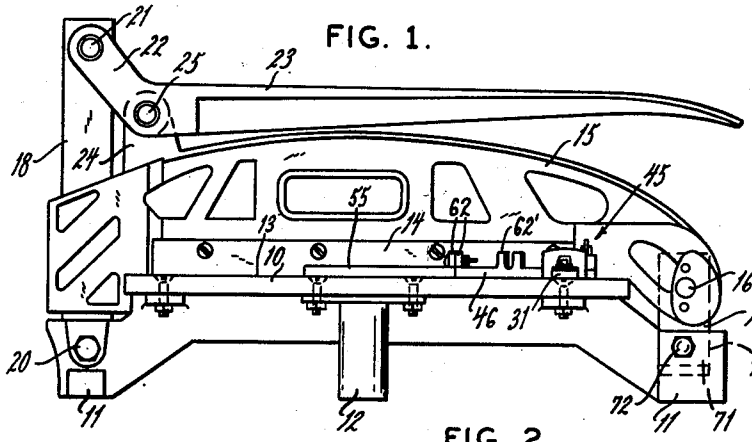


FIG. 2.

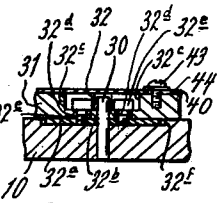


FIG. 7.

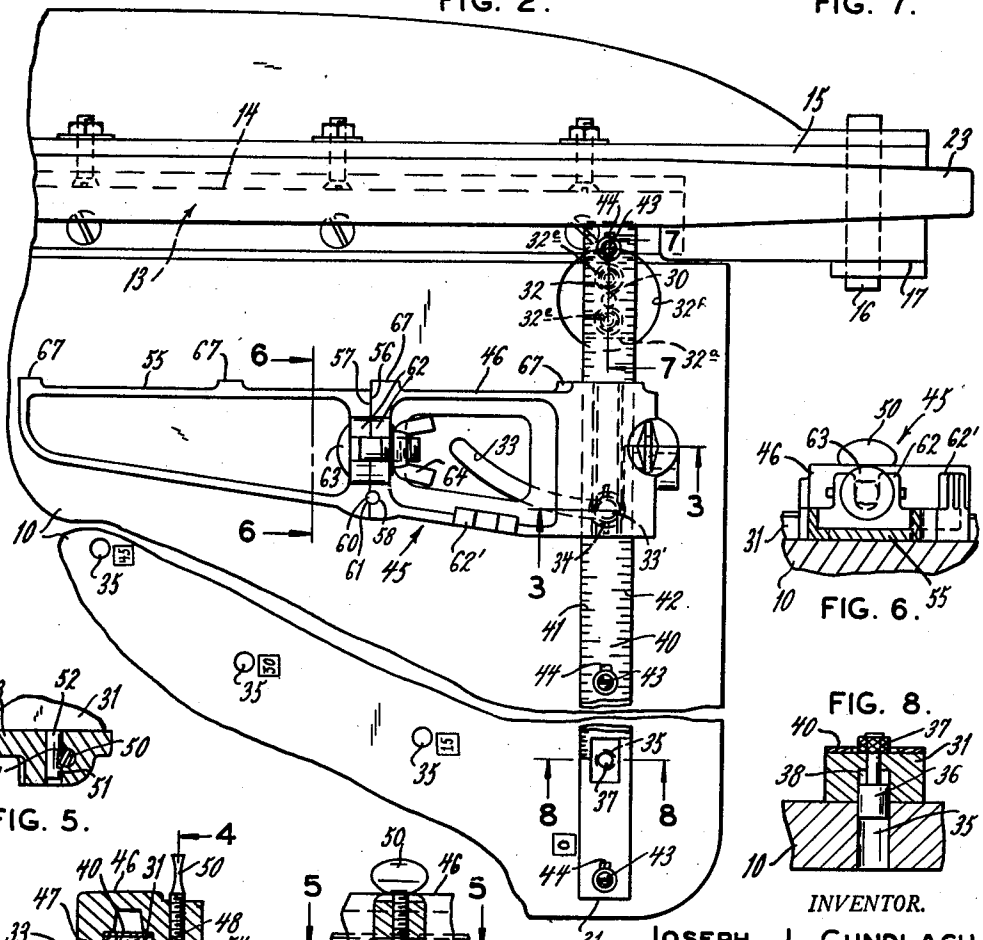


FIG. 6.

FIG. 5.

FIG. 8.

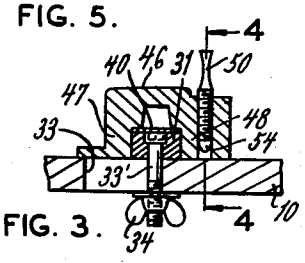


FIG. 3.

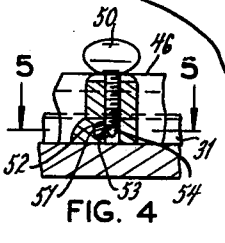


FIG. 4.

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ANGLE GAUGING DEVICE FOR USE WITH SHEARS

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4 Claims. (Cl. 33—76)

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This invention relates to improvements in angle-gauging devices for use with shears, and more particularly to an improved assembly of elements with reciprocal cutting devices, to facilitate the location of variable lines of severance of sheet materials, for example, units of wall, or floor tile of great variety, as well as sheet metal units and other sheet materials. Although not restricted in field of usage, the present angle gauging assembly was designed particularly for use with wall and floor tile, and is adapted to most or all of the standard commercial varieties of such materials.

It is a usual incident of applying many types of permanent tile, that many of the tile require a reduction in width or length; in other building situations, as in the fitting of corners and in irregular flooring and wall space, many of the tile must be accurately sized or trimmed to present one or more finished margins at a more or less definite angle to one or more of the remaining margins. As far as has come to this applicant's attention, there is no device available to the trade and suitable for use on the job or otherwise, for expeditiously so dimensioning wall and floor tile units. Heretofore work of this kind has been largely on a basis of cut-and-trial, often with loss of tile or a compromise in good workmanship. It is accordingly a principal and major object of the present invention to attain a tile severing device, together with angle-gauging means in functional and structural combination therewith, which will expedite the trimming and sizing of tile and other materials, and which will enable the job to be done by any one without especial skill beyond a minor period of experience.

The invention may be summarized by reference to one embodiment comprising particular features of advantage, including a swingable gauge bar provided with a plurality of different, relatively shifted, linear measurement scales, respectively applicable when the gauge bar is in different angular positions with respect to a margin of a cutting table or bed plate, or to a cutting line defined by associated shear elements. The improvements also are characterized by a novel arcuate guideway in the bed plate, together with a threaded clamp coacting with the guideway in fixing the adjusted position of the gauge bar. The aforesaid feature coacts at times with a series of sockets in the work table or bed plate, selectively engageable by a plunger in the gauge bar in order positively to prevent casual movement of the gauge bar from a predetermined angular position. A double-arm gauging assembly is provided, the two arms coacting in predetermined angular relation but with one such arm adjustable along the other thereof, so that each arm may serve as an edge abutment for the work piece such as a tile. A novel and simple clamping device for fixing the adjusted position of one of the arms with respect to the other, also characterizes the improvements. One of the work abutment members or arms, is formed in sections, and means are provided for detachably connecting the sections and for positively aligning same when connected. The sectional member is provided with a novel arrangement of spaced abutments with relieved areas or recesses therebetween, serving to minimize the likelihood, experienced with older straight edge abutments, that foreign particles or dirt may prevent exact parallelism between the edge of the work piece and the margin of the abutment arm. The assembly further comprises a simple expedient by which it is selectively adapted for severance of tile or like work pieces either by a true shearing action, or by the so-called "pinch-off" method of severance.

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Yet another object of the invention of importance, is realized in an improved device which is in the nature of a protractor attachment particularly for portable reciprocable shears as for tile and the like, and which optionally provides either a single scribing guide and abutment, or a plurality of such guide elements which are mutually adjustable, and which may optionally serve as abutments or cutting guides for units of sheet material on the work table of a shear.

Yet other important advantages of the invention are realized in improved adjustable clamping means for the assembly of separable angle gauging arms; an improved multiple linear scale associated with such a device, and an improved pivotal connection between one or more arms of a protractor unit, and the work table of a reciprocal shear assembly.

The foregoing and numerous other objects and advantages of the invention will more clearly appear from the following detailed description of a currently commercial embodiment of the invention, particularly when considered in connection with the accompanying drawing, in which:

Fig. 1 is a side elevation of a reciprocal cutting device for tile or like units, and embodying the current angle-gauging means;

Fig. 2 is a fragmentary enlarged top or plan view of the device of Fig. 1, particularly showing the gauge bar, gauge arm and accessories;

Fig. 3 is a sectional view in staggered vertical planes as taken along line 3—3 of Fig. 2;

Fig. 4 is a fragmentary vertical sectional view illustrating certain elements of the gauge arm clamp as taken along line 4—4 of Fig. 3;

Fig. 5 is a fragmentary sectional view taken in a horizontal plane, the location of which is indicated by line 5—5 of Fig. 4;

Fig. 6 is a fragmentary sectional elevational view as taken along line 6—6 of Fig. 2;

Fig. 7 is a fragmentary view, sectional in nature, as taken along line 7—7 of Fig. 2, and

Fig. 8 is a vertical sectional view taken along line 8—8 of Fig. 2, and showing a retaining plunger for positioning selectively, the graduated gauge bar.

Referring now by characters of reference to the drawing, the coacting cutting elements, as well as the major elements of the work support or work table and actuating mechanism for the reciprocal shear, are or may be identical with or substantially similar to the shearing device disclosed in application of Serial No. 51,772 filed September 29, 1948, by Theodore F. and Joseph J. Gundlach, and entitled "Shears for Frangible Units." Attention is directed to the said copending application in which is disclosed a suitable shear assembly per se, and in combination with which the present improvements may be employed.

For present completeness it may be noted that the device embodies a work table, being a support for the units of sheet material to be subjected to severance, and indicated at 10. The element 10 may be formed of a tempered, compressed, cellulose product as is preferred, or of metal or other non-warping material. This work table or work support is carried by a base casting which includes feet 11 at opposite sides, and an intermediate foot 12. Mounted along one margin of the work table is a stationary bedknife 13 with which cooperates a vertically reciprocable shearing knife 14. The shear knife 14 is supported by a knife carrier in the form of a light weight alloy casting 15 which is pivoted as at 16 to a pivot carrier hereinafter described, which is supported by a post 17, and one of the feet 11, the opposite end of the knife carrier casting 15 guidedly embracing an opposite post element 18. The member 18 is arcuately movable within narrow limits substantially in the plane of the knife 14, and about an anchor pin or bolt 20 considered as a pivot. Pivotally secured as by pin 21 to the upper portion of post 18, is an offset end 22 of an actuating handle 23. It will be observed that portions 22 and 23 are angularly related so as to constitute in effect a single lever of dog-leg shape.

Projecting from the end of the knife carrier 15 which is opposite pivot 16, is a furcate extension 24 apertured, as is the adjacent part of handle 23, to receive a pivot pin 25. It has now become apparent that as handle 23 is moved counterclockwise (Fig. 1), this motion will result in a lifting actuation of the knife carrier 15 and knife 14, while an opposite or clockwise movement of handle 23 will result in a downward shearing or work-severing actuation of the casting 15 and the reciprocal knife 14.

Proceeding now to describe the angle-gauging facilities characterizing the present improvements, there is provided in the right hand region of the work table 10, and somewhat forwardly (i. e. toward the operator), of the bed knife, a vertically projecting, hardened metal stud 30. About the stud 30 as a pivot axis, is swingably movable in a horizontal plane over the bed plate 10, a gauge bar 31. This latter is provided with a downwardly opening socket 32, considerably larger than the pin or stud 30. A plate 32*a* is provided just below the pivot zone of bar 31, and provided with an accurately sized opening 32*b*, having no more than working clearance with the stud 30.

Provision for precision adjustment of position of the effective pivot axis of and for bar 30, includes a pair of large countersunk top recesses 32*c* on opposite sides of the socket 32. Each recess 32*c* is continued through bar 31, by a bore 32*d*, each of larger sectional area than the shank of an Allen screw or the like 32*e*. The head of each screw 32*e* is located completely within one of the top recesses 32*c*, and the screws 32*e* extend through the bar 31 into threaded connection with opposite ends of the socket plate 32*a*. It will now appear that, upon release of screws 32*e* from plate 32*a*, this plate may be shifted in any direction, and is thus universally adjustable. Thus an original or later setting of the gauge bar may be effected by removal of the top scale element (later described) from bar 31, accurately locating this bar with respect to the bed plate margin or the bed knife as with a machinist's square, thereupon tightening screws 32*e* and replacing the top scale as a cover over the screws 32*e* and sockets 32*c*.

So that bar 31 may be flush with the planar top of the bed plate, a recess 32*f* is provided therein, of a depth at least equal to the thickness of the plate 32*a*.

The provision just described permits accurate location of the true axis of the gauge bar 31, despite minor inaccuracies in casting of the bed plate 10, if it be so formed, and obviates other extreme assembly niceties and assures precision cutting practice when the device is in use.

The bed plate 10 is provided somewhat outwardly of the stud 30, with an arcuate slot 33, which latter is of slightly greater width than a depending threaded stud 33′ carried by the gauge bar 31 and extending through the arcuate slot in the table 10. Below the table, the threaded stud 33′ is provided with a relatively large, milled hand nut 34, from which it will now appear as obvious that the gauge bar, when located in any position between the limits established by the length of the slot 33, may be clamped in any selected position and hence at any predetermined angle between limits, with respect to the cutting line defined by the bed knife.

Located somewhat outwardly of the arcuate slot 33, in a direction toward the operator, is a series, shown as four, of sockets, the centers of which are arranged along an arc drawn on the center of the gauge bar pivot stud 30. The number of such sockets is optional according to needs in a particular field of service, the sockets shown being adapted, respectively, for a zero position of the gauge bar in which it is disposed normal to the cutting line. Additional such sockets, each indicated at 35, are provided for settings of 15, 30 and 45 degrees respectively of the gauge arm, from its zero or normal position. Coacting with the several sockets 35 is a small plunger 36 provided with a lifting head 37, the latter being accessible above the gauge bar 31, so that the plunger 36, frictionally fitting the recess 38 therefor, may be selectively lifted to permit free traversing movement of the bar 31, or may be selectively depressed into the predetermined socket 35, in any of which positions the gauge bar will serve as a positive fixed abutment for

the edge of a tile or like work piece on the table or bed plate 10.

It will be apparent that the pivot assembly previously described is capable of universal adjustment in all angular positions of the gauge bar 31. In certain specific angular locations of the gauge bar 31, as determined by the interfitting relation of the plunger 36 and receiving socket 35, the plunger and socket cooperate with the elements of the pivot assembly to determine the exact pivot position. Because the pivot structure permits universal adjustment, the pivot relationship can be readily checked and readjusted by the plunger 36 and sockets 35, thus obviating the necessity of precisely locating the parts of the pivot assembly in manufacture.

Further with reference to the gauge bar 31, there is provided in the example shown a separate, relatively thin scale element 40. This scale element carries indicia arranged in a double series, each along one of the side margins of the member 40, one such scale, indicated at 41, being usually graduated in inches, will provide an accurate measurement of distance from the shear line, when the gauge bar 31 is in its normal or zero position. However, when the bar 31 is moved to its 45 degree position, a different scale is necessary to represent then-existing measurements from the cutting line, for which purpose a second scale 42, which may be referred to as the 45 degree scale, is provided. This latter is necessarily linearly displaced with respect to the corresponding graduations of scale 41, due to the location of the axis of the bar 31 somewhat forwardly of the cutting line.

It is a convenience for making precise adjustments of the scale member 40 on the gauge bar 31, to provide the bar with a series of tapped recesses for the reception of screws 43 extending through slots 44, from which it will appear that the scale piece 40 may, upon backing off the screws, be shifted within limits along the gauge bar, although when once carefully adjusted, it scarcely ever need be reset.

The present improvements are usable with considerable advantage over existing equipment, without anything other than the elements thus far described; it is however a matter of considerable added convenience and utility to provide a gauge arm generally indicated at 45. Such gauge arm is by preference, but without restriction, formed of a plurality of sections detachably connected in end-to-end relation, each such section consisting of a separate casting, say of a light weight alloy. The first such element 46 of the gauge arm is provided with a clamping head which consists of two spaced, downwardly presented clamping jaws 47 and 48 between which is guidedly engaged the bar 31. The space between the jaws 47 and 48 closely approximates the width of gauge bar, so that the gauge arm may be freely slidably movable along the bar 31, while maintaining a virtually exact angular relation thereto, in most cases and as shown, this being a 90 degree position with respect to the bar 31. It will be noted that the inverted trough or channel in the head of section 46 of the gauge arm is carried a substantial distance above the bar, so that, as is necessary at times, the clamping head and jaws 47—48 will clear the plunger 36 heretofore noted.

As a simple yet positive and easily manipulable clamp for fixing the position of the gauge arm along the gauge bar 31, there is provided an upwardly presented wing head screw 50 extending depthwise into a vertical threaded bore therefor. Extended at a right angle to this bore is a short smooth bore 51, the inner end of which is open adjacent one side of the gauge bar 31, and the opposite or outer end of which may be open at the other side of the clamp jaw by which it is carried. Disposed within the horizontal bore 51 is a clamping plunger 52. Plunger 52 is characterized by a guide portion of normal diameter only slightly less than that of the bore 51, and rearwardly thereof is formed with a sloping or camming surface 53 shown as a reduced region with sloping end surfaces. The end of screw 50 is provided with a coacting, frusto-conical camming surface 54 which, as screw 50 is threaded into its bore, will actuate the plunger 52 along the bore 51 and into firm clamping engagement with the adjacent side of the gauge bar 31.

In order to assure positive and correct alignment of the sections of the gauge arm the adjacent mating ends of such sections are preferably planar and machined or otherwise so formed as to assure a true rectilinear relation of the sections when connected. Only one added arm section 55 is shown, on which is provided such an end face 56 which fits closely and conforms exactly to a corresponding finished face 57 on the element 46. A small vertical or depthwise partial bore is provided as shown at 58, in the end face 57, and serves to receive and retain therein a pin element 60, a second partial bore 61 being formed in the end face 56, so that the two partial bores 58 and 61 coact in closely embracing the pin 60 and thus provide therewith an interfitted connection or keying effect between the ends of the adjacent arm sections.

For the detachable assembly of the gauge arm sections such as 46 and 55, each thereof is provided with an upwardly extended U shape boltway forming element 62, within which, when the sections are connected, is a clamp bolt 63 provided with a wing nut 64. The first section 46 of the gauge arm is also by preference, provided with an auxiliary bolt trough 62' to which the second section 55 of the arm may be attached in similar fashion, when unused, and thus be supported against loss or misplacement, when a shortened gauge arm is desired or required.

In reference to the occasion for the requirement last mentioned, and to illustrate the advantage of the sectional gauge arm, it will be noted that when, for example, the gauge bar 31 is moved to its 45 degree position, were the gauge arm of full length, a portion thereof would project across the line of cleavage defined by the coacting cutting knives, in which case the knives would of course become inoperative. Under such circumstances it is of course desirable to employ a gauge arm, but the sectional construction thereof enables the end section to be removed when the arm must thus be shortened.

A further feature of improvement particularly identified with the gauge arm, will best appear from Fig. 2 and consists of a series of relatively short and relatively widely spaced abutments indicated at 67, there being two of these on section 46 and a second pair thereof on section 55 of the arm. The advantage of this arrangement will at once appear when it is considered that many floor tile and others are apt to spall off in some degree incident to severance of their edges, thus at times resulting in either or both a roughened edge, and the accumulation of some loose material of the tile or other work unit on the work table or bed plate 10. It will be obvious

that in case a continuous abutment edge of an uninterrupted form be provided on an abutment such as the gauge arm, the casual occlusion of such rough and irregular particles between the margin of the tile and the arm will result in an inaccurate cut. The spaced abutments have been found markedly to reduce this source of error.

As above noted, the present severing and dimensioning device was designed particularly for floor and wall tile, and its features have been particularly arrived at so that it will handle all of the commercially prominent types of tile, such as tile of asphalt, rubber, linoleum, certain synthetic plastics, cork and the like, and is equally adapted to certain of the metal wall tiles, such as those of aluminum. In the severance of certain of these many varieties of tiles, the case of asphalt tile may be selected as illustrating the facility now to be described. Such tile may be cut by either of two methods. Some contractors prefer a so-called "even bite" across the tile, which consists of and is sometimes described in the trade as a "pinch-off" method of severance. According to this method the cutting edge of the movable knife is not brought fully to engage the cutting edge of the bed knife, so that a true shearing action does not occur. In such case, separation is however complete, and results from pinching away or breaking apart the portions of the work piece.

A true shearing action constituting the other method frequently employed, is, as is well known, a so-called scissors cut, in which the movable knife is brought to a partially overlapping relation to the edge of the coacting knife such as a bed knife. Certain operators prefer shearing action on asphalt tile, under moderate temperatures, and a pinch-off method of severance when the tile is relatively cold. The present improvements enable a ready adjustment from either method of severance to the other, as will now be described.

Located in the post or like support sometimes referred to as a foot, is a recess or socket **10**. This may take the form of a full top-open recess, or as may be desired, a side-open recess. In either case, one such recessed vertical frame element is located in the region of the pivoted end of the knife. At least partly occupying such recess is a slide or filler element indicated at **11**, that portion of which extends upwardly of the socket being designated at **17** and serving to carry the knife pivot pin or screw **16**. A clamp member shown as set screw **12** threadedly engages either or both the socketed frame element such as foot **11**, as well as the slide **11** occupying the recess. From this structure it will now be apparent that, upon releasing the set screw **12**, the slide may be raised or lowered, and so adjusted in accordance with varying thickness and nature of the tile or like work units to be severed, and further in such manner that, selectively, the reciprocal knife and the bed knife may, upon full downward movement of the handle **23**, be kept short of overlapping engagement, and thus provide for severance of the unwanted portion of the tile as by the pinch-off method above described. In similar manner, by releasing the screw **12**, the slide supporting the knife pivot **16** may be brought downwardly as may be required at times to compensate for wear of the knives, and otherwise so as to assure a definite overlapping of the knives when in fully convergent position, thus assuring under such condition, a usual full shearing action on the work piece.

The manner of best utilizing the several features of improvement earlier described, is thought to have been rendered fully apparent from eariler description thereof, but it may be noted for completeness that, in case it is desired to effect severance of a margin of a tile along a line at a right angle to one of its original margins, the gauge bar **31** will be located with its plunger **36** in the first or zero position, so that it engages the appropriate socket **35** in the bed plate **10**. For this purpose the nut **34** will have been released so that the stud **33'** is freely movable in the slot **33**, and again tightened. Direct measurement of the margin of the useful portion of the tile is provided by reference to the principal or direct reading scale **41** on the gauge bar **31**. It is assumed that the actuating handle **23** will have been lifted so that the portion of the work piece to be severed, lies beyond or across the work table from the cutting line or plane. Actuation of the handle and reciprocal knife, will accordingly effect severance as required.

In case it is required to sever the tile at other than a right angle, the desired angle is selected, if possible from one of those identified with the sockets **35**; the gauge bar **31** then moved to the selected position and the plunger **36** depressed into the selected socket, with severance as before described. In case a measurement is desired or needed, along the bar **31**, with the plunger **36** in the 45 degree socket, the 45 degree scale, designated at **42**, is utilized for readings, with severance effected as before noted. In case an odd angle of cut other than any of those provided for by sockets **35** is to be made, such angle may be determined by template, pattern or measurement in which case the gauge bar **31** is tightly locked in position through its frictional retention by means of nut **34** on stud **33'**, with severance completed as aforesaid. The manner of adjusting the vertical position of the reciprocable knife pivot to select between a true shearing action or a pinch-off method of severance has heretofore been described.

It will now have appeared that the embodiment described will serve fully to realize each of the several objects hereinabove stated, and numerous others which will have been implied from the description of parts and their function.

Although the invention has been described by making detailed reference to a single preferred embodiment, the detail of description is to be understood in an instructive, rather than in any limiting sense, inasmuch as numerous variants are possible within the scope of the claims hereunto appended.

I claim as my invention:

1. In a device for the angular measurement incident to cutting of flat severable units such as floor and wall tile, a frame, a bed plate on the frame, means defining a cutting or reference line along one margin of the bed plate, a swingable gauge bar movable over the bed plate, a pivot assembly for the gauge bar located forwardly of and in substantial spaced relation with the said reference or cutting line, the pivot assembly comprised of a pin element and a pin-journal element and means providing a universal adjustment of one of said elements with respect to and parallel to the gauge bar, a multiple scale element attached to the gauge bar bearing indicia applicable to the work unit in different angular positions of the gauge bar, and means enabling precision longitudinal adjustments of the scale element along the gauge

bar, a plunger carried by the gauge bar and operable depthwise thereof and located remote from the gauge bar pivot, the bed plate being provided with a series of evenly angularly displaced plunger sockets arranged along an arc drawn on the center of the stationary element of the pivot assembly, the sockets being selectively engageable by the plunger for fixing the angular position of the gauge bar in selected relations to the reference line, and for accurately determining and adjusting the pivot axis of said gauge bar in said selected positions.

2. In an angle-gauging device, a gauge bar, a planar support over which the gauge bar may be moved and having a linear reference margin, a pivot assembly for the gauge bar located forwardly of and in considerably spaced relation with the reference margin, the pivot assembly including a pivot pin for the gauge bar, carried by said support, a journal element sleeved over the pivot pin, a pair of clamping elements, one thereof precisely centered with respect to the pivot pin, and the other thereof secured to said journal element, and one or more clamping screws extended loosely through one of said elements and threaded into the other of said elements, whereby to permit a universal adjustment of the journal element in the plane of and with respect to the gauge bar, incident to release of the screws, adjustment of the journal element and retightening of said screws, a plunger carried by the gauge bar and operable depthwise thereof and located remote from the pivoted portion, the support being provided with a series of plunger sockets arranged along an arc drawn on the center of the pivot pin, the sockets being selectively engageable by the plunger, whereby to determine and adjust accurately the pivot axis of the gauge bar in selected positions, a scale bearing element overlying the gauge bar and bearing indicia significant of length measurement in any of a plurality of angular positions of the gauge bar, and means enabling precision longitudinal adjustment of the scale element along said bar.

3. In an angle-gauging device, a gauge bar, a planar support over which the gauge bar may be operated, a pivot pin for the gauge bar, carried by said support, a journal element sleeved over the pivot pin and carried by said gauge bar, a socket plate disposed in a shallow recess provided in the planar support, the plate being rotatively movable about and precisely centered with respect to the pivot pin, and one or more clamping screws extended loosely through vertical bores provided in the gauge bar and threaded into the socket plate underlying said bar, whereby to permit a universal adjustment of the journal element in the plane of and with respect to the gauge bar, incident to release of the screws, adjustment of the journal element and retightening of said screws, a plunger carried by the gauge bar and operable depthwise thereof and located remote from the pivoted portion, the support being provided with a series of plunger sockets arranged along an arc drawn on the center of the pivot pin, the sockets being selectively engageable by the plunger, whereby to determine and adjust accurately the pivot axis of the gauge bar in selected positions, a graduated scale-bearing element overlying the gauge bar and provided with a plurality of linear slots therein, and screws extended through said slots and threadedly engaging the gauge bar to enable a precision adjustment of the scale-bearing element along the gauge bar.

4. In a precision angle-gauging device, a table element for a flat work piece, a linear reference line provided on the table element, a linear gauge bar movable radially over the table element, a pivot assembly comprised of a pivot pin member carried by the table element, a member having a pin recess and carried by the gauge bar, adjustment and securing means comprising screws engaging the pin recess member, the gauge bar being provided with screw apertures of excess size such that the screws when released, are floatingly retained for universal shifting movement over the table element, and serve when threaded up, to clamp the recess member in adjusted position, a plunger carried by the gauge bar and operable depthwise thereof and located remote from the pivot assembly, the table element being provided with a series of angularly displaced plunger sockets arranged along an arc drawn on the center of the pivot pin member, the sockets being selectively engageable by the plunger for fixing the angular position of the gauge bar relative to the reference line and for accurately determining and adjusting the pivot axis of the gauge bar in selected positions.

JOSEPH J. GUNDLACH.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
362,338	Walker	May 3, 1887
701,724	Hewitt	June 3, 1902
798,721	Wilson	Sept. 5, 1905
812,973	Barr et al.	Feb. 20, 1906
845,291	Breckenridge	Feb. 26, 1907
1,082,521	Hoepfner	Dec. 30, 1913
1,130,610	Kane	Mar. 2, 1915
1,313,606	Rotsaert	Aug. 19, 1919
1,422,641	Walters	July 11, 1922
1,446,726	Sloan	Feb. 27, 1923
1,452,809	Logue	Apr. 24, 1923
1,797,827	Heimrich	Mar. 24, 1931
2,250,830	Gonzales	July 29, 1941
2,478,562	Binns et al.	Aug. 9, 1949
2,490,989	Williams	Dec. 13, 1949