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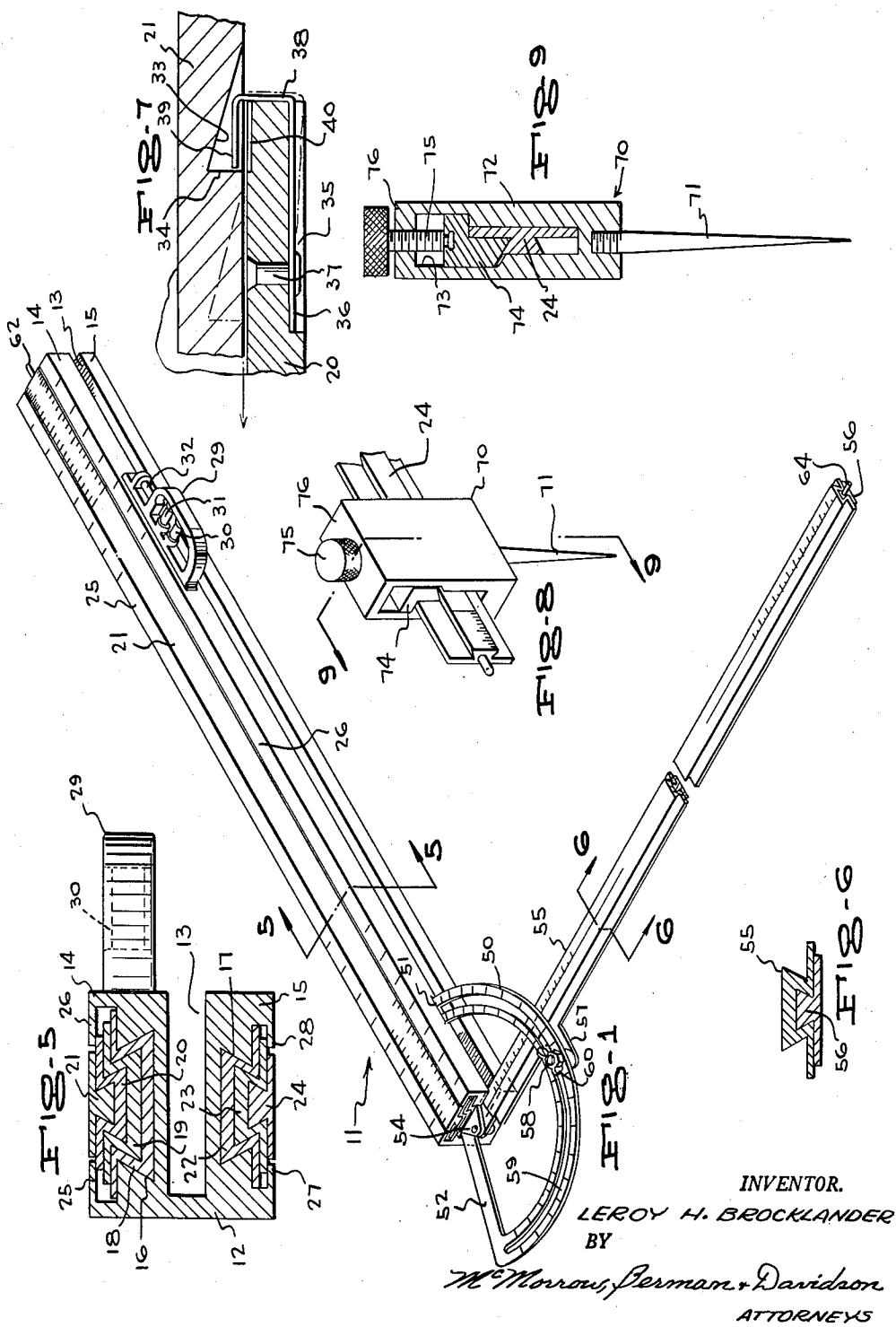
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EXTENSION RULE

Filed May 8, 1959

2 Sheets-Sheet 1



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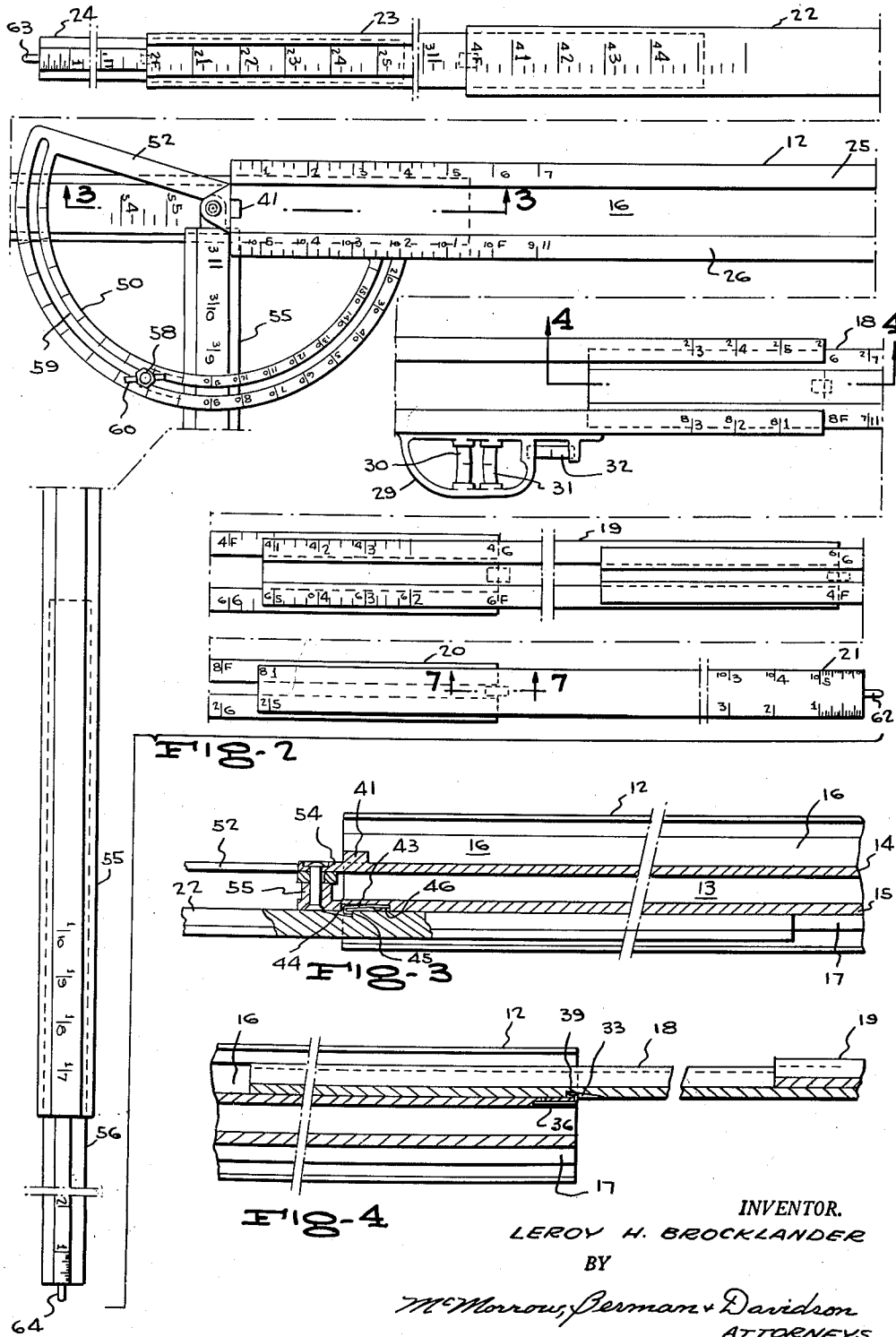
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INVENTOR.

LEROY H. BROCKLANDER

BY

McMorrow, Serman & Davidson  
ATTORNEYS

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3,065,546

## EXTENSION RULE

Leroy H. Brocklander, 85 Vaughn Ave., Spotswood, N.J.

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This invention relates to extension rules, and more particularly to a combination extensible rule and protractor especially useful in the construction trade, for example, where it is required to reach relatively distant points and relatively high locations.

A main object of the invention is to provide a novel and improved combination extensible rule and protractor which is simple in construction, which is foldable to a relatively compact size, and which can be extended to a desired length, as required.

A further object of the invention is to provide an improved extensible rule and protractor which is relatively inexpensive to fabricate, which is sturdy in construction, and which is provided with self-actuated locking means to secure the various elements of the rule in extended positions, said locking means being automatically releasable when the elements are retracted.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

FIGURE 1 is a perspective view of an improved combination extensible rule and protractor constructed in accordance with the present invention, the elements of the arms of the device being shown retracted but the protractor arm being shown adjusted to a position at right angles to the main calibrated bar member of the device.

FIGURE 2 is a plan view of the various elements of the device of FIGURE 1, said elements shown in extended positions.

FIGURE 3 is an enlarged vertical cross-sectional view taken on the line 3-3 of FIGURE 2.

FIGURE 4 is an enlarged vertical cross-sectional view taken on the line 4-4 of FIGURE 2.

FIGURE 5 is an enlarged transverse vertical cross-sectional view taken on the line 5-5 of FIGURE 1.

FIGURE 6 is an enlarged transverse vertical cross-sectional view taken on the line 6-6 of FIGURE 1.

FIGURE 7 is an enlarged vertical cross-sectional view taken on the line 7-7 of FIGURE 2.

FIGURE 8 is an enlarged fragmentary perspective view showing the manner in which a trammel member is adjustably secured on the end portion of one of the extensible elements of the main rule portion of the device of FIGURES 1 to 7.

FIGURE 9 is an enlarged vertical cross-sectional view taken on the line 9-9 of FIGURE 8.

Referring to the drawings, the combination extensible rule and protractor is designated generally at 11 and comprises a main elongated calibrated bar member 12 which is generally channel shaped, as shown in FIGURE 5, being provided with a longitudinal central groove. Thus, the groove 13 defines top and bottom arms 14 and 15. The top and bottom arms are formed with longitudinally extending dovetail recesses 16 and 17 in which are slidably mounted the respective auxiliary elongated calibrated nested bar members 18 to 21 and 22 to 24. As shown in FIGURE 5, the extensible elements 18, 19 and 20 are in the form of dovetail-shaped sleeve members having horizontal top flanges, and the horizontal top flanges of the uppermost sleeve member 20 are slidably received beneath longitudinally extending horizontal, inwardly turned flanges 25 and 26 provided on the top arm 14. Similarly, the dovetail-shaped nested sleeve elements 22 and 23 are provided with horizontal flanges, and the horizontal flanges of the lowermost sleeve

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element 23 are slidably received above and are retained by inwardly projecting horizontal flanges 27 and 28 provided on the bottom arm 15. Nestingly engaged with the uppermost sleeve member 20 is the extensible calibrated bar member 21 which is provided with the dovetailed rib engaging the dovetailed sleeve member 20. The lowermost bar member 24 similarly has a dovetailed rib which is slidably engaged with the dovetailed sleeve member 23.

The top arm 14 is integrally formed with a bracket structure 29 which carries respective tubular bubble level elements 30, 31 and 32, the tubular bubble level elements 30 and 31 extending transverse to the bar member 12 and being reversed with respect to each other so that they may be employed to determine the deviations of various surfaces from the vertical, or, in conjunction with the protractor arm of the device, to determine the deviation of various surfaces from the horizontal. The third bubble level 32 extends parallel to the main calibrated bar member 12 and is employed in the conventional manner.

The extensible elements may be locked in extended positions in the manner illustrated in FIGURE 7. Thus, the extensible members are formed at their inner end portions with inwardly facing, generally triangular recesses 33 having abutment walls 34 perpendicular to the members. The outer end portion of the adjacent rule member is formed with an outwardly facing longitudinal recess 35, and secured in this recess is the shank portion 36 of a resilient hook member formed of flat bar material, the shank portion being secured in the recess 35 by suitable fastening means, such as a rivet 37. A hook element extends around the end of the calibrated bar members, for example the calibrated bar member 20 in FIGURE 7, and is provided with the free, reversely extending arm 39 which is biased to an upwardly projecting position, as viewed in FIGURE 7, by the resiliency of the shank member 36. The arm 39 is thus receivable in the recess 33 when the cooperating extensible element, for example, the element 21 in FIGURE 7, is in its fully extended position. The arm 39 thus is engageable with the abutment wall 34 to limit further extension of the member 21 with respect to the member 20. When the member 21 is retracted, the inclined top wall surface of the recess 33 cammingly engages the arm 39 and causes said arm to extend and to be received in a recess 40 provided therefor in the member 20, so that the arm 39 is disposed substantially flush with the top surface of the member 20, allowing the member 21 to be retracted.

The top arm 14 is provided with a stop block 41 (FIGURE 3) which is located on the end portion of the bottom wall of recess 16 therein and which limits the inward retraction of the dovetailed sleeve member 18.

As shown in FIGURE 3, the automatically operated locking means for limiting extension of the calibrated auxiliary bar members may comprise resilient hook members 43 which have projecting hook portions engageable in triangular recesses 44 provided in the surfaces of the adjacent members so that the hook elements of the resilient members 43 are biased so as to lockingly engage with the vertical abutment wall surfaces 45 of the recesses 44 when the members are in their extended positions. When the members are retracted, the sloping wall surfaces of the recesses 44 cammingly engage with the hook elements to move said hook elements inwardly into their receiving recesses so as to allow the rule to be contracted. As shown in FIGURE 2, the resilient members 43 are secured in recesses 46 of sufficient depth to receive the hook portions of the members 43 when they are cammed inwardly by the sloping wall surfaces of the associated recesses 44.

Rigidly secured to the end portion of top arm 14 is an arcuate track member 50 which is coplanar with the top arm 14, having one end secured to the side wall surface of arm 14 at 51 and having the other end connected by an integral radius arm 52 to the end of the member 12. The track member 50 is substantially greater than the one-hundred and eighty degrees for a reason presently to be explained.

A pivot lug 54 projects from the end of the bar member 12, and pivotally connected thereto centrally of the track member 50 is a calibrated elongated protractor arm 55, in the form of a dovetailed sleeve in which is slidably received an extensible auxiliary dovetailed calibrated bar 56. A laterally projecting lug 57 of substantial length projects from one side flange of the arm 55, and secured on the end of the lug 57 is an upstanding stud 58 which extends slidably through the arcuate track slot 59 formed in the track member 50. A wing nut 60 is threaded on the upstanding stud 58 to lock the arm 55 in an angularly adjusted position on the calibrated arcuate track 50.

Since the track member 50 is of substantially greater length than one-hundred and eighty degrees, as above explained, the arm 55 may be locked in a position which is at least perpendicular to the main arm 12, since sufficient additional length exists in the arcuate track member 50 to allow the arm 57 to be disposed at the proper position for clamping the member 55 to the track 50 in perpendicular relationship to the main bar member 12. The lug 57 is of substantial length to allow the angle markings on the arcuate track member 50 to be easily viewed without interference from the clamping nut 60.

As above explained, the auxiliary calibrated arm 55 is provided with a dovetailed groove and the extension element 56 is formed with a dovetailed rib slidably engaged in said groove.

As shown in FIGURE 2, the innermost extensible rule elements 21 and 24 are provided at their ends with longitudinally projecting feeler pins 62 and 63, said feeler pins being of sufficient length so they may be easily grasped when it is desired to extend the slidable calibrated dovetailed rule members. The innermost slidable element 56 of the auxiliary arm 55 is likewise provided at its outer end with a pin element 64 of sufficient length to allow same to be grasped when it is desired to extend the calibrated slidable member 56 relative to the main portion of the arm 55.

As shown in FIGURES 8 and 9, trammel members 70 may be mounted on the end portions of the innermost extensible elements of the rule, for example, on the end portion of the extensible element 24, as illustrated in FIGURES 8 and 9, the trammel members 70 being provided with scribing points 71. Each trammel member 70 comprises a main, generally rectangular sleeve portion 72 through which the associated ruler arm is receivable, for example, the element 24 in FIGURES 8 and 9, the sleeve portion 72 slidably receiving the member 24 and being formed with an enlarged top cavity 73 in which is slidably disposed a clamping block 74 shaped to interfit with the recess defined between the dovetailed rib and the upper flange of the member 24, as shown in FIGURE 9. A clamping screw 75 is threadably engaged through the top wall 76 of the sleeve member 72 and is rotatably secured to the clamping block 74. When the screw 75 is tightened the block 74 exerts blocking force on the member 24, rigidly securing the trammel member 70 at a desired location on the calibrated member 24. Obviously, trammel members 70 may be provided on the respective oppositely extensible end portions of the rule so that the device may be employed to define a desired radius between the trammel points 71 at the opposite end portions of the rule. Ordinarily, a trammel member 70 will be provided for each of the innermost extensible elements 21 and 24.

The rule may be designed so that it will open to a relatively large length, for example, a length of sixteen feet.

The protractor arm 55 and its cooperating extensible element 56 may be designed to extend to the maximum length of the order of four feet. Thus, the device may be employed to measure from a bench mark, in which the arm 55 will be locked at a ninety degree position on the arcuate track member 50 and the main arm 12 will be held plumb, in accordance with the showing of the bubble level 30. Desired measurements may then be made along the main calibrated bar member 12 with its extended calibrated portions.

The members 12 and 18 to 21 are calibrated so that when the device is employed to measure upwardly from a bench mark as above described, the scale numerals on the left sides of said members ascend upwardly in value, so that heights above the bench mark may be read directly. The scale numerals at the right sides of members 12 and 18 to 21 increase in value downwardly.

As will be readily apparent, the device may be employed as an ordinary level when all the slide elements thereof are in retracted positions. The groove 13 is designed to receive the arm 55 and to house same. Thus, the device is foldable to a very compact volume, enabling it to be employed as a standard level.

The device is particularly useful in sheet metal work, wherein it is often necessary to take gross dimensions between duct fittings, where ducts are located at different planes or levels. The small pin elements 62, 63 or 64 may be inserted into the corner of a duct to support the adjacent portion of the rule while a desired dimension is read.

As will be readily apparent, the device may be employed to lay out angles with large side dimensions, employing the pivoted arm 55 and the calibrated arcuate track member 50 to set up the angles. As above mentioned, the pin members 62, 63 and 64 are employed as means for grasping and extending the inner calibrated slidable portions of the rule.

The calibrations on the various sections of the rule may be in any desired fractions of inches, for example, may be in quarter inch intervals, except for the first inch of the scale which may be in sixteenths. The calibrations should be countersunk below the surface of the rule elements to prevent them from being worn off.

While a certain specific embodiment of an improved combination extension rule and protractor has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In an extension rule of the type comprising a main elongated calibrated bar member formed with a longitudinal dovetailed groove and an auxiliary elongated calibrated bar member having a dovetailed rib slidably engaging in said dovetailed groove, whereby the auxiliary calibrated bar member may be extended relative to the main bar member, the improvement comprising a resilient hook member secured to and extending around the end of the main bar member, said hook member comprising a resilient shank portion and a reversely extending arm defining a detent element spaced from and extending parallel to said shank portion, said main bar being provided with recess means adapted to receive said reversely extending arm, said arm normally projecting outwardly from said recess means parallel to said main bar member, said auxiliary bar member being formed with a generally triangular recess adapted to receive said arm when the auxiliary bar member is in extended position, said triangular recess comprising a transverse abutment wall arranged perpendicularly to the auxiliary bar member and a sloping camming wall arranged to cammingly engage with said arm to move said arm into said recess means when the auxiliary bar member is retracted.

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2. An extension rule comprising a main elongated calibrated bar member formed with a longitudinal dovetailed groove, an auxiliary elongated calibrated bar member having a dovetailed rib slidably engaged in said dovetailed groove, whereby the auxiliary calibrated bar member may be extended relative to the main bar member, a resilient hook member secured to and extending around the end of the main bar member, said hook member comprising a resilient shank portion and a reversely extending arm defining a detent element spaced from and extending parallel to said shank portion, said main bar member being provided with recess means adapted to receive said reversely extending arm, said arm normally projecting outwardly from said recess means parallel to said main bar member, said auxiliary bar member being formed with a generally triangular recess adapted to receive said arm when the auxiliary bar member is in extended position, said triangular recess comprising a transverse abutment wall arranged perpendicular to the auxiliary bar member and a sloping camming wall arranged to cammingly engage with said arm to move said arm into said recess means when the auxiliary bar member is retracted, an arcuate track member disposed at one end of said main bar member and having a radius located in the same plane as said main bar member, said arcuate track member subtending an angle of substantially more than one-hundred and eighty degrees, a radial arm rigidly connecting one end of the arcuate track member to the end of said main bar member and being disposed at the obtuse angle to said main bar member, the other end of the arcuate track member being rigidly connected to the main bar member, a calibrated elongated arm pivoted to said main bar member centrally of said arcuate track member, a lug of substantial length rigidly connected to and projecting from said calibrated elongated arm, and means slidably connecting the end of said lug to said arcuate track member.

3. An extension rule comprising a main elongated calibrated bar member formed with a longitudinal dovetailed groove, an auxiliary elongated calibrated bar member having a dovetailed rib slidably engaging in said dovetailed groove, whereby the auxiliary calibrated bar member may be extended relative to the main bar member, a resilient hook member secured to and extending around the end of the main bar member, said hook member comprising a resilient shank portion and a reversely extending arm defining a detent element spaced from and extending parallel to said shank portion, said main bar member being provided with recess means adapted to receive said reversely extending arm, said arm normally projecting outwardly from said recess means parallel to said main bar member, said auxiliary bar member being formed with a generally triangular recess adapted to receive said arm when the auxiliary bar member is in extended position, said triangular recess comprising a transverse abutment wall arranged perpendicular to the auxiliary bar member and a sloping camming wall arranged to cammingly engage with said arm to move said arm into said recess means when the auxiliary bar member is retracted, an arcuate track member disposed at one end of said main bar member and having a radius located in the same plane as said main bar member, said arcuate track member subtending an angle of substantially more than one-hundred and eighty degrees, a radial arm rigidly connecting one end of the arcuate track member to the end of said main bar member and being

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disposed at an obtuse angle to said main bar member, the other end of the arcuate track member being rigidly connected to the main bar member, a calibrated elongated arm pivoted to said main bar member centrally of said arcuate track member, a lug of substantial length rigidly connected to and projecting from said calibrated elongated arm, and means slidably connecting the end of said lug to said arcuate track member, said main bar member being formed with a longitudinal groove of sufficient size to at times receive said calibrated elongated arm.

4. An extension rule comprising a main elongated calibrated bar member formed with a longitudinal dovetailed groove, an auxiliary elongated calibrated bar member having a dovetailed rib slidably engaging in said dovetailed groove, whereby the auxiliary calibrated bar member may be extended relative to the main bar member, a resilient hook member secured to and extending around the end of the main bar member, said hook member comprising a resilient shank portion and a reversely extending arm defining a detent element spaced from and extending parallel to said shank portion, said main bar member being provided with recess means adapted to receive said reversely extending arm, said arm normally projecting outwardly from said recess means parallel to said main bar member, said auxiliary bar member being formed with a generally triangular recess adapted to receive said arm when the auxiliary bar member is in extended position, said triangular recess comprising a transverse abutment wall arranged perpendicular to the auxiliary bar member and a sloping camming wall arranged to cammingly engage with said arm to move said arm into said recess means when the auxiliary bar member is retracted, an arcuate track member disposed at one end of said main bar member and having a radius located in the same plane of said main bar member, said arcuate track member subtending an angle of substantially more than one-hundred and eighty degrees, a radial arm rigidly connecting one end of the arcuate track member to the end of said main bar member and being disposed at an obtuse angle to said main bar member, the other end of the arcuate track member being rigidly connected to the main bar member, a calibrated elongated arm pivoted to said main bar member centrally of said arcuate track member, a lug of substantial length rigidly connected to and projecting from said calibrated elongated arm, means slidably connecting the end of said lug to said arcuate track member, said main bar member being formed with a longitudinal groove of sufficient size to at times receive said calibrated elongated arm, said calibrated arm being of dovetailed cross section, and an auxiliary calibrated arm having a dovetailed rib slidably engaged in said calibrated elongated arm.

5. The structure of claim 4, and respective feeler pins secured on the end of said auxiliary calibrated bar member and on the end of said auxiliary calibrated arm.

#### References Cited in the file of this patent

##### UNITED STATES PATENTS

|           |            |                |
|-----------|------------|----------------|
| 149,532   | Sherwin    | Apr. 7, 1874   |
| 1,015,877 | Du Mouchel | Jan. 30, 1912  |
| 1,878,119 | Dowd       | Sept. 20, 1932 |
| 2,842,850 | Anderson   | July 15, 1958  |

##### FOREIGN PATENTS

|        |         |               |
|--------|---------|---------------|
| 56,271 | Austria | Nov. 11, 1912 |
|--------|---------|---------------|