

PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION.

An Improved Pocket Clinometer.

We, JOHN AND EDWIN WRIGHT, LIMITED, Wire-rope Manufacturers, a company registered under the laws of Great Britain, and JOHN WILLIAM ALFRED RULE, British subject, both of Garrison Street, Birmingham, do hereby declare the nature of this invention to be as follows:—

10 The object of the present invention is to provide a portable clinometer which is adapted to be folded readily into a small compass so as to be capable of being carried in the user's pocket, and which may be combined with or capable of being used
15 as callipers and a depth gauge for measuring purposes, the appliance being particularly useful for mining engineers and the like for the purpose of measuring angles of incline diameters of wire ropes,
20 and depth of pulley grooves.

According to the invention, the improved clinometer comprises a base or carrier frame to which are pivoted two folding leaves one of which can be turned
25 into a position at right-angles to the base and carries at its upper end a freely swinging pointer, while the second leaf, whose correct positions can be determined by a stop, is graduated in the form a scale
30 to indicate different angles, the pointer moving over the scale as the inclination of the base is varied so that a direct reading of the said inclination can be obtained. The two pivoted leaves may
35 conveniently be so shaped or formed as to constitute a pair of callipers, a scale being provided, if desired, for indicating the width of the gap, said scale being formed upon one of the leaves and being arranged
40 to be intersected by a curved edge of the other leaf. Both leaves can be folded down within or on to the base so that the

appliance can readily be carried in the pocket.

In carrying out the invention the base 45 or carrier frame may be of rectangular shape, and in the form of a narrow U-sectioned casing open at the top and ends. Pivoted between the sides of the base or carrier frame is a leaf adapted to be
50 turned up into a position at right-angles to the base, being prevented from being turned beyond this perpendicular position by means of a suitable stop which may be formed by a butt end of the leaf engaging
55 a suitable part of the base. Pivoted to the outer end of the leaf is a freely swinging gravity pointer which is adapted to maintain a vertical position whatever may be the inclination of the base. The lower
60 end of this pointer is arranged to overlap a second leaf pivoted to the base preferably upon the same centre as the first-named leaf and adapted to be raised from
65 the base to a suitable angle with the pointer-carrying leaf, in which position it can be retained by means of a stop. This stop may conveniently be formed by forming the upper edge of the second leaf
70 curved outwardly and slightly bent laterally, so that the said edge will engage a corresponding notch or shoulder on the inner edge of the first-named leaf. By slightly bending or deflecting the said
75 curved edge of the second leaf, or by exerting a slight pressure, it can be disengaged from the notch or shoulder of the first leaf and folded over the latter so that both leaves can be turned down within the
80 base. The second leaf is engraved with an arc of a circle and is graduated with a scale of angular degrees, and also, if desired, with a gradient scale, so that when the base is placed in an inclined

[Price 1/-]

position the angle of inclination will be indicated upon the scale by the lower end of the pointer.

In order to close the top of the base or carrier frame when the instrument is folded up, the pointer-carrying leaf may be provided with a flange along its upper edge. When the said leaf is turned up at right-angles the device can be used as a set-square.

To enable the instrument to be used as callipers for measuring diameters and the like, the ends of the two leaves may be provided with blunt points, between which the object to be measured is spanned. The width of the gap may conveniently be shown by a scale upon the pointer-carrying leaf which is intersected by the curved edge of the other leaf, upon which may be shown another scale preferably one giving the circumference of any circular object measured between the joints. One edge is so curved that the graduation of the scales is regular at all distances. Other scales can be shown on the back inside edges of one or both leaves.

In order to retain the leaves in their folded position, the head of the pin which forms the axis of the pointer may be arranged to engage a hole or recess in the side plate of the base, which said plate may be of a spring character so as to open slightly until the pin head engages in the recess.

The sides of the base may be used for embossed or printed scales, tables of

inclines or other data; or they may bear advertisements or other matter.

In order that the instrument may be used to register levels and distant objects, either above or below the observer suitable foresights and backsights are provided which can conveniently be fixed at the extreme ends of the base in such a manner that they will be parallel with the bottom edge; or sights can be fixed on or form part of the upright leaf, so that when this is turned at right-angles to the base the sights will correspond with the sights at the other end of the base.

The outer edge of the second leaf in conjunction with the top edge of the base may be arranged to show angles of bevels, and a scale to show these angles can be shown either on the leaf or the side of the base.

The pointer can be made with parallel sides except at the point and its surface can be divided into parts of inches or millimeters, so that when the pointer is swung out clear of the upright leaf it can be used as a depth gauge.

When the device is being used as callipers, the pointer may be retained upon the upright leaf by means of a suitable spring clip.

Dated this 21st day of July, 1920.

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COMPLETE SPECIFICATION.

An Improved Pocket Clinometer.

We, JOHN AND EDWIN WRIGHT, LIMITED, Wire-rope Manufacturers, a company registered under the laws of Great Britain, and JOHN WILLIAM ALFRED RULE, British subject, both of Garrison Street, Birmingham, do hereby declare the nature of this invention and in what manner the same is to be performed; to be particularly described and ascertained in and by the following statement:—

The object of the present invention is to provide a portable clinometer which is adapted to be folded readily into a small compass so as to be capable of being carried in the user's pocket, and which may be combined with or capable of being used as callipers for measuring purposes,

the appliance being particularly useful for mining engineers and the like for the purpose of measuring angles and diameters of wire ropes.

According to the invention, the improved clinometer comprising a base or carrier frame to which are pivoted two folding leaves one of which can be turned into a position at right-angles to the base and from which is suspended a freely swinging pointer, while the second leaf, whose correct position can be determined by a stop, is graduated in the form of a scale to indicate different angles, the pointer moving over the scale as the inclination of the base is varied so that a direct reading of the said inclination can be obtained. The two pivoted leaves

may conveniently be so shaped or formed as to constitute a pair of callipers, a scale being provided, if desired for indicating the width of the gap, said scale being
5 formed upon one or both of the inner edges of the leaves, the edge of the one leaf being preferably made of such a curvature that the divisions of the scale for the other leaf indicating the size of
10 the gap are equi-distant apart. Both leaves can be folded down within or on to the base so that the appliance can readily be carried in the pocket.

Figure 1 of the accompanying drawings is an elevational view of the improved clinometer when opened out, showing the manner in which same is used.

Figure 2 is an elevation view showing same being used as callipers.

Figure 3 shows the instrument opened out for use as a clinometer, with the casing in section.

Figure 4 is a section on the line x Figure 1.

Figure 5 is a longitudinal section through the casing, showing the instrument folded up.

Figure 6 represents a section on the line x^1 Figure 5.

Figure 7 shows the top edge of the casing when the instrument is folded up.

The same reference numerals indicated corresponding parts in each of the figures.

Referring to the drawings, the instrument is contained within a narrow
35 rectangular casing open at one side and at the top, and of a suitable size so that it may be conveniently carried in the pocket. Mounted upon a pivot pin 1
40 between the sides 2 of the casing is a leaf 3 adapted to be turned up into a position at right angles to the latter, being prevented from being
45 turned beyond this perpendicular position by its flanged edge 4 which engages against the edge of a plate 5 fixed to the one side of the casing, the plate being suitably shaped so that it serves to close the bottom and one end of the casing. Pivoted at 6 to the outer end of the leaf 3 is a freely swinging gravity pointer 7 which is adapted to maintain a vertical position whatever may be the inclination of the base or casing. The
55 lower end of this pointer is arranged to overlap a second leaf 8 also mounted between the sides of the casing upon the pivot pin 1, and adapted to be raised from the casing to a suitable angle with the
60 pointer-carrying leaf 3, in which position it is adapted to be retained by means of a stop. This stop is preferably formed by slightly bending the leaf 8 laterally

into the same plane as the leaf 3, and in forming the edge of the leaf 8 with a
65 stepped portion 9 adapted to engage against a stepped portion 10 upon the edge of the said leaf 3, when the two leaves are moved into the correct position for use as a clinometer, as shown in
70 Figure 1. The two stepped portions can readily be sprung apart when desired, so that the leaf 8 may be moved over the leaf 3 as in Figure 2. When the two leaves are moved one over the other in
75 this manner they may be used as callipers, the outer ends of the two leaves being formed respectively with inwardly extending projections 11 and 12. To fold up or collapse the instrument the leaves 3 and
80 8 are folded so as to lie one upon the other, and the pointer 7 is engaged beneath a clip 13 formed integral with the flange 4 of the leaf 3. The two leaves are then folded down about the pivot 1 so that they
85 lie between the sides 2 of the casing, the flange 4 serving to close the top of the latter.

In using the instrument as a clinometer the leaf 3 is raised from the casing by
90 means of the finger piece 14 formed by an extension of the flange 4, the said leaf being turned about its pivot 1 until the flange 4 engages against the edge of the plate 5. The leaf 3 is then at right angles
95 to the lower edge or base of the casing. The pointer 7 is disengaged from the clip 13 and the leaf 8 turned down over the leaf 3 until the stepped portions 9 and 10 upon the respective leaves spring into
100 engagement with each other, as shown in Figure 1. The clinometer is now ready for use. The base or lower edge of the casing is placed upon the surface of the object, and the inclination of the surface
105 is measured by the position which the end of the pointer 7 takes upon a graduated scale 15 marked upon the leaf 8. To measure distant objects above the observer sight apertures 16 and 17 are
110 provided respectively in the end 20 of the casing and in the lower portion of the flange 4. The eye is applied to the aperture 16 and the centre of the aperture 17 and the object in question are brought
115 into line, the inclination of the said object will then be measured by the position of the pointer 7 upon the scale 15. In like manner the angle of an object below the observer can be measured
120 through the aperture 21 (Figure 3) in the flange 4, the object being brought into line with the gap 22 formed on the top edge of the end 20 of the casing. To use the device as callipers the inwardly
125 extending projections 11 and 12 upon the

respective leaves are moved towards each other until they engage with the sides of the object, the diameter or width of the latter is then measured by a scale 18 upon the leaf 3, the reading being taken at the point where the two leaves intersect. The leaf 8 may be provided with a scale which gives the circumference of the object being measured, or a scale giving the gap between the calliper points in millimeters may be provided. The pointer 7 may be graduated and may be used as a depth gauge by moving the pointer away from the leaf 3.

The sides of the base may be used for embossed or printed scales, tables of inclines or other data; or they may bear advertisements or other matter.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A clinometer comprising a base or casing having two pivoted folding leaves, one of which may be turned into a position at right angles to the said base or casing and which carries a freely swing-

ing pointer arranged to move over a scale upon the other leaf so as to indicate the inclination of the object or surface, substantially as described.

2. In clinometers as claimed in Claim 1, the provision of sights or sight apertures carried by or formed in the base or casing for the purpose of ascertaining the inclination of distant objects, substantially as described.

3. In clinometers as claimed in Claims 1 or 2, forming or providing the opposed edges of the two leaves with stepped portions or stops, adapted to be brought together to ensure the correct relative positions of the two leaves, substantially as described.

4. In clinometers as claimed in Claims 1, 2 or 3, shaping or forming the two leaves so that they constitute a pair of callipers, substantially as described.

5. The improved clinometer substantially as herein described and set forth by the accompanying drawings.

Dated this 12th day of February, 1921.

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[This Drawing is a reproduction of the Original on a reduced scale]





