R. G. AINSWORTH.

SURVEYOR'S TRANSIT.

APPLICATION FILED FEB. 12, 1914.

1,132,236.

Patented Mar. 16, 1915.

2 SHEETS—SHEET 1.

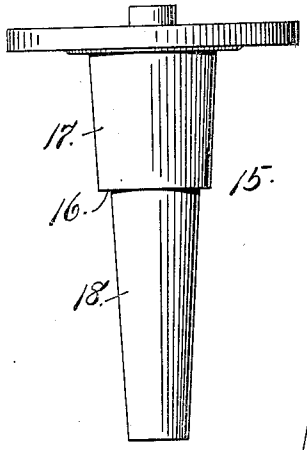


Fig. 2.

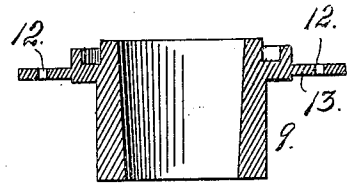


Fig. 3.

Fig. 1.

Witnesses

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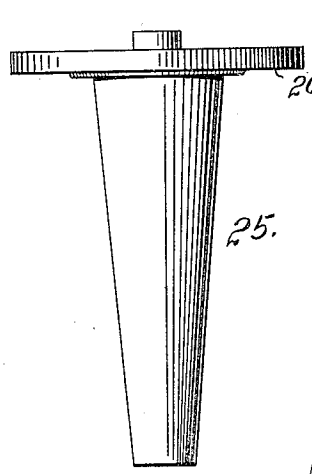


Fig. 5.

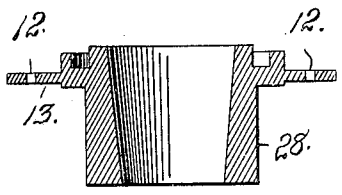


Fig. 6.

Fig. 4.

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SURVEYOR'S TRANSIT.

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To all whom it may concern:

Be it known that I, ROBERT G. AINSWORTH, citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Surveyors' Transits; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in surveyors' transits, my object being to provide a construction whereby the limb or rotary member of the instrument arranged between the upper and lower members thereof may be actuated without interfering with the position of the upper member upon which the telescope is mounted.

In one construction common to this class of instruments, as heretofore manufactured, the vertically disposed cone-shaped spindle of the upper member engages throughout its entire length a depending sleeve fast upon the rotary limb of the instrument. Where the last named construction is employed, if the exterior of the sleeve is not accurately centered with reference to its interior, the rotation of the limb will throw the entire upper member out of proper adjustment. Hence, this form of the device necessitates great accuracy of construction.

In my improvement the spindle of the upper member engages a relatively short sleeve formed on the limb, while the lower portion of the spindle engages the frame work of the lower or leveling member. Hence, the rotary action of the limb has no effect upon the upper member, since it turns or is journaled on an intermediate portion only of the spindle.

Having briefly outlined my present improvement, I will proceed to describe the same in detail, reference being made to the accompanying drawing, in which is illustrated an embodiment thereof.

In this drawing: Figure 1 is a vertical section taken through the limb of the instrument, also cutting the spindle of the upper member, as well as the frame work of the lower leveling member. Fig. 2 is a detail elevation of the spindle of the upper member. Fig. 3 is a sectional view of the sleeve of the limb which is shown in detail, or detached from the body of the limb. Fig. 4 is a view similar to Fig. 1, showing a slightly modified form of construction. Fig. 5 is a detail elevation of the spindle of the form of the device shown in Fig. 4. Fig. 6 is a sectional view of the sleeve shown in Fig. 4.

The same reference characters indicate the same parts in all the views.

Referring first to Figs. 1, 2 and 3, let the numeral 5 designate the upper member of the transit, and numeral 6 the lower member thereof. Arranged to rotate independently of the upper and lower members is the limb 7, whose body portion 8 is substantially of the same construction heretofore employed. To the body of this limb is secured a relatively short sleeve 9, the attachment being made by means of screws 10 which pass through the lower portion of the body of the limb and enter threaded openings 12 formed in an annular flange 13, with which the upper portion of the sleeve 9 is provided. The lower extremity of the sleeve 9 rests upon the upper surface of the frame part 14 of the lower member 6. In this form of construction the spindle 15 of the upper member has an offset 16 intermediate its extremities forming a shoulder between the upper and lower parts 17 and 18 of the spindle. This shoulder also rests upon the stationary frame part 14 of the lower member 6.

The upper extremity 19 of the sleeve 9 does not necessarily engage the annular flange 20 surrounding the upper portion of the spindle in this form of construction. Hence, as the limb 8 and the sleeve 9 are turned, as is required in the regular performance of the function of the instrument, the movement of the limb has no effect upon the position of the other parts of the instrument, and this is true, even if the exterior of the sleeve is not accurately centered, with reference to its interior. In other words, the axes of the interior and exterior of the sleeve 9 and the axis of the spindle 15 may be non-coincident without interfering in any manner with the position of the upper member of the device, as the limb is rotated.

In order that the spindle and the parts which it engages, namely, the sleeve 9 and the frame 14, may be properly lubricated automatically, I prefer to form a small chamber 21 in the upper portion of the spin-

dle. This chamber or receptacle contains oil or other suitable lubricating material, the upper extremity of the receptacle being normally closed by a screw plug 22. From this chamber or receptacle small ducts 23 and 24 lead to the outer surface of the spindle, terminating respectively above and below the shoulder 16 of the spindle.

In the form of construction shown in Figs. 4, 5 and 6, the spindle of the upper member of the instrument constitutes the frustum of a cone being devoid of the intermediate offset shown in the other form of construction. This form of spindle may be designated by the numeral 25. In this form of the device the top flange 26 of the spindle rests upon the upper extremity 27 of the sleeve 28 of the limb, while the lower extremity 29 of the said sleeve bears upon the adjacent surface 30 of the frame of the lower member, the said bearing surface of the sleeve extending to the spindle, as the latter is uniformly cone-shaped between its extremities. With the exception that in this form of construction the top flange of the spindle of the upper member must rest upon the upper extremity of the sleeve of the limb, the operation of the two constructions are substantially similar.

The form shown in Figs. 1 and 2 is believed preferable, since less accuracy is required in its construction, due to the fact that the upper extremity of the sleeve, as it does not necessarily engage the flange 20 of the spindle, need not be absolutely accurate, since slight inaccuracy would not interfere in any way with the position of the upper member during the adjustment of the rotary limb in the manner common to this class of instruments, and as heretofore explained.

Having thus described my invention, what I claim is:

1. In a surveyor's transit, the combination of an upper member provided with a spindle and a limb member provided with a sleeve, the latter being journaled upon the spindle of the upper member intermediate the extremities of the said spindle, substantially as described.

2. In an instrument of the class described, the combination of an upper member, a limb member, and a lower member, the upper member provided with a spindle and the limb member provided with a sleeve journaled upon the upper portion of the said spindle, the lower extremity of the sleeve engaging the framework of the lower member, the spindle of the upper member having a right angled offset intermediate its extremities forming a shoulder which engages the framework of the lower member in the same plane as the lower extremity of the sleeve of the limb.

3. A surveyor's transit including an upper member, a limb member and a lower member, the upper member provided with a spindle, an annular flange on the top of the said spindle, the limb member having a sleeve journaled upon the upper portion of the spindle and occupying a position below the said flange, the spindle also having an offset intermediate its extremities which engages the frame-work of the lower member of the instrument, the lower extremity of the sleeve of the limb also engaging the frame work of the lower member, while its upper extremity is free from engagement with the flange of the spindle, substantially as described.

4. A surveyor's transit including an upper member, a limb member and a lower member, the upper member provided with a spindle and the limb member having a sleeve journaled upon the said spindle and having its lower extremity bearing upon the frame work of the lower member, the lower portion of the spindle engaging a socket formed in the framework of the lower member, the spindle having a lubricant containing receptacle and ducts leading therefrom to the upper and lower bearing portions of the spindle, substantially as described.

5. A surveyor's transit including an upper member, a limb member and a lower member, the upper member provided with a spindle and the limb member having a sleeve journaled upon said spindle intermediate the extremities of the latter, the lower extremity of the sleeve bearing upon the frame work of the lower member, the spindle of the upper member having an offset intermediate its extremities, and in the plane of the lower extremity of the said sleeve, the offset of the spindle also bearing upon the frame work of the lower member, the spindle having a lubricant containing receptacle and also provided with ducts leading therefrom to the bearing portions of the spindle above and below its offset, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ROBT. G. AINSWORTH.

Witnesses:
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A. EBERT O'BRIEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."