

Oct. 13, 1931.

L. A. BLAKE

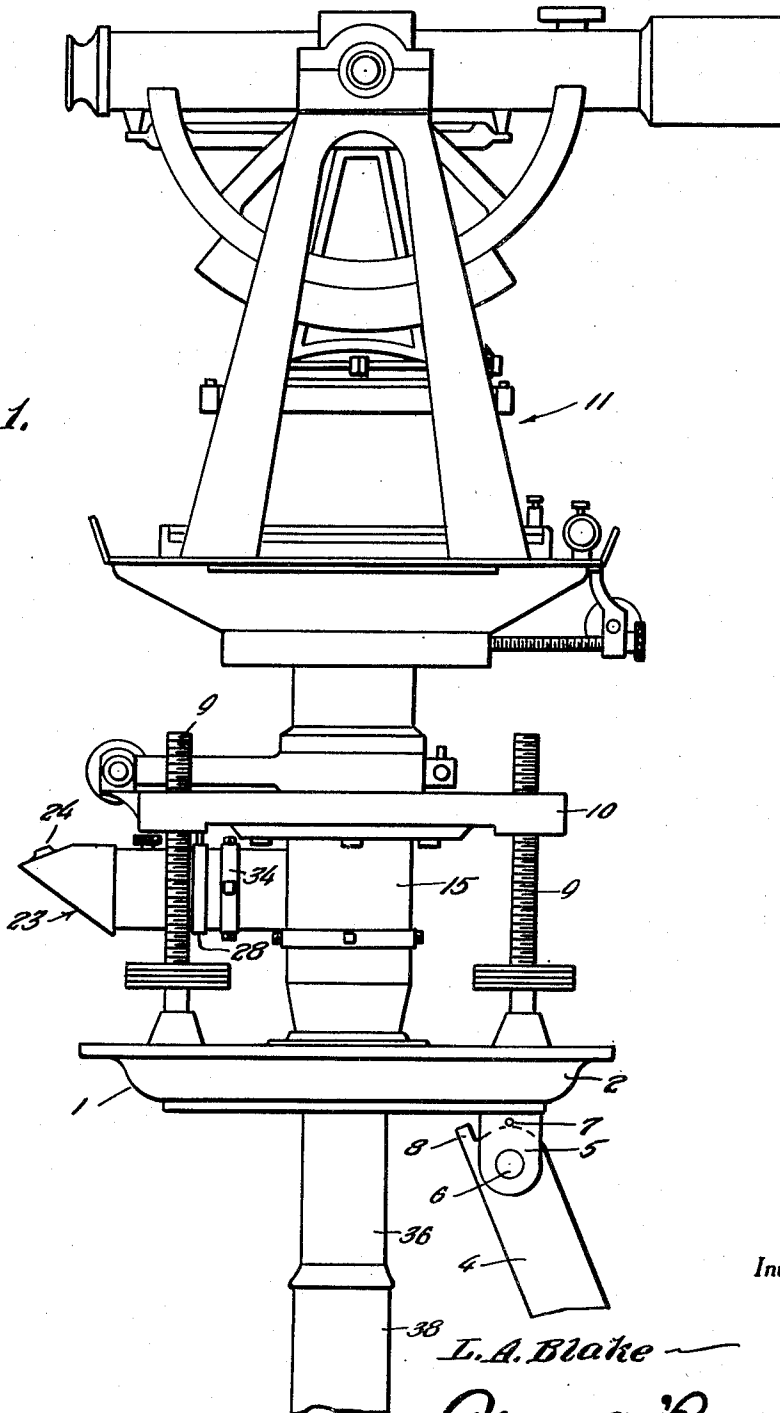
1,827,135

TRANSIT

Filed July 22, 1930

4 Sheets-Sheet 1

Fig. 1.



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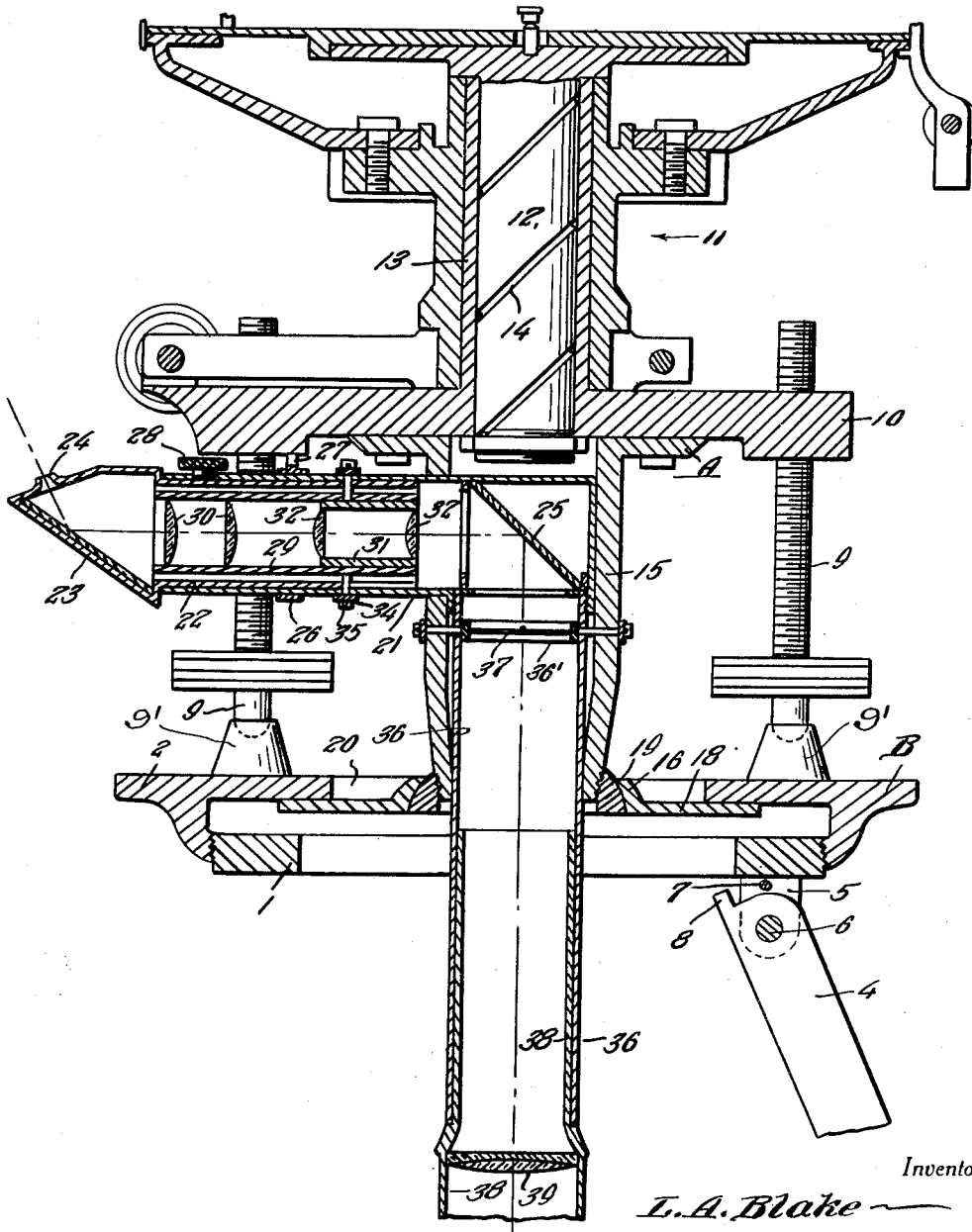
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Fig. 2.



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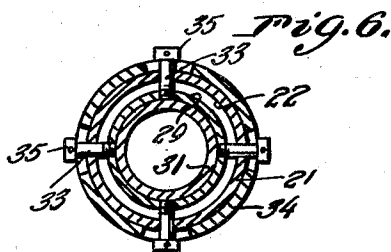
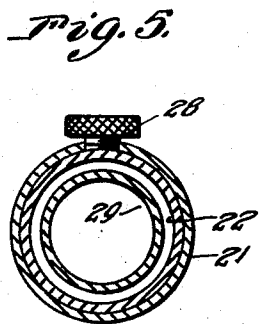
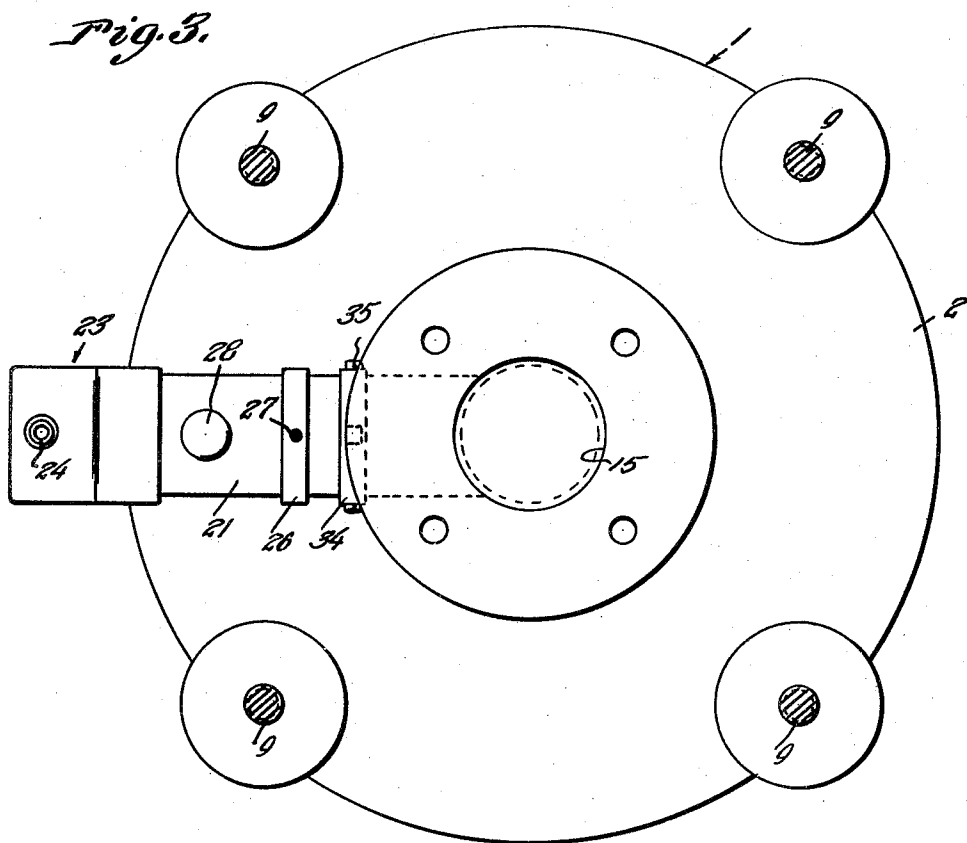
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Fig. 4.

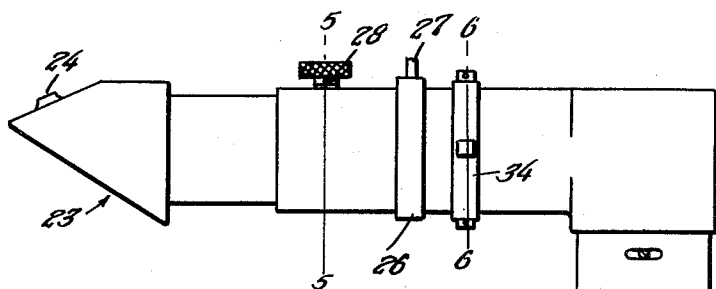


Fig. 7.

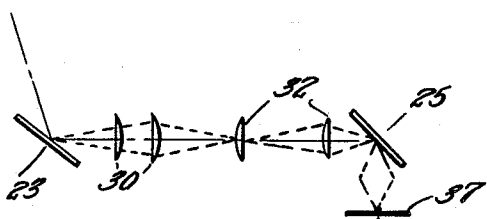
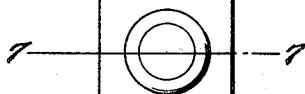
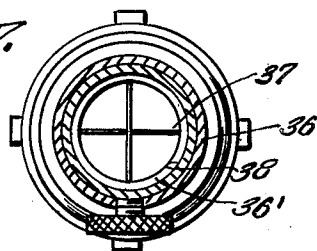


Fig. 8.

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UNITED STATES PATENT OFFICE

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TRANSIT

Application filed July 22, 1930. Serial No. 469,758.

This invention relates to new and useful improvements in transit of the type in widespread use at present by engineers or surveyors and has for its primary object to provide, in a manner as hereinafter set forth a device of this character embodying means whereby the centering of the transit over a desired point is greatly facilitated, said means rendering unnecessary the use of the conventional gravity actuated plumb bob which has been found to be inaccurate and otherwise unsatisfactory under various conditions.

Other objects of the invention are to provide a transit of the aforementioned character which will be comparatively simple in construction, strong, durable, highly efficient in its use and which may be manufactured at low cost.

All of the foregoing and still further objects and advantages of the invention may become apparent from a study of the following specification, taken in connection with the accompanying drawings wherein like characters of reference designate corresponding parts throughout the several views, and wherein:—

Figure 1 is a view in side elevation of a transit constructed in accordance with this invention.

Figure 2 is a view in vertical section of the device with the head removed.

Figure 3 is a horizontal sectional view through the device.

Figure 4 is a detail view in side elevation of the visual centering means which constitutes the essential feature of this invention.

Figure 5 is a cross sectional view taken substantially on the line 5—5 of Figure 4.

Figure 6 is a cross sectional view taken substantially on the line 6—6 of Figure 4.

Figure 7 is a cross sectional view taken substantially on the line 7—7 of Figure 4.

Figure 8 is a diagrammatic view illustrating the principle of operation of the various lenses.

Referring to the drawings in detail, it will be seen that the reference numeral 1 (see Figure 2) designates a flat ring constituting a tripod head having a threaded peripheral

edge upon which is mounted the plate 2. The elements 1 and 2 constitute a base which is mounted on a plurality of hinged supporting legs only one of which is shown and designated by the reference numeral 4. Pairs of ears 5 depend from the ring 1 and hingedly mounted therebetween are the legs 4 on the pintles 6. Pins 7 extend between the upper portions of the pairs of ears 5 for engagement by the lugs 8 formed integrally on the upper ends of the legs 4 in a manner to limit the inward swinging movement of said legs.

Vertically disposed leveling screws 9 are shiftably supported on the plate 2 and adjustably support the plate 10 in vertically spaced relation on the base. Conical members 9' are disposed between the screws 9 and plate 2 and have their upper ends recessed to receive said screws 9. The members 9' are slidable on the plate 2 when the device is being adjusted for use. The head of the transit is designated generally by the reference numeral 11 and may be of any desired approved type and construction. The head 11 is supported for rotation on the plate 10 through the medium of the spindle 12 mounted in the sleeve 13 extending upwardly from the centrally disposed opening in said plate 10 and through which opening the spindle 12 extends. The spindle 12 is provided with a spiral groove or channel 14 for the distribution of lubricating oil throughout its length in the sleeve 13. A lock nut is threaded on the lower end of the spindle 12 for engagement with the lower side of the plate 10 for anchoring the head 11.

Depending centrally from the plate 10 and rigidly secured thereto is a metallic tube 15 having a tapered externally threaded lower end portion upon which is threaded the collar 16, having a rounded outer surface. A flat annulus 18 is rotatably supported on the collar 16 and has its inner periphery provided with an upstanding curved flange portion 19 engaged with the collar 16 in a manner to permit rotary adjustment of said collar. The annulus 18 is engaged with the lower side of the plate 2 when the parts are secured in adjusted position. The plate 2 is provided with a centrally disposed opening 20 into which

the tube 15 extends. The collar 16 and flange 19 provide a support which will permit universal movement of the annulus 18 when the screws 9 are threaded upwardly in the plate 10 to remove the pressure from the plate 2 when the device is to be adjusted.

Extending transversely into the tube 15 adjacent the upper end thereof is a tube 21 in which is telescopically mounted for sliding movement a tube 22 having on its free end a reflecting prism designated generally by the reference numeral 23 and having a peep hole 24 associated therewith. A prism 25 is properly positioned in the inner end portion of the tube 21 within the tube 15. The tube 21 is supported at its outer end portion from the plate 10 through the medium of the encircling ring 26 suspended from said plate 10 through the medium of the hanger 27. The inner sleeve 22 may be adjusted longitudinally in the tube 21 by any suitable means, such as a rack and gear arrangement. A set screw 28 is provided for securing the inner tube 22 in adjusted position in the tube 21.

A tube 29, open at its opposite ends, is mounted longitudinally in the inner tube 22 and has mounted therein in spaced relation and at the desired point the plano convex lenses 30. A conventional rack and pinion arrangement (not shown) may be provided between the tubes 22 and 29 for adjusting the lenses relative to the prism 23 for focusing the instrument. A comparatively short tube 31 is mounted for longitudinal adjustment in the inner end portion of the tube 29 and has mounted in its opposite end portions the plano convex lenses 32 which are reversely disposed with respect to the lenses 30. Shanks 33 radiate from the tube 31 and extend through openings provided therefor in the tubes 29, 22 and through circumferential slots in the tube 21 and the outer end portions of said shanks extend through the annulus 34 which encircles the tube 21 and have mounted on their free end portions the capstan heads 35 and provide means for centering the eye piece tube 22 and securing same in centralized position.

An elongated tube 36 is threadedly engaged with the inner end portion of the tube 21 and depends therefrom longitudinally through the tube 15 and the member 1. A ring 36' is adjustably mounted in the upper end portion of the tube 36 and supports the cross hairs 37. A tube 38 is mounted in the lower end portion of the tube 36 and has mounted therein a suitable lens 39 which is a by-convex lens of crown glass cemented to a plano concave lens of flint glass. The lens 39 constitutes the object lens of the device. Any suitable means such as a rack and pinion (not shown) may be operatively connected to the tube 38 for lowering or raising same in the tube 36 to adjust the lenses therein relative to the cross hairs. The principal op-

eration of the sighting device is illustrated diagrammatically in Figure 8 of the drawings and has for its purpose to reflect an image or object to the eye through the telescope in the manner as if said image or object were viewed by the naked eye, that is, when the head of transit is shifted to the left or to the right or forward or rearwardly the conditions are the same in regard to the shifting a transit head as if a plumb bob were in use.

It is believed that the many advantages of a transit constructed in accordance with this invention will be readily understood, and although the preferred embodiment of the invention is as illustrated and described, it is to be understood that changes in the details of construction may be had which will fall within the scope of the invention as claimed.

What is claimed is:—

A transit of the character described comprising a supporting structure including a base member having a centrally disposed opening, supporting screws extending upwardly from the base member, a plate adjustably mounted on the supporting screws in vertically spaced relation to the base member, a transit head adjustably mounted for rotation on the plate, a metallic sleeve anchored to the plate and extending therefrom in vertical alignment with the opening in the base member, a horizontally disposed telescope section extending into the tube, said telescope section having reflecting prisms at its opposite end and lenses intermediate said prisms, and a telescope section extending through the base and longitudinally through the tube and connected to the first named section and depending therefrom.

In testimony whereof I affix my signature.

LOWELL A. BLAKE.