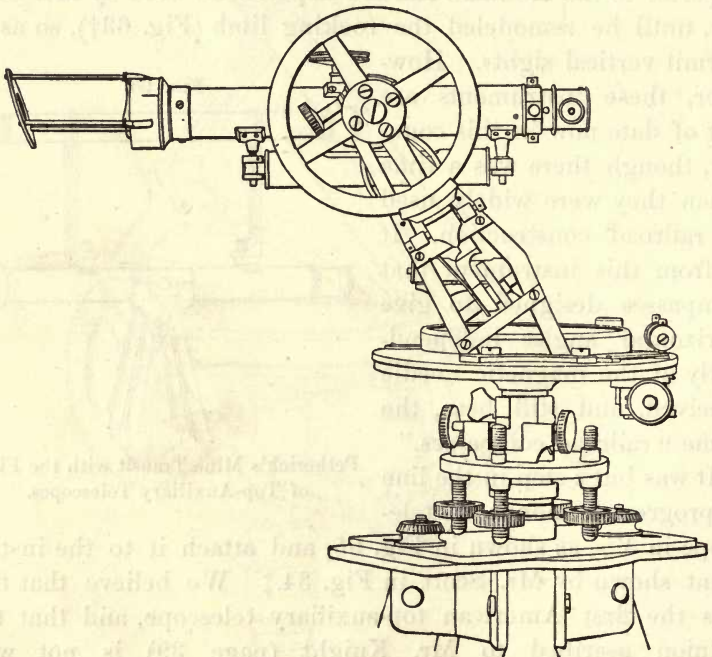


were attached permanently to the transit-telescope, and the auxiliary only was made detachable, as well as reversible, "end for end" (somewhat as shown in Fig. 94); but in this form the uprights would get bent in the mines, and render the attachment useless. A hinged upright was then tried, similar to the folding compass-sight (Fig. 34, above cited), but the hinge-pin would wear, and the uprights rattle.

The writer's plan, introduced in 1891, is to mount the

FIG. 96.



McNair's Original Inclined-Standard Mine Transit.

uprights upon a base-plate, and attach it to the main telescope by "Y" bearings.

When Mr. Scott assumes\* that the inclined-standard mining-transit came down through Seibert's solar, he is not entirely correct. As a matter of fact, the first inclined standards made by this house were made in July, 1854, for Alexander Roberts, of Hamburg, Pa. In the next year we made one of the same kind with long center, double verniers and telescope-level, but

\* Page 47.

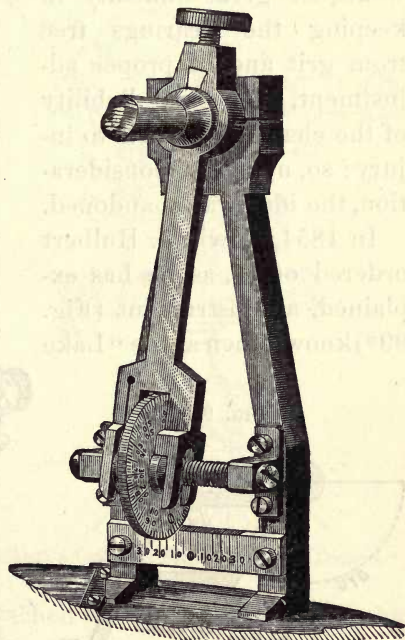
no vertical arc, for the Philadelphia, Wilmington and Baltimore R.R., but we have no photograph or further description of these instruments. From this time on, no others of this pattern seem to have been made by us until that made in 1875 for Thomas S. McNair, then mining engineer for the Lehigh Valley Coal Company at Hazleton, Pa. It was at this time that our Mr. Thomas N. Watson, in the course of the argument, suggested the principle of the "hinged standards" by revolving a draughtsman's triangle on one of its corners. The idea was rejected; but it seems to us now that if unusually large journals had been used and the adjustment had been secured as in the horizontal axis of the telescope, it could have been made to project correct alignments.

Mr. McNair's instrument is still in use, and is reproduced here (Fig. 96) from a photograph kindly prepared by that gentleman especially for this discussion. The credit for first having used this type in mining work is possibly due to Mr. McNair; but he modestly refuses to accept it without reserve, observing, "The ancients, you know, are said to have infringed on our inventions." Attached to this instrument

will be noticed the style of gradienter introduced by this house in 1872, the first, we believe, to appear in America. It is shown more in detail in Fig. 97. We use it still, for the reason that it is not so exposed as the other style, and is equally easy to read and manipulate.

Of distinctively mining transits, there are probably more of the inclined standard type in use than any other, all objections to its eccentricity and "overhang" melting away wherever it has once been used. It has achieved this recognition without any special recommendation on the part of the makers.

FIG. 97.



Young's Gradienter.