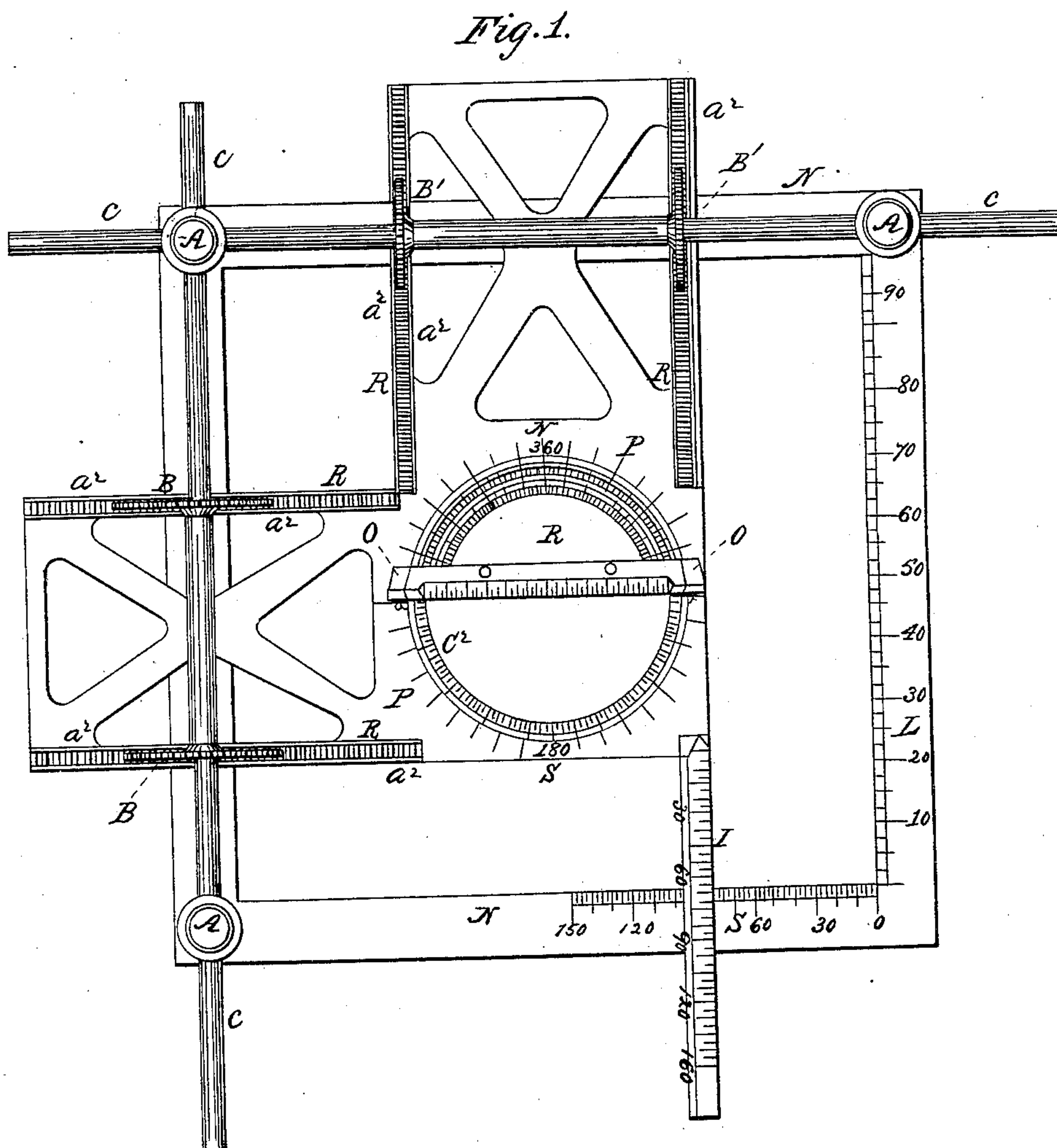
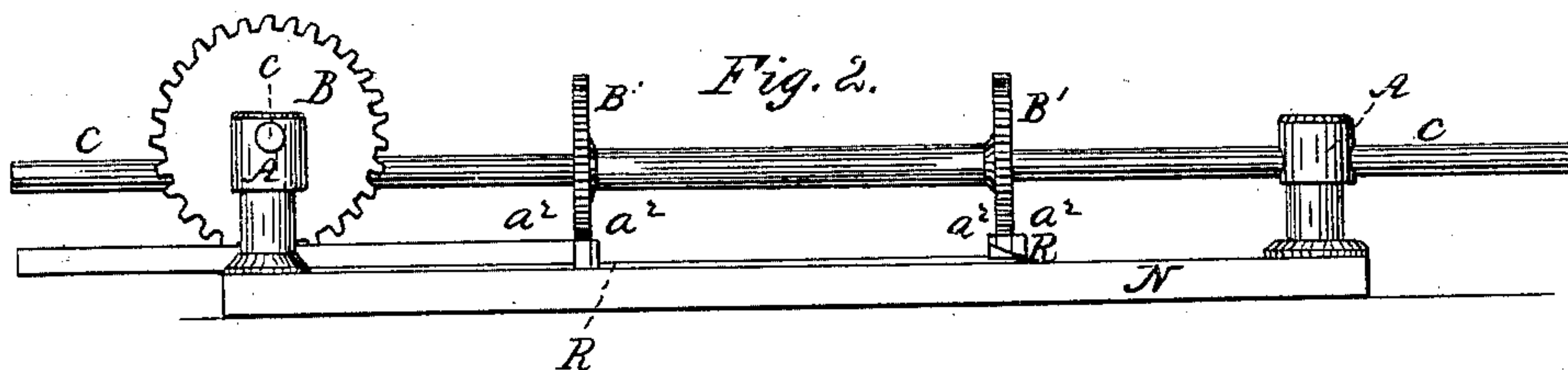


T. HINKLEY.

Protractors.

No. 10,133.

Patented Oct. 18, 1853.



UNITED STATES PATENT OFFICE.

THOMAS HINKLEY, OF HALLOWELL, MAINE.

INSTRUMENT FOR PLOTTING.

Specification of Letters Patent No. 10,133, dated October 18, 1853.

To all whom it may concern:

Be it known that I, THOMAS HINKLEY, of Hallowell, in the county of Kennebec and State of Maine, have invented new and useful Improvements in Machines for Finding Distance, Departure, Difference of Latitude, and for Drafting; and I do hereby declare that the following, taken in connection with the drawings herewith presented, is a full and exact description of it.

The machine, which is represented in top view in Figure 1 and in side view in Fig. 2 of the said drawings, is composed of metal, wood or other suitable material and consists of a square, open and flat frame, N, about ten inches square, and made of bars about one inch wide. On or near three of its corners are erected the posts A, A, A, each about one and one half inches high. Through them the two shafts *c c*, *c c*, arranged at right angles are made to slide longitudinally and turn transversely accurately and smoothly. On each of these shafts two cogged wheels or pinions B B, B' B', are secured at a distance of three or four inches apart, so that they can turn only with the shaft. Within the frame lies the square plate P P, called the compass plate which is cut out in the form of a circle, and chamfered around the periphery of the cut as seen at C². The circular edge so beveled is graduated with the thirty two cardinal points, and 360 degrees of a circle. In this circular opening a semicircular protractor R is fitted and made to play accurately and so to be capable of being turned around within the circular limb and have its center coincident with that of the circular recess or divided limb thereof. From the corners of the plate, at right angles to two of its sides, that stand perpendicularly to each other sunken racks R R, R R, extend, which racks are played into by the pinions B B, B', B'. These racks are sunk in bars or have parallel rails *a*² *a*² raised above them at a distance apart equal to the width of the cog wheel or pinion that is to play between them, and thus by the transverse rollings and longitudinal slidings of the shafts *c c*, *c c*, the plate P P is allowed to move in any possible direction, the sides of it are always kept parallel with the sides of the frame N, N, N. From one corner of the plate P P there extends an index I, playing across the margin (*s*) of the frame and at right angles with it. This index, as also

the margin over which it plays, and the diameter of the protractor, are all graduated on the same scale of equal parts. On another part of the margin of the frame N, N, is inscribed a table or series of divisions L, showing the number of miles to every degree of longitude in different latitudes from 0° to 90°.

To illustrate the use and operation of the instrument I will take a simple case: Suppose a vessel has sailed three courses, viz., NW. 18 miles, WNW. 15 miles, N. 25 miles, and we desire to find its course, distance, departures, and difference of latitude. Lay the machine on a sheet of paper, place the compass-plate in the southeast corner of the frame N, N, N, that is the corner between the scales of the frame, turn the protractor till it points NW., draw a line by its edge, lay off on the line eighteen equal parts, and make a point. Now set the protractor in the direction of the second course, viz., WNW., and move the plate till the edge of the protractor falls on this point. From this point draw a line and set off as before fifteen equal parts. Proceed in like manner with the remaining course. Now set the protractor so that its edge will fall on the first point of the first course and on the last point of the last course, and draw a line. This will represent the course, which will be indicated on the plate by the bar O, O, attached to the protractor. The length of this line is the distance, and is read from the edge of the protractor. Now draw the plate into the corner, as at first, without changing the protractor, and then, by moving the plate, cause the protractor to traverse the length of the course, on a line drawn by its edge so that the last point of the course (or parallel line representing it) shall coincide with the first point of the protractor. Now the protractor and the whole plate have moved over the hypotenuse of a right angled triangle of which the perpendicular will be measured on the index I, (which will indicate the difference of latitude) and the base on the marginal scale S, which latter will show the departure in miles which can be reduced to degrees by the table on the margin L. By means of the sunken racks (or the racks provided with parallel edges or bars *a*², *a*²,) the pinions, and the shafts made to rotate and slide in these supports as specified, a compound or resultant parallel motion of the compass

plate can readily be obtained. It is this part of the machine or apparatus which is new.

What I claim as original and my own invention and wish to secure by Letters Patent is—

The method or means of obtaining in the above described machine, a compound or resultant parallel motion, the same consisting in a combination of pinions or gears,

and sunken racks (or racks provided with parallel bars as specified) two sliding and rotary shafts, as arranged, connected and supported so as to operate together substantially as hereinbefore described.

THOMAS HINKLEY.

Witnesses:

JOHN OTIS,
S. M. OTIS.