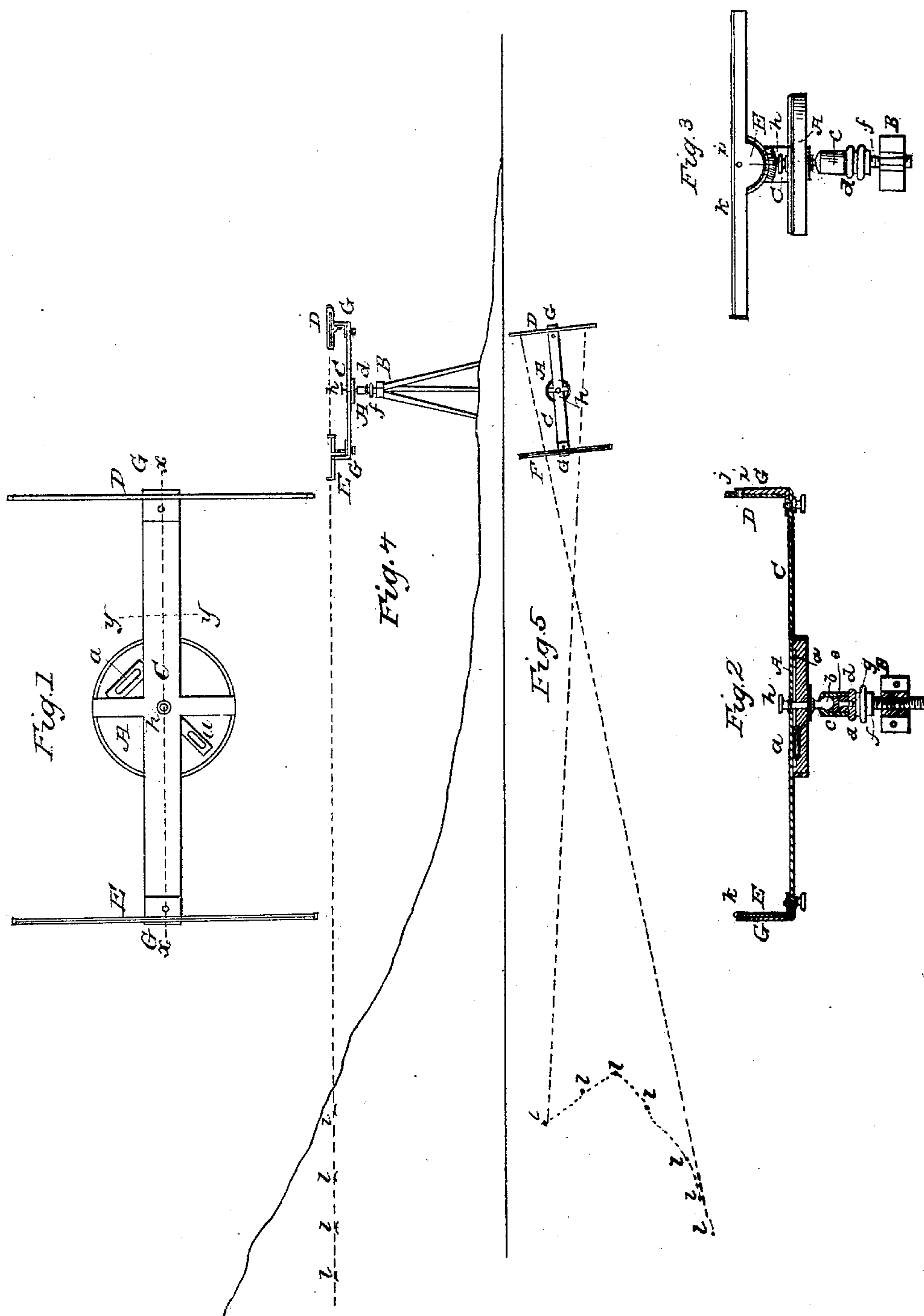


J. GRAY. Leveling Instrument.

No. 18,689.

Patented Nov. 24, 1857.



UNITED STATES PATENT OFFICE.

JOSEPH GRAY, OF RAYMOND, MISSISSIPPI.

LEVELING INSTRUMENT FOR DITCHING, &c.

Specification of Letters Patent No. 18,689, dated November 24, 1857.

To all whom it may concern:

Be it known that I, JOSEPH GRAY, of Raymond, in the county of Hinds and State of Mississippi, have invented a new and useful Instrument for Laying Out Levels and Grades; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan of the instrument. Fig. 2 is a vertical section of the same, in the line *x, x*, of Fig. 1. Fig. 3 is a vertical section of the same, in the line *y, y*, of Fig. 1. Figs. 4 and 5 are respectively an elevation and plan, illustrating the operation of the instrument.

Similar letters of reference indicate corresponding parts in the several figures.

My instrument is chiefly designed to be used in agricultural operations, to aid in marking out the lines for plowing ditches and furrows on hill sides or undulating ground.

To enable others to make and use my instrument, I will proceed to describe its construction and operation.

A, is a small circular table of wood or metal, which is provided with two spirit levels *a, a*, arranged at right angles to each other, and is supported on a tripod or other stand B upon which it is made adjustable to a level position and to a proper elevation, and also capable of turning freely. *b c*, is the ball and socket joint upon which it is adjusted to a level position.

d, is a nut, and *e, e¹*, packing rings for tightening up the ball and socket and fixing the table when level.

f, is the screw by which the table A is raised and lowered.

g, is a pivot on the top of the screw *a*, upon which the table is capable of turning when the nut *d* is slackened, the said pivot passing through the said nut and having a head which is clamped against the lower packing ring *e¹*.

C is a bar secured to the top of the table A by a screw *h*, which, being in the center of the table, serves also as a pivot upon which the said bar is capable of turning upon the table. The bar C has a small standard G, at each end, and to one of these standards is secured a transverse bar D, and to the

other a transverse bar E, said bars being arranged to turn on pivots *i, i*, which are secured in the standards G, G, and which stand in the same horizontal line when the table is leveled by the aid of the spirit levels *a, a*, and the said bars being horizontally parallel with each other. Each of the transverse bars D, and E, is provided with a graduated sector, described from its pivot *i*, and these graduated sectors correspond with others on the standards G, G, and serve as gages to enable the bars D, and E, to be adjusted to horizontal positions or at any required grade. The bar D has a very narrow slit *j*, extending longitudinally nearly from end to end, and the bar E has a hair line *k*, extended from end to end.

The instrument is employed in laying out the grade lines for ditches and the horizontal lines for furrows on the face or side of a hill, a piece of rising ground, in the following manner, as illustrated in Figs. 4 and 5: The instrument on its stand is placed in a suitable position opposite the side of the hill with the hair line bar E nearest the face of the hill, and the table A is leveled with the bar C, standing as nearly as practicable at right angles to a horizontal line running along or around the face of the ground, and consequently with the bars D, E, as nearly parallel with the said horizontal line as the nature of the ground will permit. The two bars D, E, are then adjusted by the aid of the graduated sectors, one of which is exhibited in Fig. 3, to the grade required for the ditches, and the person using the instrument then looking through the slit *j* in the bar D and sighting the line struck by the hair line *k* on the face of the hill, directs an assistant to mark the ground at intervals as shown at *l, l*, in Figs. 4 and 5, by placing a sod or lump of earth or kicking up the surface with his foot. Having marked out the lines for a number of ditches in this way the bars D, E, are adjusted to a horizontal position, and the lines for the furrows, or a suitable number of them to serve as sufficient guide for the plowman, are marked in the same manner as the ditches. As the bars D, E, are of considerable length, say one foot or more, the grade or level may be marked for a considerable distance along the face of a hill without moving the stand of the instrument,

and when this is necessary the same lines can be continued to any distance.

The operation of laying out levels or grades by this instrument in lines transverse
5 to the lines of vision is far more expeditiously performed than the ordinary operation of sight-leveling, which is performed directly in the line of vision.

The above explanation of the use of the
10 invention for laying out grades of ditches and levels of furrows for plowing will enable any person to use it for other leveling or grading operations.

Instead of the bar D having a slit *j*, it
15 may have a hair line like the bar E.

What I claim as my invention, and desire to secure by Letters-Patent, is:

The combination of the two adjustable bars D, E, provided with graduated sectors, with the table A, and bar C, or other equivalent support, capable of being adjusted in a level position, for the purpose of laying
20 out levels or grades in a direction transverse to the line of vision, substantially as herein described.

JOS. GRAY.

Witnesses:

JOHN SHELTON,
T. F. OWEN.