

E. REICHENBACH.  
INSTRUMENT FOR SURVEYING AND GRADING DITCHES.  
No. 433,697. Patented Aug. 5, 1890.

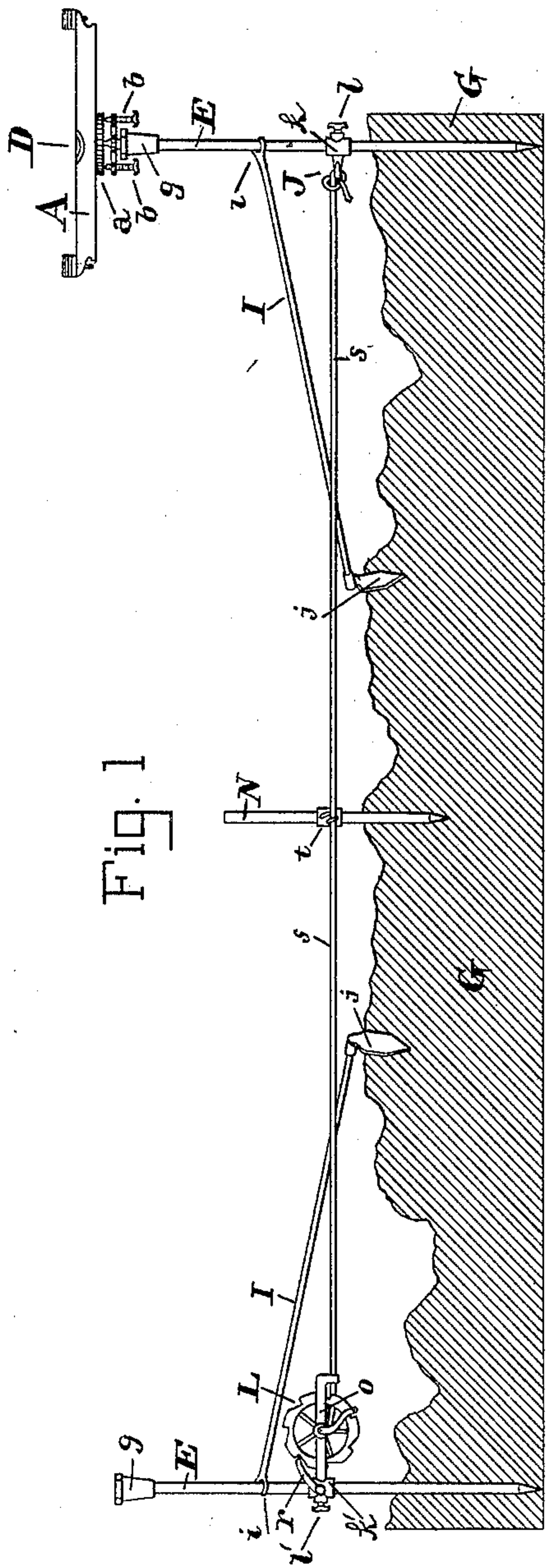


Fig. 1

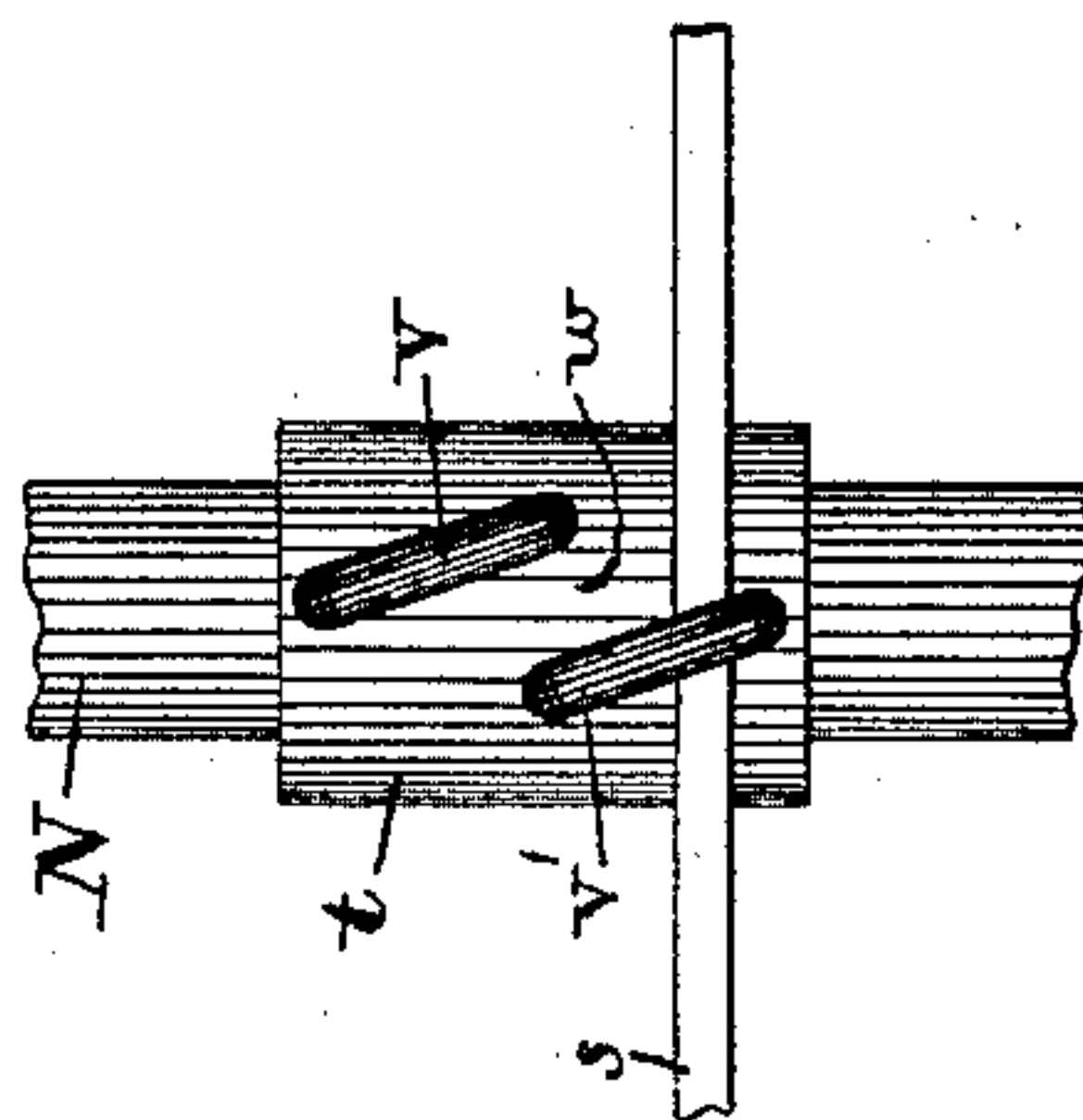


Fig. 4

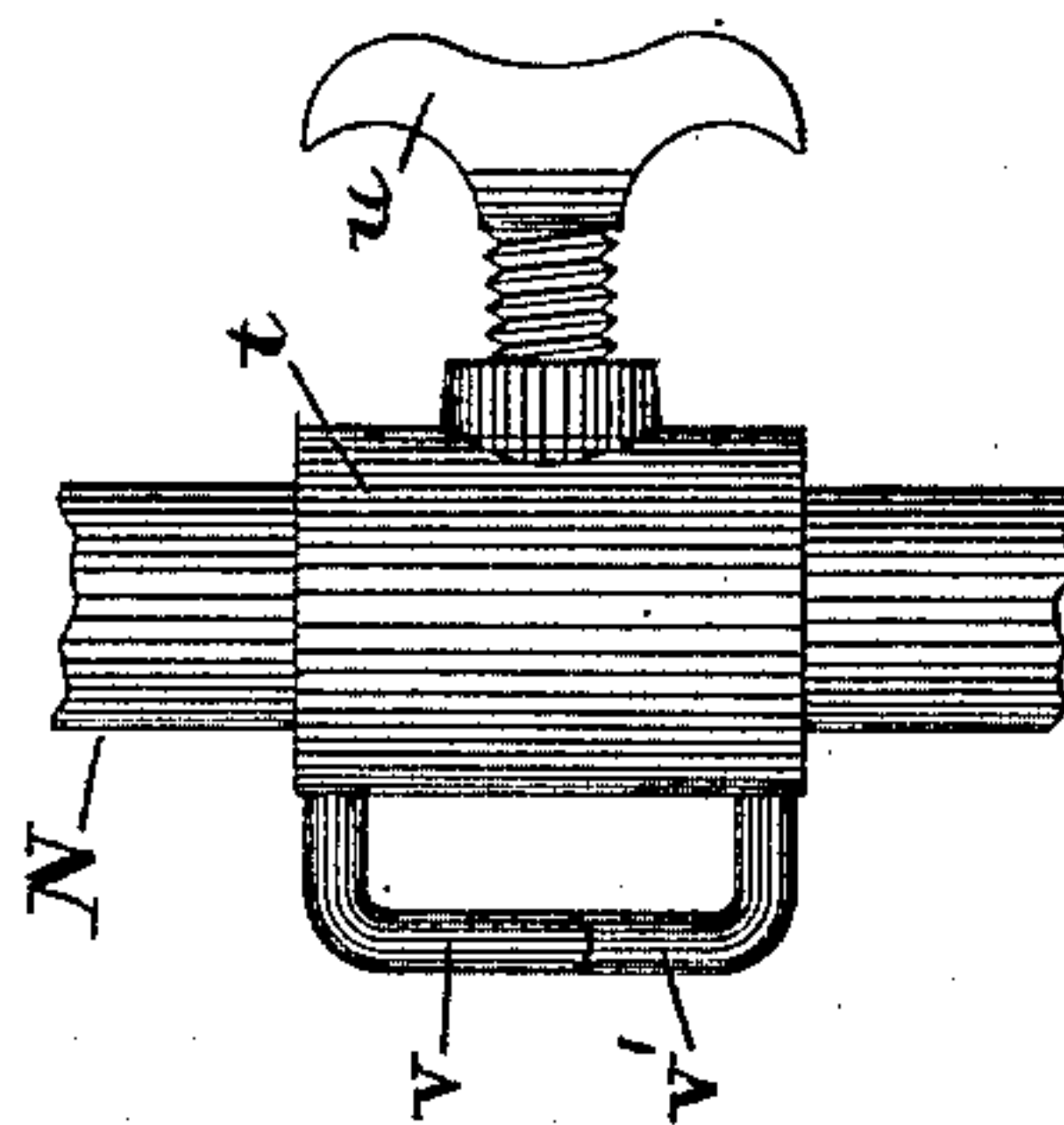


Fig. 3

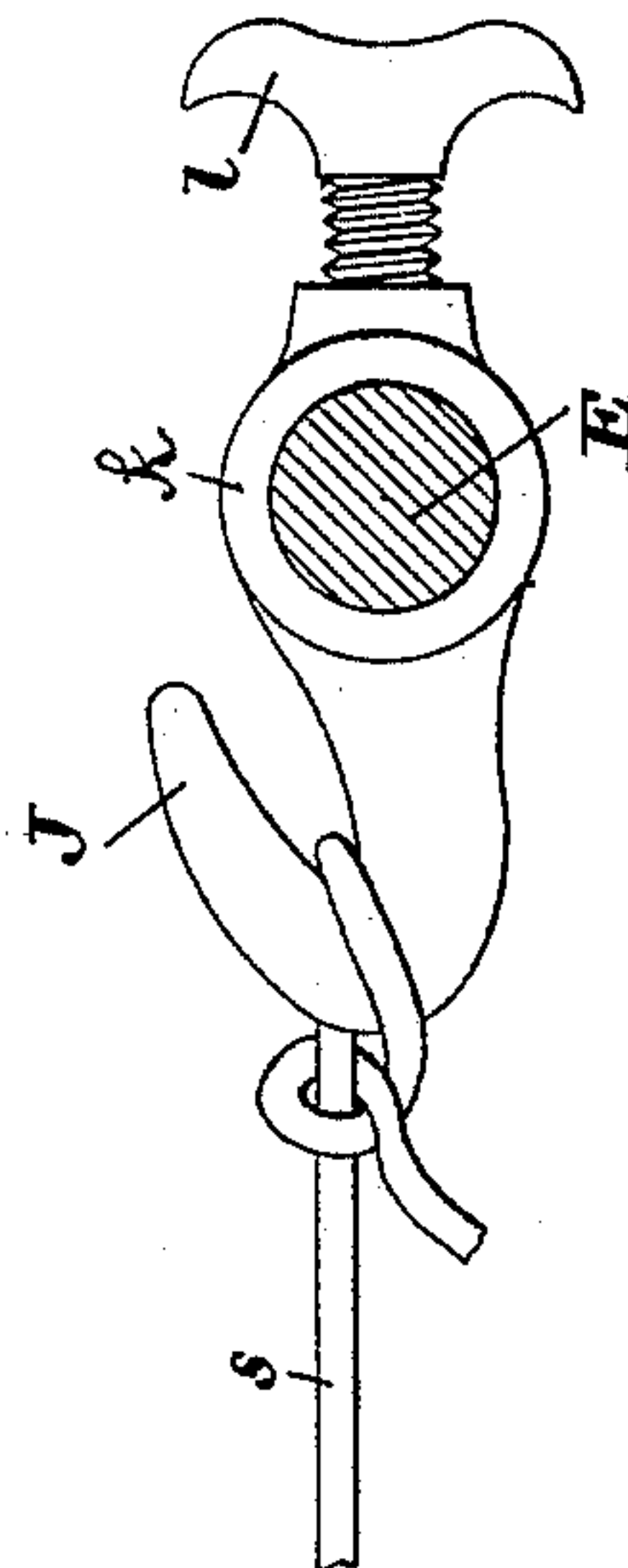


Fig. 2

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*John E. Morris*

INVENTOR:

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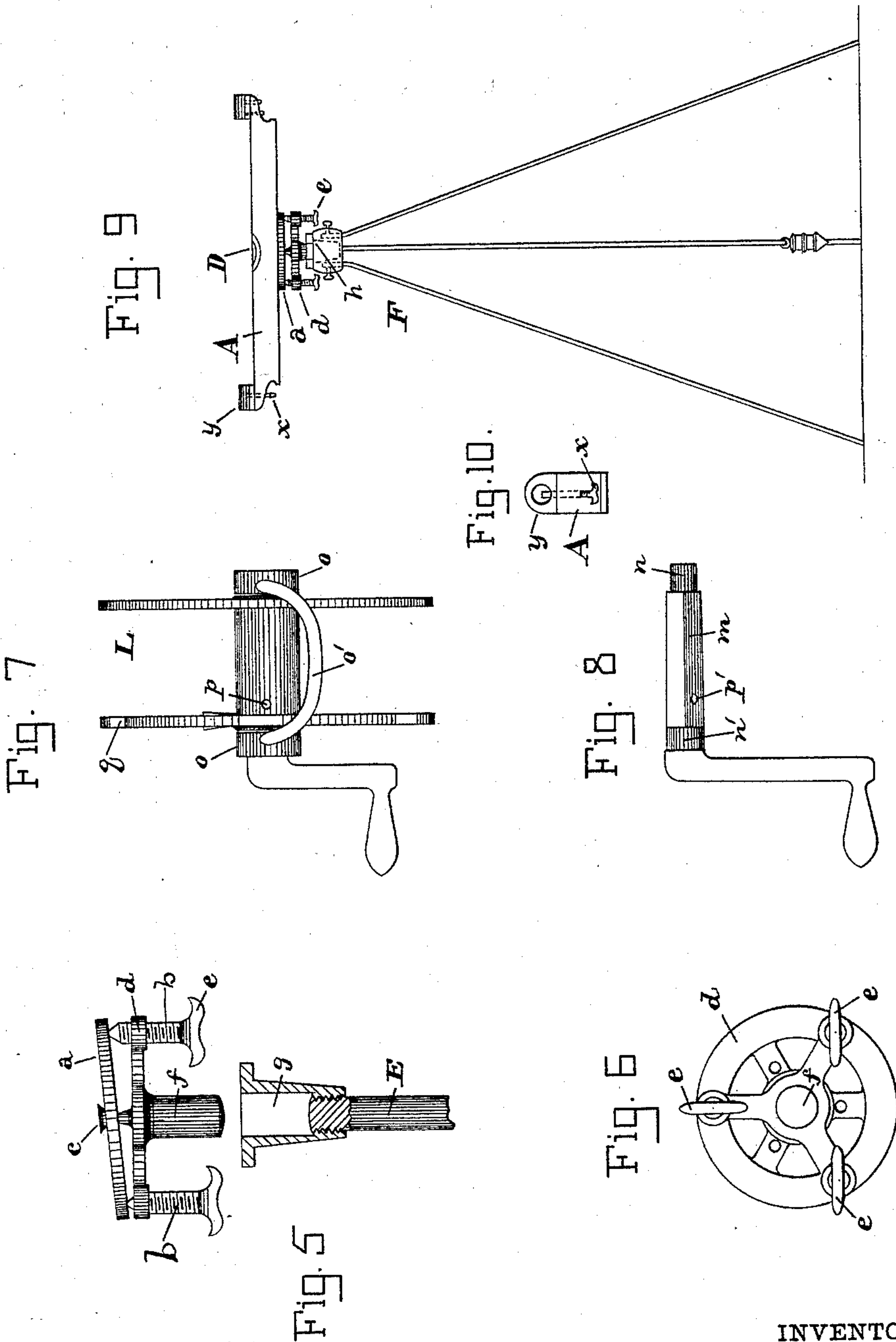
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# UNITED STATES PATENT OFFICE.

EDWARD REICHENBACH, OF ORRVILLE, OHIO.

## INSTRUMENT FOR SURVEYING AND GRADING DITCHES.

SPECIFICATION forming part of Letters Patent No. 433,697, dated August 5, 1890.

Application filed March 27, 1890. Serial No. 345,483. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD REICHENBACH, a citizen of the United States, residing at Orrville, in the county of Wayne and State of Ohio, have invented certain new and useful Improvements in Instruments for Surveying and Grading Ditches, of which the following is a specification.

This invention relates to a leveling-instrument for employment in various works, such as making ditches for draining land, terracing hillsides, grading and leveling roads, lots, &c.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a sectional view of a piece of ground, showing the various parts of the leveling-instrument in position as when used for grading. Fig. 2 shows the adjustable hook to which the reel-line is attached. Figs. 3 and 4 are views of the open-eye, which is adjustable on the center-prop. Figs. 5 and 6 show the swiveling level-adjuster. Fig. 7 shows a front view of the reel, of which a side view on a smaller scale is seen in Fig. 1. Fig. 8 shows the crank-shaft of the reel. Fig. 9 shows the horizontal spirit-level bar, swiveling adjuster, tripod, and legs, used as a ditching level. Fig. 10 is a view of the sight-bore and screw.

The body A of the level has a spirit-glass D, and at each end bosses with sight-bores, which may be made in any approved manner. This part is substantially like that shown and described in my United States Letters Patent No. 340,690, dated May 11, 1886.

One end of the level-body A is provided with a set-screw *x*, which enters at the under side below the sight-boss *y*. The end of the screw penetrates the sight-bore, as seen in Fig. 10, and as the screw may be adjusted up or down the screw end serves as a sight in a manner similar to the muzzle-end sight of a gun. This screw as a sight may be adjusted to suit the set position of the spirit-glass D instead of adjusting the latter to suit the sights.

The level-body A may be mounted in a standard E or on a tripod F, and to enable the level-body to be adjusted and properly leveled I employ a swiveled plate *a* and screws *b* to adjust the plate. The plate *a* is suitably

attached to the under or bottom side of the level-body A, and at its center has a hole through which loosely passes the pivot-pin *c*, attached to and projecting up from a base *d*. The plate *a* and level-body A may be turned around on the said pivot *c*, and also tilted or inclined in any direction, as indicated in Fig. 5. These adjusting-screws *b* pass up through the base-plate *d* and are equidistant and have pointed ends which bear up against the swiveled plate *a*. By this device it will be seen that the level-body A may be adjusted accurately.

The base-plate *d* is provided on its under side with a central prong or stud *f*, which fits in a socket *g* on the top of the standard, or on the tripod, as the case may be. This prong or stud may set in the socket and be held there by friction, or it may be screwed therein. In the case of the standard E this socket is screwed onto the upper end. (See Fig. 5.) In the case of the tripod F the socket is fixed in a head-block *h*. (See Fig. 9.)

When used for grading, as in Fig. 1, the lower ends of the standards E are set into the ground G, and a brace-rod I has at one end a crotch *i*, which rests against the standards E, and at the other end has a foot *j*, shaped something like a hoe. This hoe-foot *j* enters the ground, as shown, and prevents the brace-rod from pushing out of position. One standard E has an adjustable hook J, which is secured by an eye or collar *k*, which surrounds the standard and is provided with a set-screw *l*, whose end impinges against the standard. Thus the hook J is adjustable up or down. Both standards in practice have scale-marks and figures denoting inches. One standard has a reel or windlass L, which is vertically adjustable. This reel is an ordinary spool having a square socket or bore through its center to receive the square crank-shaft *m*. This shaft is slightly tapering, and one end has a small journal *n* and at the other end a larger journal *n'*. These journals turn in the frame having two side bars *o*, the spool or reel L resting between said two bars. A pin *p* passes through the spool and through a hole *p'* in the crank-shaft and keeps the parts in place. At the rear end the frame-bars *o* are attached to a collar *k'*, which surrounds the standard E, and said collar has a



set-screw  $l'$ . This collar and set-screw are provided for the vertical adjustment. At the front end the frame-bars  $o$  are united by a downwardly-curved cross-bar  $o'$ , over which the cord passes and which keeps the cord practically at the same height whether the spool be wound nearly full or nearly empty. One side wheel of the reel has ratchet-teeth  $q$ , and a pawl  $r$ , pivoted on the collar  $k'$ , engages these teeth and prevents the reel from unwinding. The cord  $s$  is wound on the reel  $L$  at one standard, and in use has one end attached to the adjustable hook  $J$  on the other standard. By these devices the cord  $s$  may be stretched taut and leveled.

A center-prop  $N$  is stuck in the ground midway of the standards and has a collar  $t$ , provided with a set-screw  $u$ , for vertical adjustment. This collar is provided with an open-eye device, consisting, in the present instance, of two bent prongs or hooks  $v v'$  one above the other, with their hook ends projecting toward each other, but turned obliquely, as seen in Fig. 4, so as to pass at one side of each other. An open space  $w$  is thus left between the hooks for admitting the cord  $s$ . This open-eye device allows the operator to set the cord in through the open space, and when once in a stretched condition the cord has a certain freedom, but cannot escape.

When land has been staked and surveyed, the grading-level device can be used to good advantage. By a simple calculation based upon the surveyor's notes it is easy to determine how high to draw the cord above the stakes so as to obtain the desired fall.

The device shown in Fig. 9 shows the level-body  $A$  mounted on a base-plate  $d$ , with the same central prong and socket  $g$  shown in Fig. 5, and supported on tripod-legs. These instruments are used together.

Where the land has not been staked off and

surveyed the adjustable level mounted on one of the upright standards  $E$  will serve to test the level of the stretched cord by sighting a level line at an ordinary measure-rule set in an upright position at the opposite end of the said cord.

Having described my invention, I claim—

1. The combination of the level-body  $A$ , swiveled plate  $a$ , base-plate  $d$ , having set-screws  $b$ , and provided with a pivot-pin  $c$  upon its upper side, which projects loosely through the plate  $a$ , and at its underside with a stud  $f$ , and a standard having at its upper end a socket  $g$  to receive the said stud, as shown and described.

2. The combination of the standard  $E$ , a windlass-frame consisting of two side bars  $o$ , having at the rear end a collar and set-screw  $l'$ , and at the front end a downward cross-bar  $o'$ , a crank-shaft turning in said frame, and a reel on the said shaft between the side bars.

3. The combination of the two standards  $E$ , a cord connecting them, and a center-prop  $N$ , having a vertically-adjustable collar  $t$ , provided with bent prongs or hooks  $v v'$ , one above the other, with their hooked ends projecting toward each other, but turned obliquely and passing each other with an open space between them, thereby forming an open-eye, as specified.

4. The combination, with the level-body  $A$ , of a spirit-glass  $D$ , a boss at one end with a sight-bore through it, and an adjustable set-screw entered at the under side upward and penetrating the said sight-bore.

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

EDWARD REICHENBACH.

Witnesses:

A. O. BABENDREIER,  
JNO. T. MADDOX.