(No Model.)

A. CRAVEN.

SURVEYOR'S TARGET.

No. 340,702. Patented Apr. 27, 1886.

Fig. 3

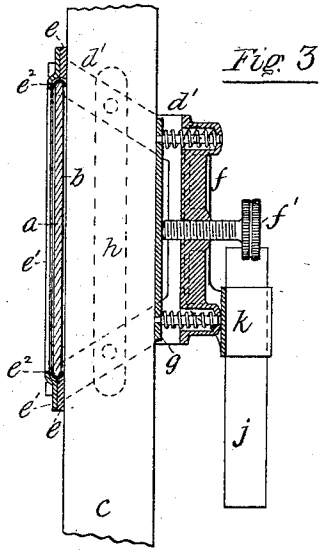


Fig. 1

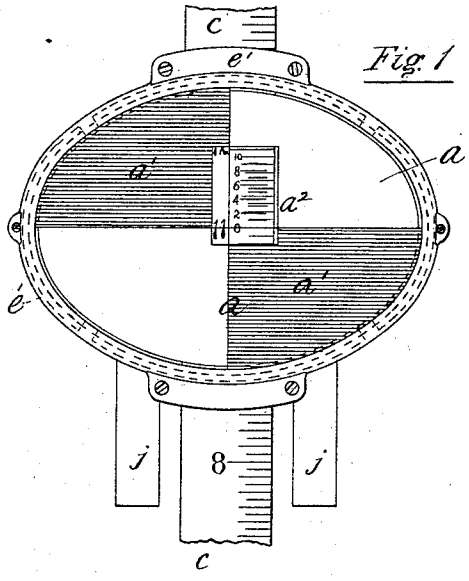


Fig. 4

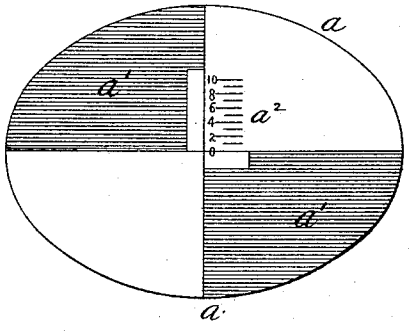
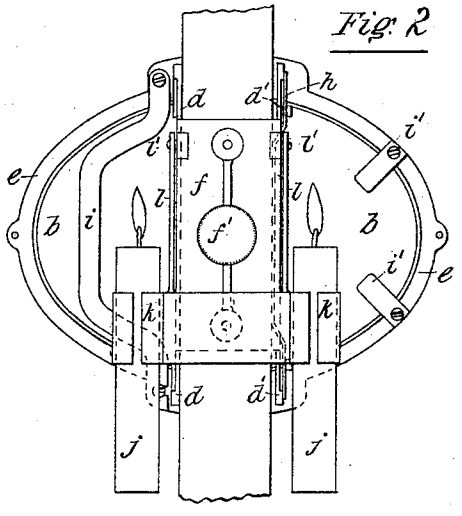


Fig. 2



Witnesses

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UNITED STATES PATENT OFFICE.

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SURVEYOR'S TARGET.

SPECIFICATION forming part of Letters Patent No. 340,702, dated April 27, 1886.

Application filed September 25, 1885. Serial No. 178,143. (No model.)

To all whom it may concern:

Be it known that I, ALFRED CRAVEN, a citizen of the United States, residing at Irvington, county of Westchester, State of New York, have invented certain new and useful Improvements in Surveyor's Targets, of which the following is a specification.

The sliding targets of surveyor's leveling-staffs have heretofore been made opaque, their markings being visible by light reflected from their surfaces, making it inconvenient to use them in other than strong diffused lights.

Now, this invention has for its object the construction of a surveyor's target adapted to be used with equal facility in diffused light, as daylight, and in the dark, as at night, or in tunnels, &c.; and this I accomplish by making the target plate or face of a suitable transparent or translucent substance capable of reflecting the light-rays, and also readily transmitting the rays of light from a lamp or candle placed behind the same, thus making said plate an illuminant when the instrument is used in dark places.

The invention also embraces certain novel features in the construction of targets.

In the accompanying drawings, to which I will now refer, Figure 1 is a front elevation of a surveyor's target embodying my improvements. Fig. 2 is a rear view of the same. Fig. 3 is a vertical central section, and Fig. 4 is a detached view of the light-transmitting target plate or face.

The target plate or face *a* is composed of a material which will transmit light, being either transparent or translucent. Of the materials having these qualities I mention glass, horn, mica, hardened gelatine, and celluloid as adapted to be used for this purpose. The colored quarters *a' a'*, which are generally red, (indicated by the horizontal shading-lines in the drawings,) may be produced by means of a suitable paint or dye that will transmit light applied to the light-transmitting plate. The clear quarters correspond to white quarters of ordinary surveyor's targets. If glass is used, a red flashed glass may be taken and the clear quarters produced by removing the red glass by grinding or other suitable process, making said quarters translucent, so that the light will be reflected from all parts of the target when the instrument is used in natural or diffused light, and when an artificial light is placed behind the target in using the instrument at night or in dark places, as tunnels, &c., the whole of the face of the plate *a* will be, by the transmission of the light, uniformly illuminated. If these clear spaces be made or left transparent, then a white translucent backing-piece, *b*, of paper or other suitable material, (shown at Fig. 3,) may be placed behind the plate to reflect the light for day work, and may, if desired, be also used for night work to diffuse the artificial light placed behind the target; or, if a transparent substance be used, it may be made translucent by white paint or dye.

On the target-plate *a* is marked the vernier a^2, commencing at the horizontal indicating-line, which is used in conjunction with the scale on the leveling-staff in the ordinary manner.

The central part of my improved target-plate may be cut away, as in ordinary opaque targets; but I prefer to leave it whole with its central part transparent, so that the scale on the staff may be readily observed through it.

The frame in which the target-plate *a* is held, and by which it is attached to the staff *c*, is composed of two thin open side pieces, *d d'*, secured to the rear of or forming part of the ring *e*, in which the plate *a* is directly secured by the covering-ring *e'*, said plate being provided with an elastic cushioning-binding, e^2, to preserve it from injury due to jars, &c. The rings *e* and *e'* are held together by means of screws, so that the plate *a* may be readily removed and replaced by a new one, if necessary. The rear ends of the side pieces, *d d'*, are joined together by the back plate, *f*, through which passes the binding-screw *f'*, setting against the spring-plate *g*, between which and the rear of the ring *e* the staff *c* is clamped. The spring-plate *g*, when the screw *f'* is slacked, presses against the staff *c* with sufficient force to uphold the target on the staff; and to keep the side piece *d* always against the side of the staff, the spring *h* is fastened to the other side piece *d'* and presses on said staff through the open space of said side piece. The place of contact of the spring *h* being between the two bearing-points of the side piece *d'* on the

other side of the staff allows the target to slide freely up and down the staff without any shaking or wabbling action, as occurs in targets now in use, in which the frames are made with solid side pieces and the retention-spring formed to bear on the staff at points beyond the frame.

To hold the white backing-piece *b* in position against the transparent or translucent target-plate *a*, a flat spring, *i*, is pivoted at one end to the frame *c* in such a manner as to bear on the backing *b*, as shown, or to be clear of it when moved around on its pivot to permit the backing-piece to be placed in position or removed from behind the target-plate. Two of these springs *i* may be used, one on either side; or, in lieu of the long spring *i*, small springs *i' i'*, pivoted to the ring *c*, may be used to hold the backing-piece in position.

The light-carrying appendage is so pivoted to the rear part of the frame that the light or lights will swing beyond the top of the target should it be tilted backward, so that no damage could be caused thereby. It may be constructed to hold any form of lamp, but is shown as adapted to hold two common candles, *j j*, in sockets *k k*, from which extend arms *l l*, having holes in their upper ends fitting over pins *l' l'*, projecting from the upper parts of the side pieces, *d d'*, of the frame. The arms *l l* are made sufficiently flexible to be sprung over the ends of the pins *l' l'*, thus permitting the light to be readily removed when it is not required. The candles *j j* are so placed that the light emanating from them passes freely through the target-plate *a* at both sides of the staff *c*, thereby illuminating all parts of it, and by reason of the translucency of the target, due to the nature of the target-plate itself, white paint applied thereto, or to the paper backing, the glare of the light is avoided and prevented from interfering when observations are being made.

It is evident that my new light-transmitting target-plate may be applied to surveyor's targets of other constructions than here described, and also that the improvement in target-frames here described may be used without the light-transmitting target-plate.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a surveyor's target, a transparent or translucent target plate or face, substantially as and for the purpose set forth.

2. In a surveyor's target, the combination, with a transparent or translucent target plate or face, of a light reflecting or diffusing backing-piece, substantially as and for the purpose set forth.

3. In a surveyor's target, the combination, with a transparent or translucent target plate or face, of an artificial illuminant attached to the rear side of the target, substantially as and for the purpose set forth.

4. A surveyor's target plate or face composed of a transparent or translucent material having right-angled indicating-lines dividing the same into four quarters—two colored and two plain—the central portion being transparent and provided with a vernier-scale, substantially as set forth.

5. In combination, a light-transmitting target-plate, a leveling-staff, an adjustable holding-frame by which the target-plate is attached to the staff, and an artificial light-holder attached to the rear side of the target-frame, substantially as and for the purpose set forth.

6. In combination, a light-transmitting target-plate, a frame in which the target-plate is held, a light-reflecting backing-piece, and springs attached to the frame and arranged to bear on the backing-piece to hold it against the rear side of the target-plate, substantially as set forth.

7. In combination, the target plate or face *a*, the rings *e e'*, side pieces, *d d'*, back plate, *f*, spring-plate *g*, and staff *c*, substantially as set forth.

8. In a surveyor's target, in combination, the open-side frame-pieces *d d'*, the target-plate rings *e e'*, and back plate, *f*, connecting the two pieces *d d'* together, the staff *c*, and the spring *h*, secured to the side piece *d'*, with its central part bearing on the staff through the open space of said side piece, as and for the purpose set forth.

9. In a surveyor's target, in combination, the light-transmitting target-plate *a*, the holding-rings *e e'*, the translucent backing-piece *b*, and the holding-springs *i' i'*, substantially as set forth.

10. In a surveyor's target, in combination, the light-transmitting target-plate *a*, the holding-frame *d d' e e' f*, the staff *c*, and the artificial light-holder *k k l l'*, substantially as set forth.

In testimony whereof I have hereunto set my hand, at New York, county and State of New York, this 21st day of September, 1885.

ALFRED CRAVEN.

Witnesses:

H. D. WILLIAMS,

JOSEPH GARDAM.