

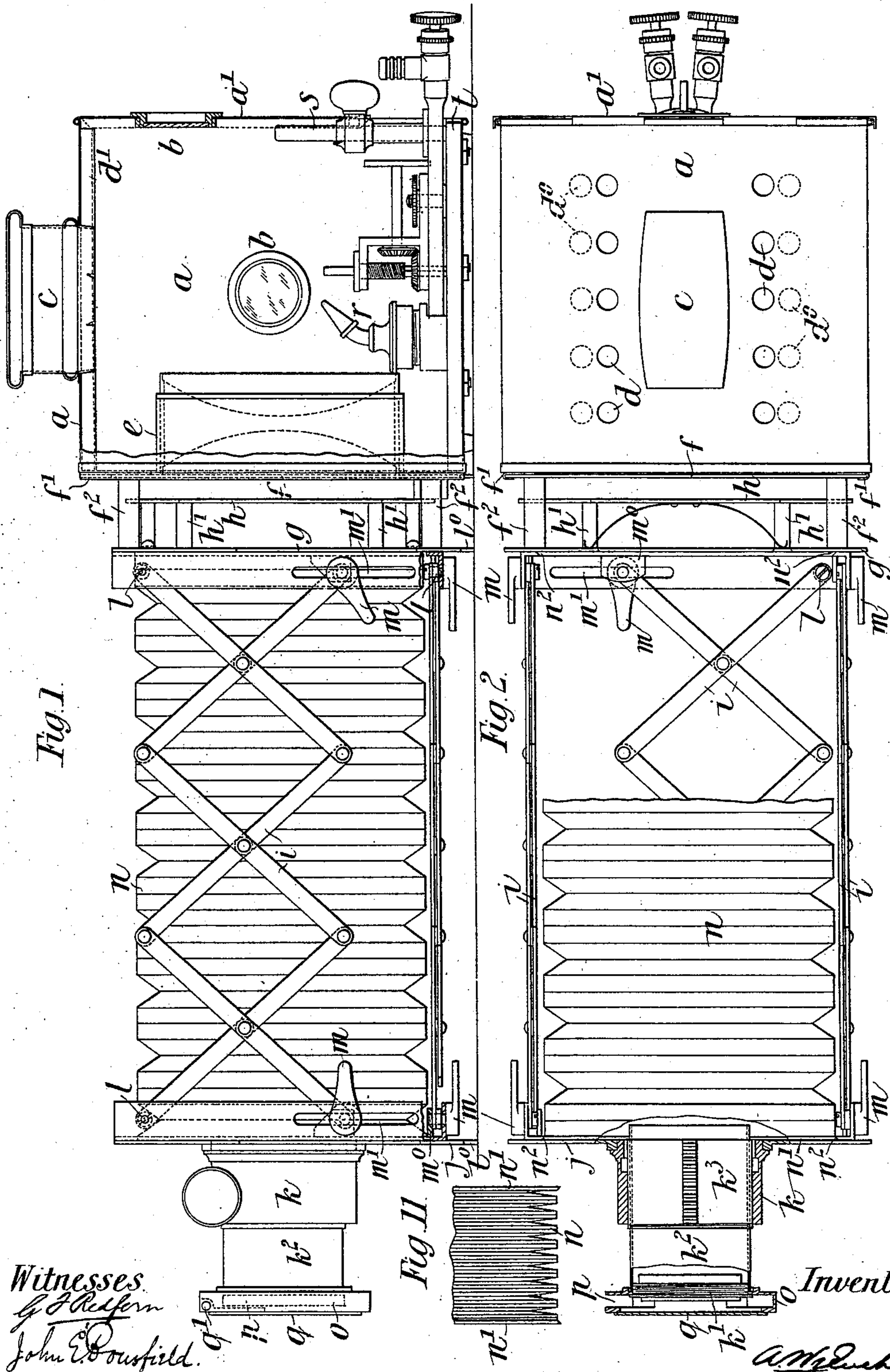
(No Model.)

2 Sheets—Sheet 1.

A. WRENCH.  
COLLAPSIBLE MAGIC LANTERN.

No. 540,414.

Patented June 4, 1895.



Witnesses  
G. J. Redfern  
John E. Dousfield.

Inventor.

A. Wrench

A. WRENCH.  
COLLAPSIBLE MAGIC LANTERN.

No. 540,414.

Patented June 4, 1895.

Fig. 3

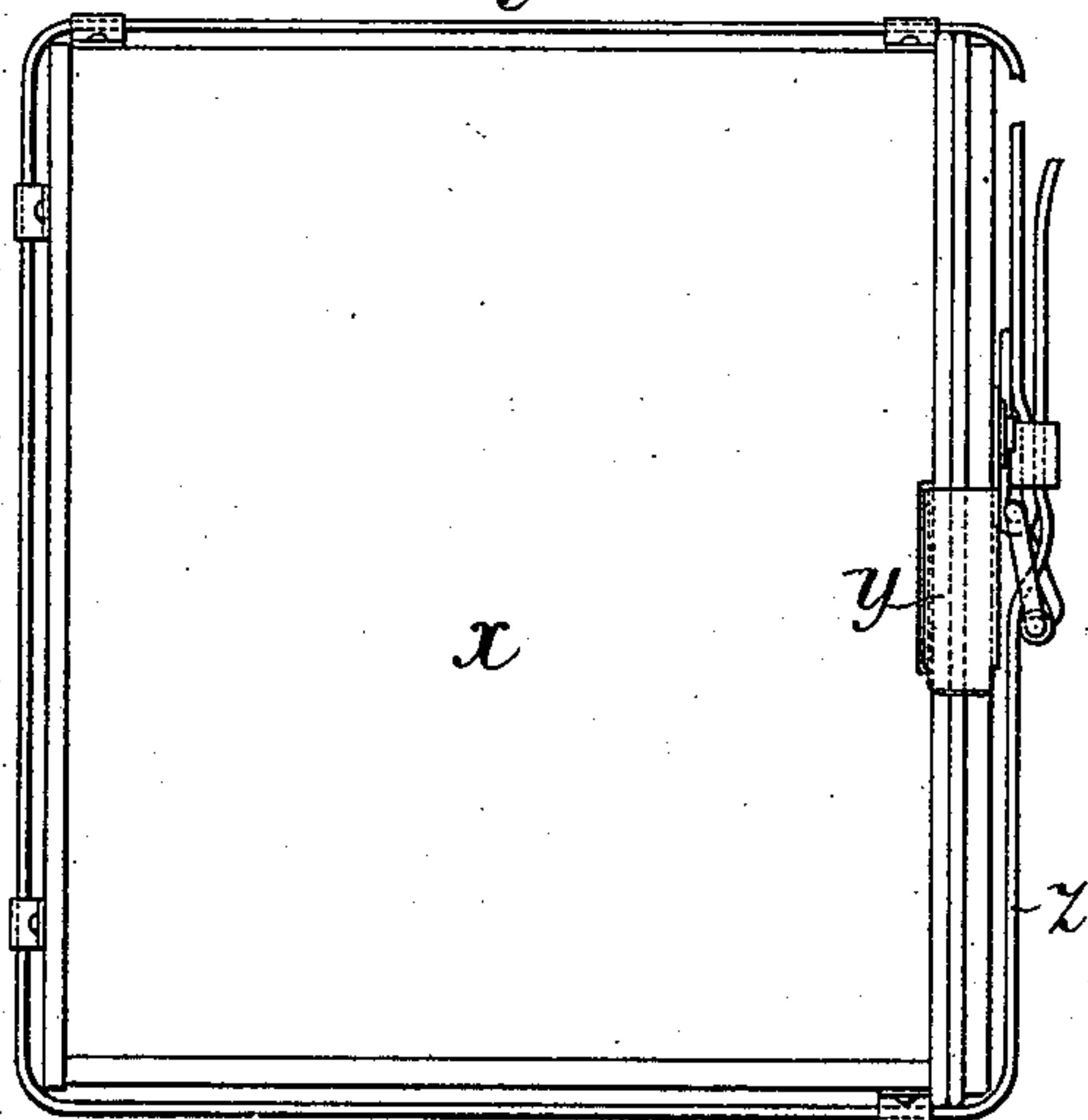


Fig. 4

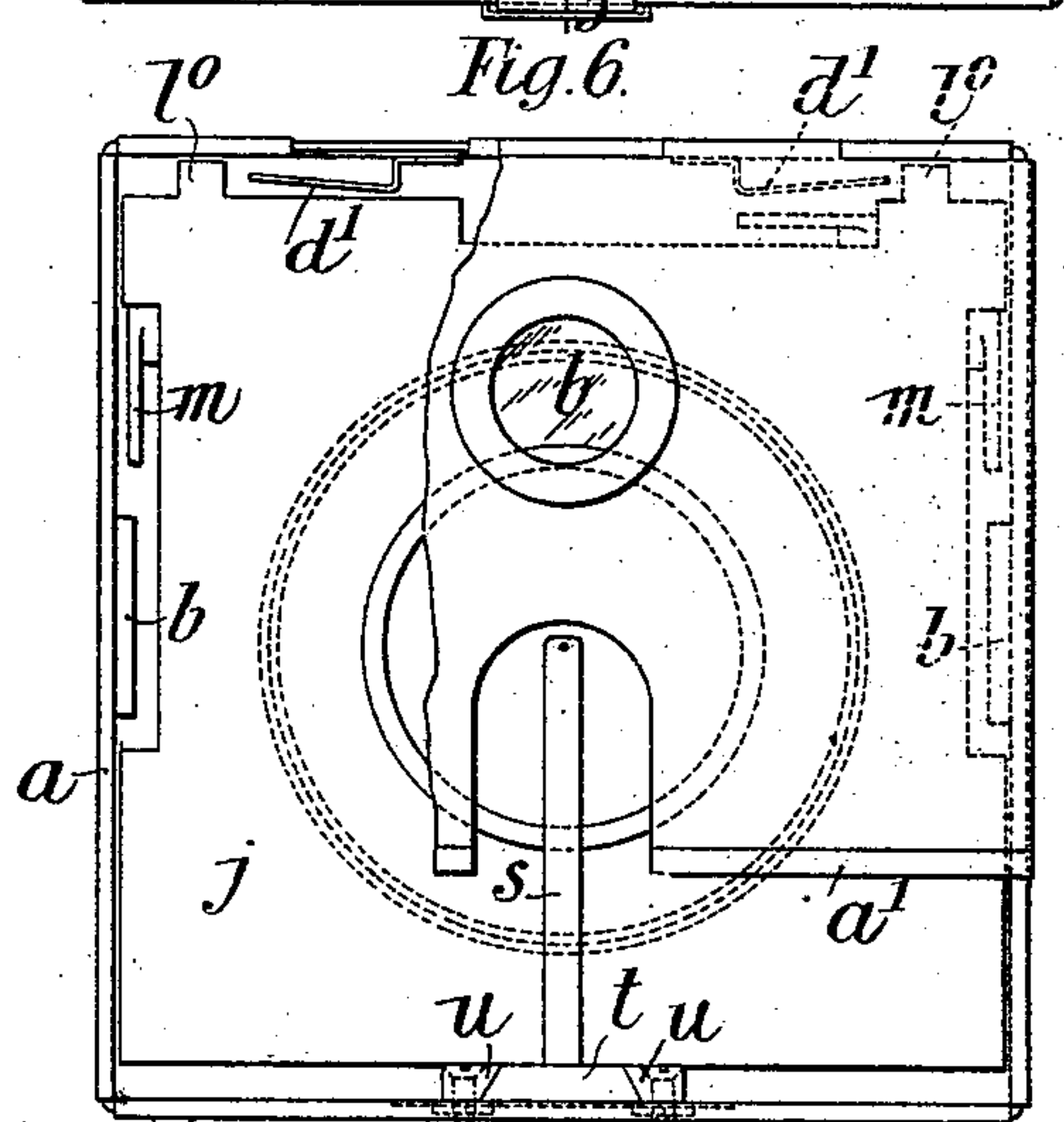
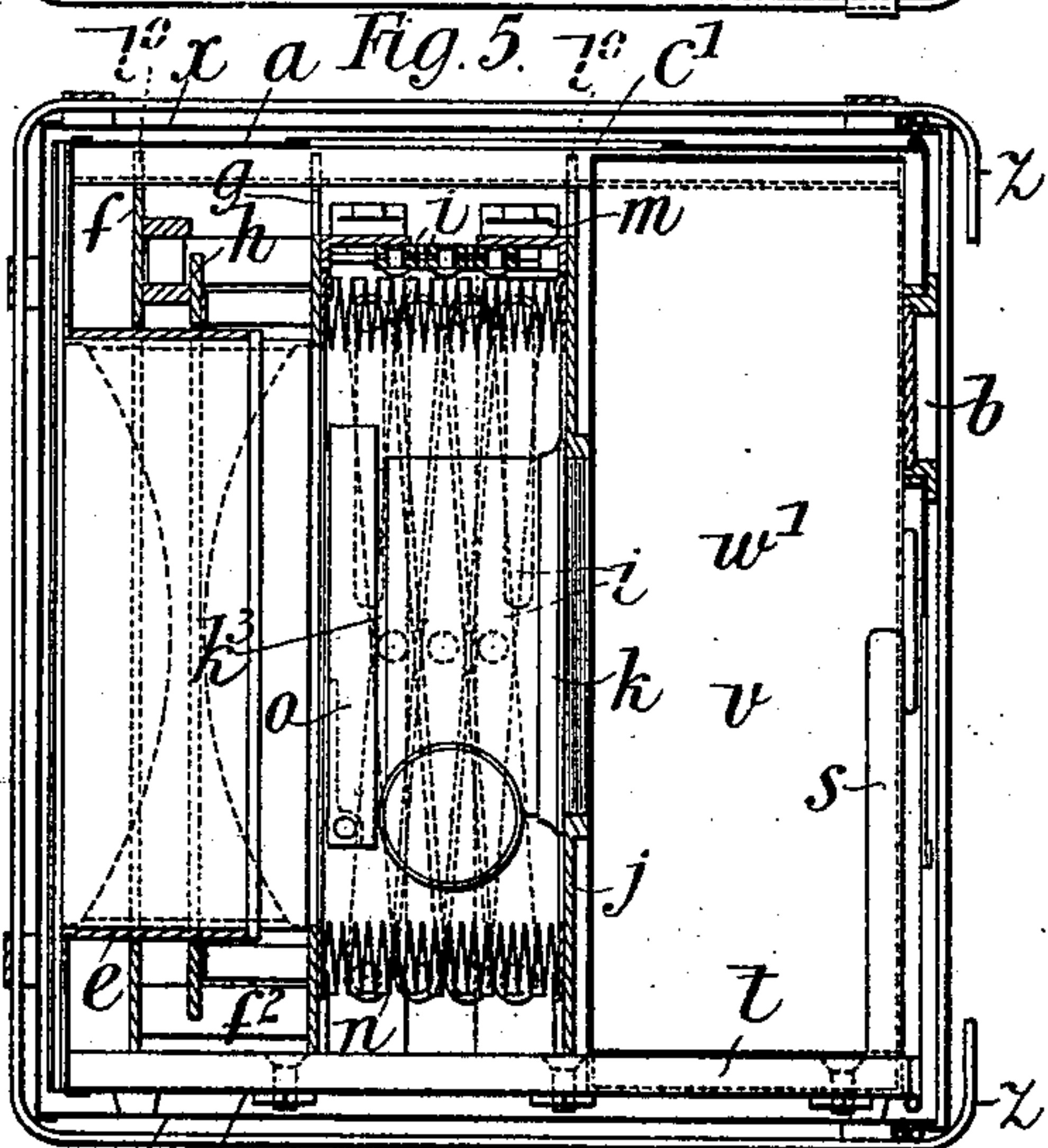
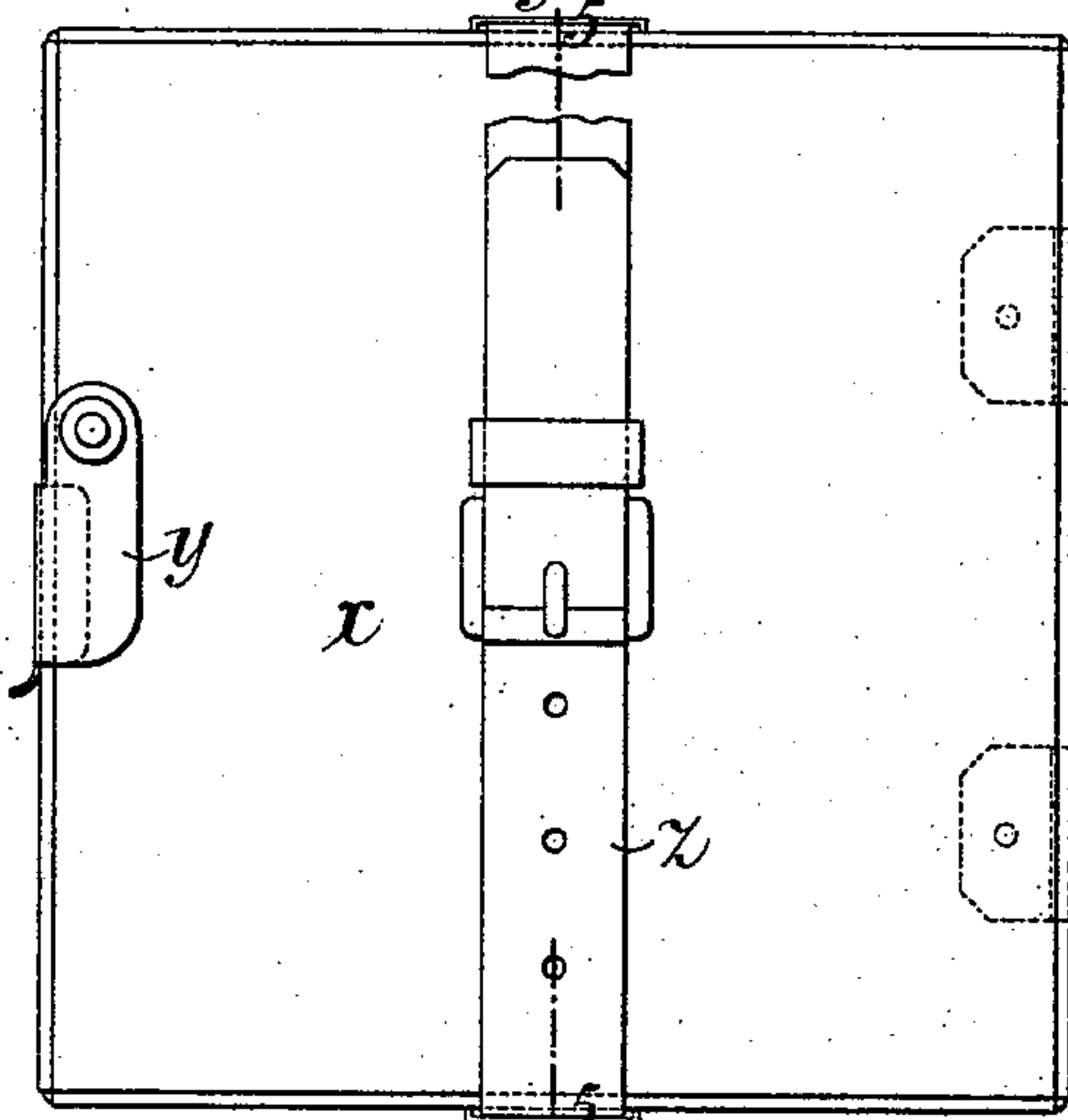


Fig. 7

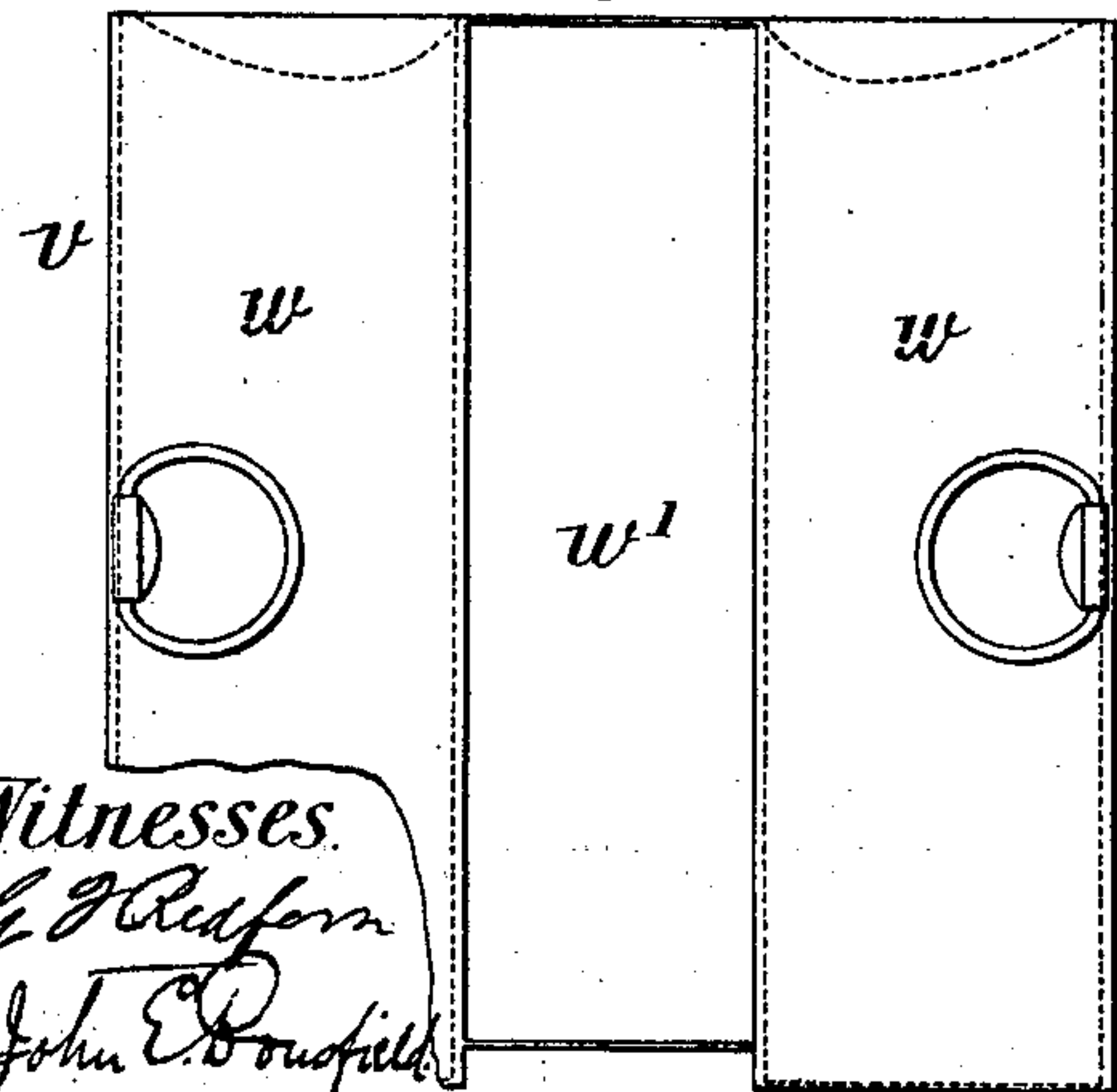


Fig. 8

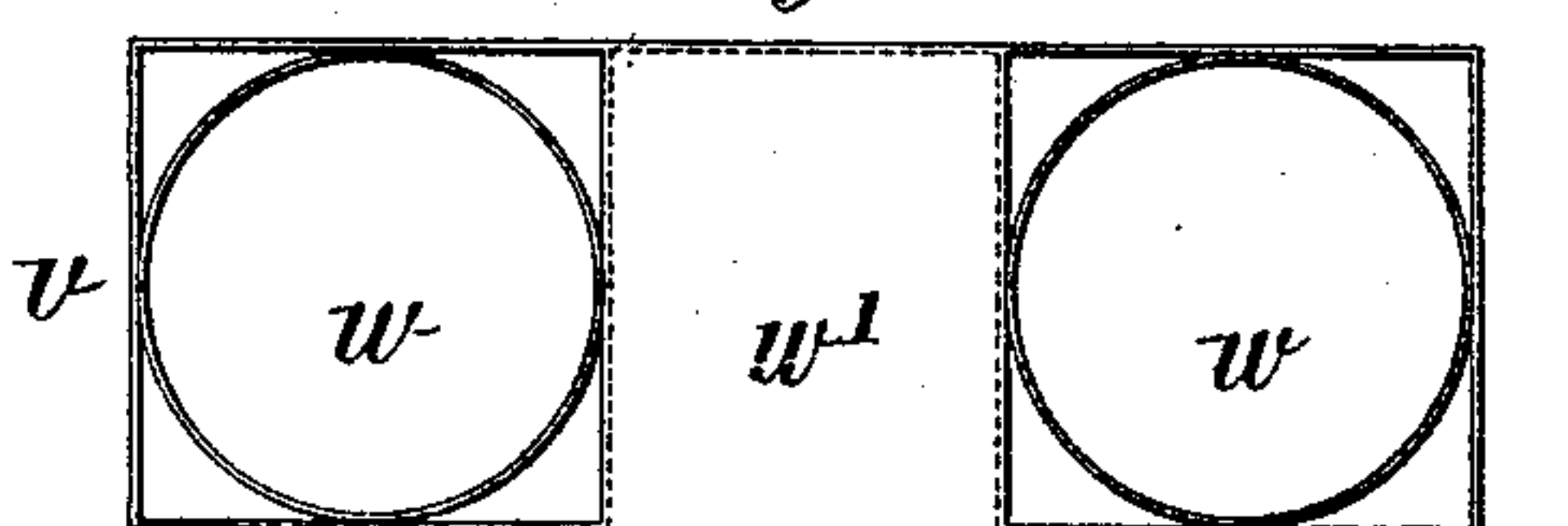


Fig. 9

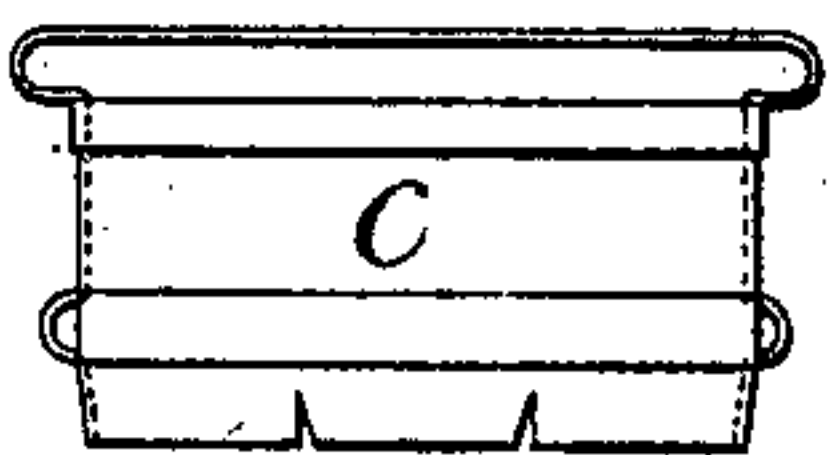
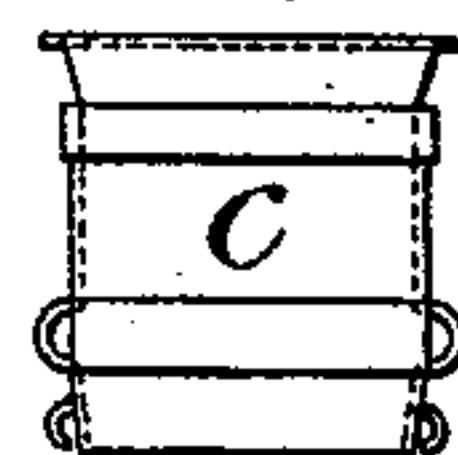


Fig. 10



Witnesses.  
G. J. Redfern  
John E. Doudell

Inventor.

A. Wrench



# UNITED STATES PATENT OFFICE.

ALFRED WRENCH, OF LONDON, ENGLAND.

## COLLAPSIBLE MAGIC LANTERN.

SPECIFICATION forming part of Letters Patent No. 540,414, dated June 4, 1895.

Application filed July 17, 1894. Serial No. 517,827. (No model.)

*To all whom it may concern:*

Be it known that I, ALFRED WRENCH, a subject of the Queen of Great Britain, residing at London, England, have invented new and useful Improvements in Collapsible Magic Lanterns, of which the following is a specification.

My invention relates to magic lanterns, and has for its object to provide a lantern which can be folded or collapsed into a much smaller space than a lantern of similar capabilities (as regards the diameter of the disk illuminated and the focus) as heretofore constructed and also to provide means whereby the lantern when extended or opened out will be more rigid than heretofore.

A lantern constructed according to my invention has a metal body having at the back a hinged door and on the inside of the front a cell for carrying the condenser. To the front of this body is fitted a frame carrying the staging for the slides and having connected to it by lazy-tongs levers the front plate carrying the objective mount, screws being provided for fixing the lazy-tongs levers and so insuring the rigidity of the extensible portion of the lantern. The space between the said frame and the plate carrying the objective mount is provided with a leather bellows. The objective lenses and some other loose parts are adapted when the lantern is folded up or collapsed to be carried in a box or case designed to fit within the lantern body, and the lantern body itself with all the parts which it contains are inclosed in an outer box.

To enable my invention to be fully understood I will describe the same by reference to the accompanying drawings, in which—

Figure 1 is a sectional side elevation showing my improved lantern extended, and Fig. 2 is a sectional plan of the same. Figs. 3 and 4 are side and end views, respectively, of the box for containing the lantern and its accessories. Fig. 5 is a section on the line 5 5, Fig. 4, showing the lantern within the box. Fig. 6 is a rear elevation of the lantern-body with part of the hinged cover broken away, the said view also showing the position of the front plate of the extensible portion of the lantern when the same is folded up within the said body. Figs. 7 and 8 are an elevation and plan of the box for containing some of the accessories. Figs. 9 and 10 are side and

end elevations, respectively, of the lantern-chimney; and Fig. 11 is a plan view illustrating the construction of the bellows.

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

*a* is the lantern body which is preferably formed of Russian iron, and *a'* is the door at the rear of the said body, the said door as shown being hinged to the top of the body, and *b, b* are sight holes formed in the sides of the body and in the door and provided with colored glass in a well known manner.

*c* is a chimney (shown detached in Figs. 9 and 10) having its lower edge slit to enable it to be sprung into a hole or aperture *c'* formed in the top of the body.

*d, d'* are ventilating holes formed respectively in the top and bottom of the body, and *d'* are shields placed inside the top of the body to prevent light from showing through the holes *d*.

*e* is the cell for containing a condenser in a metal mount.

The frame carrying the staging and the extensible portion of the lantern comprises a plate *f* adapted to slide in, and be held against the front plate of the body *a*, by guides *f', f'* on the latter, pillars *f<sup>2</sup>, f<sup>2</sup>* fixed to the plate *f* carrying another plate *g* to which the extensible portion of the lantern is directly connected. The plates *f, g* are provided with central apertures for the passage of the light and the space between the said plates is occupied by the staging for the slides, *h* being the spring-plate by means of which the slides are held in position, and *h', h'* guide-pins for the said plate, the said pins sliding in holes in the plate *g*.

*i, i* are the lazy-tongs levers carrying the plate *j* in which the objective mount *k* is fixed. In practice I use three sets of such lazy-tongs levers, namely, one set at each side of the extensible portion of the lantern and one at the bottom, each set at each end having one of its levers pivoted at *l* to a flange upon the plate to which it is connected and having the other lever at each end provided with a clamping screw *m* and nut *m<sup>0</sup>*, the said clamping screw sliding through a slot *m'* also formed in the flanges of the plates *g* and *j* for fixing the lazy-tongs in any position in which the extensible portion of the lantern is placed. In practice the clamping screws *m* are made



with lever extensions, as shown, to facilitate the tightening of the same and the plates *g*, *j* are cut away as shown in Fig. 6 to allow of free movement for the said screws when the  
5 levers *i*, *i* are extended.

The plates *f*, *g* and *j* are provided with feet or extensions *l*<sup>0</sup> at the bottom to support the extensible portion of the lantern in the proper plane relatively with the body *a*, the spaces  
10 between the feet serving to allow the said plates to pass the shields *d'* when the extensible portion is placed inside the body as shown in Fig. 6.

*n* indicates the leather bellows which are  
15 fixed between the plates *g* and *j* in the space between the sets of lazy-tongs levers *i*. In order to permit of the bellows being readily removed, for instance, in cases when the lantern is to be used as a science lantern I attach the ends of the said bellows to plates *n'*,  
20 *n'* as shown most clearly in Fig. 11, the said plates being designed to slide in grooves *n*<sup>2</sup>, *n*<sup>2</sup> on the plates *g* and *j*, Fig. 2.

I prefer that the extensible portion of the  
25 lantern should have a range of adjustment of twelve inches which is sufficient for a twelve and one-fourth focus front or objective lens, but as I provide my lantern with objective lenses of varying foci the extent to which the  
30 extensible portion of the camera is opened being according to the focus of the particular lens used.

The objective lens *k'* is carried by a tube *k*<sup>2</sup> adapted to be held by a tube *k*<sup>3</sup> in the  
35 mount *k* the tube *k*<sup>3</sup> being arranged to be moved by a rack and pinion to permit of accurate focusing and the front *o* (attached to the tube *k*<sup>2</sup>) is formed with a slot *p* into which colored pieces of glass may be introduced for  
40 tinting purposes. A shutter *q* hinged at *q'* is also connected to the said front piece *o*.

*r* is an oxy-hydrogen burner of ordinary construction which is carried upon a pillar *s* fixed to a bar or tray *t* sliding in guides *u*, *u*  
45 on the bottom of the lantern body *a*.

*v*, Figs. 5, 7 and 8, is the box or receptacle into which certain of the accessories of the lantern are packed, *w*, *w* being the compartments for the objective lenses and the chimney *c*, and *w'* the compartment into which the  
50 oxy-hydrogen burner is placed.

*x* is the box into which the whole apparatus is packed, the lid of which box is provided with a catch or clasp *y* for retaining the lid  
55 closed, and *z* is a strap which is provided for facilitating the carrying of the said box.

The mode of packing the apparatus is as follows: The frame with the staging and extensible front portion of the lantern are first  
60 detached from the body *a* and after the screws *m*, *m* are loosened the extensible portion is collapsed. The lens *k'* and the tube *k*<sup>2</sup> are then removed from the tube *k*<sup>3</sup> of the mount *k* and placed in one of the compartments *w* of the  
65 case *b* and the front *o* is removed from the tube *k*<sup>2</sup> and screwed onto the end of the tube *k*<sup>3</sup>. The mount *k* with the said front *o* is then

removed from the plate *j* and again screwed into the opening from the inside of the bellows (this position being shown in Fig. 5).  
70 The bar or tray *t* with the oxy-hydrogen burner is also removed from the body *a* and the whole of the extensible portion is then put within the said body through the opening in the rear of the latter, with the feet *l*<sup>0</sup> upper-  
75 most, the condenser cell *e* projecting through the openings in the plate *f* and the spring-plate *h* also as shown in Fig. 5. The case *v* for containing the accessories is then introduced into the body and finally the bar or  
80 tray *t* carrying the burner standard *s* is introduced into its guides *u*, *u*. The door *a'* is then closed and the whole lantern is introduced into the box *x* and secured therein by the clasp *y* and strap *z*.  
85

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a magic lantern the combination with  
90 the main body carrying a condenser and adapted to receive a lamp or burner, of guides secured to the front of said main body, a framing provided with a staging for the slides having a portion for removably engaging said  
95 guides, a front lens carrying plate, connected to said framing by lazy-tongs, and clamping devices secured to said framing and engaging an arm of said lazy-tongs to rigidly secure  
100 said front plate in any desired position, substantially as described.

2. In a magic lantern the combination with the main frame, of the framing provided with a staging for the slides adapted to be removably secured thereto, a front lens carrying  
105 plate connected to said staging by lazy-tongs, adjusting devices engaging an arm of said lazy-tongs for rigidly clamping said front plate in any desired position, guides secured to said front plate and to said framing and a  
110 collapsible bellows having end frames for removably engaging said guides, substantially as described.

3. In a magic lantern the combination with the main body or casing adapted to contain  
115 all the parts of the device, of the frame carrying the staging for the slides, removably secured to the front plate of said main body, the front lens carrying plate movably secured to said frame, a bellows connecting said frame  
120 and front plate, a removable lens for said front plate, a removable chimney for said body, and a box or casing for containing the lantern accessories, adapted to be placed within said  
125 main body whereby said frame, bellows, front lens carrying plate and said box or casing may be placed within said main body, substantially as described.

In witness whereof I, the said ALFRED WRENCH, have hereunto set my hand.

ALFRED WRENCH.

Witnesses:

JOHN E. BOUSFIELD,  
B. BRADY.