

(No Model.)

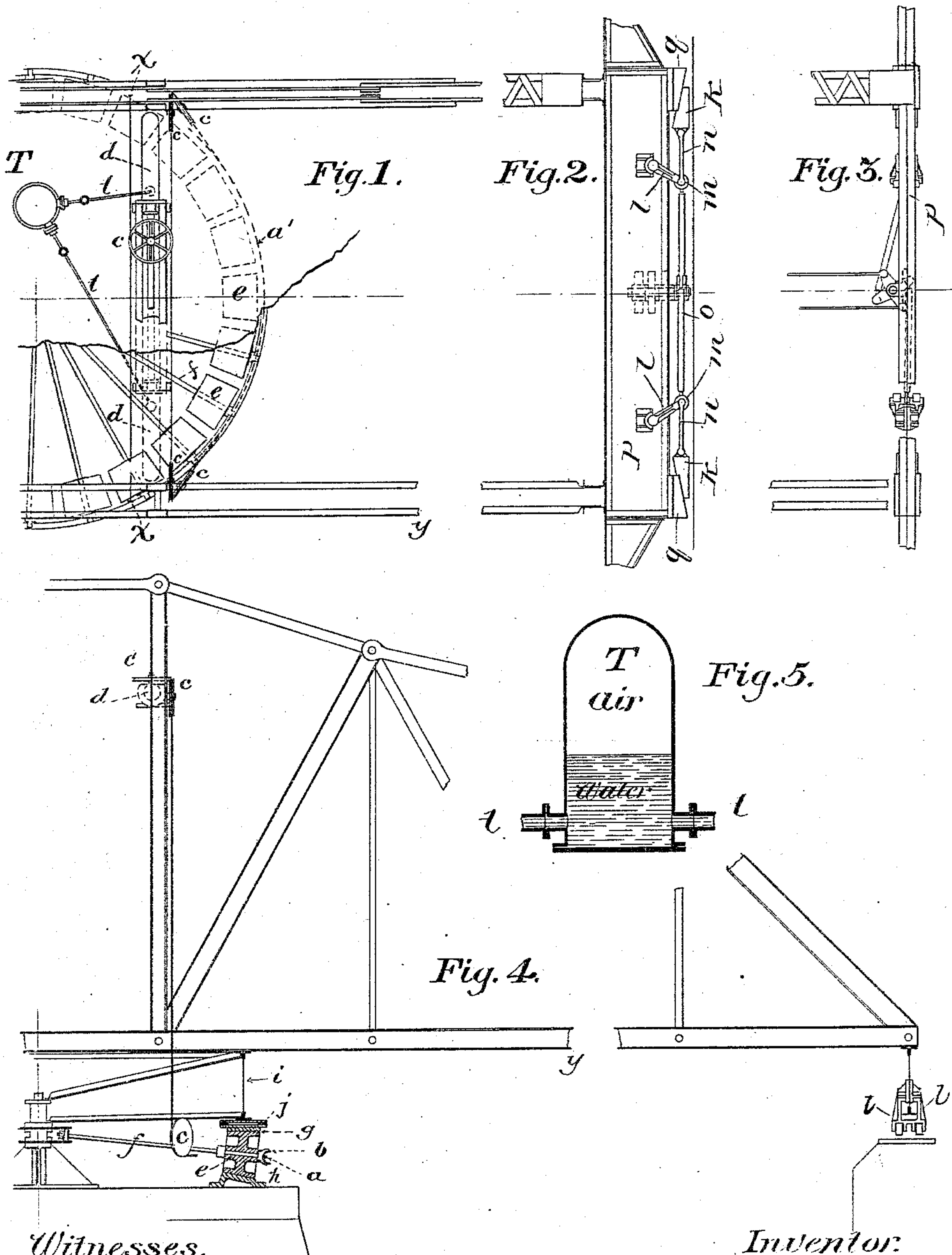
2 Sheets—Sheet 1.

T. COOPER.

DRAW BRIDGE.

No. 305,795.

Patented Sept. 30, 1884.



Witnesses.
 Sam Curtis.
 Francis P. Reilly

Inventor:
Theodore Cooper
by P. H. Voorhees
Attorney.

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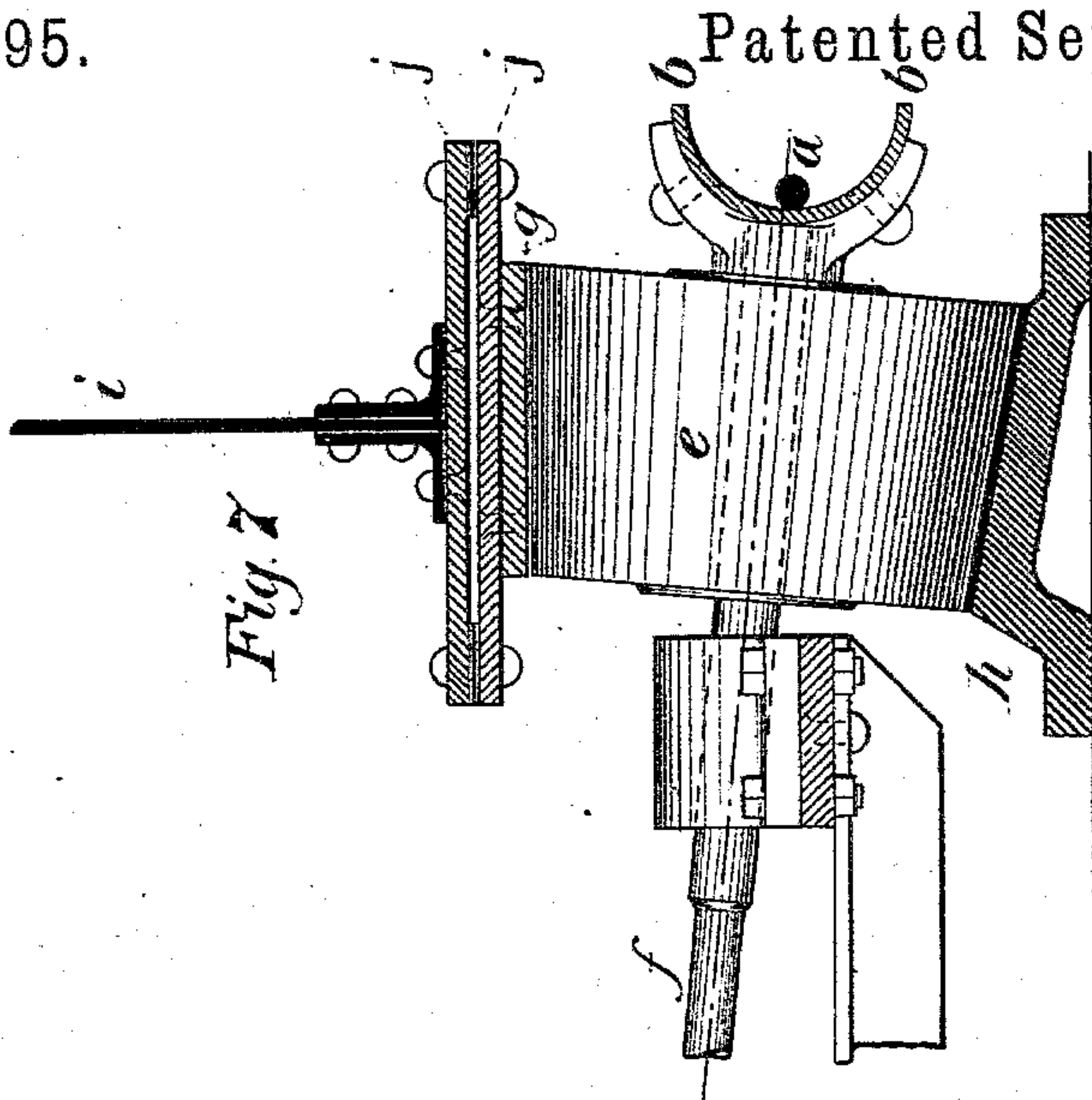


Fig. 7

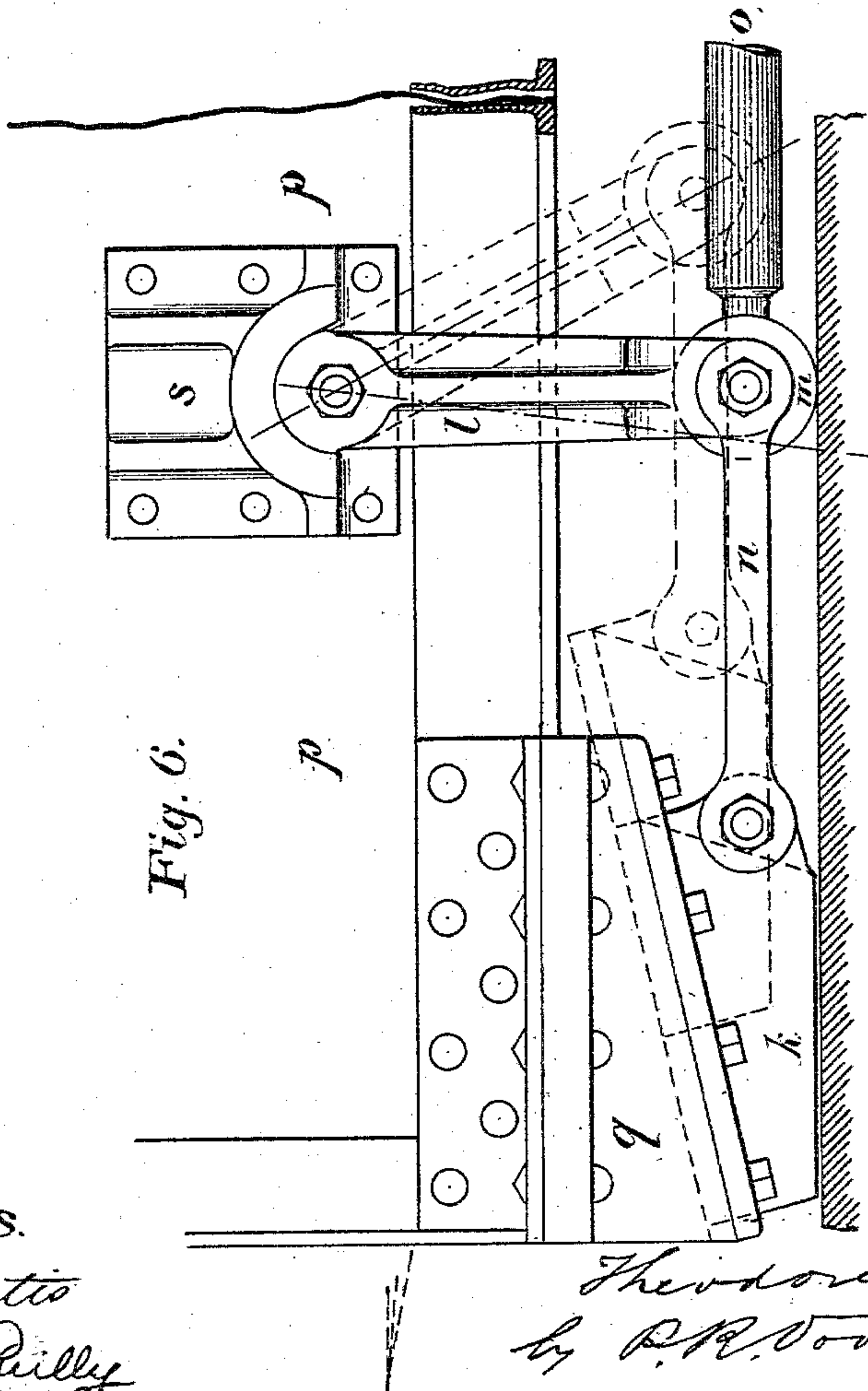


Fig. 6.

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UNITED STATES PATENT OFFICE.

THEODORE COOPER, OF NEW YORK, N. Y.

DRAW-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 305,795, dated September 30, 1884.

Application filed May 15, 1884. (No model.)

To all whom it may concern:

Be it known that I, THEODORE COOPER, of the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Draw-Bridges, which improvements or invention are fully set forth and illustrated in the following specification and accompanying drawings.

The object of this invention is to simplify the construction, to increase the efficiency, to cheapen the cost, and to decrease the friction of the operative mechanism of that class of draw-bridges more properly termed "swing-bridges" or "turn-tables."

The invention consists of the parts and combinations of parts and mechanism as herein-after particularly described, and specially set forth in the claims.

In the accompanying drawings, Figures 1 and 3 show a general view in half-plan, with a portion of the flooring of the draw removed, illustrating the hydraulic rams, traction-ropes, wedge, and toggle-gear, and cone-wheels for turning the draw; Fig. 2, inserted between the broken lines of said half-plan, is a projection of Fig. 3 viewed from its right-hand side. Fig. 4 shows in elevation a part of the framing of the draw broken at the point *y*, one of the coned bearing-wheels and part of the rope or chain passing over a lower and an upper sheave for turning the draw. It also shows a side view of one of the floor-beams, with toggle-arm below, (wedge omitted.) Fig. 5 is a detached sectional elevation of the air-accumulator. Fig. 6 is an enlarged view of a portion of the draw, showing the wedge and toggle-gear for elevating the draw. Fig. 7 is an enlarged view, partly in section, of one of the cone-wheels, its cone ring or bed, axis, and rope-guide, and the spring-plates bearing on its upper side.

In said figures the several parts are indicated by letters, as follows: The letter *a* indicates the wire rope; *b*, the curved guide; *c*, sheaves; *d*, hydraulic rams; *e*, cone-wheels; *f*, their inclined axes; *g*, the horizontal line of said wheels; *h*, the cone-ring; *i*, the drum; *j*, the spring-plates; *k*, the wedge; *l*, the toggle-arm provided with friction-rollers *m*; *n* and *o*, bars for operating the wedges *k* and toggle-

arms *l*, and pivoted thereto, as seen in Fig. 6. In said figure the part of the frame of the draw indicated by the letter *p* is shown above the wedge *k*, moved in under the inclined shoe or lug *q*, riveted to the frame. The weight of the draw is thus taken upon the wedge instead of upon the toggle-arm *l*. Said arm first elevates the draw by being moved inward from the position shown in dotted lines to or beyond the vertical position shown in full lines, the wedge following or rather advancing with the toggle-arm until it (the wedge) reaches the position shown in the drawings in full lines, just before it takes the weight of the draw, which weight it takes as soon as the toggle-arm *l* passes the vertical, as above explained:

The advantages gained by the construction shown, and the mode of operation of the parts above named, and of the mechanism complete as a whole will now be explained.

As hereinbefore explained, the direction of the axes of the coned wheels *e e* is inclined at such an angle as to make the upper bearing-line of said wheels horizontal. I prefer to make said upper line horizontal; but the axes of the coned wheels may be inclined below the horizontal, if desired, so as to make the lower bearing-line of the coned wheels horizontal.

The method heretofore in use in draw-bridges has been to make the axes of said wheels horizontal; but by the change above described in the direction of the wheels' axes from the horizontal to that of an incline or angle the following advantageous purposes are accomplished: First, instead of two coned rings, one above and one below the coned wheels, only one such ring is required; second, one of the bearing-rings being horizontal, preferably the top one, a set of spring-plates, as *j*, can be inserted between the drum and the coned wheels. The loads can thus be more uniformly distributed over the wheels, and less power will be required in the operation of turning the draw. The bearing-plate under the drum being thus made without any taper or coned surface, any distortion of the drum will be compensated or accommodated by a free motion in a horizontal direction.

As draw-bridges are usually constructed any such distortion will change the form of

the coned surfaces and produce an irregular and binding action of the parts when turning the draw.

I do not confine myself to the precise construction of spring-plates shown, as any suitable spring or elastic medium may be used between the drum *i* and the wheels *e*.

The operation of the machinery is as follows: The wire ropes *a*, being connected to the curved guide *b* at some convenient point, as *a'*, are led in opposite directions in and around the same and up and over the sheaves *c*, their opposite ends being secured to some convenient part of the draw, as at *xx*. The sheaves *c* are secured at suitable intervals for fair leading upon the drum *i* upon the frame of the draw, and upon the rod uniting the two rams, so that when the rams are caused to reciprocate the sheaves both revolve and reciprocate in one direction or the other, according to the direction of travel of the rams.

Figs. 1, 4, and 5 show the hydraulic machinery and attachments for operating the draw. The air, being compressed in the air-vessel *T* above the surface of the water therein, reacts upon the surface of the water and impels it through one or other of the pipes *tt*, as may be desired, to one or other of the rams *d*. The water and air are forced into the air-vessel *T* by any suitable pump (not shown) in any suitable and well-known manner. The air-vessel *T* is thus seen to be an air-chamber which is essentially an "air-accumulator," in which is stored reserve power capable of operating the rams upon the opening and closing of the proper valves, (not shown,) such as are commonly used for actuating hydraulic rams. The reserve power may be stored in said accumulator, either by means of a steam-engine or by hand-power, during the intervals when the draw is at rest. It will be observed that this whole mechanism is placed upon, attached to, and operated solely from the draw itself, or its pier or foundation.

I do not confine myself to operating the draw by hydraulic power, nor to the precise method of attaching or connecting the parts shown, as such variations in practice must be made as varying circumstances may require. The curved guide *b*, instead of being secured to the axes of the coned wheels, as shown in the drawings, and traveling with said wheels, may be secured to the masonry or substructure of the draw, and remain stationary while the wheels traverse. The coned wheels also may be set so as to revolve upon fixed axes or journals, instead of making a rolling traverse. It is further evident that the coned wheels may be placed at any suitable point for supporting the swinging draw, whether under it, near its circumference, or radially at any other point

or points nearer its center, without departing from the principle of this invention or changing the effect of said wheels. It is also obvious that these coned wheels may be equally well applied in the manner herein described to the turn-tables of railroad-tracks for turning locomotives and cars.

I am aware that it is not new to operate a draw-bridge by means of wire ropes attached to the drum of the bridge. I am aware, also, that wedges and toggles have been independently and severally used for both raising and holding up the ends of draw-bridges.

I am also aware that the axes of coned wheels have heretofore been inclined from the horizontal for other and special purposes than those herein shown.

I am also aware that air-chambers as storages of power are not, *per se*, new; and none of these said things, as and for said purposes, do I claim; but,

Having thus fully described my said improvements as of my invention, I claim—

1. In combination with a swing-bridge or turn-table, a coned ring and a series of coned wheels set with their axes inclined, so as to throw one cone-side of each wheel into a horizontal line, the whole operating substantially as described, for the purposes set forth.

2. In a turn-table for draw-bridge or other purposes, a series of cone-wheels set with their axes inclined, in combination with horizontal spring-plates supported on said wheels, and supporting the drum or rim of said draw, substantially as and for the purposes set forth.

3. In a turn-table for draw-bridge or other purposes, the combination, with a series of cone-wheels, as *e e*, and a rope or ropes, as *a*, of a curved guide, as *b*, for said ropes, all arranged and operating substantially as and for the purposes set forth.

4. In a turn-table for draw-bridge or other purposes, the combination of a wedge and toggle-arm for lifting and supporting the turn-table or draw, whereby the weight is taken from the toggle and supported by the wedge after the ends of the draw have been raised by said toggle, substantially as and for the purposes set forth.

5. In the operative machinery of a draw-bridge turn-table or other turn-table, the combination of an air-accumulator, a hydraulic ram or rams, and a traction-rope or its equivalent, secured as described, the whole arranged and operating substantially as and for the purposes set forth.

THEODORE COOPER.

Witnesses:

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