

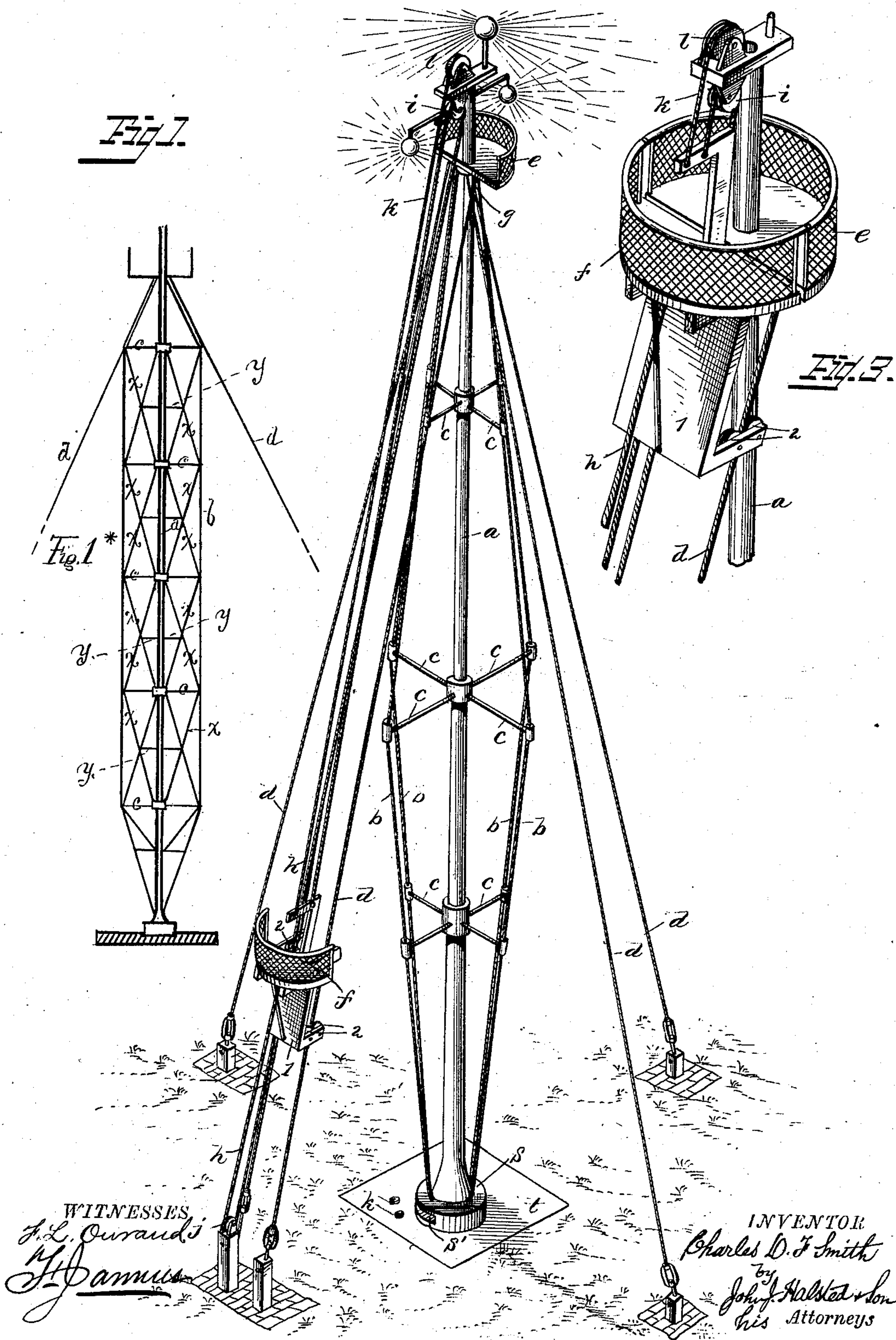
(No Model.)

2 Sheets—Sheet 1.

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TOWER FOR ELECTRIC LIGHTS, &c.

No. 287,881.

Patented Nov. 6, 1883.



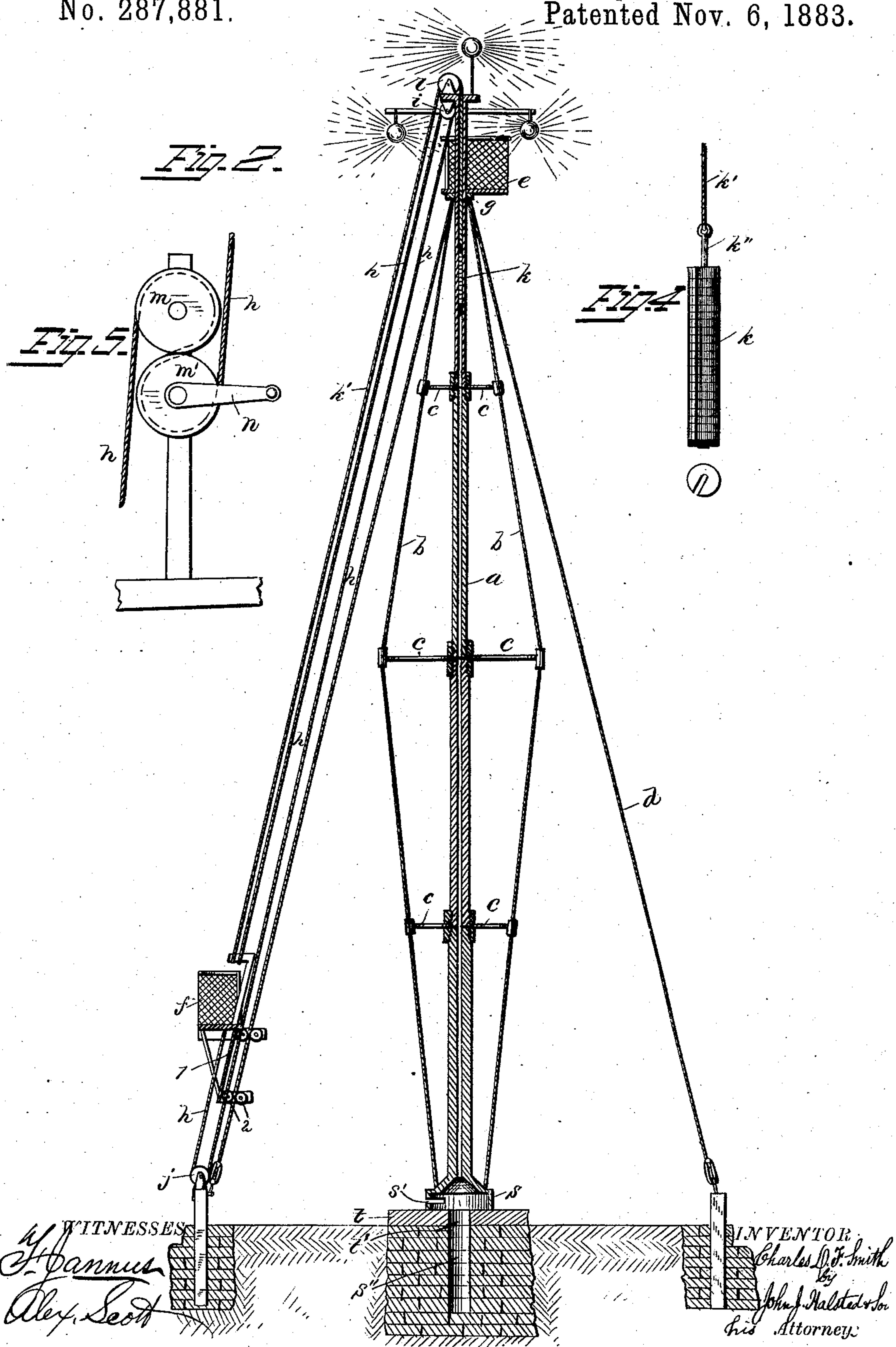
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UNITED STATES PATENT OFFICE.

CHARLES D. F. SMITH, OF AURORA, ILLINOIS.

TOWER FOR ELECTRIC LIGHTS, &c.

SPECIFICATION forming part of Letters Patent No. 287,881, dated November 6, 1883.

Application filed December 13, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. F. SMITH, of Aurora, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Towers for Electric Lights, &c.; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention is a further improvement on the construction shown in my Patent No. 267,115, dated November 7, 1882, and has in part for its objects the giving to the central tube or tower the requisite rigidity when built to comparatively great heights, of, say, a hundred-feet or more, and yet enabling the tower to be made of tubes of comparatively small diameter and weight, and without the need of braces extending from the guys or stays; an improved arrangement of the balcony and its adjacent parts; an improved means for raising and lowering the carriage, and other particulars hereinafter set forth.

Figure 1 is a perspective. Fig. 1* is a modification; Fig. 2, a vertical section; Fig. 3, a detail enlarged, showing the fixed balcony supplemented by the elevated carriage; and Figs. 4 and 5, enlarged details of a tower illustrating my improvements.

With towers of great height—say of one or two hundred feet, or more—the guys would need to spread or extend at the bottom so far from the central tube as to render it impracticable to brace from this tube to the guys, and in some locations it would be both desirable and necessary to extend the guys to a considerable distance from the tube, thus making it impossible to brace from the tube to the guys—as, for instance, if the tower or tube were located upon a street-corner, it would be necessary to carry two, at least, of the guys entirely across the street, and in some instances it may be necessary or advisable to fasten the outer or lower ends of some or all of the guys to elevated objects, such as the roofs of buildings and the like. It is also of manifest importance, when erecting a high tower, that it shall have as little weight as is consistent with the requisite

strength and stability. I therefore stiffen and give rigidity to the central tube, *a*, by means of three or more, but preferably four, cords or rods, *b*, which are fastened at or near the top, and also at or near the bottom, of this tube, the braces *c* extending from these cords or rods to the tube, as shown, thus forming a truss of a compact form to make the pipe rigid. This construction permits of using tubes of much smaller diameter, and consequently less weight and cost, in the erection of high towers, and the truss cords or rods *b* should of course be made taut enough to make this whole structure rigid. In fact, to make a high tower with a small central tube the truss system is absolutely essential. This also permits of fastening the lower ends of the guys *d* to a foundation in the ground or to a building, or to any convenient object, or at any convenient distance from the tube, or at any suitable height above the surface of the ground, according to circumstances or the surroundings. For a city road much traveled it would evidently be advisable not to fasten the lower ends of the guys anywhere to impede traveling. I have shown them anchored to posts.

The braces may be secured to the tubular column *a* and to the cords or rods *b* in any suitable manner. The guys may be attached to the column near its top, and also, if desired, at any other points requisite to keep it upright.

The balcony *e*, I place not directly upon the top of the tube, but, say, some five or six feet below it, so that the carriage *f* in ascending will come alongside of this platform and not several feet below or under it. This renders it much safer and more convenient for the person ascending in the carriage to attend to his duties, and also avoids any interference or obstruction by the guys or by the platform to the movements of the carriage. This also allows the guys and truss-rods all to terminate at the height or point *g* at which the balcony commences, the latter being entirely above that point.

The carriage should preferably be such as to size and style as to correspond with the size and style of the balcony *e*, so that when the carriage is elevated to its highest point it practically forms part of the balcony, the floors of both being in the same plane and their railings jointly extending completely around such enlarged balcony. In other words, the car-

riage, when in position at the top, becomes a section or part of the balcony, their combined floors and railings entirely surrounding the central tube.

5 To the carriage I attach an endless cord, h , which extends over a pulley, i , near the top of the tower and around a pulley, j , below, or near the ground, and by means of this cord the carriage can be pulled up or down inde-
10 pendently of the counter-balance or weights k , this counter-balance being, as in my afore-said patent, within the tubular column, and attached to a cord, k' , extending from the carriage and passing over a pulley, l . The weight
15 should be in sections adapted to be slipped on or off a weight-rod, k'' , somewhat after the manner practiced with the weights on the weight-rod of scales. No cord is needed to be
20 attached to the bottom of the weight or counter-balance k within the tube in order to pull it down; nor is there any need of a tail rope or cord to bring the carriage down, for the endless cord h can accomplish the duties of both.

25 The carriage may pass up and down upon parallel tracks specially provided, as in my former patent; but one of the cords or cables of the track may be one of the guys which I utilize for this purpose, thus saving the ex-
30 pense of one cord and one anchorage, that for the guy answering the double purpose—namely, for the track and for the guy. As the track at its upper end terminates at the bottom of the balcony, the bottom only of the carriage
35 can be supported by and on the tracks; but this is all that is necessary, because the carriage will be sustained in its upright position by the cords attached to it, and which pass over the pulleys at the top of the tower. The
40 carriage may have a bed-piece or extension, 1, beneath its floor—say two or three feet in length and parallel with the track—and provided with other grooved rollers, 2 2, thereon, substan-
45 tially as shown. This will enable the carriage to be held more firmly by and to ride more steadily on the track.

The endless cord h may be attached to the carriage by passing it in reverse directions around two pulleys, $m m'$, on the carriage, as
50 shown in Fig. 5, these pulleys being secured, as shown, on an upright post secured to the floor of the carriage. The passenger, having first made this endless cord fast in the pulley
55 j , to prevent its traveling around said pulley, and having also, if desired, fastened this cord at the top of the track, can then with ease move himself and the carriage up and down by means of the crank n on one of the pulleys. The
60 friction may be increased by having the pulleys $m m'$ press against each other at their peripheries, or they may be connected by a small gear, or more than two of such pulleys may be used.

If it be desired to operate the carriage from
65 the ground, the fixed or endless cord is made fast to the carriage. If, on the contrary, it be desired to operate it from the carriage itself,

the cord should be made fast at or near the ground, as already stated.

The foot s of the tower is raised some six or
70 eight inches, and is hollow, and has an opening, s' , at one side, through which the weight k is accessible, in order to increase or lessen the weight, as may be desired. This foot s rests upon a stone, t , having an opening, t' ,
75 in it directly over an opening, s'' , in the ground, which allows the weight to pass below the foot s , so that through the opening s' the top one of the weights can be reached to remove or
80 to add any section or sections of a sectional weight from the rod k'' , thus conforming the weight to that of the carriage and its load, whatever that may be.

When the tower is high and the central tube small, additional truss cords or braces should
85 be used to give the tube perfect rigidity—such, for instance, as shown in Fig. 1*, in which $x x$ indicate such subordinate or additional cords or braces, but preferably cords. These cords or braces should extend from the
90 central tube to the ends of the main braces c , where they intersect with the main truss-cords b , as plainly indicated in the drawings. These tie-rods or braces x , at their points of
95 crossing or intersection at z , are fastened together, and also supported upon and by radial braces y , projecting from the tubular column, thus affording additional strength and rigidity to the structure. This arrangement of the ra-
100 dial struts or braces c , (in each of which there may be three or more arms radiating from the same center,) with the auxiliary shorter radial struts or braces y of similar construction, in connection with the crossing tie-rods x , all
105 connected together as described, constitute a very strong and firm combination of trusses upon three or more sides of the column, and these peculiar trusses overlap one another
110 throughout the main length of the column, while the exterior cords or rods b , extending from top to bottom of the column and fastened to the outer extremities of the longer radials
115 c , form one long truss, and render the structure still firmer, approaching the strength of a solid structure of large diameter.

Still referring to Fig. 1*, that portion of the
115 tube from 1 to 3, together with its tie-rods x connecting these points, and with the strut c between these points, constitute one truss. In like manner that portion of the tube from 2 to
120 4, together with the tie-rods x connecting these points, and the strut c between these points, constitute another truss, which overlaps the half of the other truss—namely, that
125 part between 2 and 3—while the tie-rods $x x$, clamped together at their point of intersection, in connection with two struts, $c c$, and the intermediate short strut, y , form with the central tube a subordinate truss extending from 2 to 3.

The radial character of the arms of the struts
130 c and y , projecting, as they do, directly from the central column, leaves a free open triangular space between any two adjacent arms, thus offering no obstacle to the passing of the

carriage at any portion of its ascent or descent; and this also the better permits the two parts of the divided balcony to be so made or shaped that when brought together their floor, and also their railing may be practically a continuous whole, and therefore safer to the occupant. At the same time it will permit the carriage to be run up and down close to the central tube, and in a vertical line, if desired.

10 I claim—

1. In a tower adapted for elevated electric lights, the combination, with the central tubular column, of the radial struts or braces *c*, crossing rods or cords *x*, and the cords or rods *b*, fastened to the column at or near its top or bottom and to the extremities of each of the struts *c*, all as shown and described.

2. The combination, with the central tubular column, of the cords or rods *b*, fastened to the column at or near its top and bottom, the braces *c*, connecting these parts together, and the additional braces or cords *x*, extending from the ends of braces *c* to the central tube at the point where other braces *c* intersect the same, substantially as and for the purposes set forth.

3. In combination, the central tubular column, cords or rods *b*, struts or braces *c*, cords or rods *x*, and guys *d*, substantially as and for the purposes described.

4. In combination with the tubular column and its truss cords or rods and struts, the di-

vided balcony, one part of which is permanently placed above the guys *d* and below the top of the column, and the other part of which is affixed to the carriage, substantially as and for the purposes set forth. 35

5. In combination with the carriage-track and carriage of an electric-light tower, two or more pulleys, *m m'*, and a fixed cord passing around them, substantially as shown and described, and a hand-crank, *n*, affixed to the axle of one of these pulleys, all substantially as and for the purpose set forth. 40

6. In combination with the tubular column and its inclosed cord and set of weights, the opening at the base of the column, whereby the weights may severally be inserted or removed, substantially as and for the purpose set forth. 45

7. In combination with the central column of a tower, the radial struts *c*, the intermediate shorter radial struts *y*, and the rods or cords *x*, secured to the extremities of both and to the column, all as shown and described. 50

8. In combination, the central column, radial struts *c* and *y*, rods or cords *x*, connected to these struts and to the column, and the cords or rods *b*, connected to the struts *c* and to the tower, as shown and described. 55

CHARLES D. F. SMITH.

Witnesses:

E. D. PINNEY,

H. S. BRYAN.