(No Model.)

3 Sheets—Sheet 1.

J. S. ADAMS.

SKELETON TOWER.

No. 297,334

Patented Apr. 22, 1884.

Fig. 1.

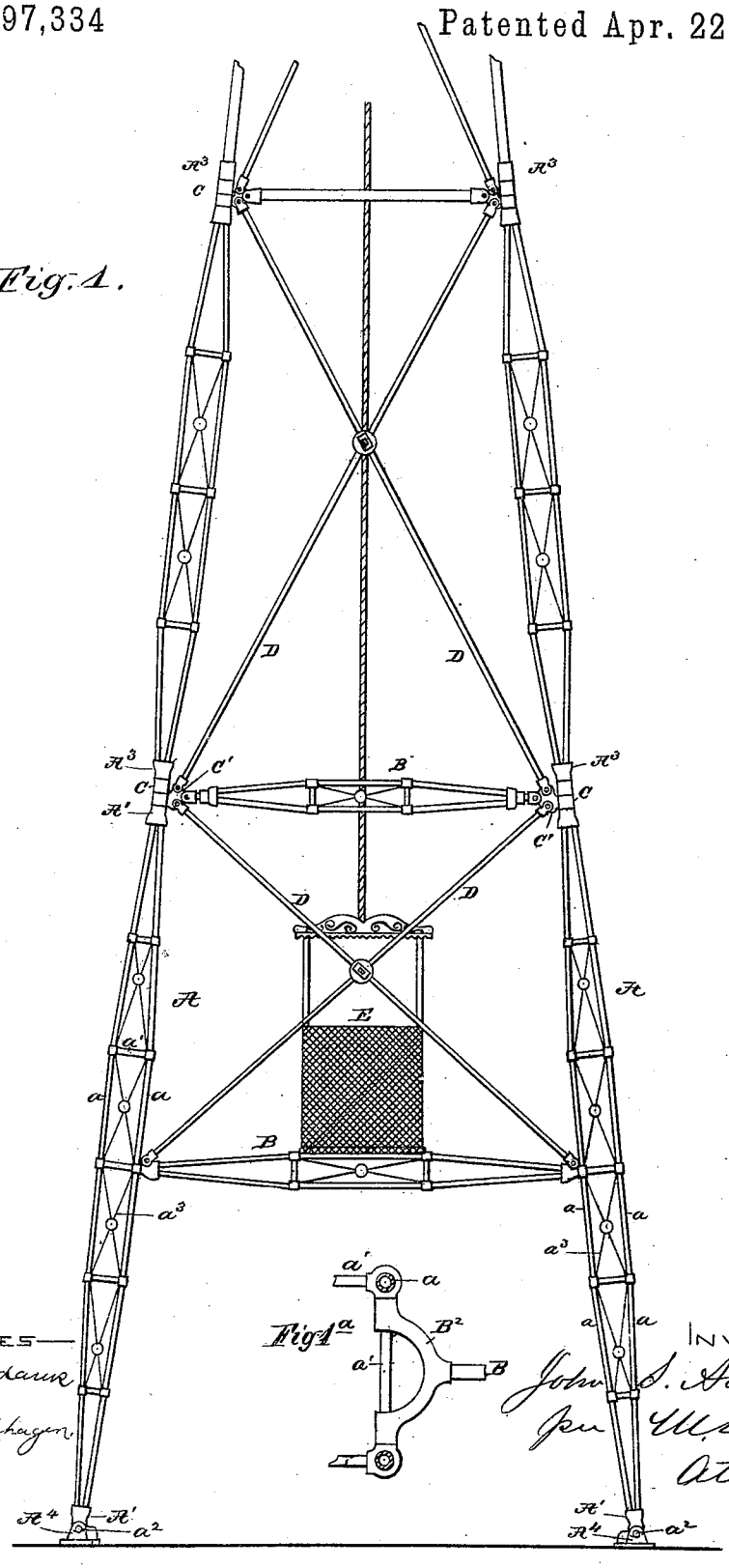


Fig 1ª

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Fig. 2.

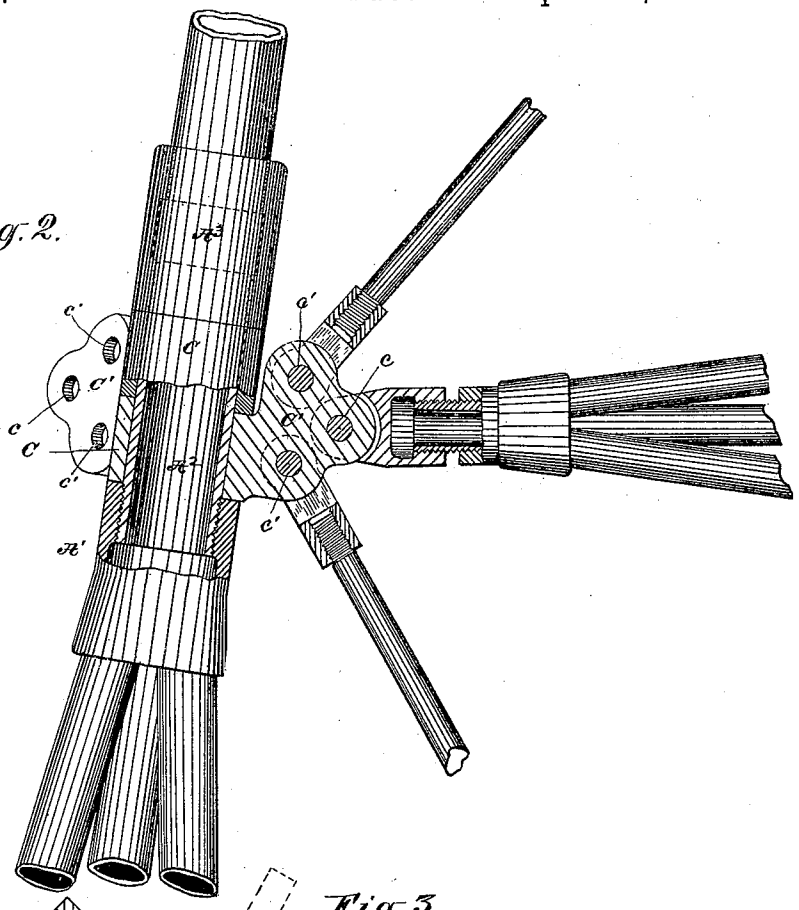


Fig. 3.

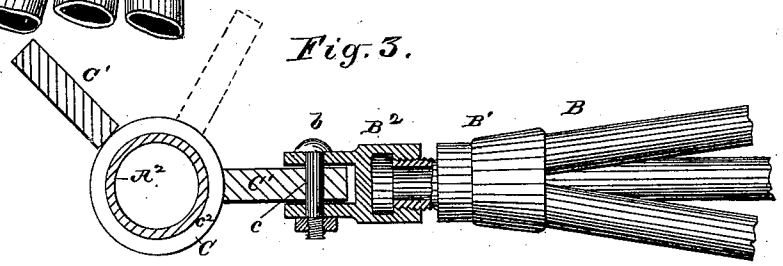


Fig. 4.

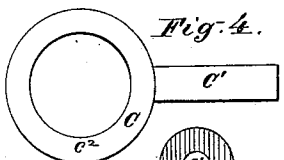
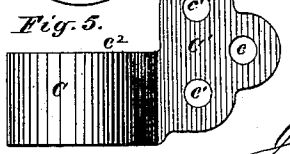


Fig. 5.



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Fig. 6.

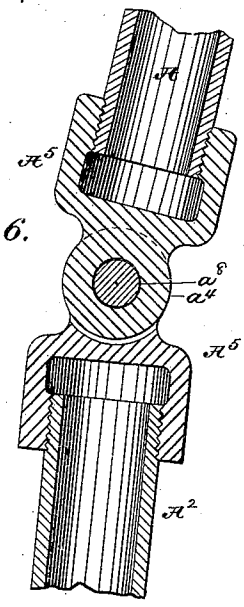


Fig. 7.

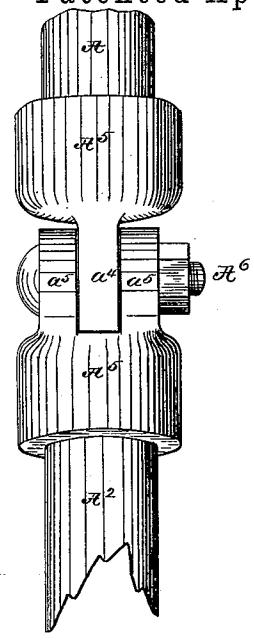


Fig. 8.

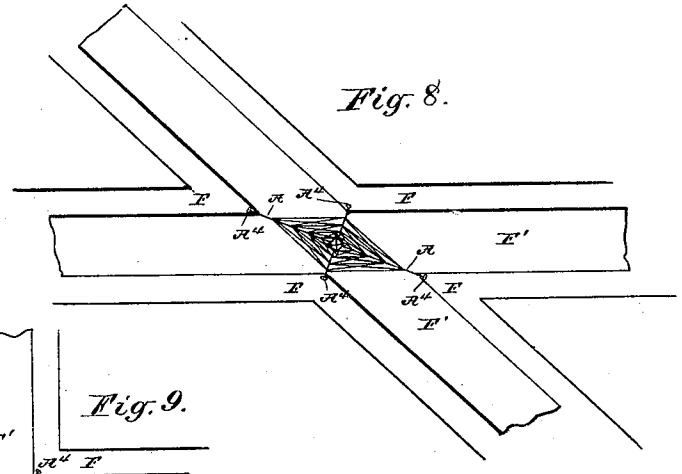
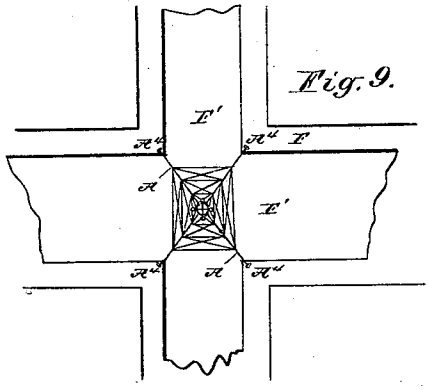


Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN S. ADAMS, OF ELGIN, ILLINOIS, ASSIGNOR TO THE DETROIT IRON TOWER COMPANY, OF DETROIT, MICHIGAN.

SKELETON TOWER.

SPECIFICATION forming part of Letters Patent No. 297,334, dated April 22, 1884.

Application filed June 13, 1882. Renewed July 30, 1883. Again renewed March 17, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. ADAMS, of Elgin, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Skeleton Towers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in skeleton iron towers; and it consists in the several matters hereinafter set forth and claimed, whose several objects will be stated in connection with the description thereof.

In the drawings hereto annexed, Figure 1 is a side elevation of a quadrangular tower. Fig. 1ª is the branched casting for connecting the girts with the trussed uprights between their ends. Fig. 2 shows in elevation and partial section a joint in which two contiguous sections of an upright, together with girts and diagonals, are connected. Fig. 3 is a horizontal section of the joint shown in Fig. 2. Fig. 4 is a top or plan view of one of the two lug-bearing eyes which enter into the joint of Fig. 2 detached. Fig. 5 is a side elevation of the part shown in Fig. 4. Fig. 6 is a vertical section of a jointed connection used in coupling adjacent lengths of a tower-upright when it is desired to give different inclinations to different parts of said upright. Fig. 7 is an elevation of the jointed connection of Fig. 6. Figs. 8 and 9 are plan views of intersecting streets, together with towers whose uprights rest upon the angles of the walks.

A A are the tower-uprights. B are horizontal girts joining the uprights. C C are couplings joining the girts and diagonal braces with the uprights. D D are such diagonal braces, and E is an elevator-cab located within the tower.

The first feature of my improvement that will be described relates to the construction of the tower at its base, whereby a free, unobstructed space is left between the lower uprights for the passage of vehicles and a free view. To this end my improvement consists in a tower having horizontal girts located at proper height from the ground and connected with the lower sections of the uprights between their ends, diagonals terminating at their lower ends at or near the said girts, and uprights in the lower section of the tower of a trussed construction, whereby suitable strength is imparted to the tower at this point in the absence of diagonal braces extending to the feet of the uprights. This feature of construction is shown in Fig. 1, in which the lower uprights A are of the open trussed form fully set forth and claimed in another patent granted to me, consisting of a number of sub-members, *a*, connected with each other and with cross-ties *a'* by suitable couplings, and converging at their ends in junction-pieces A'. The sub-members *a* are made in sections which are straight between their ends, and unite with each other and with the cross-ties and terminal junction-pieces, to constitute a unitary, three or more sided structure of double-tapering form, reducing from the middle toward its ends. Such a structure obviously has great strength to resist lateral as well as compressive strain. At the same time it is relatively light, is open, and is not necessarily large at its point of greatest diameter. By employing this form of upright in the lower section of the tower, in connection with the girt B, affixed thereto at a suitable distance from the ground, the diagonals, which, in the use of a single or post form of uprights, should properly extend to the foot of said uprights, may terminate at or about the point where the girt is joined to the uprights, and thus leave a high and wholly free space beneath the tower, which affords an unobstructed view or passage—very desirable in towers located at the intersection of streets in cities.

The girts B may be, and preferably are, of the same or similar trussed form, since by their great length in some towers they are subject to sagging strain; but they may be of simple form, if desired. As a suitable connection for the girt with the trussed uprights at a point between their ends, the connecting-piece B", Fig. 1ª, is shown. This piece consists of a branched casting receiving the girt centrally, but embracing one of the cross-ties *a'* of the upright near its ends. The uprights may be arranged to present their angles inward, if

preferred, in which case one of the couplings uniting the sub-members of the upright may be constructed to also receive the end of the girt.

Another feature of my improvement relates to a form of coupling for connecting the main girts with the joint uniting the adjacent lengths of the tower-uprights, whereby a single form of casting may serve for towers having different forms in plan or horizontal section, and also for towers differing in the inclination of their uprights. Thus, in erecting towers at street-intersections and elsewhere, it is sometimes necessary to locate the columns otherwise than in the angles of a regular triangle or other geometrical figure—as, for example, in the case of a four-columned tower at the intersection of streets not at right angles with each other, which, as may readily be seen, gives unequal angles between the sides of the tower. It sometimes occurs also that towers of only moderate height require to be very wide spread at their bases, which obviously necessitates various inclinations of the uprights or columns in different towers. In order to meet these conditions and requirements without the necessity of providing special castings for each individual case, I have devised a form of the couplings by which the girts are joined with the uprights adapted to serve for all these conditions. This coupling is shown in Figs. 2, 3, 4, and 5 of the drawings. This coupling, as a whole, consists of two similar parts, each composed of the eye C and the vertical flange or lug C′. Said lugs have three apertures, *c*, *c′*, and *c′*, the first of which, or *c*, is intended for the attachment of the girt B, and the others, or *c′*, for the attachment of the diagonals D.

As clearly shown in Fig. 2, and as fully described in another patent, the adjacent lengths or sections of the uprights are joined by an intermediate nipple, A″, and couplings A′ and A‴. Before the upper coupling, A‴, is put in place the eyes C are dropped over the thimble A″—one above the other—so as to rest on the shoulder formed by the lower coupling, A′, and, by the subsequent application of the upper coupling, A‴, said eyes are embraced as closely as may be desired.

It is obvious that the lugs C′ may be turned on the nipple or upright in any required direction, according to the angle formed by the sides of the tower with each other. By the pivotal connection of the girts with the lugs C′, as shown at *c* in Figs. 2 and 3, it is also apparent that any desired inclination from the vertical may be given to the upright.

In order to bring the adjacent girts in the same plane when the two-part coupling just described is employed, the lug C′ projects or is offset in the direction of the axis of the eye C at one side of the latter, so that the central aperture, *c*, is in line with the face *c″* of the eye, as shown in the detached Fig. 5. By then inverting one of the parts C C′ and bringing the faces *c″* in meeting, as shown in Fig. 2, the several apertures *c* and *c′* of the lugs are brought opposite each other, respectively, and the connected girts and diagonals of one face of the tower are substantially in line with the corresponding members of the other faces. Of course it is intended that these castings, as well as others used for connecting the various parts of the tower, shall differ in size according to the size of the rods or tubes which are to be connected thereby, and for every tower a family of castings is provided, embracing all the sizes required for the connection of the several parts. Thus the column-sections A diminish in size toward the top of the tower, and a group, series, or family of couplings or special castings is provided for the various sizes of the parts to which they are applied. As the expense of constructing patterns for such families of special castings is great, the form of coupling C C′ is very useful by reason of its being suited to all sectional forms and all inclinations of towers.

In connecting the larger with the smaller sections of the uprights A, the ordinary device of a reducing-coupling is employed, preferably, at A‴.

Means for pivotally connecting contiguous sections of the tower-uprights for the purpose of giving a different inclination to different parts of the same uprights are shown in Figs. 6 and 7, and consist in two screw-threaded caps provided with the lugs a'''' a^5, centrally apertured at a^8, and connected pivotally by the bolt A^6. Said caps are preferably and usually applied in place of the coupling A‴ of Fig. 2, by which the foot of an upright section is joined with the nipple A″. By means of a jointed coupling applied to connect adjacent upright sections of the tower, the lower sections of the tower may be spread to rest upon available points for support—as, for example, on the angles of the walks at street-intersections—and the remainder of the tower carried up at a less abrupt inclination. In this manner the tower is materially reduced in size and cost, and in case of the location of the tower at a point where the base is irregular, the lower uprights may be variously inclined, and the superposed part of the structure given a symmetrical form. The form of pivoted coupling shown permits these modifications without the construction of special castings for each particular case, as above set forth concerning the girt-connections, and with the same advantages in economy of outlay and labor.

The last-mentioned form of structure may form the subject of a separate patent.

In the use of the two-part coupling uniting the girts with the uprights, it is of course immaterial whether the nipple A″ is employed, as the lower section of the upright may be obviously threaded down far enough to receive the lower coupling together with the two eyes C C, and to also afford connection with the upper coupling, A‴.

The couplings C C′ may be used to attach horizontal girts to the rod-shaped uprights at any point between the ends of said sections by passing a pin through said uprights, or preferably applying a clamp thereto to form a suitable shoulder for the support of the couplings and girts.

In a quadrangular tower the lower horizontal girts, B, Fig. 1, may, if preferred, be arranged diagonally across the tower, so as to intersect each other in the middle thereof, in which case one or more of said girts may be constructed in form to support a platform or walk by which an elevator cab or carriage, E, if present, may be reached from an angle or angles of the tower. A broad girt of this description may have its members connected with the couplings which unite the members of the trussed uprights, or in any other suitable manner connected with the uprights.

The tubular parts in Fig. 6 may be taken to represent different parts of a tower-upright arranged at different inclinations or out of line.

Some features of construction shown but not herein claimed are subjects of other applications for patents.

I claim as my invention—

1. In a skeleton tower, the combination, with the girt B, connected to the lower sections of the tower-uprights between their ends, of the said uprights having the trussed construction described, and the diagonal braces terminating at their lower ends at or near their girt extremities, substantially as described, and for the purposes set forth.

2. In a skeleton tower, the combination, with uprights A and horizontal girts, of the couplings formed of the two eyes C, having apertured lugs C′, and suitable means for retaining the eyes in place upon the uprights, substantially as described, and for the purposes set forth.

3. As a special fitting for use in the construction of skeleton towers, as described, the casting composed of the eye C and the lug C′, the latter being offset, as shown, and provided with the apertures *c c′*, arranged substantially as shown, and for the purposes stated.

4. In combination with the trussed sections of the tower-uprights and with the girt B, the fitting B″, centrally connected with the girt and embracing the tie *a′* at or near its ends, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

JOHN S. ADAMS.

Witnesses:
M. E. DAYTON,
CYRUS KEHR.