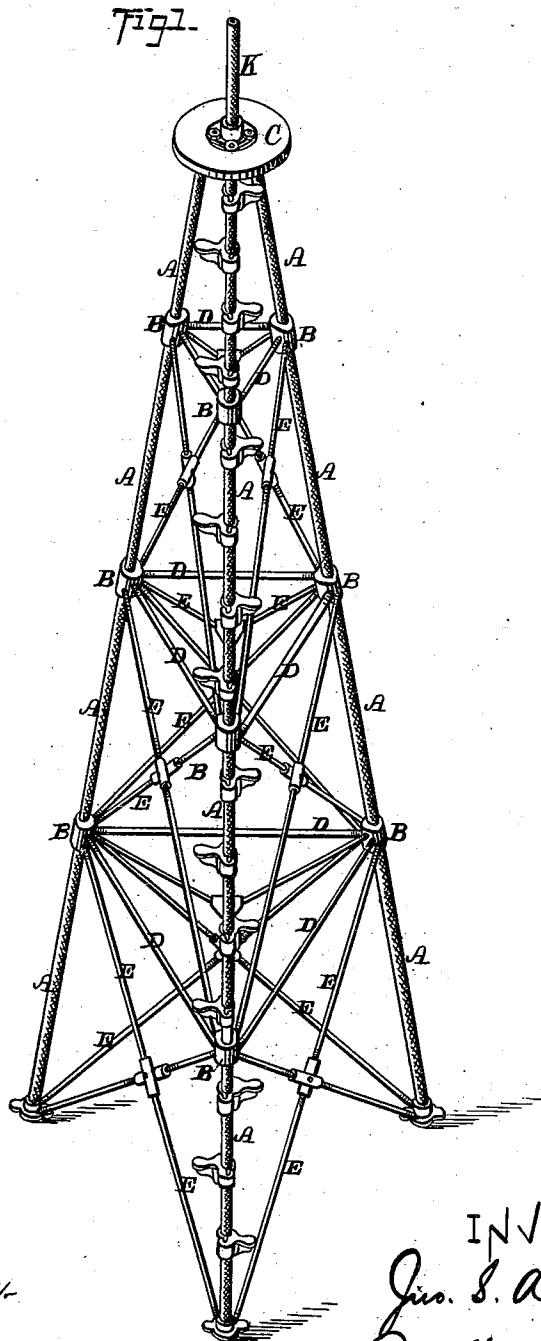


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TOWERS FOR WIND-MILLS.

No. 187,078.

Patented Feb. 6, 1877.



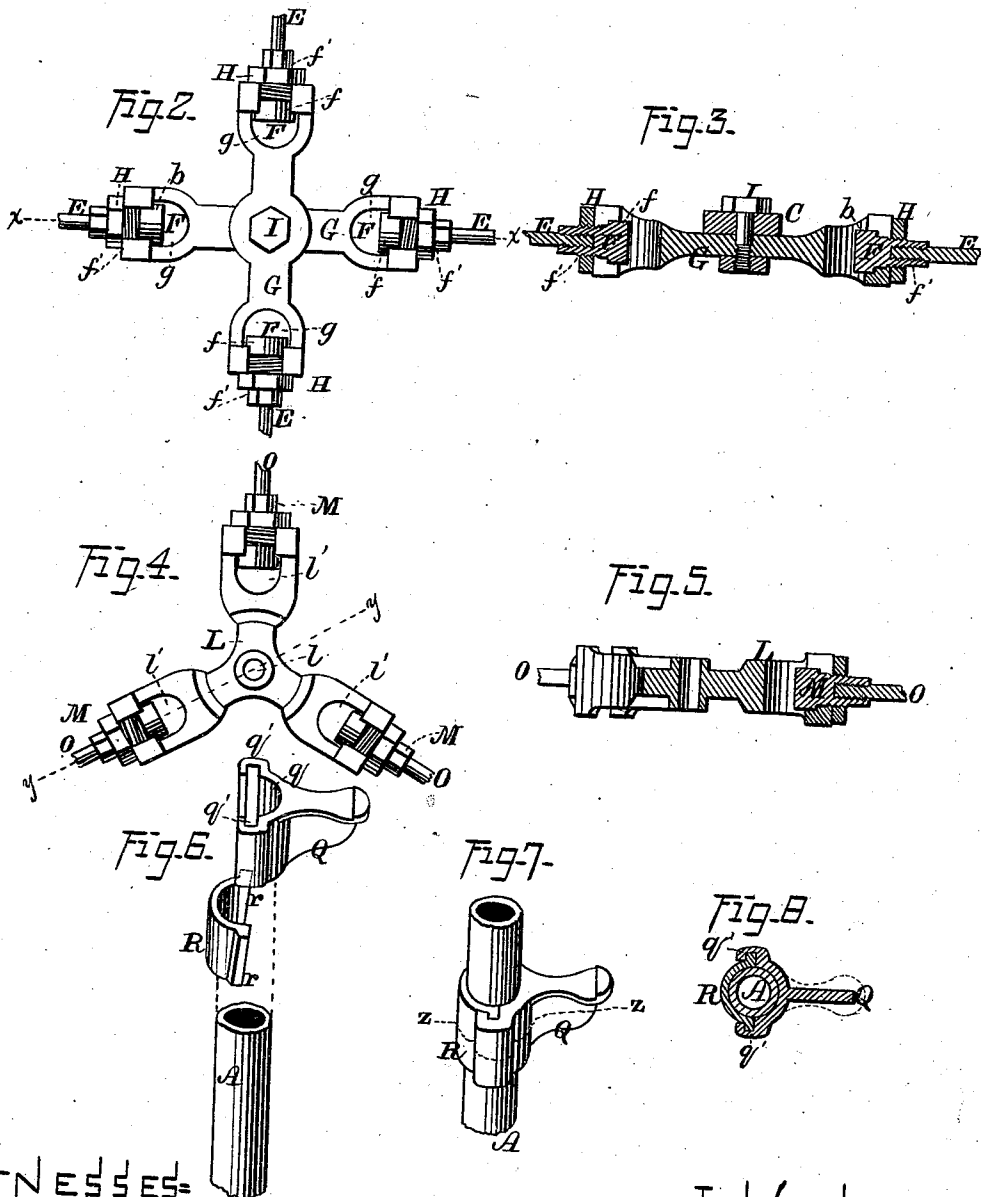
WITNESSES
Geo. Hutchinson
A. C. Hazard

INVENTOR
Jos. S. Adams, by
Prindle & Co. his Attys

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UNITED STATES PATENT OFFICE.

JOHN S. ADAMS, OF ELGIN, ILLINOIS.

IMPROVEMENT IN TOWERS FOR WINDMILLS.

Specification forming part of Letters Patent No. **187,078**, dated February 6, 1877; application filed October 23, 1876.

To all whom it may concern:

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

Figure 1 is a perspective view of my improved frame arranged for use. Fig. 2 is a plan view of the intersecting portions of two of the diagonal side braces. Fig. 3 is a section of the same upon line *xx* of Fig. 2. Fig. 4 is a plan view of one of the central guides for the operating-rod of the pump. Fig. 5 is a section of the same upon line *yy* of Fig. 4. Fig. 6 is a perspective view of the parts of my self-locking step separated from each other and from the standard. Fig. 7 is a like view of the same in position upon said standard, and Fig. 8 is a section upon line *zz* of Fig. 7.

Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is mainly to produce in a tower for windmills a maximum of strength and rigidity by use of a minimum of metal, so as thereby to cause said tower to present but little surface to the action of the wind; to which end it consists, principally, in the construction and combination of the standards and diagonal and horizontal braces, substantially as and for the purpose hereinafter specified.

It consists, further, in the means employed for connecting together the diagonal braces, and for regulating the tension of the same, substantially as and for the purpose herein-after shown.

It consists, further, in the means employed for connecting the horizontal braces to or with the guide for the pump-rod, and for centering said guide, substantially as and for the purpose hereinafter set forth.

It consists, finally, in the peculiar construction of the parts of the self-locking steps, and their combination with each other and with a standard, substantially as and for the purpose shown and described.

In the annexed drawings, A represents sections of metal pipe, which are connected together at their ends by means of metal couplings B, so as to form a standard of any desired length.

Three of the standards are secured at their upper ends (at points equidistant from each other) to or upon a suitable plate, C, and at their lower ends, which are separated from each other, as seen in Fig. 1, are secured to or upon a base-plate or other firm support, the arrangement being such as to bring the axis of the triangular tower thus formed in a vertical line.

Extending horizontally between the couplings B are tubes D, the ends of which are threaded and pass into said couplings, while other tubes E extend diagonally between the couplings of each series and those of the next series above, said tubes operating as braces to insure the relative positions, and to increase the strength of the standards.

In order that the length of each diagonal brace E may be varied at will, so as to increase or diminish its tension, said brace is divided into two parts, and the inner end of each portion threaded and fitted into a threaded sleeve, F, which sleeve is provided at its inner end with an enlargement or head, *f*, is threaded upon the central portion of its periphery, and at its inner end is squared, so as to receive a wrench.

A metal block, G, having the general form shown in Fig. 2, is provided at each end with a recess, *g*, which is open at one side, and receives the head *f* and body *f'* of the sleeve F, said sleeve fitting with sufficient looseness to permit of its free rotation, while its said head, engaging with a corresponding shoulder, prevents the withdrawal longitudinally of said sleeve.

A nut, H, fitted over the threaded portion of the exterior of the sleeve F, may be caused to bear firmly against the end of the block G, and bind said sleeve in place when desired.

When the braces E, connected as described, are in place, by rotating the sleeves F said braces may be drawn toward the center, so as to increase their tension, or may be slackened and their tension lessened.

A bolt, I, passing through the center of the blocks G, confines the same in relative position, and operates as a pivotal bearing.

At the center of the connecting-plate C is secured a vertical tube, K, upon or around which is placed the windmill, and through which passes the pump-rod.

Other guides for the pump-rod are provided at suitable points between the upper and lower ends of the tower, which guides consist of a three-armed block, L, that is provided with a central opening, *l*, for the passage of said rod, and within the end of each arm has a recess, *l'*, which receives a sleeve, M, that has a head, *m*, threaded exterior and interior, a squared outer end, and a nut, N, like the sleeve F.

Each sleeve M receives the threaded end of a brace rod or tube, O, that from thence extends horizontally outward to the adjacent coupling B, within which latter the threaded end of said brace is contained. By means of the sleeves M the guide-block L can be adjusted horizontally until its central opening *l* is exactly in a line with the openings in the other guides, and with the interior of the tube K. In addition to the office of guides for the pump-rod, the braces O, with their central connection, operate to strengthen the tower laterally and increase materially its rigidity.

In order that proper facilities may be afforded for ascending the tower for the purpose of oiling or repairing the mechanism, a series of steps, Q, are attached to or upon one of the standards, at suitable points between its upper and lower ends. As seen in Fig. 6, the inner end of the step Q is provided with a half-round bearing, *q*, which corresponds to and embraces one side of the standard A, while from the rear portion of said bearing, at each side, a lip extends laterally outward, rearward, and then inward, so as to form a vertical groove, *q'*, that has right angles in horizontal section, and opens inward.

Upon the rear side of the standard A is placed a cap, R, which corresponds in shape therewith, and at its ends is provided with radial lugs *r*, that correspond to and fit within the grooves *q'* of the step Q. As seen in Fig. 6, the lugs *r* have a downward and slight rearward inclination, so that when the step Q is placed over their upper ends and pressed downward, the rearward inclination of said

lugs causes the cap R and said step to be drawn together and clasp the standard A with sufficient force to insure the position thereon of said step, and to enable the latter to sustain any desired weight.

To remove the step Q it is only necessary that it be driven upward until released from engagement with the cap R.

The tower thus constructed may be put together upon the ground, and then raised to a vertical position, or it may be built in place and its parts added from the ground upward; but when in position, and all of its parts properly adjusted, said tower possesses great strength and rigidity, it offers but little surface to the action of the wind, and, from the nature of its material, can be constructed and erected in less time and at a smaller expense than though constructed from wood.

The whole or any portion of the standard-sections and braces can be constructed from solid rods or from tubes, as may be desired.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. The hereinbefore-described tower, composed of the standards A, constructed in sections, and united by the couplings B, the top plate C, the horizontal brace D, and the diagonal braces E, said parts being combined in the manner and for the purpose specified.

2. In combination with the braces E, threaded at their inner ends, the sleeves F *f* and the block G *g*, substantially as and for the purpose shown.

3. In combination with the braces O, threaded at their inner ends and having their outer ends connected to or with the couplings B, the three-armed block L *l l'* and the sleeves M *m*, substantially as and for the purpose set forth.

4. In combination with the standard A, the step Q, provided with the half-round bearing *q* and grooves *q'*, and the cap R, having a half-round recessed face and radial lugs *r*, substantially as and for the purpose shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 18th day of October, 1876.

JOHN S. ADAMS.

Witnesses:

GEO. S. PRINDLE,
JAS. E. HUTCHINSON.