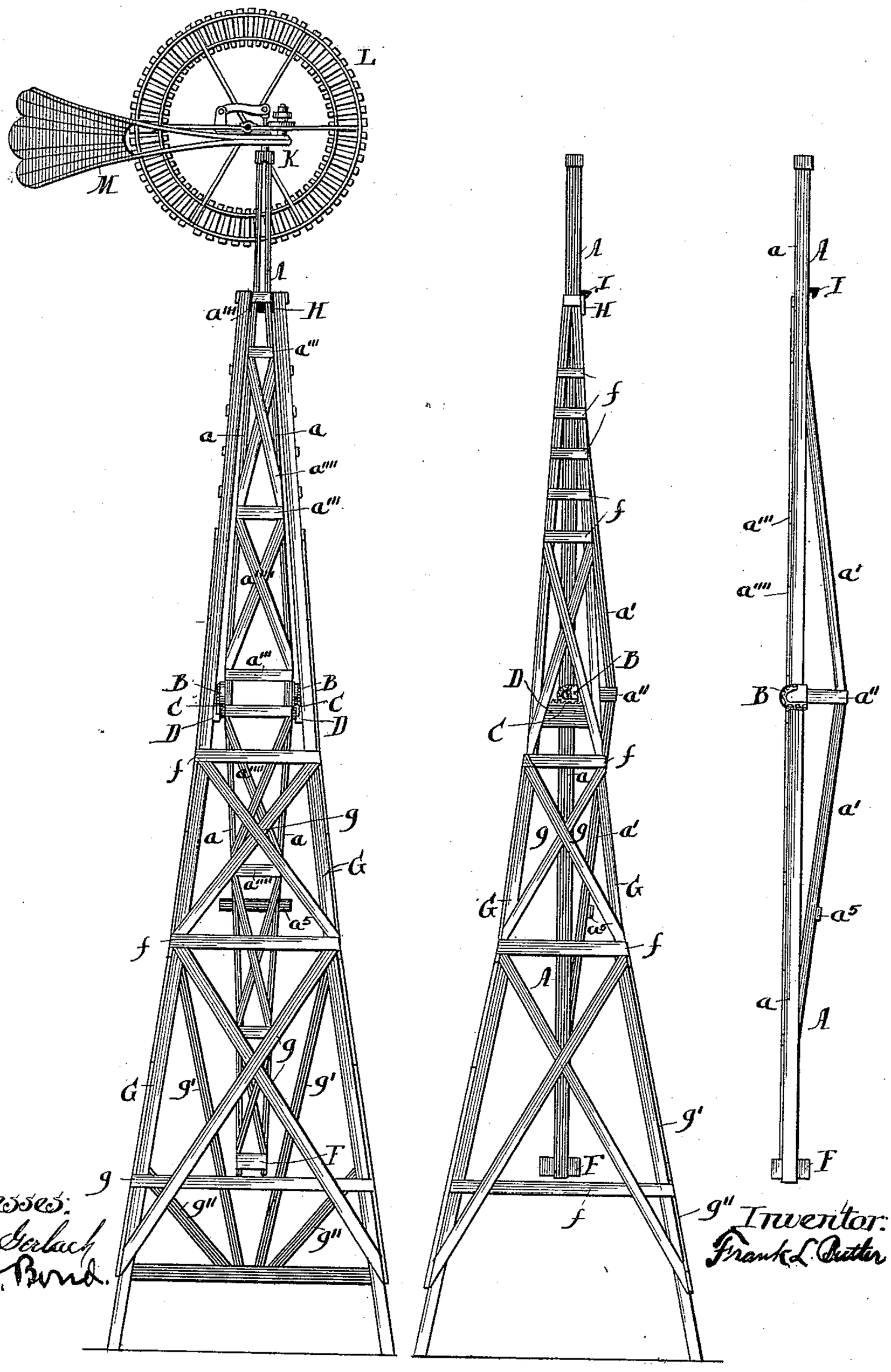
(No Model.) 2 Sheets—Sheet 1.

F. L. BUTLER.

TOWER AND MAST.

No. 449,730. Patented Apr. 7, 1891.

Fig. 1. Fig. 2. Fig. 3.



Witnesses:
Fred Gerlach
C. W. Bond.

Inventor:
Frank L. Butler

(No Model.) 2 Sheets—Sheet 2.

F. L. BUTLER.

TOWER AND MAST.

No. 449,730. Patented Apr. 7, 1891.

Fig. 4.

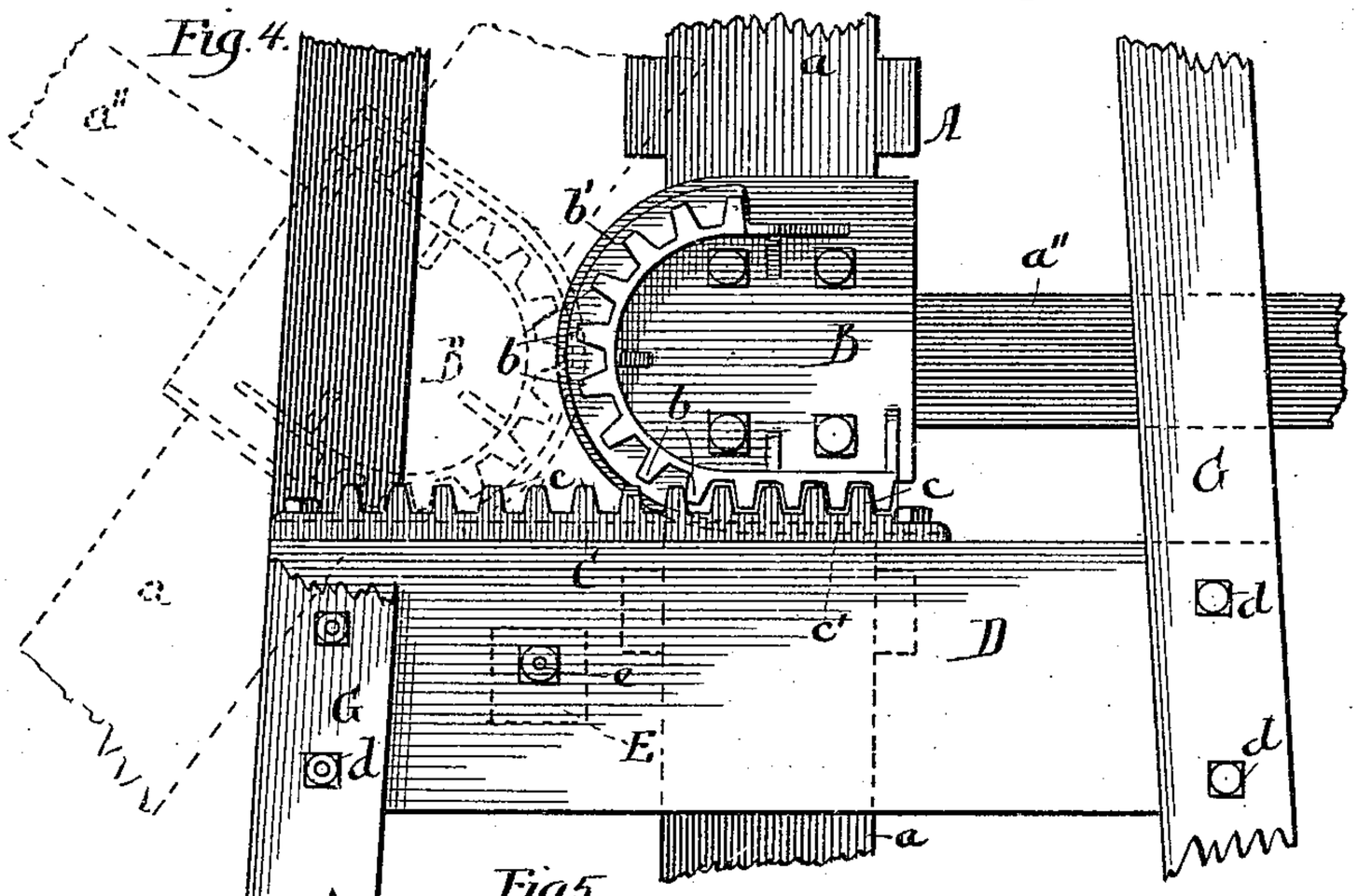


Fig 5

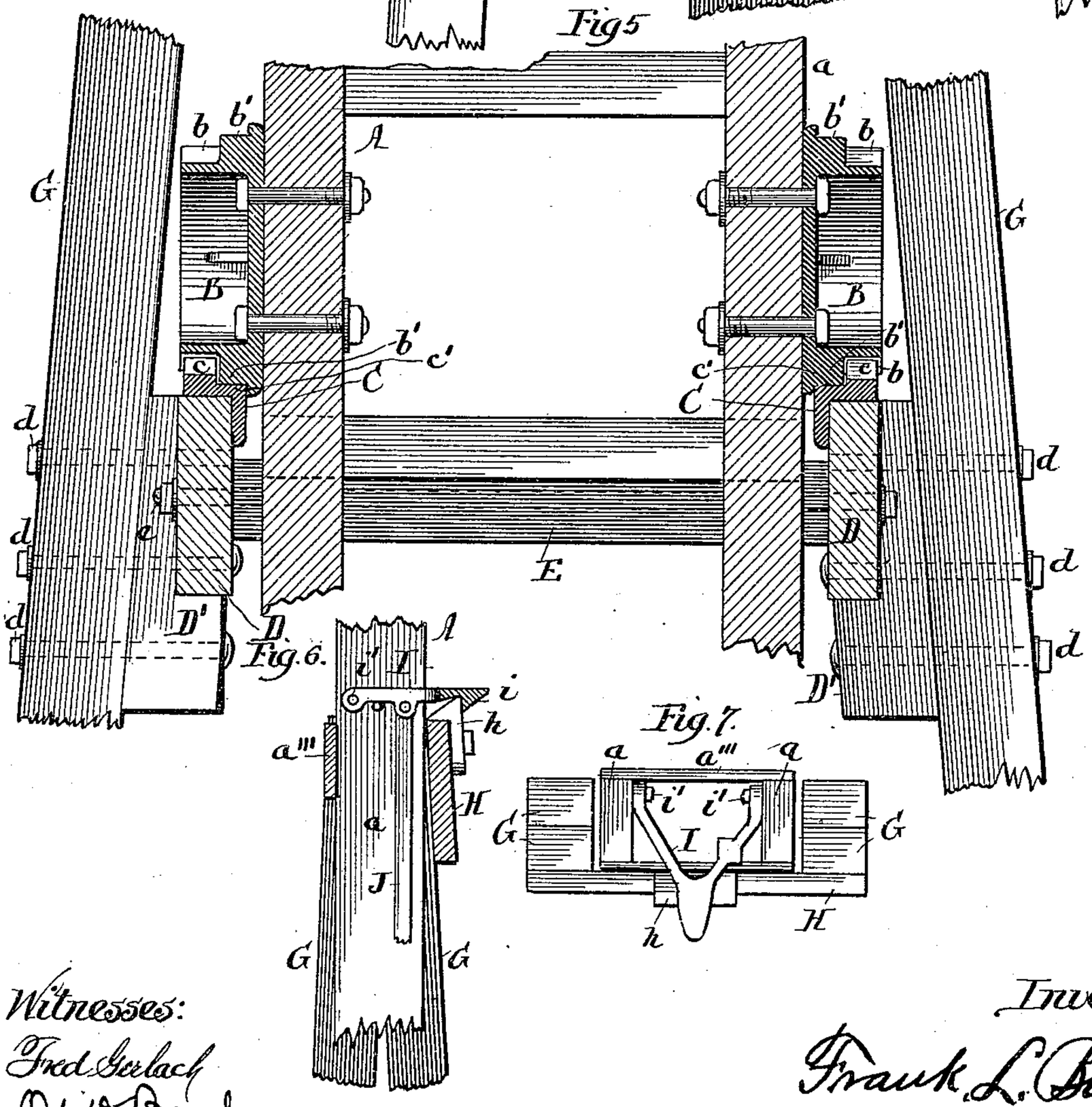


Fig. 6.

Fig. 7.

Witnesses:
Fred. Gerlach
C. W. Bond.

Inventor:
Frank L. Butler

UNITED STATES PATENT OFFICE.

FRANK. L. BUTLER, OF CARPENTERSVILLE, ILLINOIS.

TOWER AND MAST.

SPECIFICATION forming part of Letters Patent No. 449,730, dated April 7, 1891.

Application filed February 12, 1891. Serial No. 381,249. (No model.)

To all whom it may concern:

Be it known that I, FRANK. L. BUTLER, a citizen of the United States, residing at Carpentersville, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Towers and Masts; 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 pertains to make and use the same, reference being had to the accompanyings drawings, forming a part hereof, in which—

Figure 1 is an elevation of that side of the tower on which the mast turns down. Fig. 2 is an elevation of the side of the tower, showing the rack and the traveling pinion or gear. Fig. 3 is a side elevation of the mast. Fig. 4 is a detail showing the rack and the traveling gear or pinion. Fig. 5 is a cross-section showing the racks and pinions or gear. Fig. 6 is a detail showing the locking-catch in section. Fig. 7 is a detail, being a top or plan view of the locking-catch.

This invention relates to towers and masts to be used for carrying and supporting a wind-wheel or other device or mechanism at an elevation, and has for its objects to enable the mast to be lowered, so as to bring the wheel or other device down for repairs or for other purpose; and its nature consists in mounting the mast on the tower with a traveling support by which the mast can be brought from the perpendicular or upright position to a reverse position, in providing a stationary rack and a traveling gear or pinion coacting to support the mast when perpendicular and to travel over and turn the mast down, in providing an automatic catch for locking the mast when raised, and in the several parts and combination of parts hereinafter described, and pointed out in the claims as new.

In the drawings, A represents the mast, which, as shown, is formed of two side pieces *a*, sprung apart at the center and joined at each end, with side trusses *a'* running from points at the top and bottom to a center connecting piece or support *a''*, and, as shown, the side pieces *a* forming the mast are strengthened and braced by cross-girts *a'''* and diagonal braces *a''''*, running from cross-girt to cross-girt, as shown in Fig. 1; but the mast could be formed in some other suitably strong manner.

B is a traveling gear, the cogs or leaves *b* of which are arranged on a curve and a straight line, as shown in Fig. 3, and this gear has a flat face *b'* adjoining the cogs or leaves, which flat face coincides with the curved and straight portions of the cogged sections of the gear. A gear B is provided for each side piece *a* and is bolted or otherwise firmly secured to the outer face of each side piece, as shown in Figs. 4 and 5, so as to have the curved part of the cogs, when the mast is perpendicular, lie in the direction of the open side of the tower on which the mast rolls down.

C is a straight rack having a series of cogs or leaves *c*, with which the cogs or leaves *b* mesh, and each rack C has adjacent to the cogs or leaves *c* a straight face *c'*, forming a track for the face *b'* of the gear B, as shown in Fig. 5. A straight rack C is provided for each gear B and is located in such relation to its companion gear B as to have the cogs or leaves *b c* mesh and have the face *b'* and *c'* in contact.

D are cross-pieces to which or on which are secured or mounted the straight racks C, a cross-piece being provided for each rack, and the rack is secured to its cross-piece by bolts or otherwise, and these cross-pieces, as shown, are set in blocks or supports D', which are attached to the corner-posts of the tower by bolts *d*, two of the bolts, as shown, passing through each cross-piece D and attaching the cross-piece with its supporting blocks or pieces D'.

E is a brace between the cross-pieces D and attached to the cross-pieces by a tie-rod *e*, so as to prevent the cross-pieces from springing apart or toward each other.

F is a weight-box attached to the mast.

G are corner-posts, one for each corner of the tower, which posts are secured together in the construction shown by cross-girts *f* and diagonal braces *g*, running from cross-girt to cross-girt, and, as shown at the lower end of the tower, additional bracing-braces *g'* and *g''* are provided; but the tower could have its corner-posts united and braced in some other suitable manner.

H is a cross-piece at the upper end of the tower, on which is located and secured a catch *h*.

I is a locking-latch, having an engaging end or catch *i*, to coact with the catch *h*, and, as shown, this latch I at its rear end has an arm on each side which is attached to the side pieces *a* of the mast by suitable pins or pivots *i'*.

J is a lifting-rod, the upper end of which is connected with the latch I and the lower end of which runs down in the tower to be within reach.

K is the head of the windmill carrying the wheel and the vane. L is the wind-wheel, and M is the vane. These parts K, L, and M can be of any usual and well-known form of construction of carrying-head, wheels, and vane.

The traveling gear B for each side of the mast is firmly attached to its side piece *a* by bolts or in any other firm manner, and the straight racks C are secured firmly to the cross-pieces D, and when in position a gear B rests and travels upon a straight rack C. The gears B are attached to the mast in such relation to the racks C as to have the straight face of the cogs or leaves *b* mesh with the cogs or leaves of the rack when the mast stands perpendicular, and when the mast is perpendicular it is located at the center of the tower, and when in this position the latch I has its end *i* engaged with the catch *h*, as shown in Fig. 6, and, if so desired, the lower end of the mast can be locked to the tower by a cross-bar or engaging latch, which will give the mast a support at the center by the engagement of the gear with the rack, and such engagement forms a lock at the center, and such locking is insured by the engagement of the straight face *b'* with the straight face *c'*, and the mast is further locked when in its perpendicular position by the engagement of the latch I with the catch *h*, and when the mast is perpendicular the edges of the side pieces *a* abut against a cross-piece H at the top of the tower, as shown in Fig. 6. It will thus be seen that the mast is firmly locked in a perpendicular position at the center, and is also firmly locked at the upper end of the tower, so that it will be held firm and strong in its upright or perpendicular position.

The mast is traveled over and turned down to bring the wheel in reach by releasing the latch I, which can be done by raising the rod or lifting-bar J, which raises the catch *i* from engagement with the catch *h*, and when the catches *h* and *i* are disengaged the mast can be lowered by taking hold of a wire rope secured (not shown) near its upper end and drawing down on such rope, which tips the upper end of the mast over and causes the cogs or leaves *b* to travel forward on the cogs or leaves *c*, and such forward traveling of the cogs or leaves *b*, by reason of the circle on which they are formed, rolls the mast over and down, as shown in dotted lines, Fig. 4, and the limit of forward roll is had by the engagement of the last tooth of the last cog or leaf of the curved part of the gear B with the final tooth of the rack C or by the engagement of suitable stops placed on the gear and on the rack or a stop on the mast. The travel of the gears B on the racks C carries the mast A from its central position in the tower over to one side, bringing the mast into position where it can be laid alongside of the tower, close thereto, so that when the mast is turned down the tower furnishes a support therefor. The travel of the gears on the racks in a straight line is insured by the contact of the faces *b'* and *c'*. The wheel, when the mast is turned down, is brought into position where it can be oiled or repairs made thereon, and when oiled or repaired the mast is traveled back to its former perpendicular position by taking hold of a wire rope attached to its lower end (not shown) and drawing down on the rope, which travels the gears B back on the racks C, bringing the parts into their normal position, as shown in Fig. 4, and with the rising of the mast, the latch I being free, its acting end can ride over the face of the catch *h* for the catch *i* to drop and engage the catch *h* and lock the mast at the top of the tower, while the mast is locked at the center or midway by the engagement of the gears B and the racks C.

The mast is to have the usual connecting or pump rod attached to the pump or other device to be operated, which rod is carried by the mast and can be disconnected at its lower end, so as to travel with the mast in the rising and falling of the mast, and the mast A is to have on its outer end a counterbalancing-weight to assist in raising it.

The gears B and the racks C furnish a strong central support for the mast when in its upright or perpendicular position, and these parts furnish a track by means of which the mast can be traveled to one side and lowered by the act of traveling over to the side, and they also furnish a brace for the mast at the center, by which side strain or twisting of the mast on its support is prevented, and, if desired, the cogs or leaves *b c* alone can be used as the supporting-faces for traveling and carrying the mast, and in setting up the parts the racks C are to be lined up, so as to square with each other and with the gears B and furnish an easy travel for the gears over the racks.

A stop on the mast for limiting the forward roll of the gear and holding the mast against falling too far can be formed by placing a cross-piece on the mast at the lower portion with its end projecting for the ends to engage the corner-pieces of the tower when the lower end of the mast is thrown up, and such arrangement is shown in Fig. 1, where a^5 represents such cross-piece.

The curved section of the gear B is all that is required or necessary to travel the mast for raising and lowering purposes, and the

gear B could be formed with cogs or leaves on the curve only and operate to travel the mast, in which case the straight cogs or leaves would be omitted.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a tower, of a mast and a traveling support carrying the mast and rolling to one side to lower the mast, substantially as and for the purposes specified.

2. The combination, with a supporting-tower, of a mast, gears attached to the mast, and stationary racks attached to the tower for lowering the mast by the travel of the gear, substantially as and for the purposes specified.

3. The combination, with a mast, of traveling gears attached to the mast and racks receiving the gears and forming a track for traveling the gears to one side, substantially as and for the purposes specified.

4. The combination, with a tower having straight racks attached thereto, of a mast having gears attached thereto and traveling over the racks for lowering the mast, substantially as specified.

5. The combination, with a tower having stationary racks attached thereto, of a mast having gears attached thereto, the gears having each a straight and a curved portion for coacting with the rack to lock the mast perpendicularly and to lower the mast by traveling the gears on the rack, substantially as specified.

6. The mast A, having the gears B, in combination with the racks C, attached to the tower for lowering the mast, substantially as and for the purposes specified.

7. The mast A, and gears B, attached to the mast, each gear formed with cogs or leaves *b* on a straight and curved line, in combination with the straight racks C, having the cogs or leaves *c*, with which the cogs or leaves *b* mesh, substantially as and for the purposes specified.

8. The mast A, and gears B, attached to the mast and each having cogs or leaves *b* and contact-faces *b'*, in combination with the racks C, each having cogs or leaves *c* and contact-faces *c'*, and a tower having the racks C thereto attached, substantially as and for the purposes specified.

9. The combination, with a tower, of a mast and an automatic latch for locking the mast to the tower at the top of the tower, substantially as and for the purposes specified.

10. The combination, with a tower, of a mast, traveling gears attached to the mast, and stationary racks attached to the tower, and an automatic latch engaging the mast with the top of the tower when the mast is perpendicular, substantially as and for the purposes specified.

11. The mast A and latch I, having the catch *i*, in combination with a tower having a catch *h* at its top, substantially as and for the purposes specified.

12. The mast A and latch I, having the catch *i*, in combination with the lifting-rod J and catch *h* on the top of the tower, substantially as and for the purposes specified.

13. The combination, with a tower, of a mast having a central lock to the tower and a lock for the mast at the top of the tower when the mast is perpendicular, substantially as and for the purposes specified.

14. The combination, with a tower, of a mast, a traveling support mounting the mast on the tower, and a lock for the mast at the upper end of the tower, substantially as and for the purposes specified.

FRANK. L. BUTLER.

Witnesses:
O. W. BOND,
B. A. PRICE.