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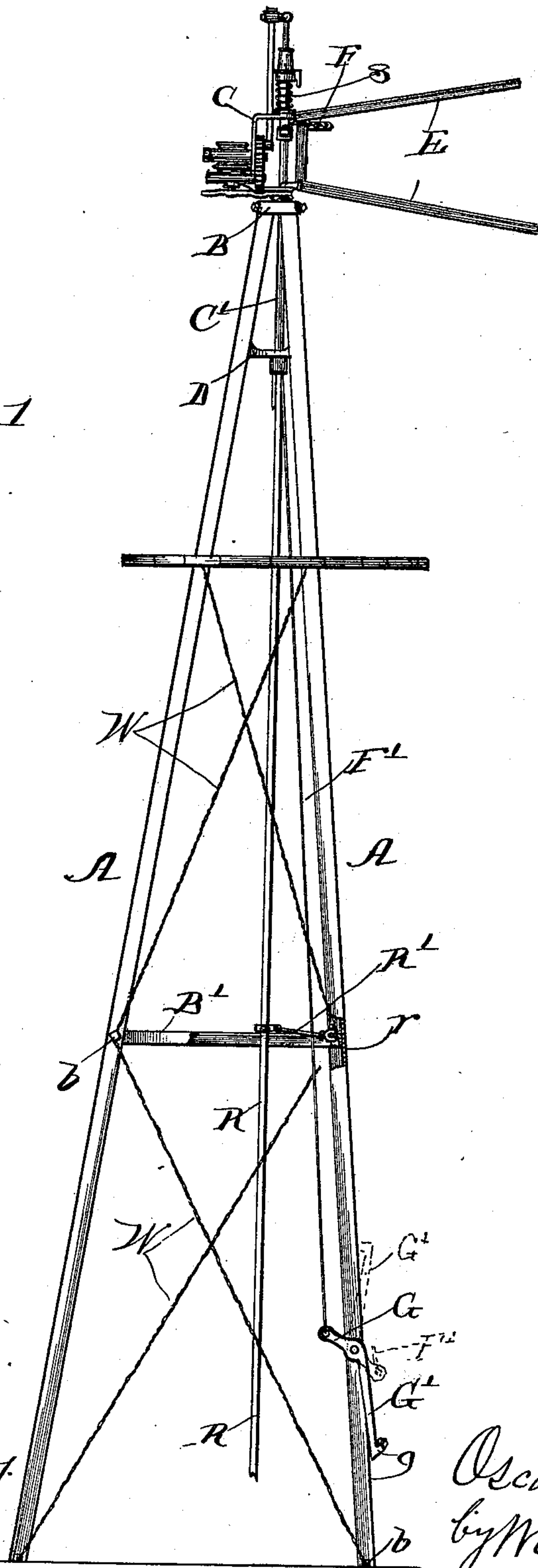
2 Sheets—Sheet 1.

O. J. ZIEGLER.  
WINDMILL TOWER.

No. 494,615.

Patented Apr. 4, 1893.

*Fig. 1*



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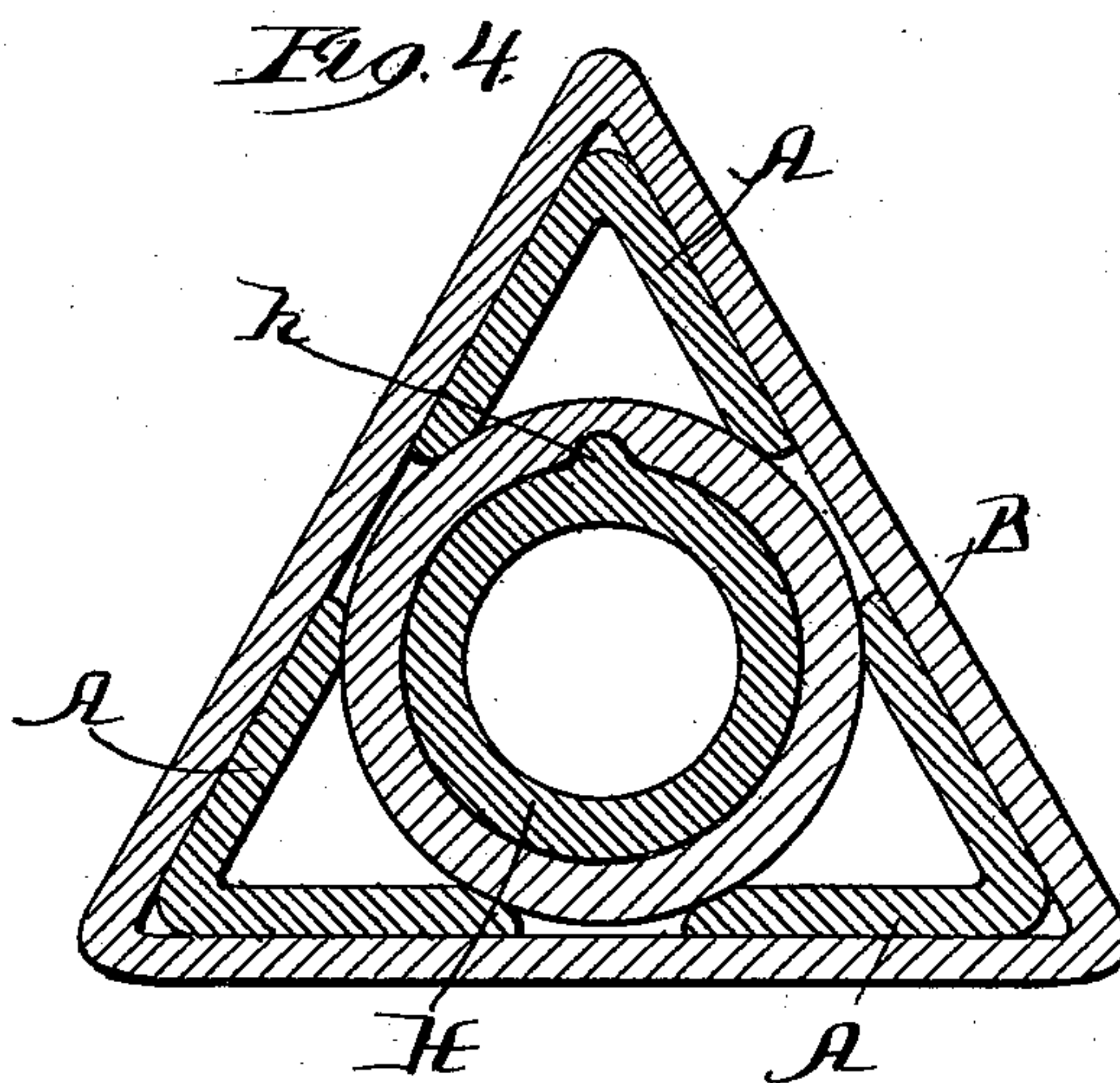
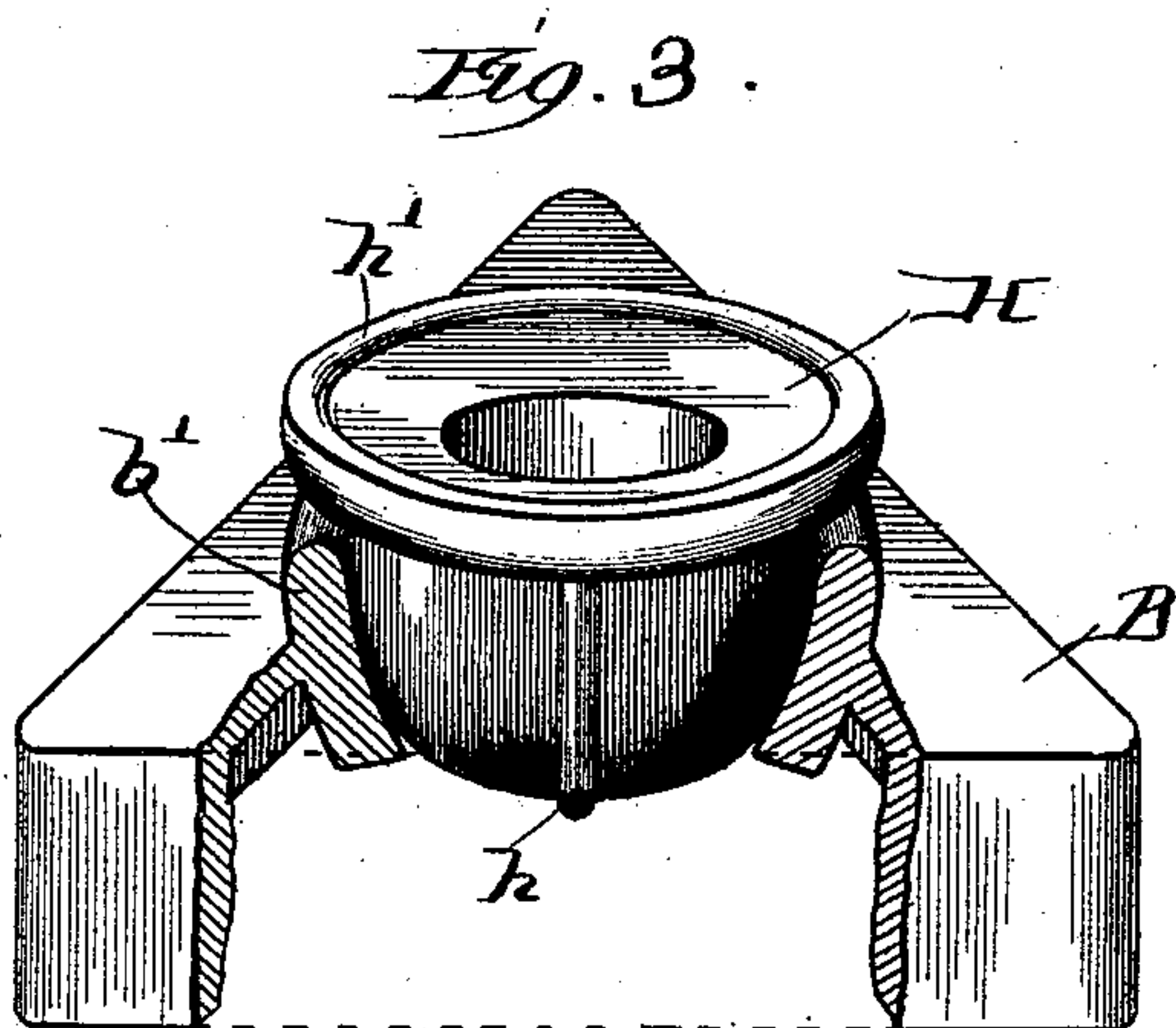
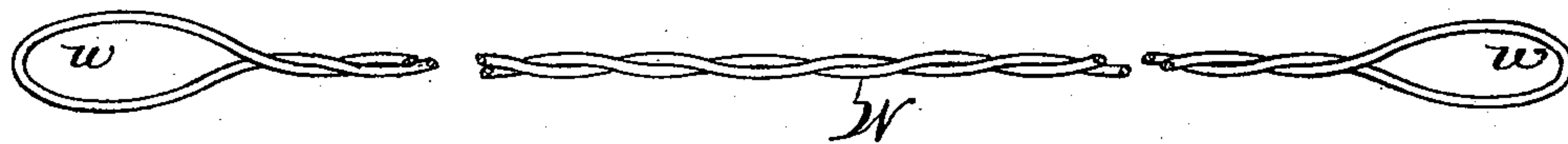
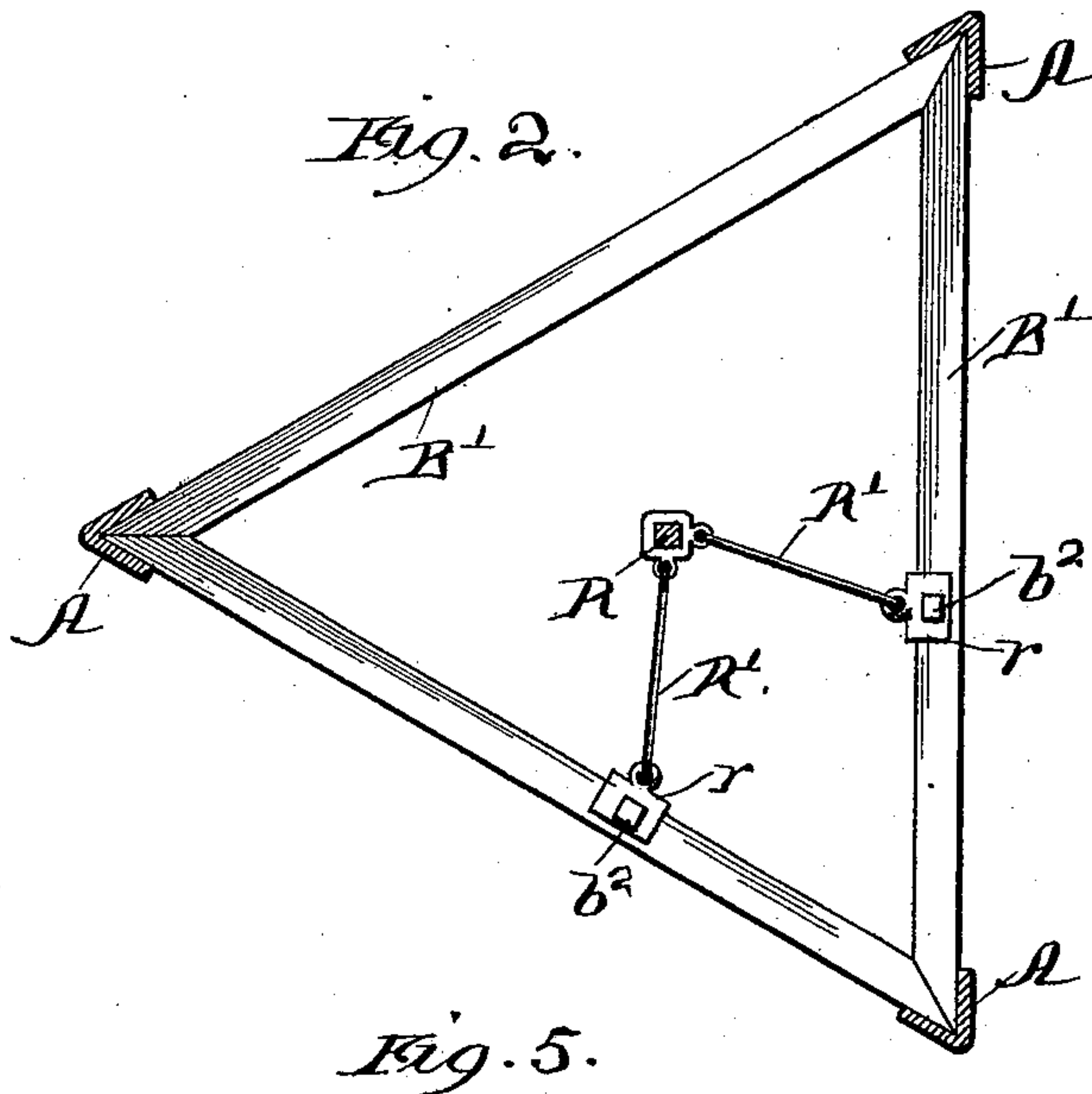
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2. Sheets—Sheet 2.

O. J. ZIEGLER.  
WINDMILL TOWER.

No. 494,615.

Patented Apr. 4, 1893.



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# UNITED STATES PATENT OFFICE.

OSCAR J. ZIEGLER, OF FREEPORT, ILLINOIS, ASSIGNOR TO THE STOVER  
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## WINDMILL-TOWER.

SPECIFICATION forming part of Letters Patent No. 494,615, dated April 4, 1893.

Application filed May 31, 1892. Serial No. 434,873. (No model.)

*To all whom it may concern:*

Be it known that I, OSCAR J. ZIEGLER, a citizen of the United States of America, residing at Freeport, in the county of Stephenson and State of Illinois, have invented certain new and useful Improvements in Windmills, of which the following is a specification.

My invention relates to improvements in windmills and is fully explained and described in the following specification and shown in the accompanying drawings; in which,

Figure 1 is an elevation of a windmill tower and certain operating parts of the mill, the whole structure being provided with my improvements. Fig. 2 is a view partly in top plan and partly in horizontal section illustrating the construction and connection of the tower, the pump rod guides and the pump rod. Fig. 3 is a perspective view of the top plate of the tower and the turntable, part of the plate being broken away to show construction. Fig. 4 is a horizontal section of the top plate and turntable; and Fig. 5 is an elevation of one of the twisted wire braces used to strengthen the frame of the mill.

In the views, A, A, A are three angle iron bars forming the posts of a windmill tower and connected by a top plate B, and horizontal braces B', placed at suitable intervals from top to bottom of the tower. Each of the three sides of the tower is divided into panels by the horizontal braces B', and each of the panels is strengthened and stiffened by the application of diagonal braces W, crossing each other and secured at their ends by bolts b, inserted in the frame at the angles of the panels and preferably serving the further purpose of fastening together the posts and the horizontal braces. Each of the diagonal braces W, is formed of a single wire having its ends fastened together in any desired manner and doubled to form terminal loops w, w, Fig. 5. The two parallel strands thus formed, are twisted together by rotation applied at their center, the twist being in opposite directions on opposite sides of the center, as shown in Fig. 5. These braces are prepared at the shop and shipped with the other parts of the tower, each of them being twisted until it is of approximately the right length for use on the panel to which it is to be applied.

When the frame of the mill is set up, the braces W, are secured in place by passing the bolts through the loops w, and each brace is then shortened by applying further twist to its center until all the braces are drawn taut, and the tower is rendered substantially rigid. I have found in extensive use of these braces that they may easily be made with such accuracy, that one or two additional turns will tighten each of them when in place on the tower, and when thus tightened, they show no tendency to untwist or slacken. At the same time, they have sufficient elasticity to compensate for contraction and expansion caused by cold and heat, and they furnish therefore a simple, practical durable and effective means of bracing the tower.

On the top plate B, of the tower rests a cap or turntable H, which supports the head C, of the mill, the head being provided with a tubular downward extension C', journaled in the cap H, and also in a centering plate D, fastened in the tower at a suitable distance below the top plate. In mills having wooden towers there is no difficulty in leveling the top plate, and in such mills, the turntable may, therefore, be flat or of any other suitable shape, but in the construction of iron or steel towers, it is extremely difficult to level the top plate for the reason that it is a matter of great labor to cut down the posts, and for the further reason that the smallness of the top of the tower causes a slight difference in the height of the posts to throw the top plate seriously out of level. To obviate this difficulty, I do away with the necessity of leveling the top plate by providing it with a cup-like flange b', and making the cap, or turntable, approximately spherical, so that it may adjust itself in the top plate, the centering of the tubular extension C', of the head being thus sufficient to level the cap. The cap may be so constructed as to turn in the top plate, if desired, but I prefer to form it with a rib, or other projection h, fitting in a suitable groove in the top plate and preventing rotation of the cap. When thus constructed, the head turns upon the cap, and the usual anti-friction balls may, if desired, be interposed between the head and the cap.

The frame E, of a vane of any desired con-



struction is pivoted to the head C, and the spring S, serves to hold the vane in its normal position parallel to the wind-wheel shaft. A chain F, fastened to the vane frame passes  
 5 over suitable pulleys and downward through the tubular extension of the head, and a wire F', fastened to the chain extends downward to a point near the foot of the tower where it is fastened to one of the ends of the bent lever G, G', pivoted to one of the tower posts.  
 10 The end of the longer member G', of the lever is provided with a short lateral extension g, adapted to impinge upon the post and lock the lever when at either of its limits of movement. When the lever is in the position  
 15 shown in full lines in Fig. 1, the wire F', is in its highest position and the mill is in the wind. If the end g, of the lever be raised, however, until it reaches the position shown in dotted lines in Fig. 1, the wire will be drawn  
 20 downward sufficiently to overcome the force of the spring S, and throw the vane and wheel out of the wind. In reaching the second position, the wire crosses the pivot of the lever  
 25 and its upward tension upon the end of the lever to which it is fastened, tends to raise that end and thus presses the extension g, against the outer surface of the post and locks the lever against further movement.  
 30 The lever is therefore automatically locked by the movement which throws the mill out of the wind, and the vane and wheel thus remain in their desired relative positions until the lever is brought back to the position  
 35 shown in full lines in Fig. 1.

Nearly all windmills of this class are used largely for pumping, each mill being provided with a pump rod R, connected in any  
 40 suitable manner with the rotating shaft of the windwheel and receiving vertical reciprocating motion therefrom. It is necessary to provide the tower with some simple and effective braces or guides which shall hold the pump rod approximately central and vertical,  
 45 and, at the same time, shall not retard it by unnecessary friction. I have provided the tower shown in the drawings, with vertically swinging guide rods, R', R', pivoted at their outer ends to adjustable blocks, r, r, fastened  
 50 to the horizontal braces, B', on two sides of the tower, and at their inner ends to a clamp encircling the pump rod and fastened to it in any suitable manner. The blocks, r, r, are  
 55 held in place by means of bolts, b<sup>2</sup>, or in any equivalent way, and the adjustment of these

blocksevidently serves as a means of varying the distance of the clamp from each of the horizontal braces and thereby centering it accurately with reference to the tower.

Having now described and explained my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with the posts of a windmill tower, of a brace made up of a wire doubled to form terminal loops and having  
 65 its ends fastened together to form two strands, the strands being twisted together in opposite directions from the center of the brace, and the ends of the brace being fastened to the posts; substantially as shown and described. 70

2. The combination with the posts of a tower, and the top plate fastened thereto, of a rocking cap supported in the top plate and adapted to support the head of the windmill  
 75 or other superstructure and to be leveled by the centering of the downward extension thereon; substantially as shown and described.

3. The combination with the posts A, A, and top plate B, of the cap H, resting in the top  
 80 plate and free to rock therein for the purpose of adjusting its upper surface substantially as shown and described.

4. The combination with the posts A, A, and the top-plate B, having the flange b', of the  
 85 approximately spherical cap H, resting in the top plate and provided with a projection h, resting in a corresponding recess in the top plate to prevent rotation of the cap; substantially as shown and described. 90

5. The combination with the tower of a windmill of two approximately horizontal rods pivoted at their outer ends to laterally adjustable blocks fastened to the tower, and at  
 95 their inner ends to a clamp adapted to be fastened to the pump rod of the mill; substantially as shown and described.

6. The combination with the posts, A, A, and the horizontal braces, B', connecting the same, of the blocks r, r, adjustably fastened to the  
 100 horizontal braces, the guide rods, R', R', pivoted at their outer ends to said blocks and a clamp pivoted to the inner ends of the rods and adapted to be fastened to the pump rod of the mill; substantially as shown and de- 105 scribed.

OSCAR J. ZIEGLER.

Witnesses:

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