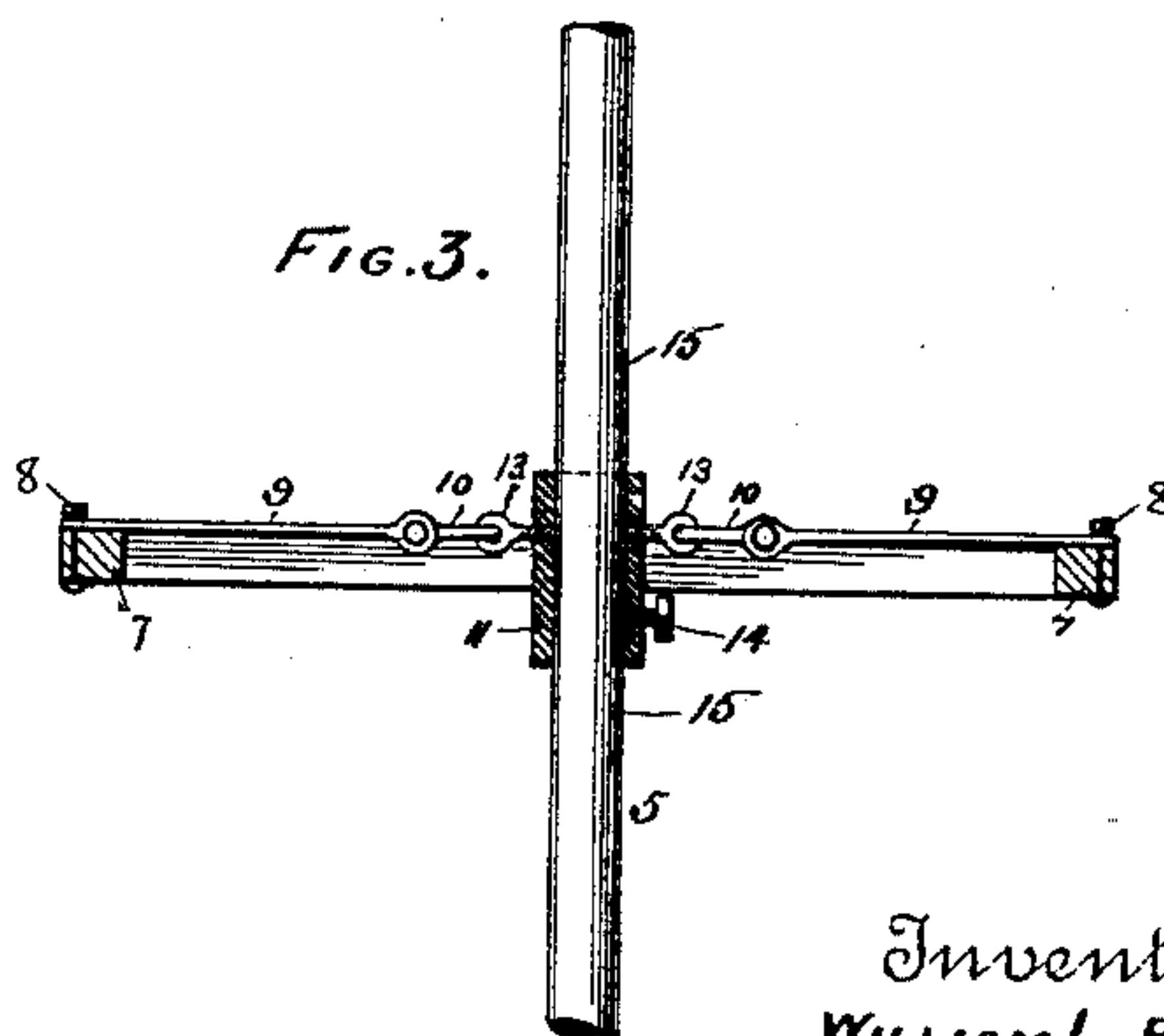
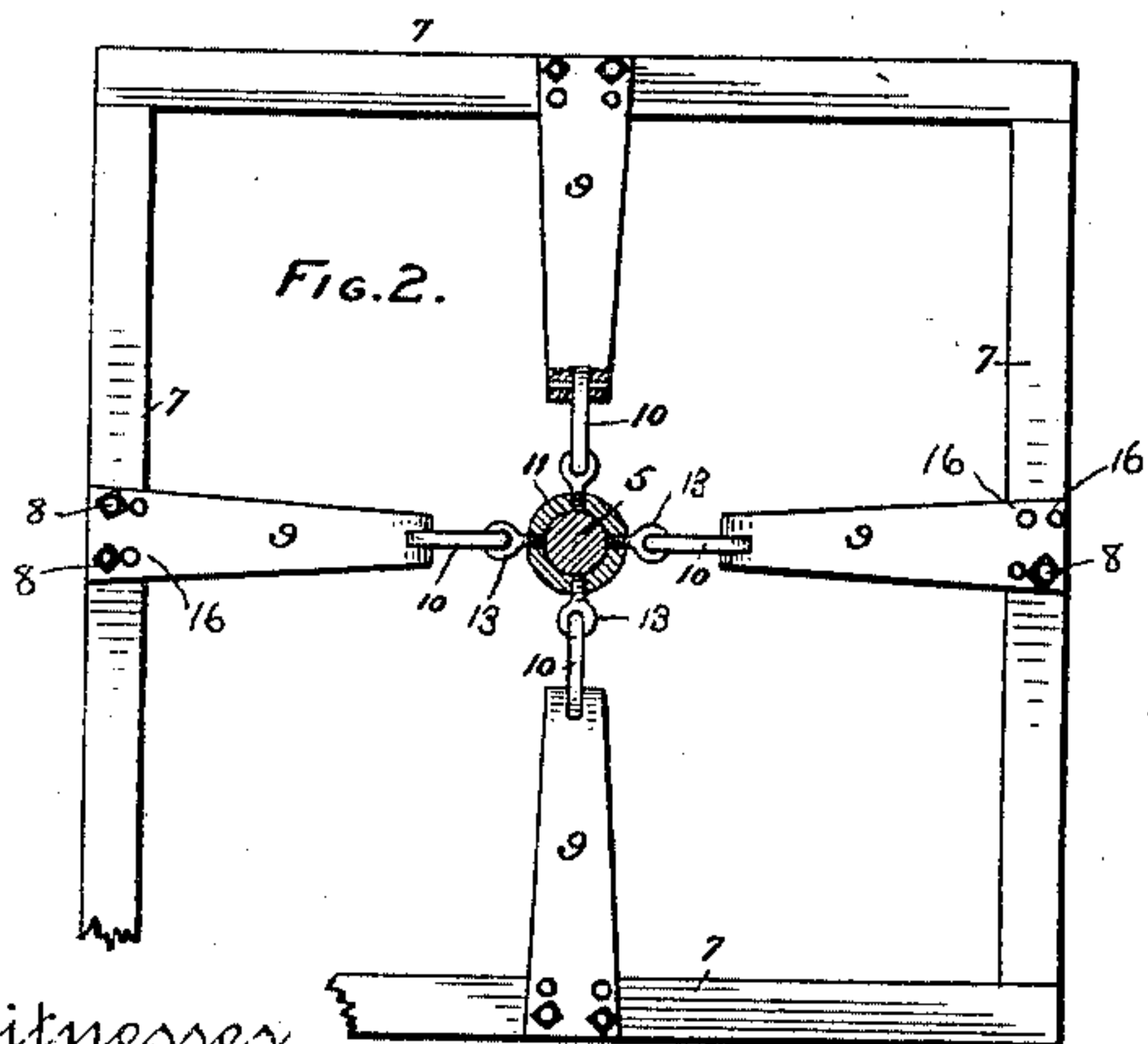
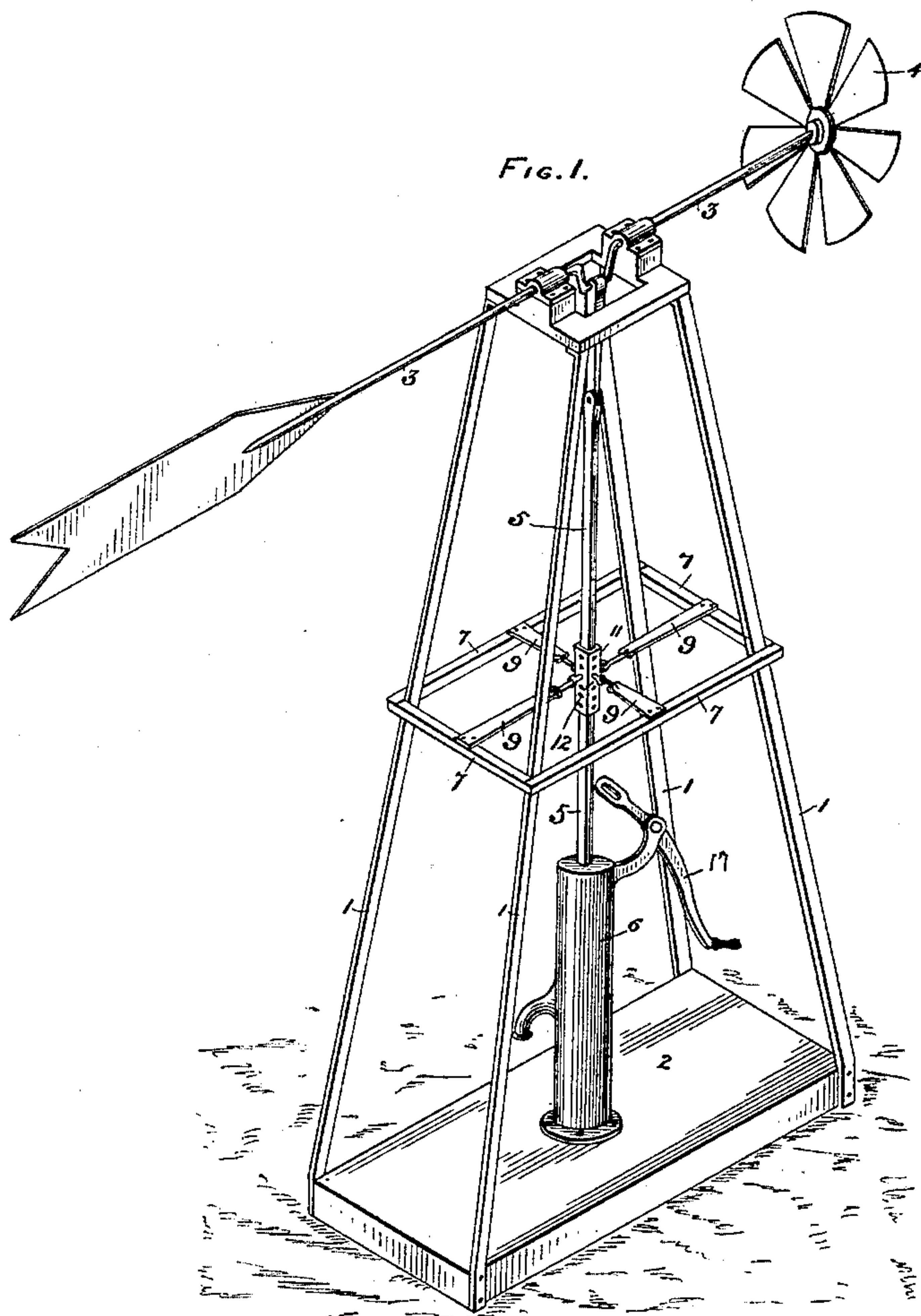


(No Model.)

W. L. BLACK.  
COMPENSATING PUMP SPRING.

No. 450,657.

Patented Apr. 21, 1891.



Witnesses

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# UNITED STATES PATENT OFFICE.

WILLIAM L. BLACK, OF FORT MCKAVETT, TEXAS.

## COMPENSATING PUMP-SPRING.

SPECIFICATION forming part of Letters Patent No. 450,657, dated April 21, 1891.

Application filed June 6, 1890. Serial No. 354,519. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM L. BLACK, a citizen of the United States, residing at Fort McKavett, in the county of Menard and State of Texas, have invented certain new and useful Improvements in Compensating Pump-Springs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates in general to pumps, and in particular to that class wherein the suction-rod is operated by some overhead power—as, for example, a wind-wheel. In this class of pumps the shaft of the wind-wheel is usually provided with an ordinary crank which is linked to the upper end of the suction-rod. As in all lift-pumps, the work to be done is thrown on the upward stroke of the suction-rod, its return or down stroke being accomplished with a relatively small expenditure of power. This results in throwing upon the operating-crank during one-half of its revolution a strain equal to the force required to lift the water as well as the weight of the rod and its connected parts, whereas in the opposite half of its revolution the crank has little or no work to perform, the weight of the rod and its connections assisting materially in restoring it to its initial position.

The object of my invention is to provide a cheap, simple, and effective means to overcome the unequal and jerking strains thus imposed on the machinery by storing up in the downward or idle stroke of the suction-rod a power which is expended during the upward stroke to assist the crank in lifting the rod with the result of reducing the power required to drive the pump, equalizing the resistance, increasing the efficiency, and generally prolonging the life of the entire mechanism.

A further object is to guide and steady the suction-rod and brace and stiffen the trestle.

To these ends the invention consists in the construction and arrangement of parts hereinafter shown and described.

In the accompanying drawings, Figure 1 is a perspective view of a windmill-pump with my invention applied. Fig. 2 is a horizontal

section through the sleeve, and Fig. 3 is a vertical section through a part of the frame and sleeve.

The same numerals indicate similar parts in the several views.

1 1 denote the four corner-uprights of the frame-work or derrick, which uprights are either planted in the ground or rise from a suitable base 2, as shown. In the top of this frame-work is suitably journaled the shaft 3 of the wind-wheel 4.

5 denotes the suction-rod link connected at its upper end with the crank of the wind-wheel shaft.

6 indicates the pump.

So far the construction and arrangement of parts are those commonly employed in this class of devices and need no further description.

To apply my invention to such a pump, I secure at any suitable point in the length of the uprights four braces 7, forming a square or rectangular frame and steadying and strengthening the derrick. To each of these braces I attach by any suitable means—such as bolts and nuts 8—a heavy leaf-spring 9, the four springs converging to the center, where they are adjustably connected to the suction-rod 5 by means presently to be described. These springs are of any preferred form or construction, and to provide for their being adjusted in and out toward and from the rod I make them with two or more holes 16 at their butt-ends, into any one of which the bolts 8 may be set. At its opposite end each spring is provided with a short pivoted link 10.

11 indicates a ferrule or sleeve circular or rectangular in cross-section (depending upon the shape of the suction-rod) and elongated, as shown in Fig. 1, or narrow, as in Fig. 3. When of the form seen in Fig. 1, it is rigidly fixed upon the suction-rod, and is provided with a series of slots or holes 12 for the adjustable connection therewith of the links 10 on the inner ends of the springs. When short or narrow, as in Fig. 3, the connection of the link therewith is not adjustable; but the sleeve itself is adjustable on the rod instead of being fixed, as in the other case.

13 denote screw-eyes or eyebolts by means of which the pivoted links 10 are connected



with the ferrule. These bolts or eyes may obviously be adjusted into any of the holes in the sleeve to vary the tension of the springs.

In Fig. 3 the sleeve is provided with an extra bolt or heavy set-screw 14 and the suction-rod is preferably formed with notches or holes 15 to receive them and insure a rigid connection of the parts.

Though the invention has so far been described in connection with a windmill-pump, it is quite as well adapted to pumps operated by other power, even hand-power.

17 denotes an ordinary pump-handle, which may be connected with the suction-rod and the pump worked entirely thereby by simply disconnecting the link-connection between the top of the rod and the crank of the wheel-shaft.

The construction being as hereinbefore described, the operation is as follows: Starting with the suction-rod in its elevated position, the springs are not under tension, but hold the rod up against descent by its own weight. As the crank turns to force the rod down, the springs are bent in an obvious manner and put under a tension which may be regulated in the manner above described to suit the exigencies of the case. As soon as the rod starts on its upstroke the springs recoil and assist the cranks in pulling up the rod, thereby reducing by the amount of their expansive force the power required to lift the rod. It thus appears that by dividing the work to be done between the up and down strokes of the rod I distribute the power over both halves of the crank's revolution, and thereby utilize the entire revolution, instead of, as in the old way, doing all the work in one half of the revolution and leaving the other half practically idle.

Another important feature of my invention is that by the particular arrangement of con-

verging springs the suction-rod is steadied and guided and held in the center of the derrick.

Although I have shown the springs fastened to braces on the derrick, they may be secured to the corner-uprights and these braces dispensed with altogether. It is also obvious that, instead of using flat or leaf springs, I may employ round or square rods of steel.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination of the suction-rod, the frame, and the springs secured at their outer ends to the frame and link-connected at their opposite ends to a sleeve inclosing the suction-rod, substantially as described.

2. The combination of the frame, the suction-rod, the springs secured at their outer ends to the frame, and an adjustable link-connection between the inner ends of the springs and the rod, substantially as described.

3. The combination of the frame, the springs secured at their outer ends thereto, the suction-rod, the sleeve inclosing the rod and provided with a series of openings, eyebolts or screws adapted to be set into any of the openings, and links connecting the inner ends of the springs thereto, substantially as described.

4. The combination of the frame, the braces 7, the springs 9, secured at their outer ends to the braces, the suction-rod 5, the sleeve 11, encircling the rod and provided with a series of openings, the adjustable eyebolts or screws 13, and the links 10, connecting the inner ends of the springs with the eyebolts, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WM. L. BLACK.

Witnesses:

W. S. TALBOTT,  
JOHN O. TALBOTT.