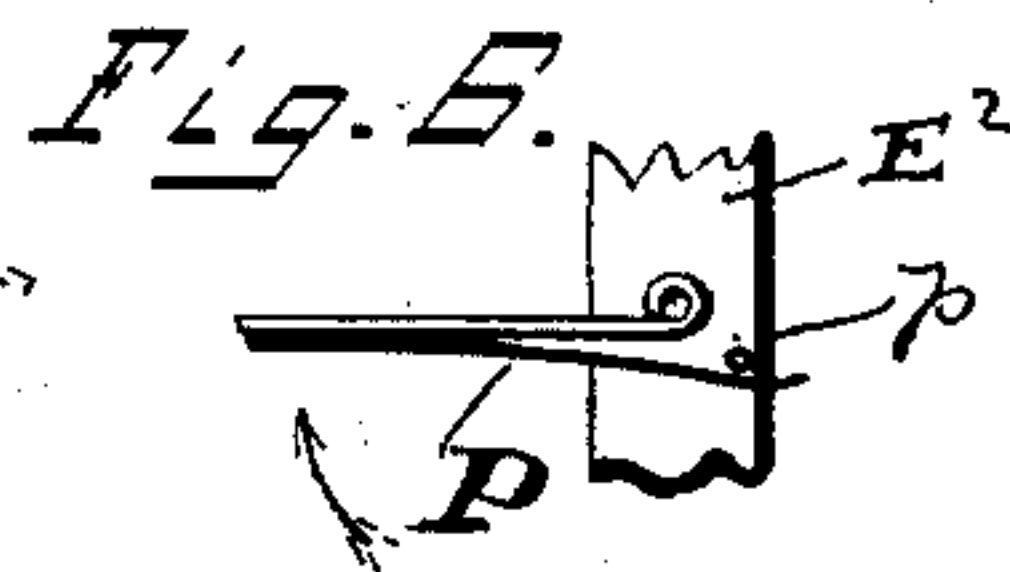
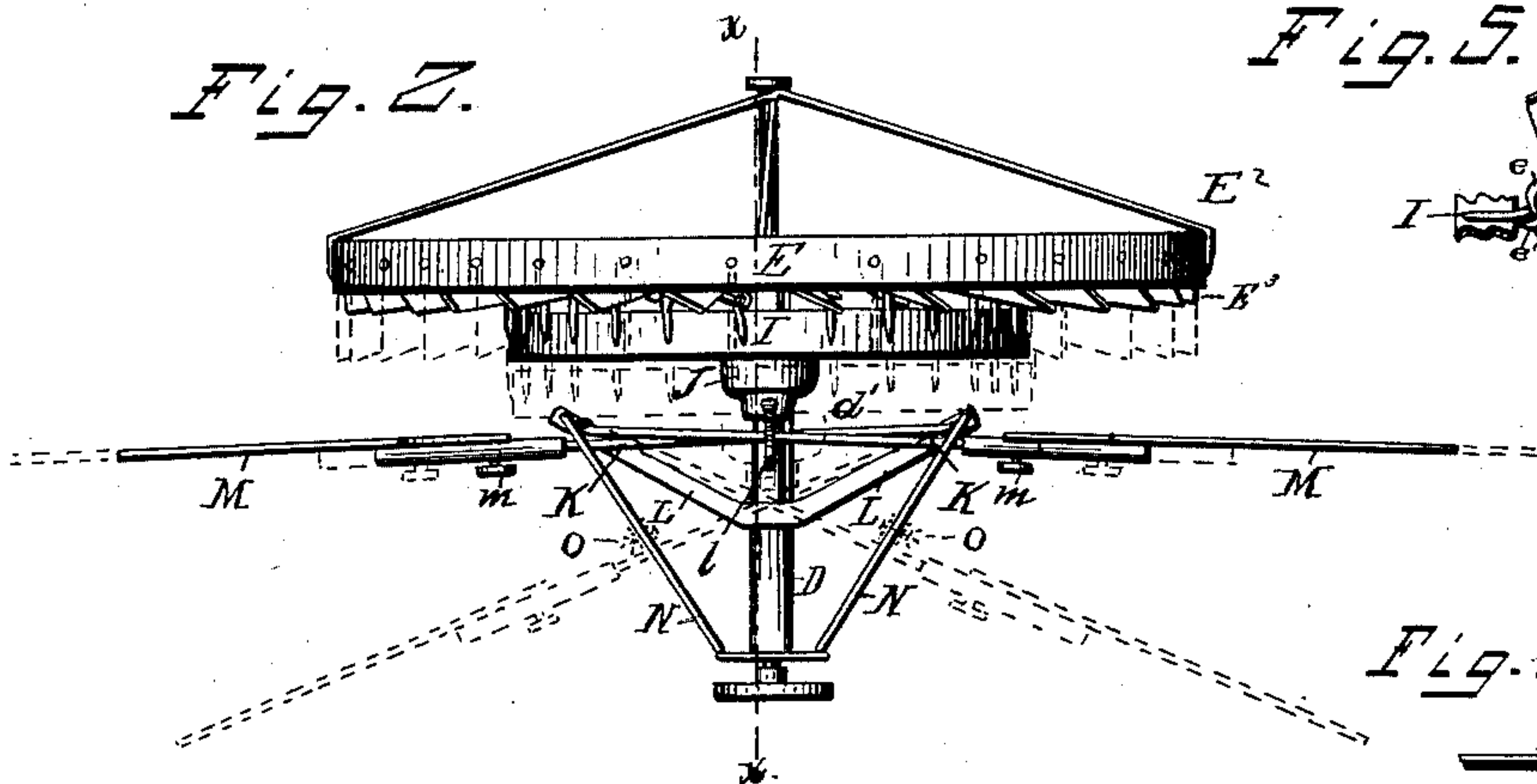
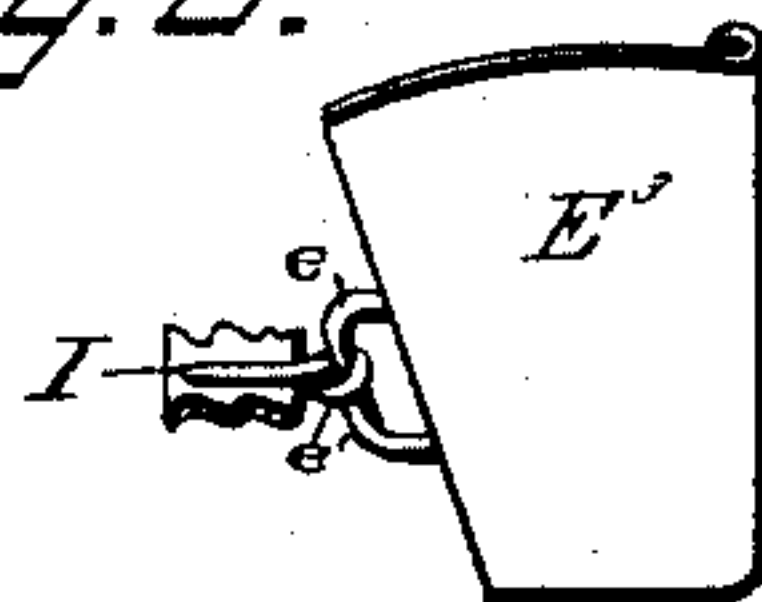
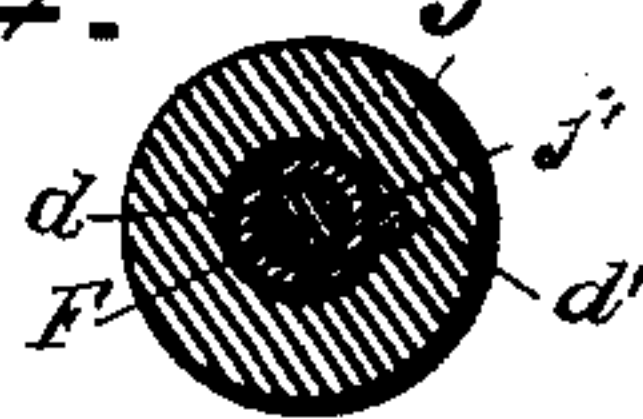
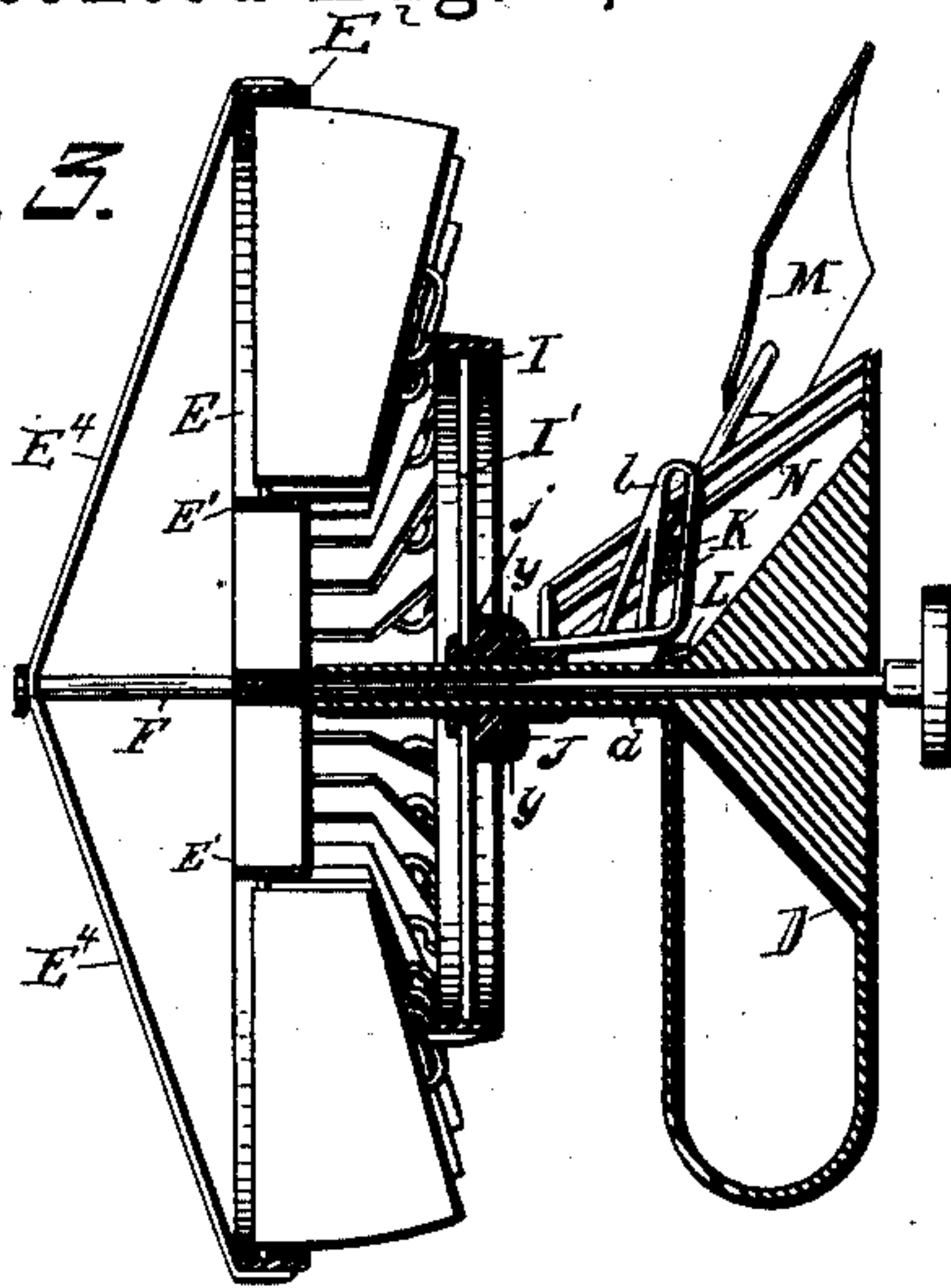


Patented Aug. 2, 1887.



Inventor
Alexander Haldan
By R.S. & A. P. Lacey
Att'ys.

UNITED STATES PATENT OFFICE.

ALEXANDER HALDAN, OF YUMA, COLORADO.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 367,517, dated August 2, 1887.

Application filed April 23, 1887. Serial No. 235,892. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER HALDAN, a citizen of the United States, residing at Yuma, in the county of Washington and State of Colorado, have invented certain new and useful Improvements in Windmills; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to that class of vertical wind-wheels having feathering blades or wings and which have the wings pivoted and connected with a ring and a sliding collar on the wheel-shaft bearing connected with the ring and with governor-vanes for controlling and regulating the position of the wings according to the force or velocity of the wind.

The object of the invention is to simplify the construction of this class of machines and compact the governor mechanism into as small a space as possible consistent with the operation of the wind-engine.

The improvement consists in the novel features of construction hereinafter more fully set forth, claimed, and shown in the annexed drawings, in which—

Figure 1 is a side view of a wind-wheel embodying my invention; Fig. 2, a plan view showing by dotted lines the governor-vanes adjusted longitudinally on their arms and the wings and governor mechanism adjusted; Fig. 3, a detail sectional view on the line X X of Fig. 2 on an enlarged scale; Fig. 4, a section on the line Y Y of Fig. 3; Fig. 5, a detail view of one of the wings and a portion of the adjusting or movable ring which is connected with the sliding collar on the bearing of the wheel-shaft; Fig. 6, a sectional view of a portion of the outer ring and one of the wings, showing the devices for limiting the outward movement of the wings.

The tower A, the tail-vane casting B, the tail-vane C, the wind-wheel casting D, the wind-wheel E, the wheel-shaft F, the crank G, and the pump-rod H are old, and are of the well-known construction and are shown as a means to illustrate the application of my invention.

The wind-wheel, composed of the inner and outer rings, E¹ E², and the pivoted wings E³, is secured to the shaft F a short distance from its end and is stayed by the braces E⁴, extended from the end of the shaft to the outer ring. The rear edges of the wings are provided with the keepers e, which secure them to the ring I by means of the eyes e'. The stay-bar I, connecting the diametrically-opposite sides of the ring I, is centrally apertured and fits in the annular groove j of the sliding collar J, so that said stay-bar can turn freely in said groove, but will follow in the longitudinal adjustments of the collar on the tubular bearing d of the wheel-casting D, through which the wheel-shaft F passes and obtains a bearing, so as to turn the wings about their axis and present more or less surface to the wind. The collar J is held from turning on the tubular bearing by the rib d', secured to the bearing fitting in the groove j' in the collar, making what is known as a "feather-and-spline" connection. The governor-vanes (two in number) located on each side of the axis of the wheel have the inner ends of their arms K pivoted to the outer ends of the arms or brackets L extended from the wheel-casting in opposite directions, and their outer ends provided with the vanes M, which are adjustably mounted upon and secured thereto by the set-screws m. The arms K cross each other at a point directly above the axis of the wheel and pass through the vertically-slotted guide l, carried by the collar J. The outer ends extend through upwardly-inclined ways N, supported between the outer ends of the brackets L and the wheel-casting.

In practice the wings of the wheel may be adjusted to any desired position, according to the load and nature of the work to be performed, by moving the governor-vanes to or from the wheel, and the vanes are normally held in this position by the stops O, clamped to the inclined ways in front of the arms K, as shown by dotted lines in Fig. 2, which limit their forward movement, yet allow the governor-vanes to move backward in the event of any abnormal pressure or force of wind. The wings are held in the wind by the gravity of the governor-vanes on the inclined ways. By adjusting the vanes M outward, along the arms K, the force holding the wings in the wind is

increased, and by moving the vanes in, said force is diminished. When the wind runs high, it carries the governor-vanes back and up the inclined ways and turns the wings, so as to present less surface, and when the wind abates, the vanes gravitate and return the wings to their normal position.

To prevent the wings turning around too far, spring-arms P are secured to the ends of some of the wings and are adapted to strike against stops p, secured to the ring E.

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

1. The combination, with the wheel-casting and the tubular bearing, of the wheel having pivoted wings, the ring connected with the wings, the sliding collar mounted on the bearing and held from turning thereon, the vertical guide carried by the collar, the governor-vanes, and the inclined ways, substantially as set forth.

2. The combination, with the wind-wheel casting, the tubular bearing, the wind-wheel having pivoted wings, the ring connected with the wings, the sliding collar mounted upon the tubular bearing and held from turning thereon, and the vertical guide carried by the collar, of the governor-vanes crossed and held together at their point of intersection by said

guide, and the inclined ways, substantially as set forth.

3. The combination, with the wind-wheel casting, the tubular bearing, the wind-wheel having pivoted wings, the ring connected with the wings, the sliding collar, and the vertical guide carried by the collar, of the brackets extended from the wheel-casting in opposite directions, the upwardly-inclined guideways, the governor-vanes having their arms crossed and held at their point of intersection by said guide, the outer portion of the arms passing through the inclined guideways and their inner ends being pivoted to the outer ends of the brackets, substantially as set forth.

4. In a wind-wheel, the combination, with the pivoted wings, the sliding collar connected therewith, and the upwardly-inclined ways, of the governor-arms pivotally supported at their inner ends and passed through said inclined ways, and the governor-vanes adjustably mounted upon and secured to the outer ends of the governor-arms, substantially as and for the purpose described.

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

ALEXANDER HALDAN.

Witnesses:

P. F. HUBER,

W. J. GOODSPEED.