

(No Model.)

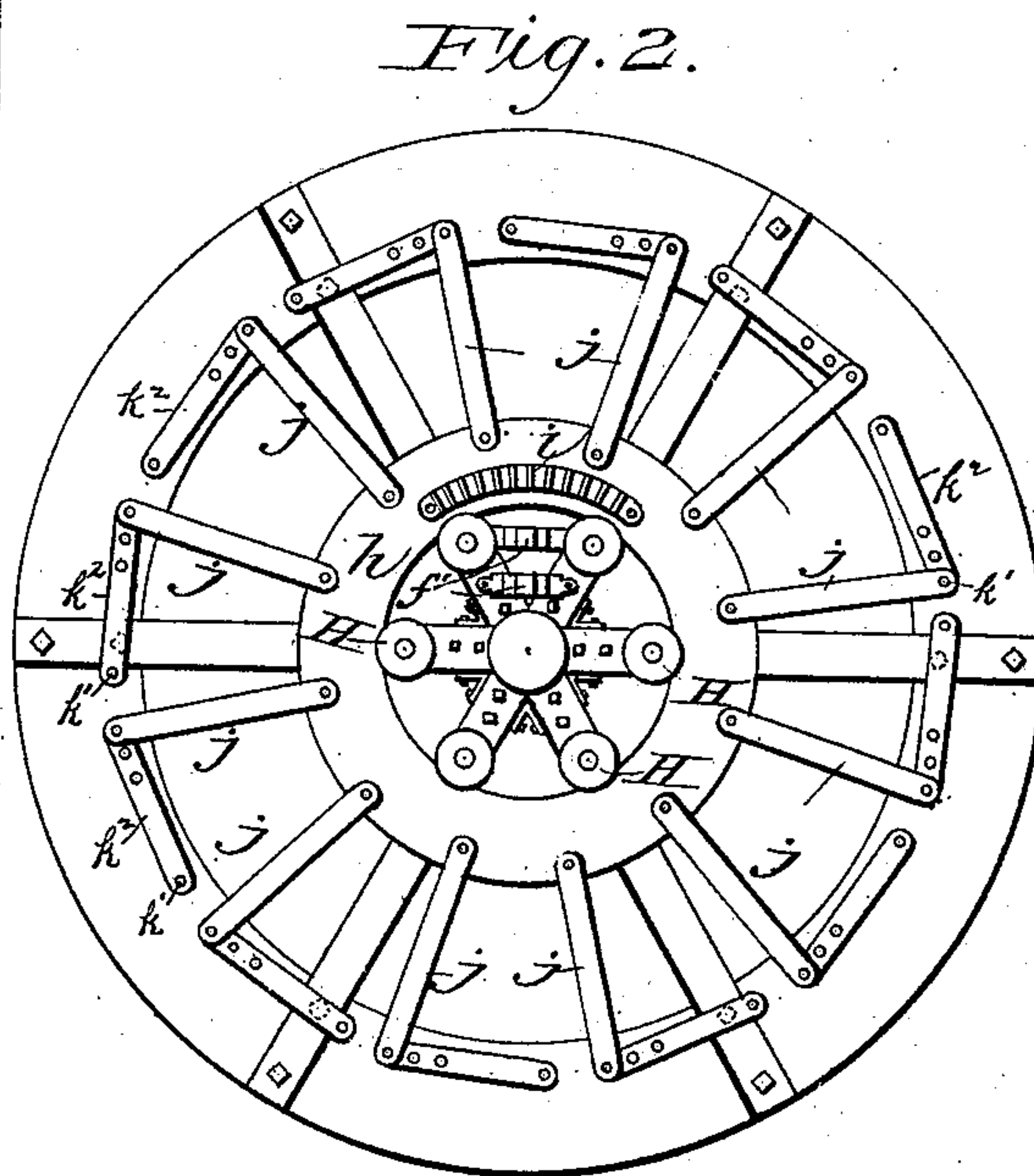
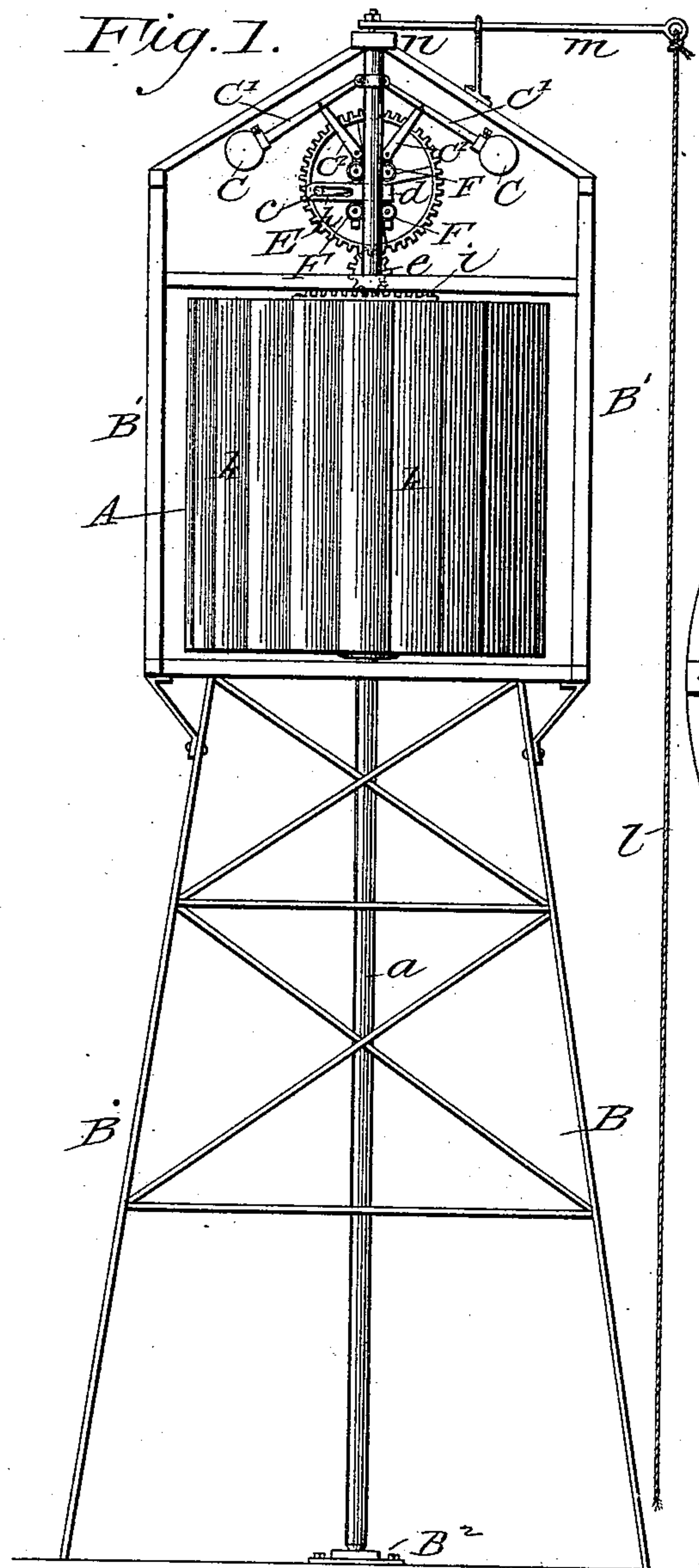
2 Sheets—Sheet 1.

H. WATKINS.

WINDMILL.

No. 370,294.

Patented Sept. 20, 1887.



Witnesses:
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R. S. Lawrence.

Inventor.
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

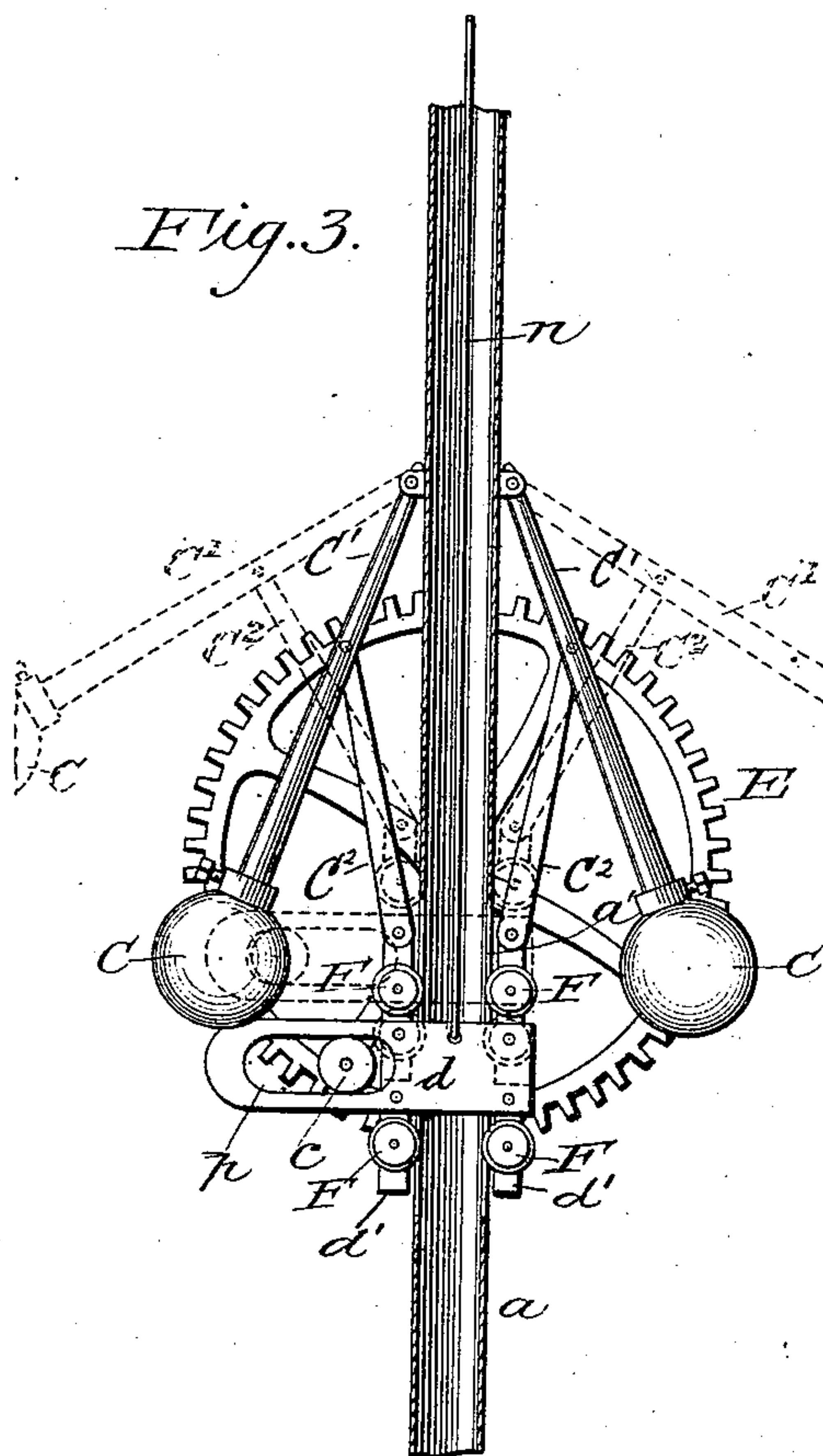


Fig. 5.

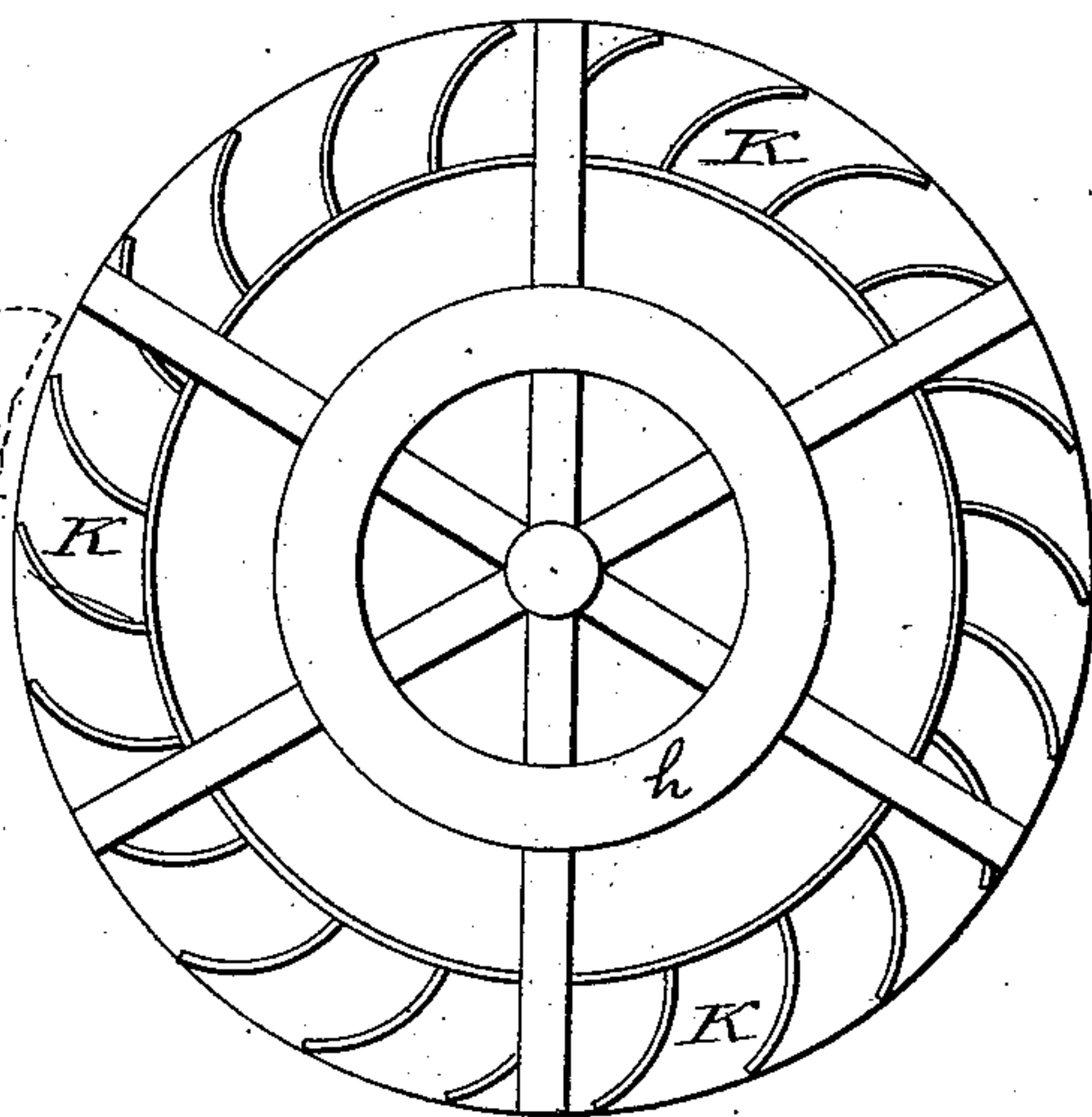


Fig. 6.

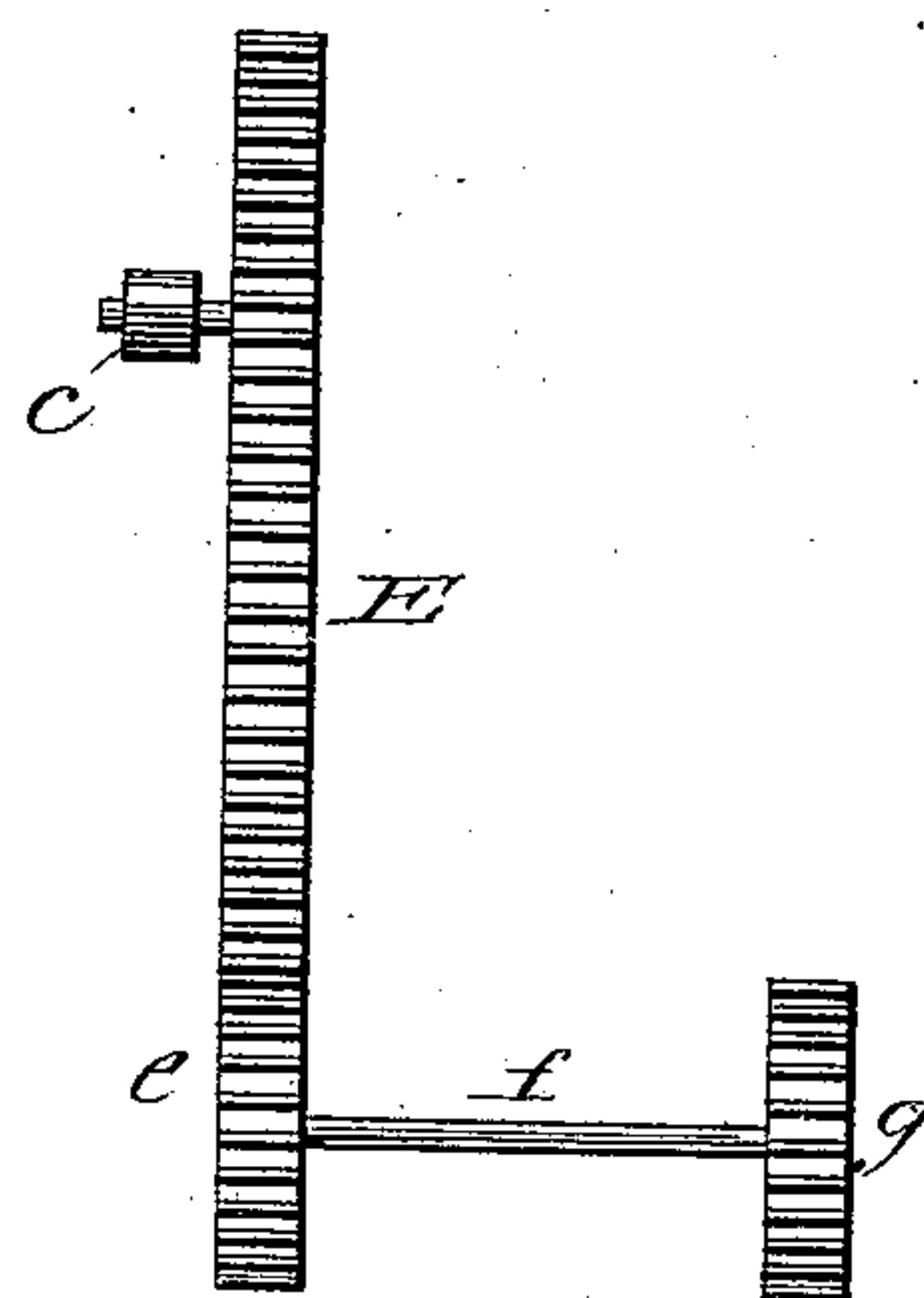
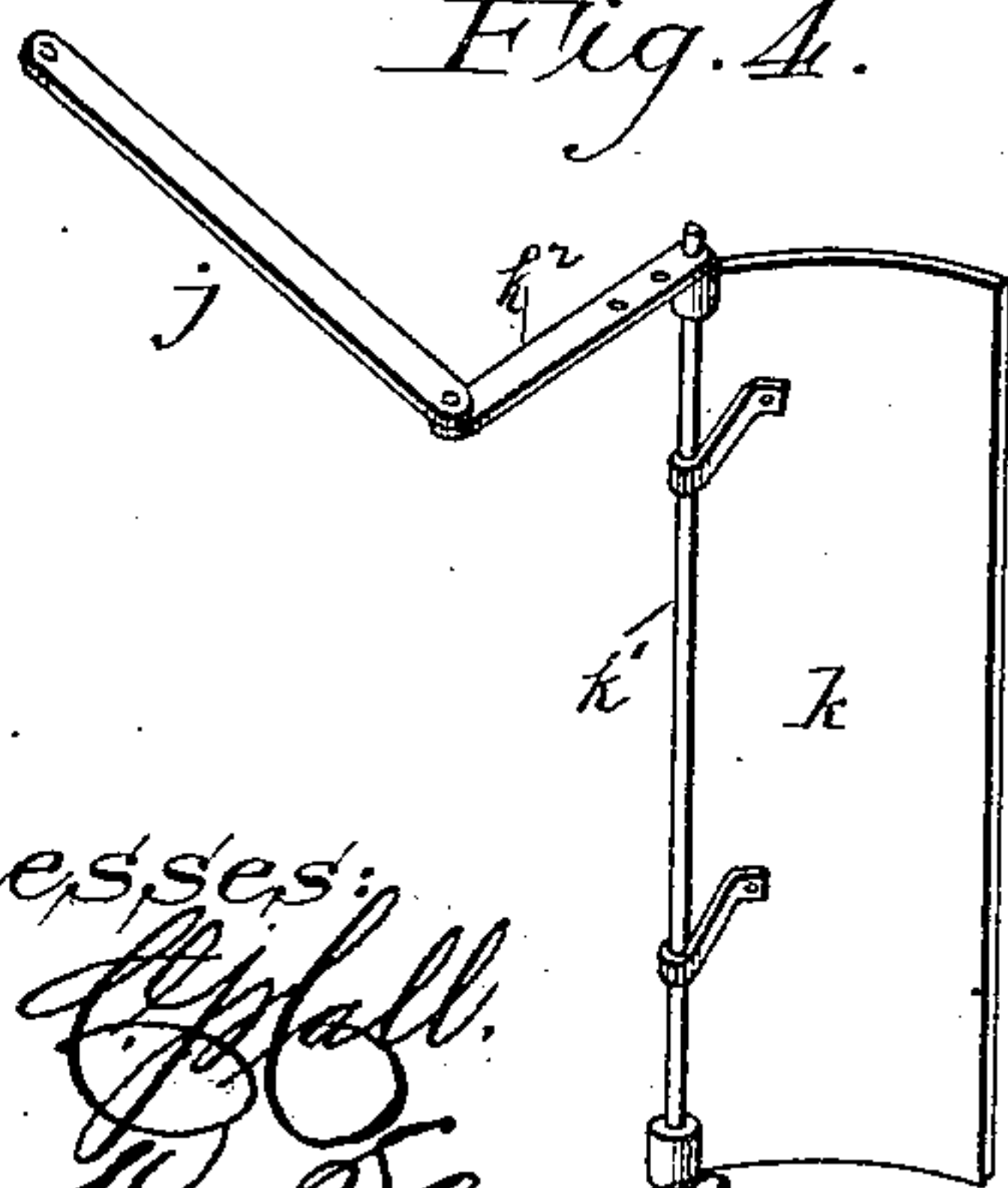


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

HIRAM WATKINS, OF PUEBLO, COLORADO.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 370,294, dated September 20, 1887.

Application filed August 12, 1886. Serial No. 210,744. (No model.)

To all whom it may concern:

Be it known that I, HIRAM WATKINS, a citizen of the United States, residing at Pueblo, in the county of Pueblo and State of Colorado, have invented certain new and useful Improvements in Windmills, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of the windmill. Fig. 2 is a plan view of the wind-wheel, the governor balls and shaft being removed. Fig. 3 is a detail view, partly in section, of the main shaft and part of the governor mechanism. Fig. 4 is a perspective view of one of the blades or wings and its operating-lever. Fig. 5 is a plan view of the wind-wheel, the entire governor mechanism being removed; and Fig. 6 is a detail view of the system of gearing forming part of the governor mechanism.

The invention will be first described, and then specifically pointed out in the claims.

B is the tower, of any suitable construction and having a frame, B', on its top, within which the horizontal drum wind-wheel A revolves. The wheel A is mounted on the vertical shaft *a*, the upper end of which has a bearing in the top cross-bar of the frame B, and the lower end of the shaft is mounted in a step, B². The curved shutters or wings *k* of the wind-wheel A are pivoted to the wind-wheel by the vertical rods *k'*, secured to their inner edges, the upper ends of the rods *k'* extending above the top of the wheel and having the arms *k*² secured to them. The outer ends of the arms *k*² have a series of apertures in them, to allow of the levers *j* being connected at different points on the said arms, whereby the shutters or wings will be opened to a greater or less extent when operated from said levers. These levers *j* are pivotally secured at their inner ends to a ring, *h*, partially rotating on top of the wind-wheel, and guided by a series of anti-friction wheels, H, secured to the top of the wind-wheel, and contacting with the inner periphery of the said ring. A segmental rack, *i*, is secured on the upper face of the ring, and into this rack meshes a pinion, *g*, fixed upon a horizontal governor-shaft, *f*, having bearings *f'* on the wind-wheel between its shaft *a* and the ring *h*.

The inner end of the governor-shaft *f* is pro-

vided with a pinion, *e*, meshing into a gear-wheel, E, journaled on the shaft *a* in vertical alignment with the said shaft *f*. The inner face of the wheel E, near its periphery, is provided with a wrist-pin or projection, on which is preferably mounted an anti-friction wheel, *c*. The main shaft *a* is tubular and has diametrically-opposite vertical slots *a'*, in which slides the vertically-reciprocating cross-head *d*.

The cross-head is provided with a horizontal slot, *p*, beyond the shaft *a*, and this slot receives the wrist-pin or its anti-friction wheel *c*, so that when the cross-head is reciprocated it will rotate the gear E, which, through the pinions *e g* on shaft *f*, will rotate the ring *h* through its rack *i*, whereby the curved shutters or blades will be opened or closed through the medium of the levers *j* and arms *k*², as will be readily understood.

To the cross-head *d* are secured the vertical arms *d'*, to which are pivoted, above and below the cross-head, the anti-friction wheels F, which bear on the main shaft *a*, as clearly shown in Fig. 3. Above the cross-head *d* are pivoted, at their inner ends, the arms C' of the governor-balls C, which arms, between their ends, are connected by links C² with the cross-head through the medium of its arms *d'*, to operate said cross-head by the movement of the balls, and in the end controlling the curved shutters or blades, as hereinbefore described.

In order that the curved shutters, blades, or wings may be operated by an attendant from his position at the base of the tower, I pivot the lever *m* on top of the frame B, and connect its inner end by a connection, *n*, extending down through the tubular main shaft, with the cross-head. A rope or wire, *l*, leads from the outer end of the lever *m* to the lower part of the tower within reach of the operator. The governor-balls and connections render the wheel self-adjusting.

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

1. The combination, with the vertical main shaft and the horizontal drum wind-wheel thereon having pivoted blades, of a vertically-reciprocating cross-head on the said shaft, a gear-wheel connected with and operated thereby, and intermediate mechanism, substantially

as described, connecting the said gear-wheel and blades, substantially as set forth.

2. The combination, with the vertical main shaft and the horizontal drum wind-wheel thereon having vertical pivoted blades, of the movable ring, levers connecting said ring and blades or wings, the segmental rack on the ring, the horizontal governor-shaft having a pinion at its outer end meshing into the said rack, and a pinion at its inner end, the gear-wheel journaled on the main shaft meshing into said inner pinion, and having a wrist-pin, the vertically-reciprocating cross-head having a horizontal slot, into which said wrist-pin projects, and governor-balls for operating the cross-head, substantially as set forth.

3. The combination, with the main shaft, the drum wind-wheel thereon having blades or wings, and a governor-shaft on the wheel for operating the blades, of a reciprocating cross-head, a gear-wheel on the shaft connected with and operated by said cross-head, and in turn operating the governor-shaft, and governor-balls having arms connected to the said main shaft and cross-head, substantially as set forth.

4. The combination, with the main tubular slotted shaft and the wind-wheel thereon having pivoted blades or wings, of the cross-head extending through the said slots and having a horizontal slot, the governor-balls having links connected to the cross-head, the gear-wheel on the main shaft having a wrist-pin entering the slot in the cross-head, the governor-shaft mounted on top of the main wheel and having pinions, one of which is operated by said gear,

the movable ring connected to the blades or wings for operating them and having a segmental rack operated by the other pinion on the governor-shaft, and the circular series of anti-friction wheels on the top of the wind-wheel and bearing against the inner periphery of the movable ring, substantially as set forth.

5. In a windmill, the combination, with the wind-wheel and its blades, the main shaft and its governor-arms, and slotted reciprocating cross-head operated thereby, of a power-transmitting gear-wheel journaled to the main shaft and having a wrist-pin entering the slot of the cross-head, and intermediate mechanism, substantially as described, connecting said gear-wheel and wind-wheel blades, substantially as set forth.

6. The combination, with the tower, the frame B', the vertical tubular main shaft, and the horizontal wind-wheel having movable blades or shutters, of the cross-head sliding on the main shaft, a gear-wheel on the main shaft operated thereby, a horizontal governor-shaft on the wind-wheel having a pinion at its inner end meshing with said gear-wheel to operate the blades or shutters, a lever on top of the frame, a connection leading therefrom down through the tubular main shaft to the cross-head, and a connection leading from the said lever to the base of the tower, substantially as set forth.

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Witnesses:

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