(No Model.)

3 Sheets—Sheet 1.

J. WITHINGTON.

CONE PULLEY.

No. 311,402. Patented Jan. 27, 1885.

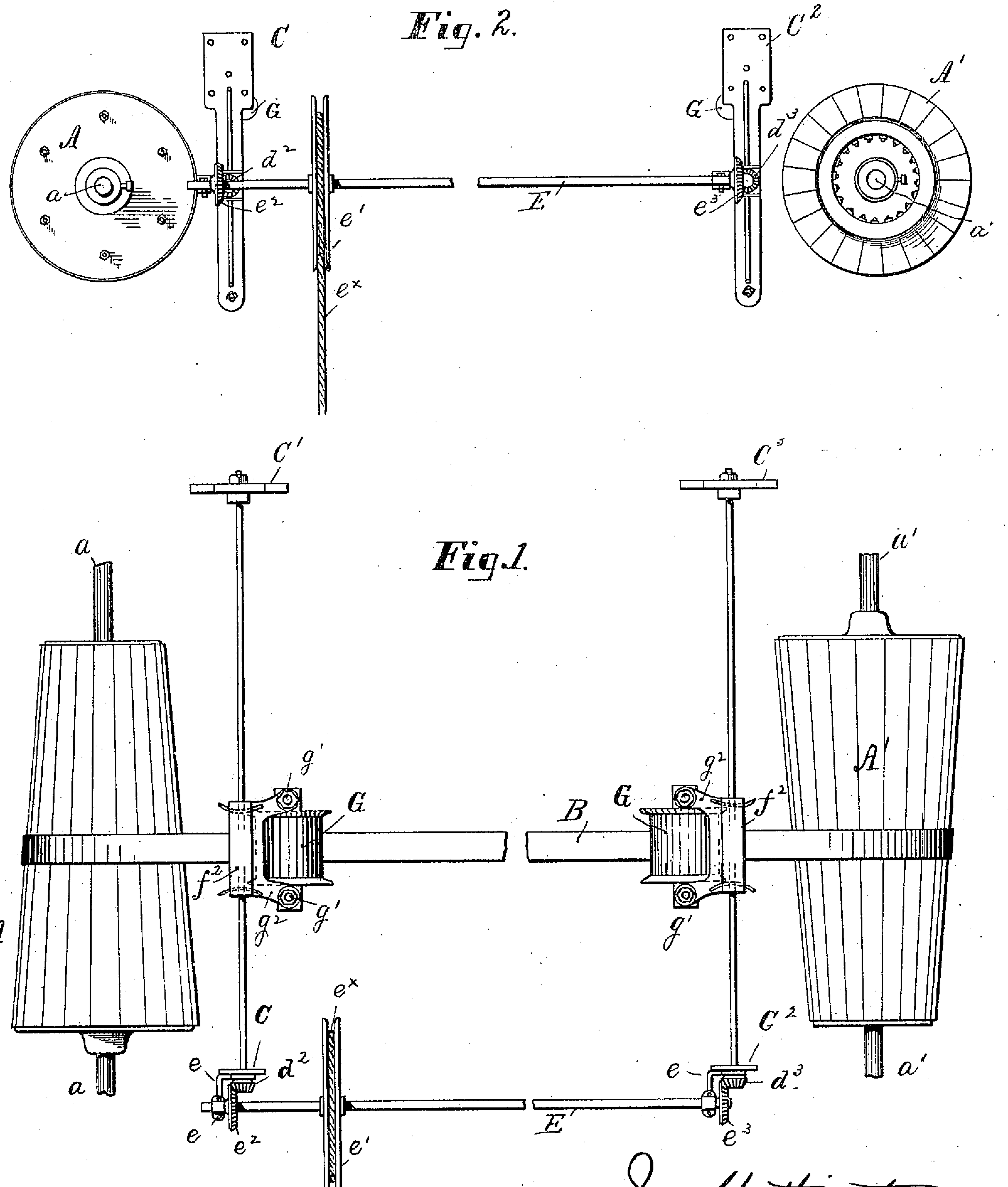

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Fig. 3.

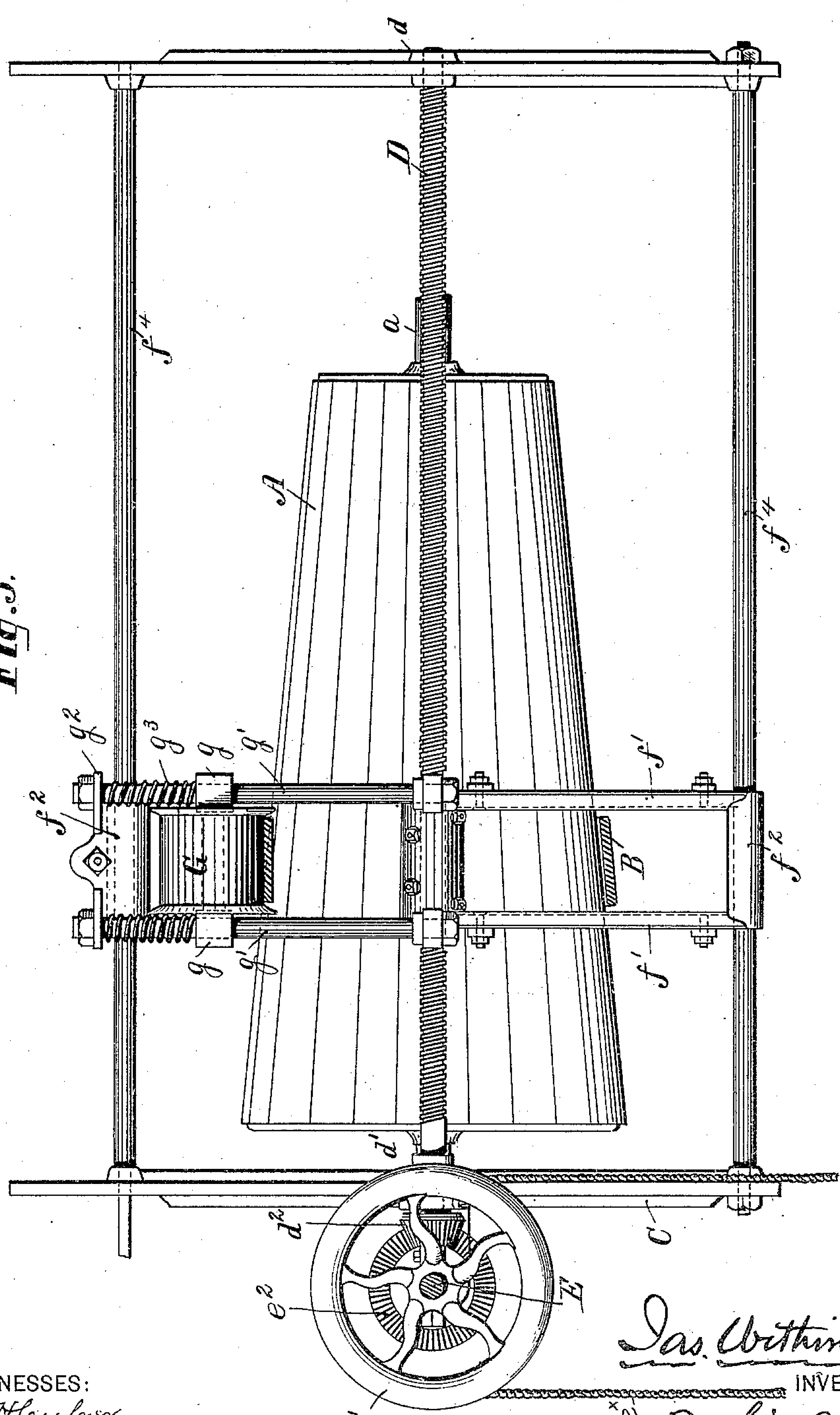

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Fig. 4.

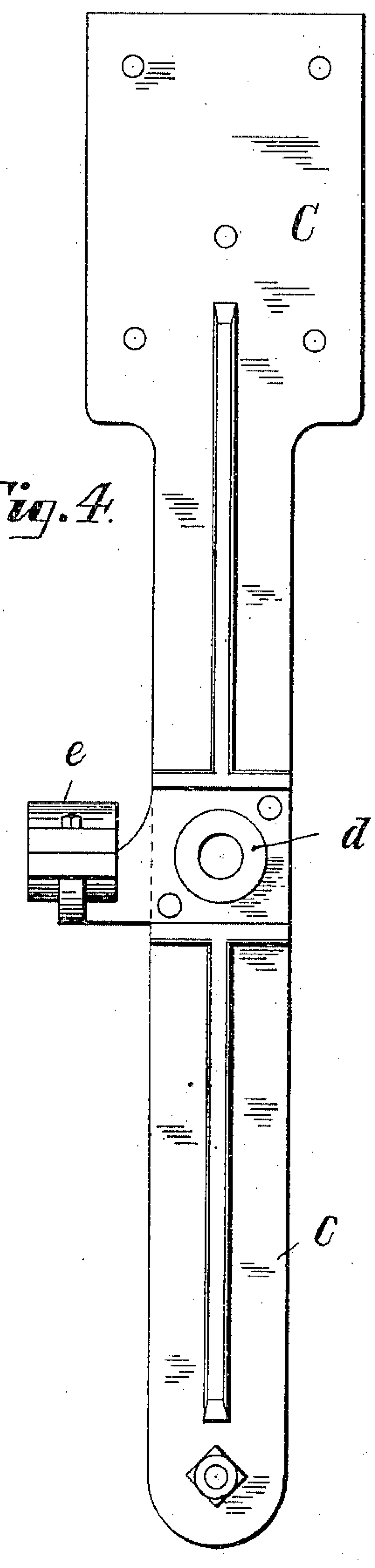
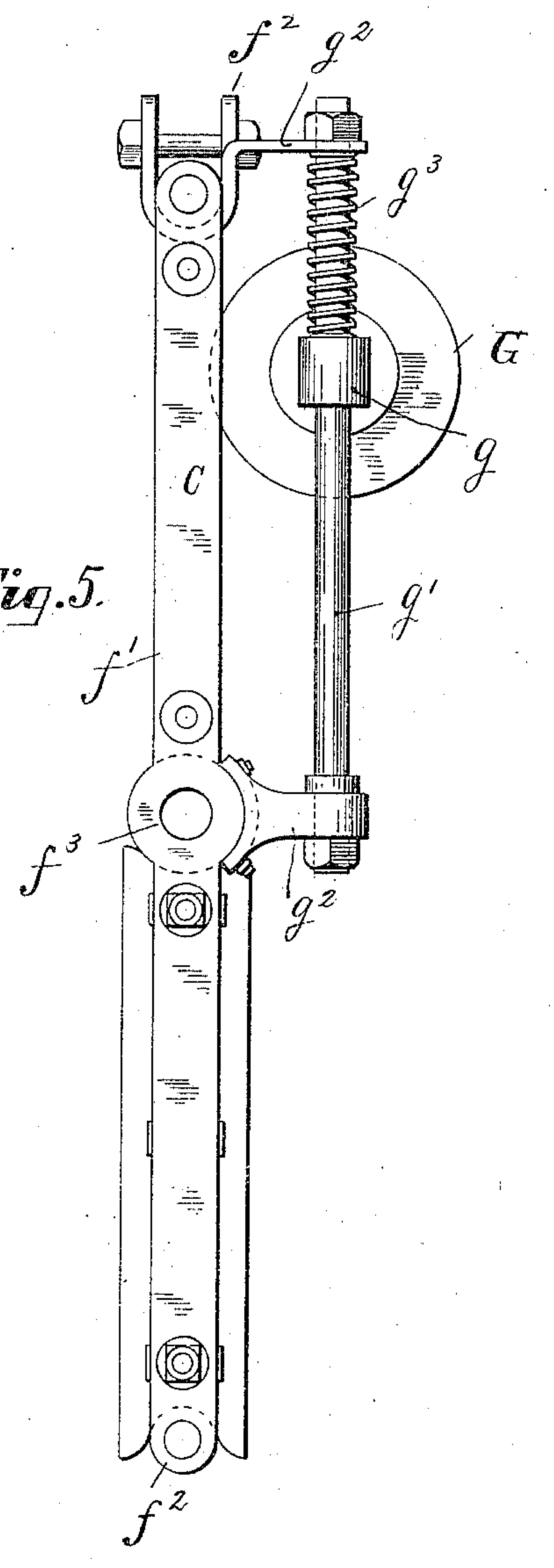


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES WITHINGTON, OF CHAMBERSBURG, ASSIGNOR TO THE TRENTON IRON COMPANY, OF TRENTON, NEW JERSEY.

CONE-PULLEY.

SPECIFICATION forming part of Letters Patent No. 311,402, dated January 27, 1885.

Application filed June 3, 1884. (No model.)

To all whom it may concern:

Be it known that I, JAMES WITHINGTON, a citizen of the United States, residing at Chambersburg, in the county of Mercer and State of New Jersey, have invented a new and useful Improvement in Belt-Shifting Devices for Cone-Pulleys, of which the following is a specification.

My invention relates to a class of pulleys known as "cone-pulleys," which are employed for the transmission of proportional speeds from a given fixedly and regularly rotating shaft to a shaft parallel with it, each of the pulleys being of the form of a frustum of a cone, and the two pulleys being set with their axes parallel, but being respectively reversed in position.

The specific object of my improvement is the provision of a device by which the belt which communicates the motion of one cone-pulley to the other cone-pulley can be readily shifted with respect to its position upon the said cone-pulleys, and when shifted shall be accurately retained in the position in which it is then set.

The above objects I attain by mechanism, a preferred form of a convenient embodiment of which is illustrated in the accompanying drawings and explained in the following description, the particular subject-matter claimed being hereinafter definitely specified.

In the drawings, Figure 1 is a top plan view of my device; Fig. 2, an end elevation of the same, sight being taken from the lower side of Fig. 1. Fig. 3 is a side sectional elevation of the apparatus on Fig. 1, on the line *x x* of said Fig. 1, and sight being taken from the right hand of said figure. Fig. 4 is an elevational view of one of the supporting-frames, and Fig. 5 an end elevational view of one of the traveling frame-bars of one of the belt-shifting frames.

Similar letters of reference indicate corresponding parts.

In the drawings, A A′ are a pair of cone-pulleys whose axles or shafts *a a′* are parallel and supposed supported in any suitable hangers. (Not represented in the drawings.) These cone-pulleys are disposed in the usual manner—that is to say, at a certain distance apart and in reversed positions—as shown in Figs. 1 and 2.

B is the cone-pulley belt which encircles both pulleys, and which, assuming that the pulley A is driven at a fixed speed, will occasion the driving of the pulley A′ either at the same speed, or at a speed proportionately less or greater than that of the pulley A, according to its position with respect to the two pulleys.

Further description of this well-known mechanical contrivance is unnecessary.

The contrivances in which the novelty of my invention resides, and which are devices for shifting the belt B and retaining it in different positions with respect to the cone-pulleys, are the following:

C C′ C^2 C^3 are four supporting frames or hangers disposed in opposite pairs, respectively, by pairs face to face in a manner which will be understood by reference to Fig. 1, and which are supported from the ceiling from which the apparatus as a whole is suspended.

Journaled, respectively, in opposite supporting-frames, near the centers thereof, are two screw-shafts, D D′, which are preferably in the same horizontal plane as the shafts of the cone-pulleys, and which are parallel with said shafts. These screw-shafts are adapted to be rotated in bearings *d d d′ d′*, formed in the supporting frames or hangers, but have no axial motion with respect thereto. Upon the corresponding extremities of each of the two screw-shafts beveled pinions d^2 d^3 are provided, which pinions mesh with other beveled pinions, e^2 e^3, respectively, at the extremities of a counter-shaft, E, supported in suitable bearings, *e e*, connected with the hangers C C^2. Upon this counter-shaft is mounted a grooved hand-wheel, *e′*, in the peripheral groove of which is suspended an endless hand-rope, $e^\times$, the manipulation of which occasions the rotation in either direction of the hand-wheel, and consequently of the counter-shaft, with the result that through the operation of the beveled gears the two screw-shafts are caused to rotate at an equal speed and in a corresponding direction, either right or left handed, according to the direction of the rotation of the hand-wheel. The office of the screw-

shafts is to occasion the longitudinal travel of what I term the "belt-shifting frames," composed of vertical frame-bars f' f', connected together at top and bottom by yoke-sleeves f^2 f^2, and at their centers provided with threaded sleeve-bearings f^3, which embrace the screw-shafts. These belt-shifting frames are held in vertical position and guided in their travel by horizontal guide-rods f^4, set, respectively, near the top and bottom of the pairs of supporting-hangers, upon which guide-rods the yoke-sleeves f^2, respectively, travel. The belt passes between the vertical bars f' f' of the belt-shifting frames, and in the movement of these frames, which are set face to face, and under the actuation of the screw-shafts travel with equal speeds in the same direction, is moved longitudinally with respect to its position upon the cone-pulleys.

In order to keep the belt taut upon the cone-pulleys, I have provided two belt-tightener rolls, G G', housed in bearings g, which slide upon vertical rods g', supported on brackets g^2, erected from the vertical bars f' of the belt-shifting frames, as clearly shown in Fig. 5. Spiral springs g^3, coiled upon the vertical rod g', between the bearings g and the upper brackets, g^2, serve to retain the belt-tightening rolls down upon the belt with a yielding pressure.

It is obvious that instead of employing two belt-shifting frames—one in connection with or propinquity to each pulley—but one belt-shifting frame can be employed. I prefer, however, to employ two, as the control of the belt is best effectuated thereby.

I am aware that I am not the first to provide means for automatically shifting the belt of cone-pulleys and for retaining the belt when shifted in given positions, and to such device, broadly, as such, I lay no claim, the novelty of my invention consisting in the specific devices for shifting and controlling the position of the belt herein described and claimed.

Having thus described my invention, I claim—

1. In combination, a pair of cone-pulleys, an endless belt traveling thereupon, the belt-shifting frames for controlling the position of said belt upon said pulleys, the screw-shafts for actuating said belt-shifting frames, the counter-shaft, and the miter-gears for connecting the screw-shafts with the counter-shaft, substantially as set forth.

2. In combination, the cone-pulleys, the endless belt, the belt-shifting frames provided with belt-tightening rolls, the screw-shafts, the counter-shaft, and the miter-gears for connecting said shafts, substantially as set forth.

3. The combination, to form a belt-shifting contrivance, of the belt-shifting frames, the guide-rods, the screw-shafts, the counter-shaft, miter-gears connecting said counter-shaft with the screw-shafts, and the hand-wheel and rope for imparting motion to the counter-shaft, substantially as set forth.

4. The combination, to form a belt-shifting contrivance, of the belt-shifting frames, the guide-rods, the screw-shafts, the counter-shaft, miter-gears connecting said counter-shaft with the screw-shafts, means for imparting rotation to the counter-shaft, the cone-pulleys, and the endless belt, substantially as described.

5. In combination with the vertical bars, suitably connected together by the yoke-sleeves, and provided with threaded sleeve-bearings, the vertical rods, slide-bearings, springs, and belt-tightener roll carried by said slide-bearings, substantially as set forth.

In testimony whereof I have hereunto signed my name this 22d day of May, A. D. 1884.

JAMES WITHINGTON.

In presence of—

J. BONSALL TAYLOR,

W. C. STRAWBRIDGE.