(No Model.) 3 Sheets—Sheet 1.

I. G. HOOPER.

FRICTION CLUTCH.

No. 362,837. Patented May 10, 1887.

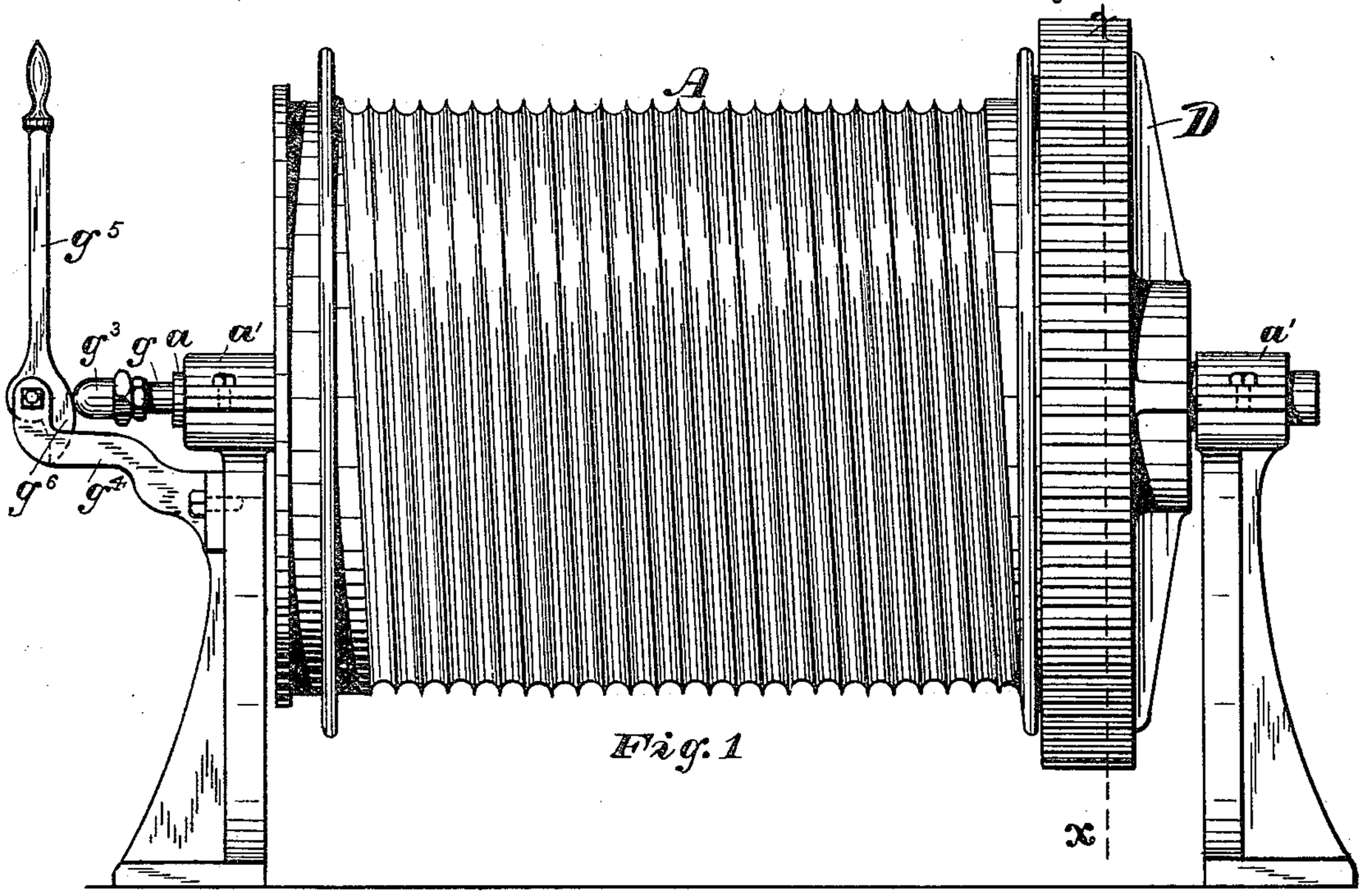

Fig. 1

Fig. 2

WITNESSES:

J. R. Bentine.

Wm. E. Bleuett.

INVENTOR:

Irvin G. Hooper,

BY Campbell & Co ATT'YS.

(No Model.) 3 Sheets—Sheet 2.

I. G. HOOPER.

FRICTION CLUTCH.

No. 362,837. Patented May 10, 1887.

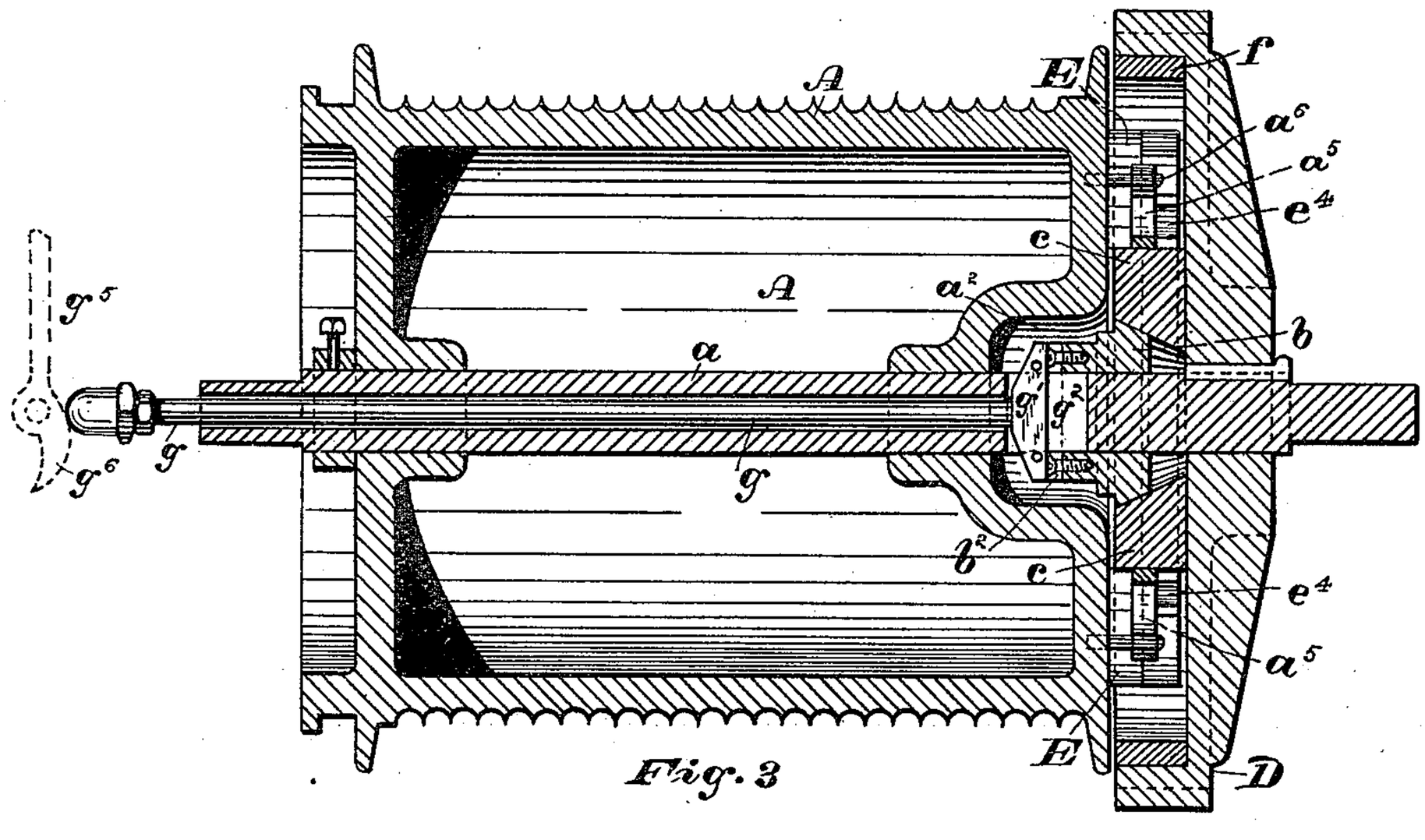

Fig. 3

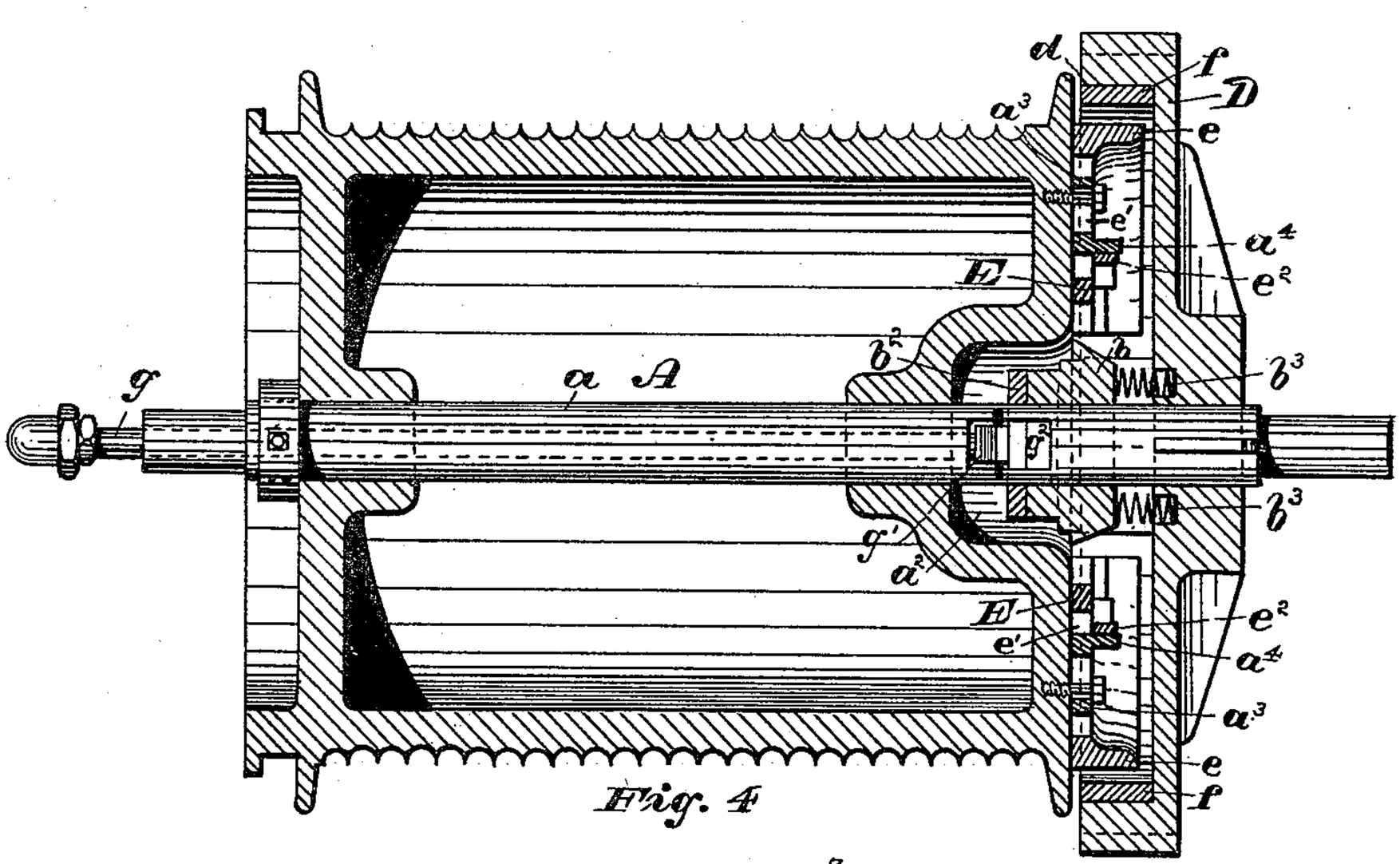

Fig. 4

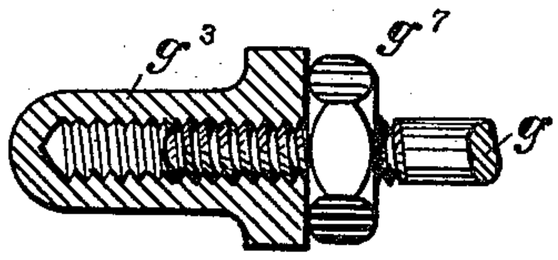

Fig. 5

WITNESSES:

A. L. Burtine

Wm. E. Blewett.

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Irvin G. Hooper,

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(No Model.) 3 Sheets—Sheet 3.

I. G. HOOPER.

FRICTION CLUTCH.

No. 362,837. Patented May 10, 1887.

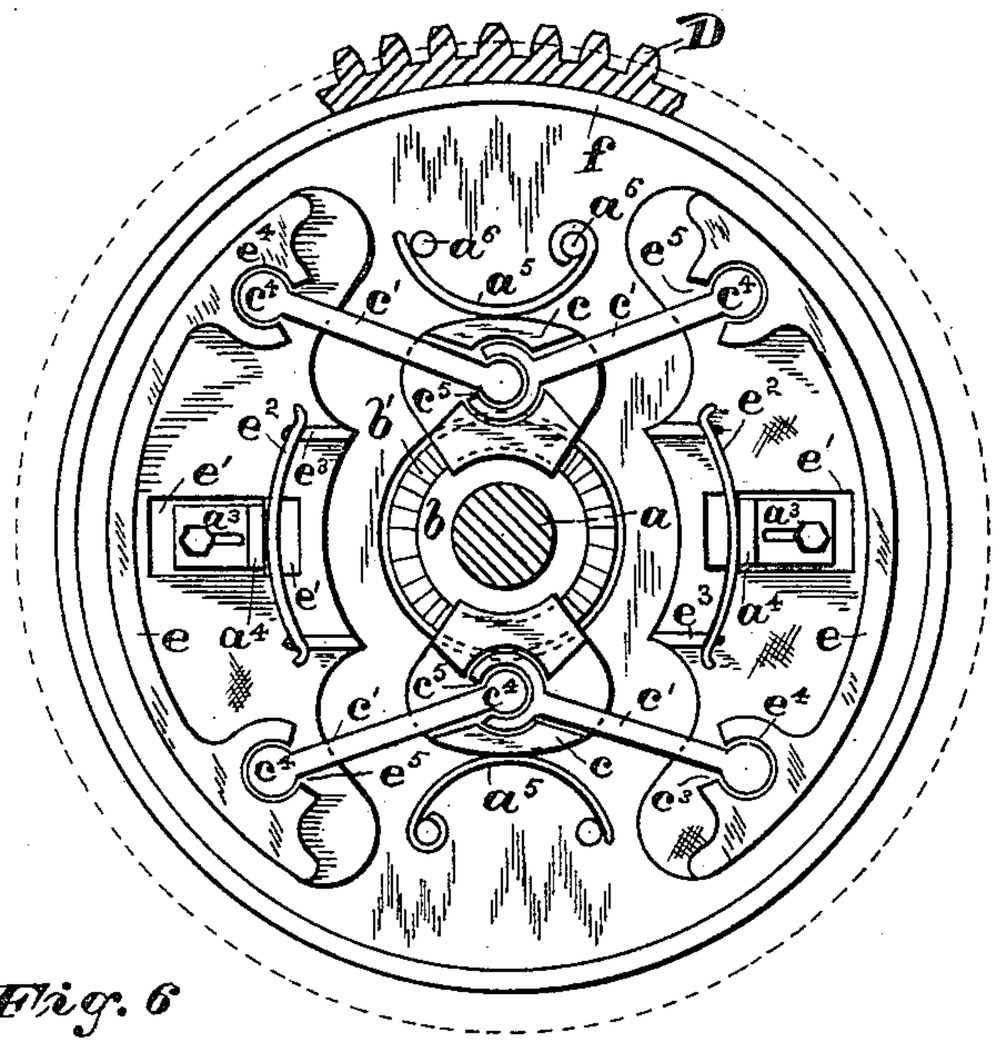

Fig. 6

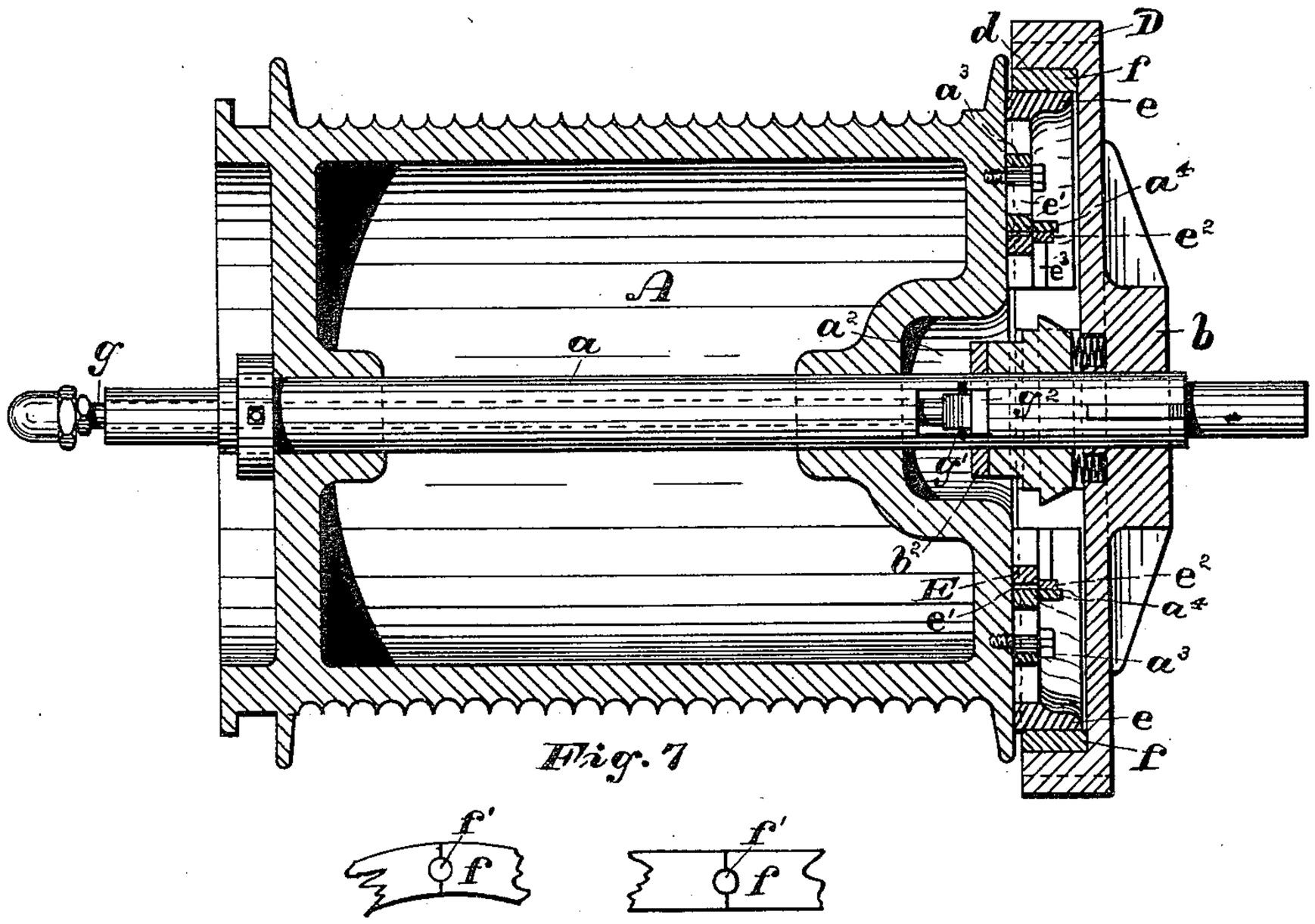

Fig. 7

Fig. 8

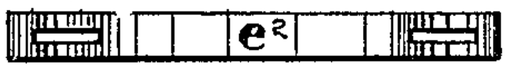

Fig. 9

WITNESSES:

A. H. Bartine

Wm. E. Blewett.

INVENTOR

Irvin G. Hooper,

BY Campbell & ATT'YS.

UNITED STATES PATENT OFFICE.

IRVIN G. HOOPER, OF NEWARK, NEW JERSEY.

FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 362,837, dated May 10, 1887.

Application filed February 5, 1887. Serial No. 226,618. (No model.)

To all whom it may concern:

Be it known that I, IRVIN G. HOOPER, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Friction-Clutches; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The general class of inventions to which my improvement relates is friction-clutches provided with expanding frictional surfaces which are caused to move outwardly by means of suitable mechanism and bind against the inner peripheral surface of a pulley or gear-wheel, and is designed to secure a friction-clutch that is more positive and prompt in binding and in releasing the pulley or gear-wheel, which may be easily adjusted to take up the wear, and which secures an increased frictional surface.

In the accompanying three sheets of drawings, in which similar reference-letters are employed to indicate corresponding parts in each of the views, Figure 1 is a front elevation of a drum of a hoisting-machine to which is attached my improved clutch mechanism. Fig. 2 is a section of the same, taken through line *x*. Fig. 3 is a longitudinal section of said drum, taken through line *y*, Fig. 2. Fig. 4 is a similar view through line *z*, Fig. 2; and Fig. 5 is a longitudinal section of an adjusting-cap with the end of the threaded plunger or actuating-rod inserted therein. On Sheet 3, Fig. 6 is a view similar to Fig. 2, illustrating a different construction of the toggle-joints. Fig. 7 is a view similar to Fig. 4, showing the clutch mechanism in an expanded holding position. Fig. 8 illustrates the manner of fastening the friction-ring, and Fig. 9 is a plan view of one of the springs used for releasing the frictional surfaces.

In the drawings, A indicates a drum of the hoisting-machine, which turns loosely on a hollow shaft, *a*, which is journaled in suitable bearings, *a'*, as illustrated in Fig. 1. In one end or face of the drum is a recess, a^2, in which is arranged and moves a reciprocally-sliding collar, *b*, having an inclined or beveled surface, *b'*, which engages with a correspondingly-inclined surface on the blocks *c*, to which the rods *c'* are pivotally attached, forming a toggle-joint. (Shown in Fig. 2.)

A recessed gear-wheel, D, keyed on the hollow shaft *a*, is arranged close to the recessed face of the drum, and in the space between said drum and gear the clutch mechanism is placed, which, in addition to the beveled blocks and collar already described, consists of segmental expanding plates E, provided with broadened flanges *e* on the outside thereof, which form frictional surfaces, which, when said segmental plates are thrown outwardly, engage with the inner peripheral surface, *d*, of the gear-wheel, or with an interposed ring of vulcanized fiber, *f*, or other suitable material, arranged between the said plates and gear-wheel, as shown in Figs. 2 and 6. The rods *c'*, which are pivoted to the blocks *c*, are also pivotally attached to the segmental plates, and when the toggle-joint is straightened by the engagement of the sliding collar with the blocks *c* the effect is to throw the segmental plates into frictional contact with the gear or ring of fiber.

In the segmental plates are slots *c'*, in which are arranged slottled angle-plates a^3, which are adjustably secured to the recessed face of the hoisting-drum, and which serve the double function of causing the said plates to turn with the drum, while at the same time permitting the necessary outward movement of the plates, and also the projecting portion a^4 of said angle-plates provides a fixed stop, against which the springs e^2 bear at their central point, being held at their extremities by the lugs e^3 on the segmental plates, as in Fig. 2.

When by the action of the toggle-joints the segmental plates are thrown into holding engagement with the gear-wheel or fiber and then released from said engagement, the springs e^2 act immediately to draw the said plates inwardly away from the frictional contact with the gear or fiber, as will be understood by reference to Figs. 2 and 7.

Springs a^5, secured to the drum by pins a^6, are placed contiguous to and bear against the top of the blocks *c*, and co-operate with the springs e^2 to quickly and positively cause the separation of the frictional surfaces. As illus-

trated in Figs. 2 and 6, the rods c' are pivotally secured to the segmental plates and the blocks c by forming annular recesses e^4 and c^2 therein, portions e^5 and c^3 thereof being cut away to permit the movement of the rods, and in said recesses the rounded ends c^4 of the rods are placed, and held between the face of the segmental plates and the inner flat face of the gear-wheel without the use of any other means of fastening the same, as will be understood by reference to Figs. 2 and 3, the latter figure showing the annular recesses only, the rods being omitted from said view.

In Fig. 2 the annular recesses are formed on opposite sides of the blocks c, and are independent one of the other, while in Fig. 6 the annular recess is formed centrally in the block, and the rounded end c^4 of one rod fits within the recessed end c^5 of the other of the rods.

The mechanism for producing the forward movement of the sliding collar toward and against the inclined surface of the blocks c consists of a rod, g, arranged within the hollow shaft, as illustrated in Fig. 3, one end of said rod bearing against a plate, g', moving in a slot, g^2, in the hollow shaft, which bears against the sliding collar or against a washer, b^2, Figs. 3 and 4, the opposite end of said rod projecting from the hollow shaft and provided with an adjustable cap, g^3, which screws upon the end of the rod, as indicated in Fig. 5. Adjacent to the cap and pivotally arranged in an arm, g^4, is a cam-lever, g^5, having a rounded end or portion, g^6, which engages the said cap when the lever is depressed and forces the rod g forward, causing thereby the sliding movement of the collar and its engagement with the blocks c.

By means of the adjustable cap the degree of pressure may be regulated, and as the parts become worn they may be adjusted to compensate for the loss—a point of great value in friction-clutches.

Springs b^3 are arranged between the end of the sliding collar and the gear-wheel, as indicated in Figs 4 and 7, the former figure showing the expanded position of said springs and the latter the compressed position thereof when the sliding collar has been moved forward to cause the frictional engagement of the segmental plates and gear-wheel. Upon the release of the collar said springs act to force said collar backward away from the blocks, and thus co-operate with the springs e^2 and a^5 to return the several parts of the clutch to their normal disengaged position, as shown in Figs. 2, 3, and 4.

The interposed ring f, which may be in one or in several pieces, and may be of fiber, copper, or any suitable material, is placed between the fixed and expanding or movable frictional surfaces of the clutch, and is held in place by inserting a straight or tapering pin, f', in an opening made where the ends of the ring join, by means of which the ring is spread outwardly and caused to bind the inner peripheral surface of the gear, as will be understood by reference to Fig. 2. By this arrangement of an interposed ring double frictional surfaces are secured, which is of manifest advantage.

Having thus described my invention, what I claim is—

1. In a friction-clutch, the combination of a recessed gear-wheel, segmental plates arranged oppositely within said recessed gear-wheel and adapted to engage with the inner peripheral surface of said gear-wheel, toggle-joints connecting said oppositely-arranged segmental plates, consisting of rods c' and blocks c, having inclined surfaces, a sliding collar provided with an inclined surface, b', which engages with the inclined surfaces on said blocks c, mechanism constructed and arranged to cause the engagement of said collar and blocks, and springs engaging with said segmental plates, blocks c, and sliding collar, substantially as and for the purposes set forth.

2. In combination, a hoisting-drum, a hollow shaft on which said drum turns, a gear-wheel keyed on said shaft adjacent to said drum, the cogged periphery of which projects toward said drum, providing a recess therebetween, segmental plates E, arranged oppositely in said recess and adapted to engage with the inner peripheral surface of said gear-wheel, and provided with slots e' therein, toggle-joints connecting said oppositely-arranged plates, consisting of rods c' and blocks c, having inclined surfaces, adjustable angle-plates arranged in said slots e' and secured to the face of the drum, a sliding collar moving on said hollow shaft, having an inclined surface, b', which engages the inclined surface of the blocks, springs e^2, a^5, and b^3, arranged for the purposes set forth, a sliding rod moving in said hollow shaft, having an adjustable cap on one end thereof, means arranged to communicate the movement of said rod to said sliding collar, and a cam-lever engaging with said rod, for the purposes set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 26th day of January, 1887.

IRVIN G. HOOPER.

Witnesses:
FREDK. F. CAMPBELL,
FREDK. C. FRAENTZEL.