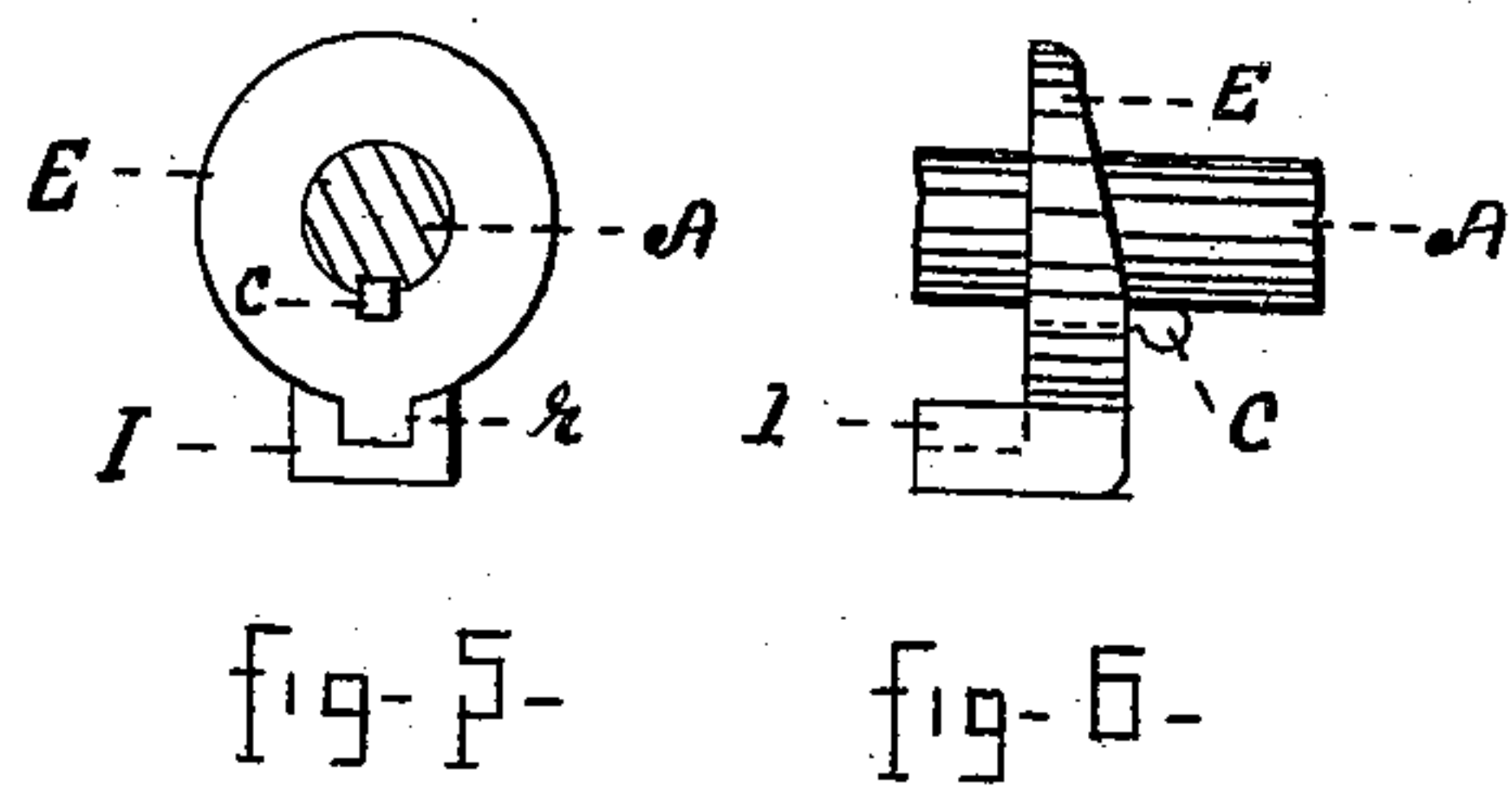
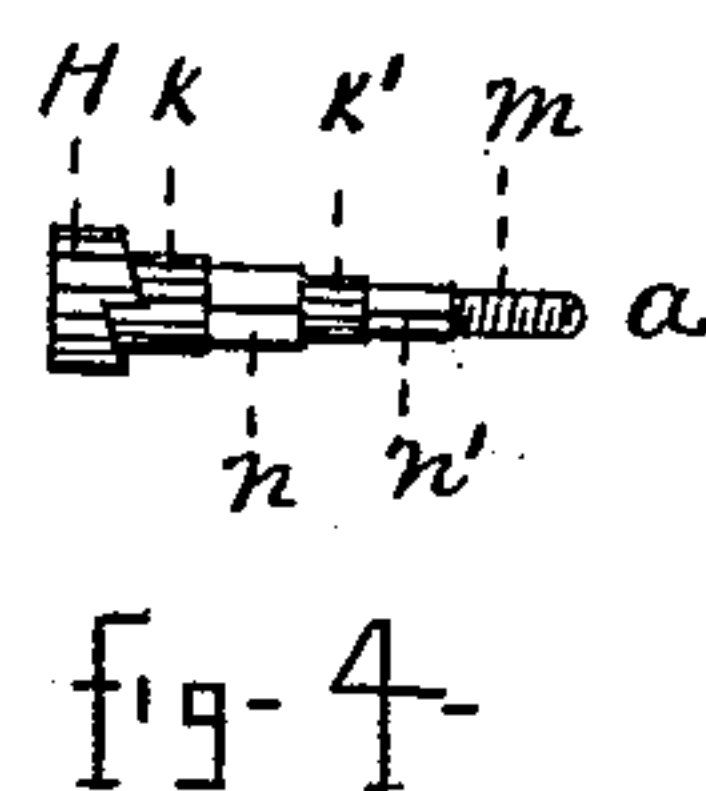
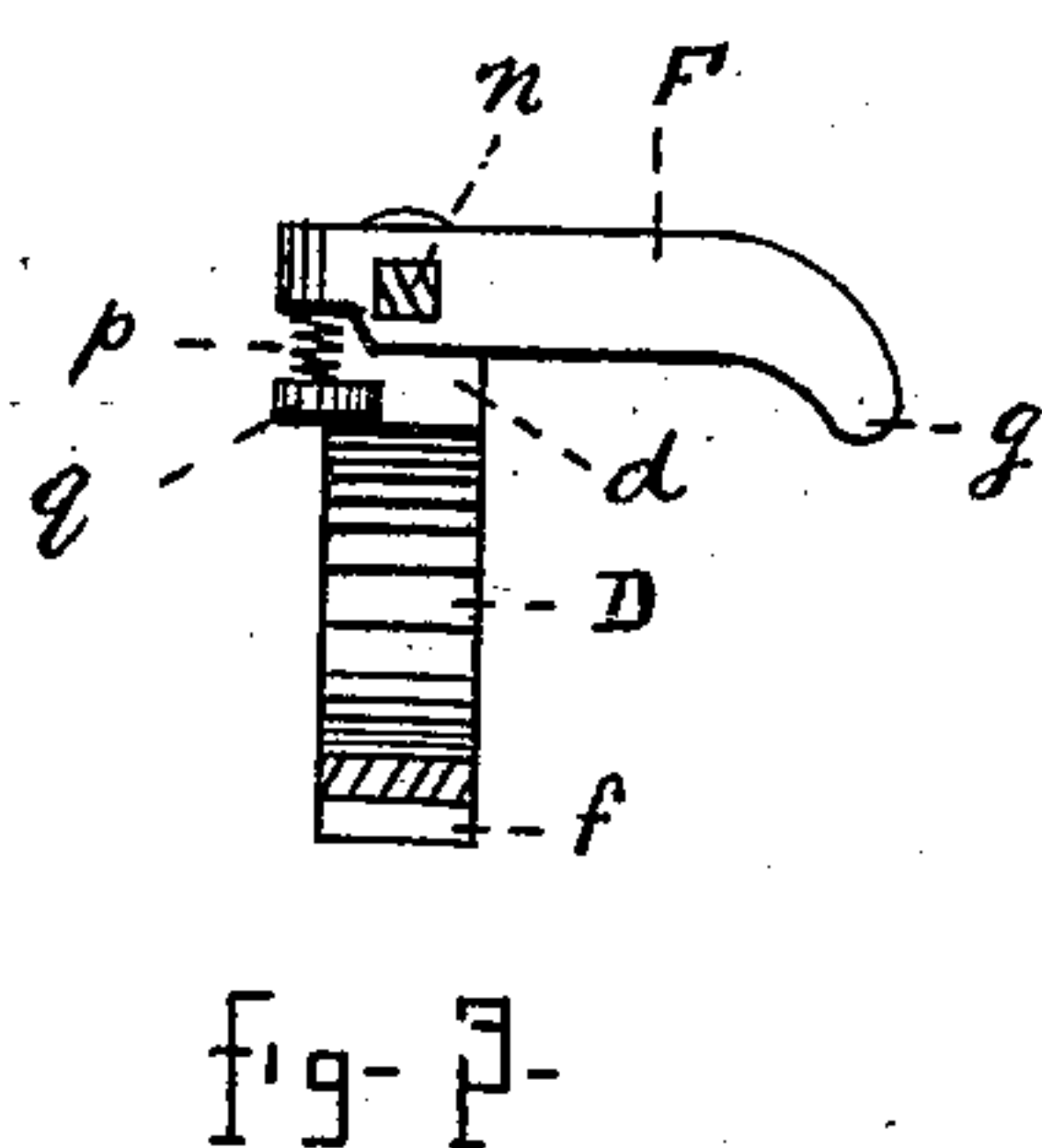
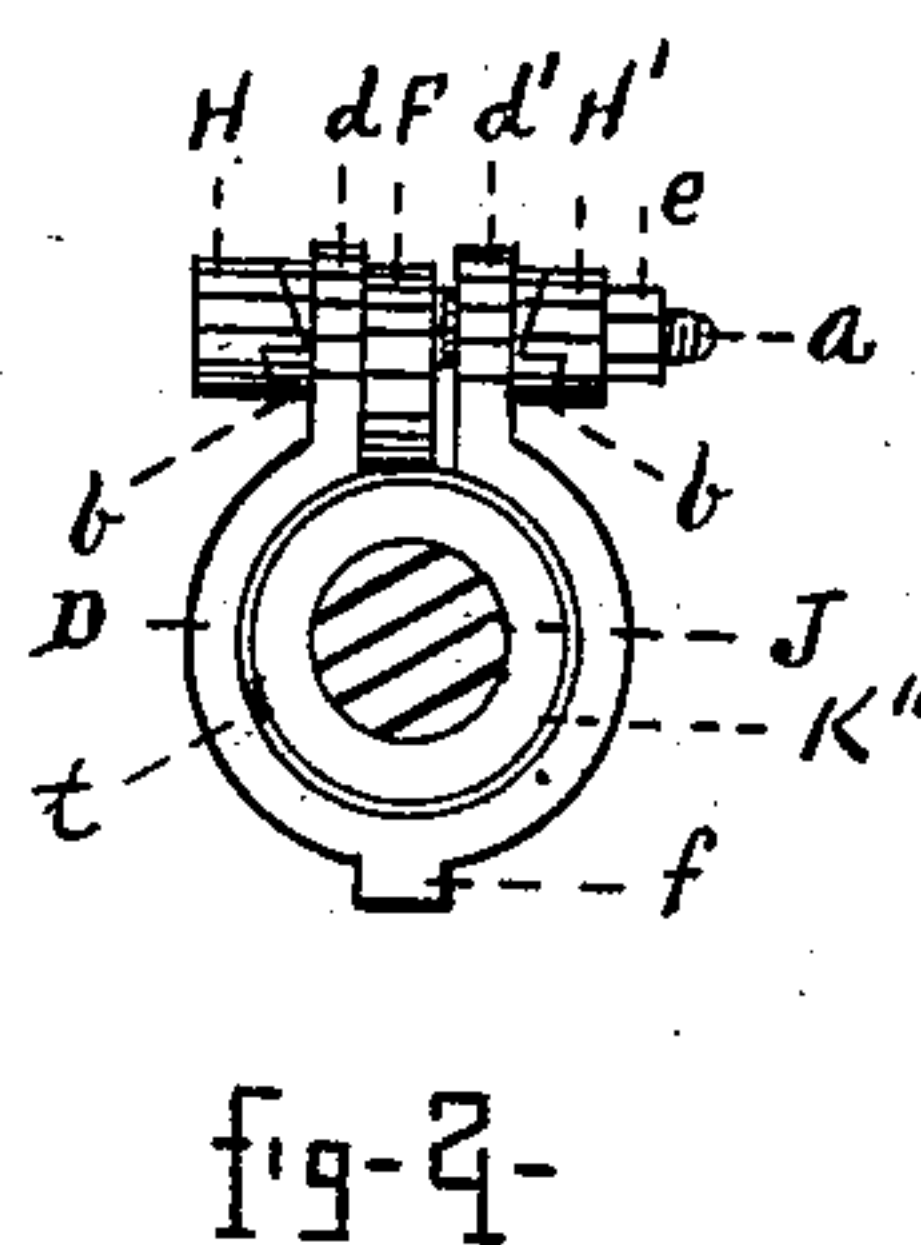
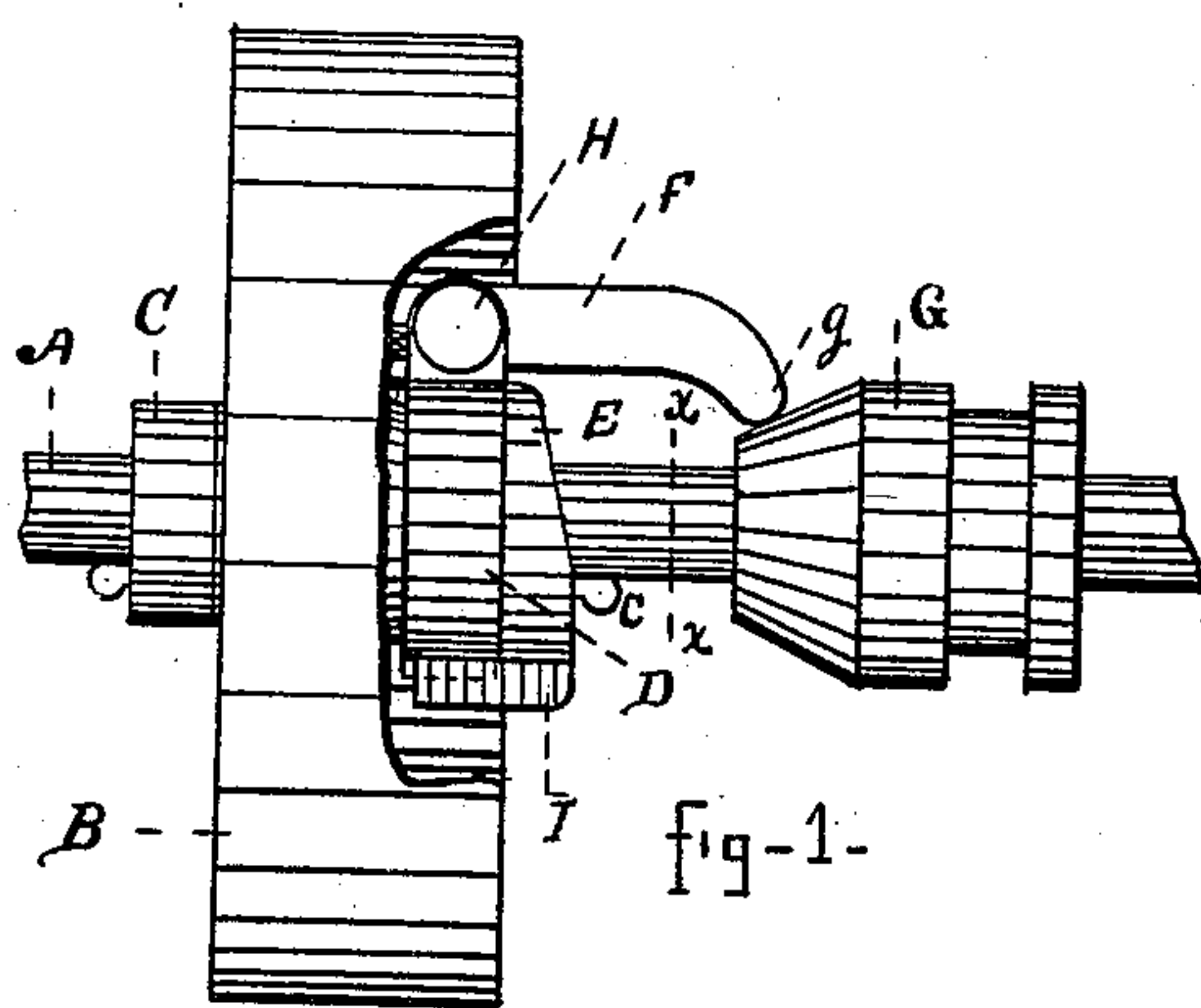


(No Model.)

F. M. BLAKE.  
FRICTION CLUTCH.

No. 312,074.

Patented Feb. 10, 1885.



WITNESSES

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# UNITED STATES PATENT OFFICE.

FRANCIS M. BLAKE, OF WORCESTER, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO C. H. BLAKE AND D. D. BLAKE, OF SAME PLACE.

## FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 312,074, dated February 10, 1885.

Application filed April 14, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, FRANCIS M. BLAKE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Friction-Clutches, of which the following is a specification, accompanied by drawings illustrating a friction-clutch embodying my invention, and in which—

Figure 1 shows a side elevation of a section of shaft carrying a loose pulley having my improved friction-clutch attached, a portion of the rim of the pulley having been removed to disclose the clutch. Fig. 2 is a sectional view on line *xx*, Fig. 1, with the carrier E removed, showing the friction-ring as applied to the hub, with the devices for compressing the same. Fig. 3 is a sectional view of the friction-ring. Fig. 4 shows the rotating spindle *a*. Figs. 5 and 6 are end and side views, respectively, of the carrier E.

Similar letters refer to similar parts in the several views.

My invention consists in the construction and arrangement of the several parts as hereinafter set forth.

In Fig. 1, A denotes a section of shafting; B, a loose pulley on the shaft A, held in place on one side by the collar C. At one end of the hub of the pulley B is a friction-strap, D, nearly inclosing the hub and open at one side, with the lugs *d d'*, Fig. 2. To the shaft A is attached the collar E, having an arm, I, overlapping the friction-ring D. On the side of the friction-ring D, and opposite the openings and lugs *d d'*, is a spline, *f*, attached to the ring, said spline entering a corresponding groove, *r*, in the arm I. Thus the collar D and arm I serve as a carrier to impart the rotation of the shaft to the friction-ring D, turning it about the hub of the pulley, which may remain at rest. Through the lugs *d* and *d'*, I pass a spindle, *a*, Fig. 4, having a head, H, whose inner side is cam-shaped. The portion of the spindle passing through the lugs *d* and *d'* is made round, so it may rotate in them, as shown at *k k'*, between the lugs *d d'*. The spindle is square, as at *n*, to receive the lever F, and the part at *n'*, Fig. 4, is also made square to receive a cam, H', which is held

against the lug *d'* by a nut, *e*, on the screw-threaded portion *m*. A sliding conoidal frustum, G, on the shaft A serves to raise the lever F, rotating the spindle *a* and cams H and H', which, acting against corresponding cam-surfaces on the outer sides of the lugs *d* and *d'*, compress the friction-ring D upon the hub J of the pulley and cause the rotation of the ring to be imparted to the pulley. By sliding the cone G back the lever F will be allowed to fall, thereby removing the pressure from the lugs *d d'* and allowing the friction-ring D to turn again freely upon the hub J. To the inner side of one of the lugs *d d'*, I attach a lug, *g*, for the purpose of carrying a spring, *p*, which acts upon the end of the lever F, holding the end *g* of the lever against the conical surface of G. Instead of rotating the shaft, the pulley B may be rotated and its motion communicated to the shaft by means of the clutch, and instead of the "right and left" cams H and H' a cam may be used on one side or against but one of the lugs *d d'*. Any wear between the ring D and the hub J may be taken up by means of the nut *e* on the spindle, bringing the cams H H' and lugs *d d'* nearer together. Between the hub J and ring D, I place a copper ring, K'', open at one side at *t*, held in place by the carrier E on one side and by a shoulder on the hub. (Not shown in the drawings.) This copper ring is loose about the hub when the friction-ring D is not compressed, and is liable to be moved about the hub by contact with the rotating ring D, so that the surface of the intermediate ring is constantly changing with reference to the surface of the hub and that of the friction-ring D. By using a copper ring I increase the friction between the surfaces, as the friction between iron and copper surfaces is much greater than between two iron surfaces.

I do not confine myself to the special method shown of connecting the elastic ring D with the carrier, as other methods of connecting the same may be used, as forming a hole in the ring in the place of the spline *f*, and, in place of the grooved arm I, causing a pin to enter the hole attached to the collar E; or, in place of the spline *f* and groove *r*, a pin may be rigidly inserted in the arm I, entering a radial hole in the elastic friction-ring D.



What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a friction-clutch, the combination, with an elastic friction-strap connected with the shaft and inclosing the hub of the pulley, a rotating cam-carrying bolt having a projecting lever acted on by a sliding collar, whereby the friction-strap is compressed on the hub, of a lug, *q*, projecting from the friction-strap, and a spring supported by said lug and acting on the projecting lever and rotating cam-bolt so as to reverse their action, as and for the purpose described.

2. In a friction-clutch, the combination, with an elastic friction-strap connected with the shaft and inclosing the hub of the pulley, and having lugs *d d'*, of a rotating screw-threaded bolt passing through said lug, having a head resting against the outer side of one of the lugs *d d'*, and having a squared section or sections, *n*, and connected projecting lever *F*, actuated by a sliding collar, of a washer sliding on a squared section of the bolt so it will rotate with it, and acting against the face of one of the lugs *d d'*, with a tightening-nut, *e*, as and for the purpose set forth.

3. In a friction-clutch, the combination, with a friction-strap inclosing the hub of a pulley and connected with the shaft, and having lugs *d d'*, and a rotating bolt with a head resting against the outside of one of said lugs, of a sliding cam-shaped washer sliding on and rotating with said bolt and acting on a similar

cam-surface on one of said lugs, and an adjusting-nut for determining the position of the cam-shaped washer on the rotating bolt, as and for the purpose set forth.

4. In a friction-clutch, the combination, with a friction-strap, *D*, inclosing the hub of the pulley, of the driving-plate *E*, attached to the shaft and connected with the friction-strap by an arm, *I*, extending laterally and entering a groove, *f*, in the friction-strap on the side opposite the ends of the friction-strap, so the connection between the driving-plate and friction-strap is made at that section of the strap where the motion caused by the expansion and contraction of the strap is the least, as and for the purpose set forth.

5. In a friction-clutch, the combination, with an elastic friction-strap inclosing the hub of a pulley, of an elastic ring held between the hub and the elastic friction-ring, and being capable of turning within the inclosing-ring, so its position relative thereto may become changed, as and for the purpose set forth.

6. The combination, in a friction-clutch, of friction-strap *D*, having lugs *d, d'*, and *q*, rotating bolt having a projecting arm, *F*, actuated by a sliding collar, sliding cam-washer *H'*, adjusting-nut *e*, and spring *p*, as and for the purpose set forth.

FRANCIS M. BLAKE.

Witnesses:

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GEO. E. SMITH.