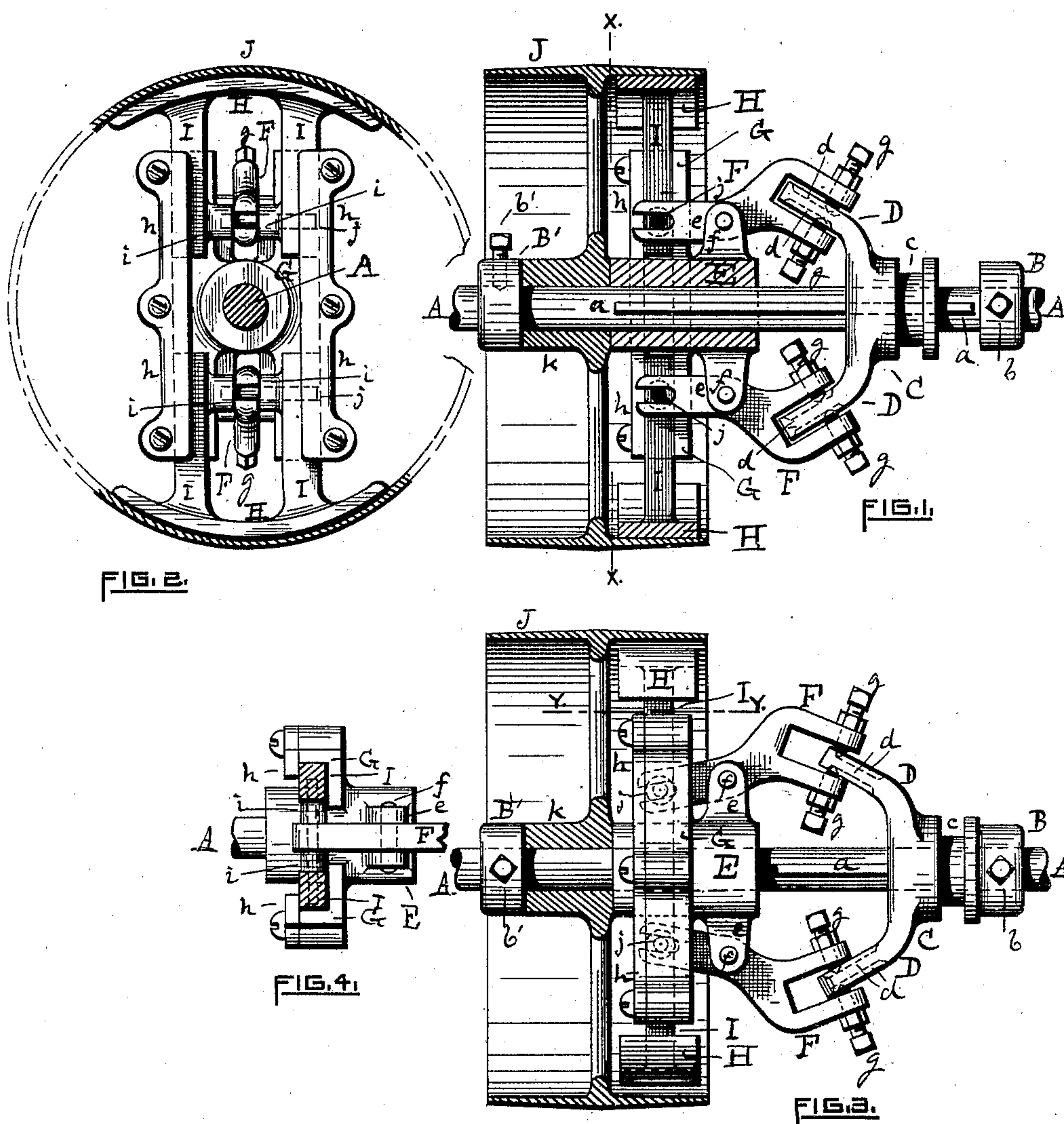


(No Model.)

R. F. HARGRAVES.  
FRICTION CLUTCH.

No. 467,652.

Patented Jan. 26, 1892.



WITNESSES,

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# UNITED STATES PATENT OFFICE.

ROBERT F. HARGRAVES, OF PROVIDENCE, RHODE ISLAND.

## FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 467,652, dated January 26, 1892.

Application filed May 22, 1891. Serial No. 393,778. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT F. HARGRAVES, of the city and county of Providence, in the State of Rhode Island, have invented a certain new and useful Improvement in Friction-Clutches for Pulleys; and I declare the following to be a specification thereof, reference being had to the accompanying drawings.

10 Like letters indicate like parts.

Figure 1 is a side elevation of my invention when the friction-clutch and pulley are in engagement, the pulley, segments, and clutch-hub being shown in vertical diametrical section. Fig. 2 is a rear elevation of my invention, the sectional parts of said figure being on line *x x* of Fig. 1. Fig. 3 is a side elevation showing the friction-clutch and pulley out of engagement with each other, the pulley being shown in vertical diametrical section. Fig. 4 is a top plan of the parts as seen from line *y y* of Fig. 3.

My invention consists of a sliding hub rotatable with the shaft, but movable along it by means of a spline, and provided with fixed arms, which are diametrically opposite each other and which are inclined outwardly, a fixed hub upon said shaft and having pivotally-mounted lever-arms, which are slotted at both ends, the slots on one end receiving the fixed arms of the sliding hub and the slots on the other end receiving the pins or cross-pieces of the sliding bars of the friction-clutch, and a supporting-plate whereon said clutch-bars are movable, all arranged and operating substantially as hereinafter specified.

In the drawings, A is the shaft, and *a* is a spline.

40 B B' are collars secured to the shaft A by set-screws *b b'*.

C is a sliding hub movable along the shaft, and rotatable with it by means of the spline *a*. The hub C has a circumferential groove *c* to receive the shipping-lever (not shown) and also two diametrically-opposite arms D, integral therewith or rigidly fastened thereto, which arms extend angularly toward the clutching mechanism, as seen in Figs. 1 and 3. The arms D are longitudinally grooved, as shown at *d*.

50 E is the clutch-hub, which is fast upon the shaft A. It has the ear-pieces *e*, on which

lever-arms F are mounted pivotally by the pins *f*. The outer ends of the levers F are bent, enlarged, and slotted, as shown in Figs. 1 and 3, and the inner ends of said levers are also slotted, as seen in solid lines in Fig. 1 and in dotted lines in Fig. 2. Set-screws *g* at the bent ends of the levers F project into the grooves *d* of the arms D.

60 G is a supporting-piece fixed upon the shaft A. Guides *h* are fastened upon the support G by screws, as shown in Figs. 2 and 4. The friction-clutch members or segments H have two bars I each, on which are the hubs *i*. A pin *j* passes through the hubs *i* and through the rear slot of the lever F. The bars I are movable on the support G, and are kept in sliding contact therewith by the guides *h*. J is a pulley loosely mounted on the shaft A, and *k* is the hub of said pulley.

When the parts are in the position shown in Fig. 3, the friction-clutch is disengaged from the pulley. The hub C lies snugly against the collar B, and the screws *g* project into the grooves *d* of each arm D, as seen in said figure. Now by sliding the hub C on the spline and shaft toward the pulley the arms D are moved into the slots of the bent ends of the levers F, the points of the screws *g* slide along the grooves *d*, and, by reason of the inclined surfaces of said arms and slots so engaged by the grooves and screws, the outer or enlarged ends of the levers F are drawn toward the shaft A and the inner ends of the levers are moved in an opposite direction. By the connection of the levers F by their slots on the inner ends with the pins or cross-pieces of the sliding bars I said bars, with their respective segments or clutch members H, are moved outwardly in directions diametrically opposite each other and the segments are crowded into forcible contact with the inner surface of the flange or rim of the pulley J, thus holding the pulley in frictional engagement with the clutch and compelling said pulley to turn with it. The clutching position of the parts is illustrated in Fig. 1. To disconnect the clutch and pulley, the hub C is moved toward the collar B, and the arms D, sliding along the slots of the levers F, spread said levers apart at their outer ends, and thereby bring the inner ends of said levers toward the shaft A. This move-



ment causes the bars I to slide inwardly and withdraws the segments or clutch members H from contact with the rim of the pulley J. As the arms D and the slots of the bent ends of the levers F·F are at an angle with the shaft A, as shown, it is evident that the arms, which project into and are engaged with said slots, respectively, as described, exert the same degree of power to operate the levers F when the hub C is moved away from the hub E as when the hub C is moved toward the hub E.

In friction-clutches which have radially-movable shoes or brakes it has been found that the centrifugal force developed by the rapid revolution of the pulley causes said shoes or brakes to press with increased power against the rim of the pulley. The releasing mechanism exerting its power in a direction toward the shaft or center is not always sufficient to counteract this centrifugal force, and so the shoe or brake has a tendency to cling to the rim and to continue to revolve with the pulley for an appreciable time. It is important that the engagement and disengagement should be practically instantaneous. In my device this result is accomplished by slotting the bent end of each of the levers F and inserting in said slots, respectively, the ends of the angularly-projecting arms D, as hereinbefore specified.

The screws *g* serve not only to keep the levers F and arms D in the same plane of motion by reason of the projection of said screws into the grooves *d*, but also to adjust the arms D and levers F to each other and to take up the wear.

I claim as a novel and useful invention and desire to secure by Letters Patent—

1. In a friction-clutch for pulleys, having radially-movable shoes, the combination, with a shaft and pulley, of a fixed support upon the shaft, levers mounted pivotally on said support and having their inner ends adapted to move said shoes radially and their outer ends bent and slotted, as shown, and a hub movable on said shaft and having angularly-projecting arms to enter the slotted ends of said levers, respectively, to operate the same, substantially as specified.

2. In a friction-clutch for pulleys, the combination, with a shaft and pulley, of the hub E upon said shaft and having the ear-pieces *e* and supporting-piece G, the sliding clutch member consisting of the segments H and bars I, said bars being movable in guides on said supporting-piece and provided with cross-pins, and the levers F, mounted on said ear-pieces *e* and having slots to engage with the cross-pins of the bars I, substantially as specified.

3. The combination of the shaft A, having the spline *a*, collar B', pulley J, the fixed hub E, having the ear-pieces *e*, the support G, the guides *h*, the clutch members H, the sliding bars I, having the cross-pins *j*, the bent and slotted levers F, having the set-screws *g*, and the sliding hub C, having the grooved arms D, all arranged and operating substantially as specified.

ROBERT F. HARGRAVES.

Witnesses:

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