

(No Model.)

2 Sheets—Sheet 1.

F. MILLER.
FRICTION CLUTCH.

No. 468,626.

Patented Feb. 9, 1892.

Fig 1.

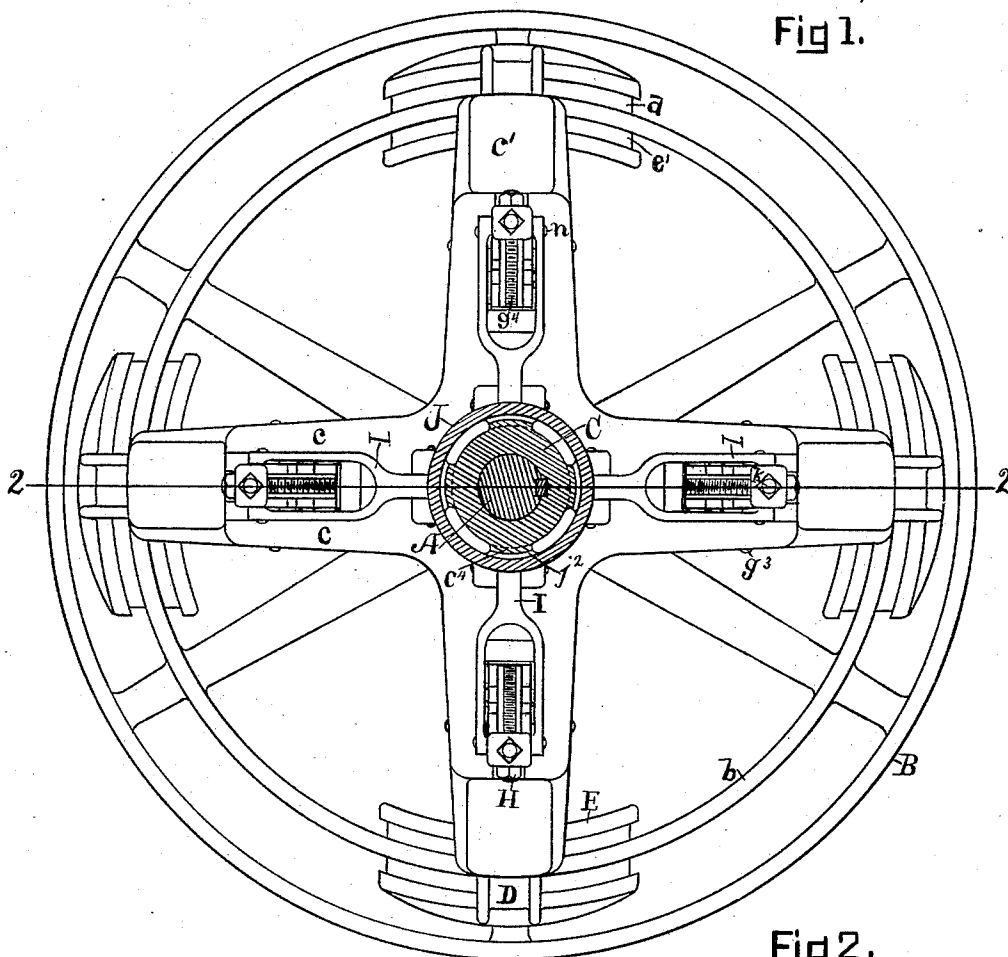
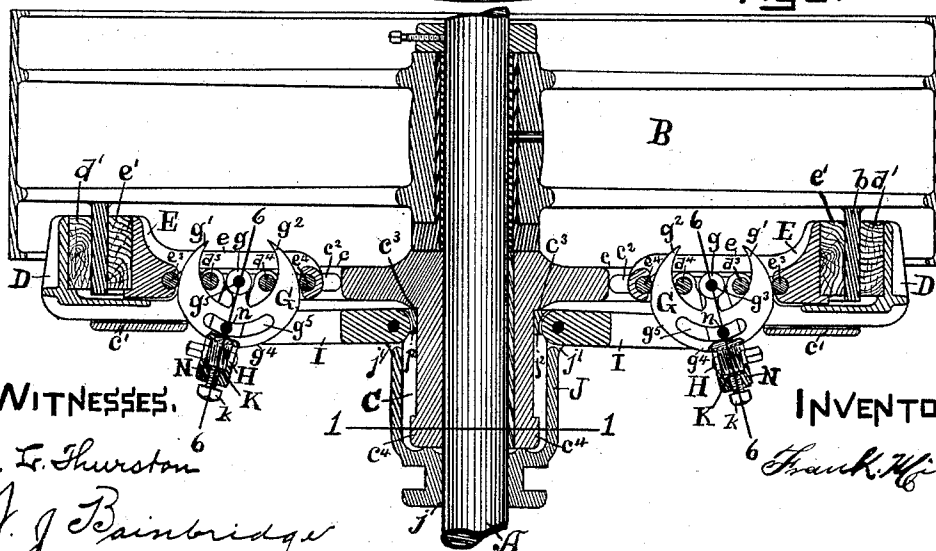


Fig 2.



WITNESSES.

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INVENTOR.

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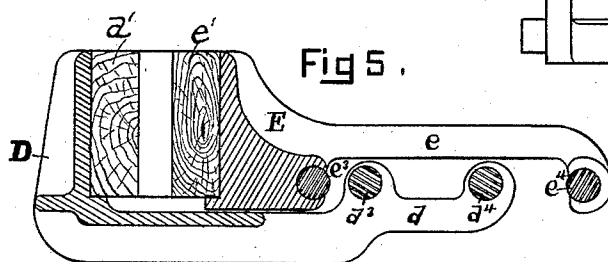
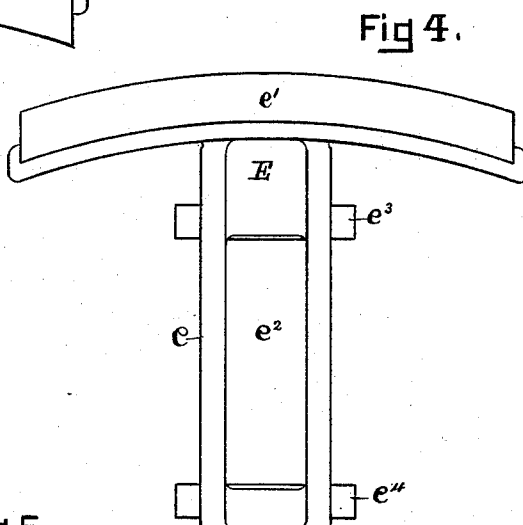
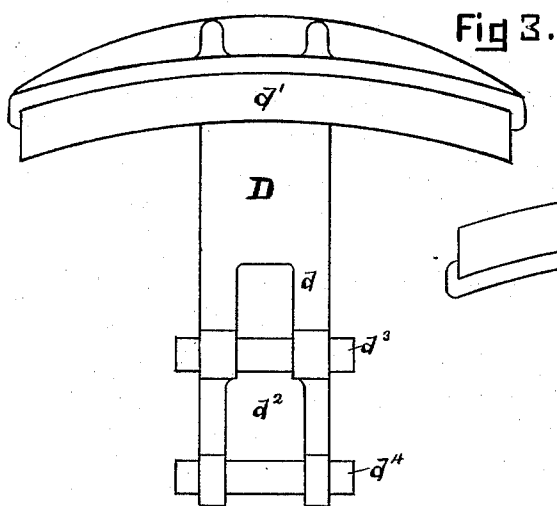
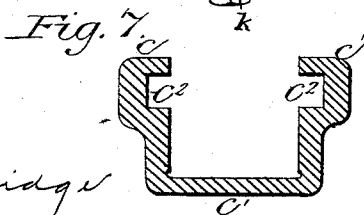
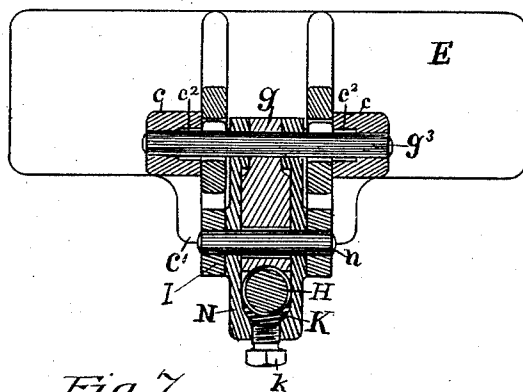


Fig 6.



WITNESSES.

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UNITED STATES PATENT OFFICE.

FRANK. MILLER, OF CLEVELAND, OHIO, ASSIGNOR TO JACOB B. PERKINS, OF SAME PLACE.

FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 468,626, dated February 9, 1892.

Application filed March 11, 1889. Serial No. 302,795. (No model.)

To all whom it may concern:

Be it known that I, FRANK. MILLER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Friction-Clutches, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My invention is designed particularly to apply to that class of friction-clutches in which a cylindric pulley-flange is grasped between two inversely and radially moving jaws.

Among the objects of my invention are, first, to provide novel mechanism whereby the jaws are caused to move simultaneously toward the interposed pulley-flange for the purpose of grasping the same between them; second, to provide novel mechanism whereby two inversely and radially moving jaws are caused to move simultaneously and positively both toward and from the interposed pulley-flange for the purpose, first, of grasping, and, second, of releasing, said flange; third, to provide novel adjusting mechanism to compensate for wear and to permit the jaws to grasp pulley-flanges of different thicknesses, and also to simplify and improve the construction and mode of operation of friction-clutches, as herein described.

My invention consists in the combination of a pair of clutch members of the type specified with a pivoted wedge-block having a curved-wedge arm adapted to engage with the jaw-shanks, and thereby compel both jaws or friction-surfaces to simultaneously move toward and grasp the interposed flange; second, in the combination of a pair of clutch members of the type specified with a pivoted wedge-block having two curved-wedge arms which engage between the jaw-shanks at two points, and thereby alternately move the jaws or friction-surfaces simultaneously and positively toward or away from the flange; third, in the combination, with a pair of radially-moving clutch members and pivoted wedge-block having a curved-wedge arm to engage with the jaw-shanks, and thereby cause the jaws to move simultaneously in inverse directions with a shifting sleeve and an adjust-

able connection between said shifting sleeve and wedge.

It further consists in the special features and subordinate details of construction hereinafter described, and definitely pointed out in the claims.

I will now proceed to describe the embodiments of my invention illustrated in the drawings.

In said drawings, Figure 1 is a side elevation of my improved clutch mechanism with so much thereof removed as is below the line 1 1 on Fig. 2. Fig. 2 is a central sectional view on the line 2 2 of Fig. 1. Fig. 3 is a plan view of the outer clutch member. Fig. 4 is a plan view of the inner clutch member. Fig. 5 is a central sectional view through both clutch members when they are in operating position. Fig. 6 is an enlarged sectional view taken on the line 6 6 on Fig. 2, and Fig. 7 is a transverse sectional view of the clutch-arm at a point near the inner edge of yoke c' .

Referring to the parts by letters, A represents a shaft, and B a pulley mounted thereon, having the cylindric pulley-flange b . C represents a hub, keyed or otherwise secured upon said shaft, and from this hub radiate as many arms as there are clutch systems. This hub and its arms constitute what will be herein termed a "clutch-frame." Upon this clutch-frame are provided radial guides for the shanks of the clutch members.

In the form of the invention shown each of the radial clutch-arms consists of two parallel bars c , which are connected, preferably, by a yoke c' . The proximate faces of these bars are provided with grooves c^2 , which serve as the guides above named.

D represents the outer and E the inner clutch member. Each of these clutch members consists of an inwardly-projecting shank d and e , respectively, and an overhanging jaw or friction-surface d' and e' , respectively, the outer friction-surface being concave and the inner friction-surface being convex. In these general characteristics the clutch members are substantially like the clutch members commonly used in this style of clutch. The jaw-shanks of each of the clutch members are provided with longitudinal slots d^2

e^2 , respectively, through which the wedge hereinafter referred to passes.

d^3 d^4 represent pins, which are fastened to the outer jaw-shank in any suitable manner, and in a position, when the parts are assembled, at right angles to a radial plane. e^3 e^4 represent similar pins similarly secured to the jaw-shank of the inner clutch member. These pins d^3 d^4 e^3 e^4 are so arranged that when the parts are assembled they will all lie in the same plane, and their ends, which they are attached, will lie in the grooves c^2 in the clutch-arms, whereby the jaws will be held in their proper position and be guided in radial paths without the necessity of smoothly finishing the entire edges of the shanks, as would be necessary if said edges, instead of the pins, engaged in the grooves in the clutch-arms.

G represents a wedge-block having two curved-wedge arms g' g^2 and having the arm g projecting midway between the two wedge-arms g' g^2 . This arm g is pivoted to the clutch-arm by means of a pin g^3 , which lies between the pins d^3 d^4 and in line therewith. One of the curved wedges g' is inserted between the pin e^3 and the pin d^3 , while the other curved wedge g^2 is inserted between the pins d^4 e^4 , so that when the said wedge-block is oscillated in one direction upon its pivot it will drive the wedge g' between two pins d^3 e^3 and force them apart, and thereby move the two jaws or friction-surfaces toward each other and toward the interposed pulley-flange, and when oscillated in the other direction the wedge g' is withdrawn, and at the same time and to the same extent the wedge g^2 is driven between the pins d^4 e^4 , thereby forcing said pins apart and drawing the two jaws away from each other and from the interposed pulley-flange.

N represents a slotted lever, which straddles the wedge-block G and is pivoted to the same pivot-pin g^3 . The outer periphery of the wedge-block between the two curved-wedge arms g' g^2 is in the form of the arc of a circle of which its axis of oscillation is the center. Upon the outer edge of this part of the wedge-block G a rack g^4 is formed and a worm H is mounted in the lever N and engages with said rack, thereby connecting the wedge-block G and the lever N together. A curved slot g^5 is cut in the wedge G, and a pin n passes through this slot and through both parts of the lever N and serves as a pivot by which the link I is secured to said lever N. The other end of the link I is pivoted to a suitable shifting sleeve J. The shifting sleeve J may be of any suitable form and it may be adapted to slide either upon the hub C or upon the shaft. In the construction shown, however, the shifting sleeve has one part j , which slides upon the shaft, and the arms j' , which extend over the hubs C, and have the lugs j^2 , which slide upon the hub. The hub has the shoulders c^3 , against which

the lugs j^2 strike when the clutch is locked, and the shoulders c^4 , against which said lugs strike when the sleeve has been drawn back far enough to completely release the clutch. In order that this shifting sleeve may reach the position shown in Fig. 2, the shoulder c^4 is cut away between the points where the lugs j^2 engage with it when in operative position, so that said sleeve may be slipped over the hub and then given about an eighth of a turn, which prevents it from being slipped off again.

When the parts are assembled in the manner hereinbefore described, and shown in the drawings, it operates as follows: When the shifting sleeve is moved backward from the locked position shown in Fig. 2, the wedge-block G is rocked so that the curved wedge g' is withdrawn from and the curved wedge g^2 driven in between the pins, with which they engage respectively, thereby causing both jaws to move simultaneously from the flange b. When the sleeve is moved in the opposite direction, the curved wedge g^2 is withdrawn from and the curved wedge g' simultaneously inserted between the pins with which they engage respectively, thereby moving the jaws toward each other and firmly gripping the flange b. As the jaws become worn the wedges are adjusted by the turning of the worm H, so that the lever N connects with the wedge-block at a point nearer the wedge g^2 .

If great accuracy is required in the operation of the clutch, a small plate K is inserted between the worm and the outer end of the lever N, and when the parts are properly adjusted this plate is thrust against the worm by means of a set-screw k , thereby preserving the adjustment until such time as is desired to change the same.

I do not wish to be understood as limiting my invention to the subordinate details of construction herein shown and described further than is expressed distinctly in the claims. The clutch in its entirety, as herein shown, is the best and most complete embodiment now known to me of my invention in all its details; but one skilled in the clutch art will readily see how these details may be varied in many ways without departing from the principle of the invention and without discarding some of its essential parts.

Among the modifications which will suggest themselves may be mentioned changes in the form of the clutch-arm, in the details of the jaw-shanks and the means for seating them on the clutch-frame, the employment of a wedge-block having only one curved-wedge arm instead of two, in the adjusting devices, in the form and arrangement of the shifting sleeve, and in the connections between said wedge-block and shifting sleeve.

I hereby disclaim as my invention, first, the combination, in a friction-clutch, of a pulley having a cylindric flange, a radial clutch-arm, and two inversely and radially moving clutch members of the type specified,

with a movable wedge adapted to engage with the shanks of said clutch members; second, the combination, in a friction-clutch, of a pulley having a cylindric flange, a radial clutch-arm, and two inversely and radially moving clutch members of the type specified, with a movable wedge adapted to engage with the shanks of said members, a shifting sleeve, suitable connections between said sleeve and wedge, and means for guiding the movement of said wedge; third, the combination, in a friction-clutch, of a pulley having a cylindric flange, a radial clutch-arm, and two inversely and radially moving clutch members of the type specified, the inner ends of the shanks of the two members being in substantially the same radial plane with a wedge, guides for said wedge, a shifting sleeve, and an adjustable connection between said wedge and shifting sleeve, and, fourth, the combination of a pulley having a cylindric flange and two inversely and radially movable clutch members with a clutch-arm consisting of two parallel bars having grooves upon their proximate faces in which the shanks of the clutch members slide, and mechanism for moving said clutch members.

In comparison with the combinations above enumerated my claims are specific claims and are limited to some specific form or mode of operation of one or more of the elements named in said combinations or contain some new limiting element in addition thereto.

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

1. In a friction-clutch, the combination of a pair of clutch members of the general type specified and a clutch-frame upon which they are mounted with a wedge-block pivoted to said frame and having two curved-wedge arms on opposite sides of the pivotal point, adapted to engage with the shanks of said clutch members, substantially as and for the purpose specified.

2. In a friction-clutch, the combination of an oscillating wedge-block adapted to operate the clutch members of the friction-clutch and a clutch-frame to which said wedge-block is pivoted with a lever pivoted to said frame upon the same center, a rack-and-worm connection between said lever and wedge-block, a shifting sleeve, and suitable connections between said shifting sleeve and lever, substantially as and for the purpose specified.

3. In a friction-clutch, the combination of a radial clutch-arm consisting of two parallel grooved bars and a pair of clutch members of

the type specified, each clutch member having two pins projecting from both sides of its shank and engaging at their ends in said grooves, with mechanism for imparting to said clutch members a simultaneous inverse movement, substantially as and for the purpose specified.

4. In a friction-clutch, the combination of a pair of clutch members of the general type specified, having their shanks slotted longitudinally and transverse pins extending across said slots and projecting from the sides of the shanks, and a clutch-arm consisting of two parallel grooved side bars, with an oscillating wedge-block pivoted to said side bars and having a curved-wedge arm which engages with a pin on each of said shanks, substantially as and for the purpose specified.

5. In a friction-clutch, the combination of a pair of clutch members of the general type specified, each having slotted shanks and two transverse pins and a clutch-frame upon which said shanks are seated, with a wedge-block pivoted to said frame and having two curved-wedge arms and a curved slot, a lever pivoted to said frame upon the same center, a worm-and-rack connection between said lever and wedge-block, a pin passing through said curved slot and secured to said lever, a link pivoted to said lever by said pin, and a shifting sleeve, substantially as and for the purpose specified.

6. In a friction-clutch, a wedge-block for operating the clutch members, having an arm g , whereby said block is pivoted, and two curved wedges g' g'' on opposite sides of said arm, the outer periphery of said wedge-block between the two wedges being curved in the arc of a circle of which the wedge-block pivot is the center and having a rack formed on the said curved edge, substantially as and for the purpose specified.

7. In a friction-clutch, the combination of a pair of clutch members of the general type specified, having slotted shanks and a clutch-frame upon which said shanks are seated, with a wedge-block G , pivoted to said frame and having a curved-wedge arm g' , a lever N , pivoted to said frame on the same center, a curved rack on said wedge-block, a worm H , mounted in said lever, a movable block K , set-screw k , a shifting sleeve, and connections between said lever and shifting sleeve, substantially as and for the purpose specified.

FRANK. MILLER.

Witnesses:

E. L. THURSTON,
W. J. BAINBRIDGE.