(No Model.) 2 Sheets—Sheet 1.

W. KERSHAW.

FRICTION CLUTCH.

No. 481,794. Patented Aug. 30, 1892.

FIG. I

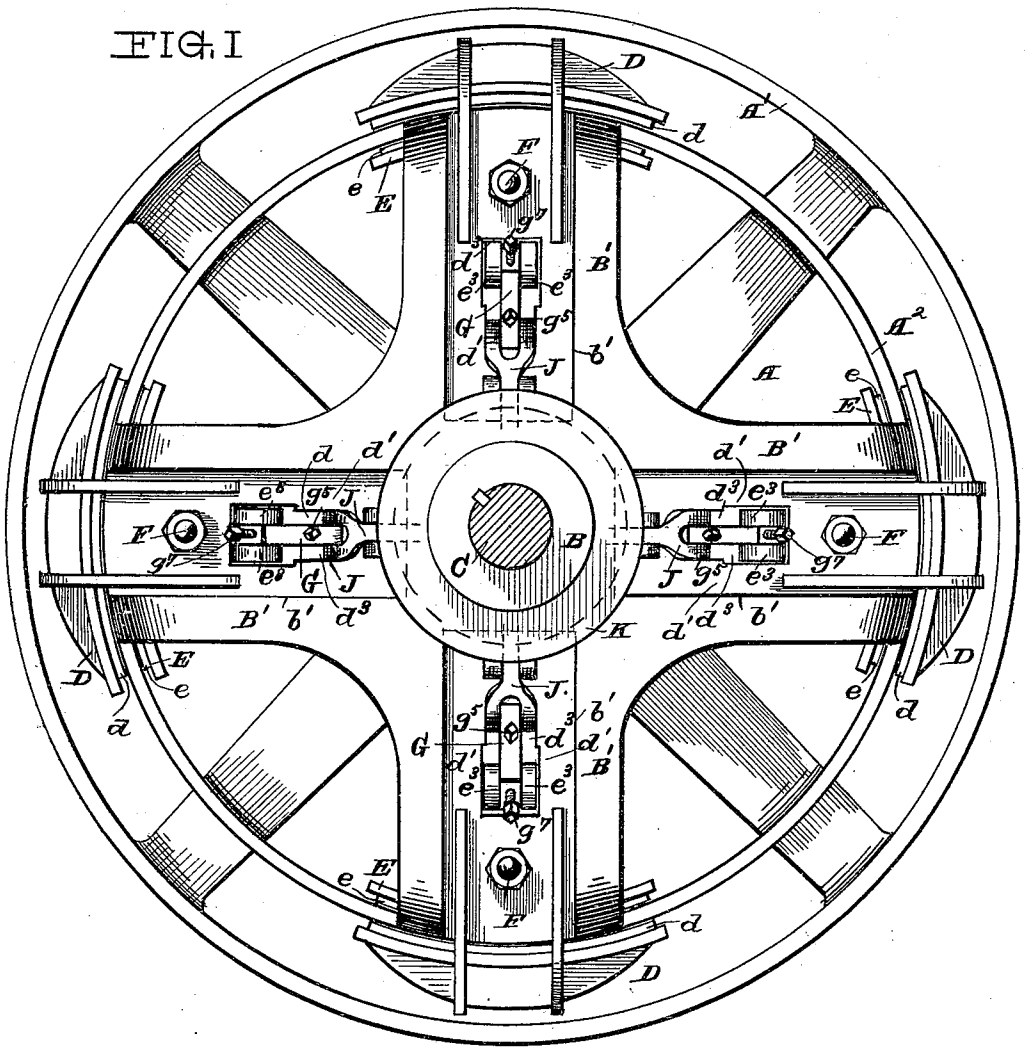
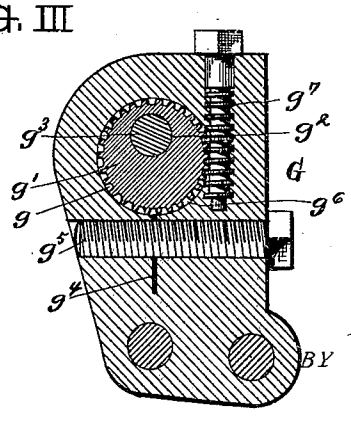


FIG. III



WITNESSES:

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(No Model.) 2 Sheets—Sheet 2.

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FIG. II

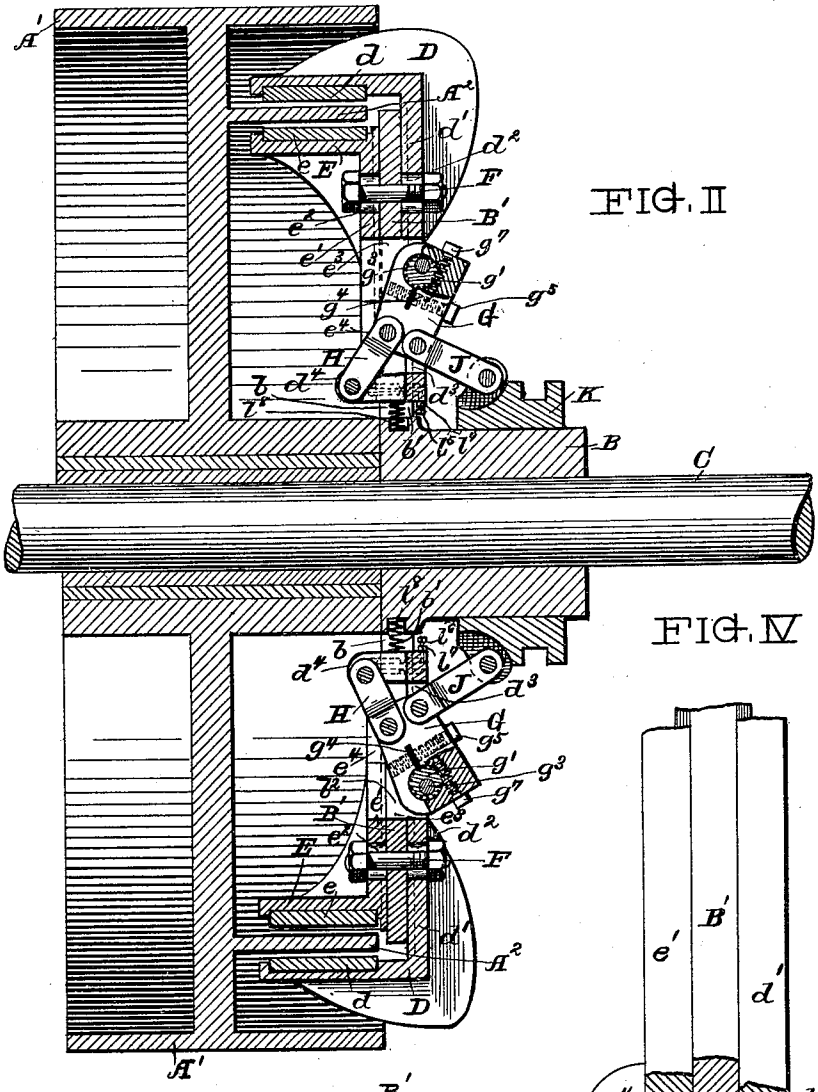
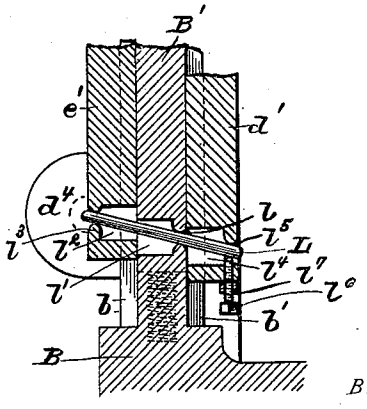
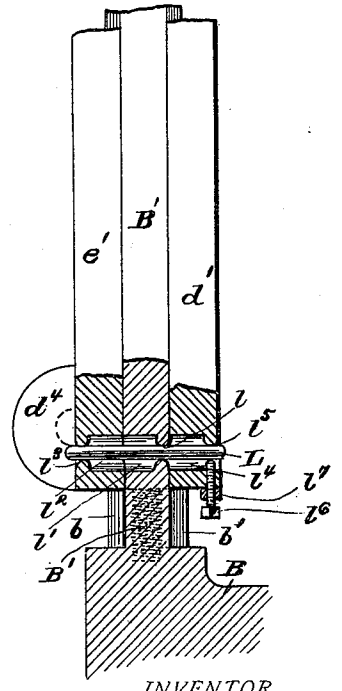


FIG. IV

FIG. V





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UNITED STATES PATENT OFFICE.

WILLIAM KERSHAW, OF CLEVELAND, OHIO.

FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 481,794, dated August 30, 1892.

Application filed July 11, 1891. Renewed July 8, 1892. Serial No. 439,417. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM KERSHAW, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Friction-Clutches, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The annexed drawings and the following description set forth in detail one mechanical form embodying the invention, such detail construction being but one of various mechanical forms in which the principle of the invention may be used.

In the annexed drawings, Figure I represents a front elevation of my improved friction-clutch pulley; Fig. II, an axial section; Fig. III, a sectional detail view of the parts composing the device for taking up wear in the clutch; and Figs. IV and V, sectional detail views of the balancing device for the clutch-jaws, showing the jaw-arms in position when the jaws are partly open and when the jaws are closed.

In the drawings the letter A indicates the loose pulley, which is formed with the belt-rim A' and the friction-rim A^2. A hub B, having radiating spider-arms B', is keyed or otherwise secured upon the shaft C, and the faces of said spider-arms are formed with radial grooves or recesses b and b' in their inner and outer faces, respectively. The outer jaws D of the clutch have friction-blocks d, of wood or other suitable material, secured in their faces to bear against the outer periphery of the friction-rim and have arms d', which fit and slide in the outer grooves b' of the spider-arms. The inner jaws E have friction-blocks e, of wood or other suitable material, secured in their faces to bear against the inner periphery of the friction-rim and have arms e', which fit and slide in the inner grooves b of the spider-arms. Nutted bolts F are inserted through the spider-arms near their outer ends and through longitudinal slots d^2 and e^2, respectively, in the outer and inner jaw arms. The inner-jaw arms have outwardly-projecting perforated ears e^3 at their middles, which project through slots b^2 in the spider-arms and through slots d^3 in the outer-jaw arms, and the outer-jaw arms have inwardly-projecting perforated ears d^4 at their lower ends, which project through the slots b^2 in the spider-arms and through slots e^4 in the inner-jaw arms. Outer toggle-arms G are pivoted at their outer ends between the ears of the inner-jaw arms and to inner toggle-arms H, which are pivoted at their inner ends to the ears of the outer-jaws arms. Links J are pivoted to the inner ends of the outer toggle-arms and to a sleeve K, which slides upon the extended hub B of the spider and has suitable means for sliding it toward or from the spider and pulley. It is obvious that the toggle-arms will be straightened and will force the jaws to clamp the friction-rim when the shifting sleeve K is moved toward the spider, the arms being thrown slightly beyond a straight line to lock them, and that they will be flexed and will draw the jaws apart from frictional contact with the friction-rim when the sleeve is shifted from the spider. The inner ends of the spider-arms have small bores l, which open into larger bores l' in the inner sides of the arms, and the inner-jaw arms have registering large bores l^2 and small bores l^3 in their inner ends, said large bores corresponding in size to and registering with the large bores l' when the jaws are partly spread. The outer-jaw arms have large bores l^4, which under the same conditions as above stated register with the small bores of the spider-arms and radial slots l^5 through the outer sides. Screw-bolts l^6 are inserted through the inner ends of the outer-jaw arms into the ends of the slots and are provided with jam-nuts l^7, which serve to secure said bolts as they are adjusted. Bolts or pins L are inserted through said bores and have their fulcra in the small bores of the spider-arms and have the outer and inner jaws balancing upon them with their small bores and slots and screw-bolts. The jaws are balanced by means of these pins and bores, so that the tendency of the outer jaws to be thrown outward and to remain in that position by the influence of centrifugal force will be counterbalanced by the same tendency of the inner jaws, which on account of their lighter structure and closer proximity to the center act upon the longer arms of the levers

formed by the pins L. The slots l^5 and screw-bolts l^6 serve to take up play caused by uneven wear of the two jaws. Springs l^8 are secured to bear outward against the inner ends of the outer-jaw arms, so as to maintain the ends of the screw-bolts l^6 in contact with the pins L.

The outer toggle-arms G are provided with a device for taking up the wear of the friction-blocks of the jaws and of the other parts of the clutch, and said device is illustrated in detail in Fig. III. The toggle-arms have circular holes g, in which disks g' may turn. Said disks have eccentric holes g^2, through which pass the pivot-bolts g^3, which are inserted through the ears e^3 of the inner jaws and which form the pivotal attachment of the arms. Slits g^4 extend from the holes g into the arms and screws g^5 pass through the arms and slits, serving to draw the slitted portions of the arms together, so as to firmly clamp the eccentric disks g' in whatever positions they may be turned in their holes.

For the purpose of revolving the disks their rims are formed with cogs g^6, and worms g^7, which turn in suitable bores in the arms, engage said cogs, and may thus revolve the eccentric disks when they (the screws) are revolved. In this manner the distance between the two pivotal points of each toggle-arm may be changed and wear taken up in the parts of the clutch. In the drawings the disks are shown turned to the extreme of their movement in taking up wear.

This clutch-pulley is simple of construction, and consequently cheaply and easily manufactured, as well as durable and strong. It may be easily operated, on account of the jaws being balanced by balancing-pins, centrifugal force having no influence upon the jaws, which may be thrown into and out of engagement with the rim with perfect ease, whether the shaft is in motion or standing still.

Other modes of applying the principle of my invention may be employed for the mode herein explained.

Changes may be made as regards the mechanism herein set forth, provided the principles of construction respectively recited in the following claims are employed.

I therefore particularly point out and distinctly claim as my invention—

1. In a friction-clutch pulley, the combination of an inner and an outer jaw provided with inwardly-extending radial arms, two toggle-arms pivoted to each other and respectively pivoted to the inner jaw and to the inner end of the outer jaw, means for bending and straightening the toggle-arms, and means for moving the pivotal connecting-point between one of the toggle-arms and one of the jaws, and thereby lengthening or shortening the relative distance between the pivotal points of the toggle-arms, substantially as set forth.

2. In a friction-clutch pulley, the combination of a spider having radiating arms, outer and inner jaws having arms sliding upon the faces of the spider-arms and having means for operating them, and balancing-pins having pivotal bearings in the spider-arms and forming pivotal bearings at their ends for the jaw-arms, substantially as set forth.

3. In a friction-clutch pulley, the combination, with sliding jaws, toggle-arms connected to slide said jaws, and a pivot-pin upon one of said jaws for one of said toggle-arms, of a disk eccentrically pivoted upon said pivot-pin and turning in one end of said toggle-arm and means for revolving said disk and securing it in its adjusted position, substantially as set forth.

4. In a friction-clutch pulley, the combination of a loose pulley having a friction-rim, a spider having radial arms, clutch-jaws having their arms sliding upon said spider-arms and having perforated ears at about the middles of the inner arms and at the inner ends of the outer arms, toggle-arms having holes at their outer ends and slits extending from said holes, pins through the ears of the inner arms, worm-disks in the holes of the toggle-arms and eccentrically pivoted upon said pins, worms engaging said disks, screws through the slitted portions of the toggle-arms, toggle-arms pivoted to said outer toggle-arms and to the ears of the outer-jaw arms, a sliding sleeve upon the spider-hub, and links between said sleeve and the joints of the toggle-arms, substantially as set forth.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 5th day of May, A. D. 1891.

WILLIAM KERSHAW.

Witnesses:
GEO. R. SNEADEN,
ROSA SAWYER.