

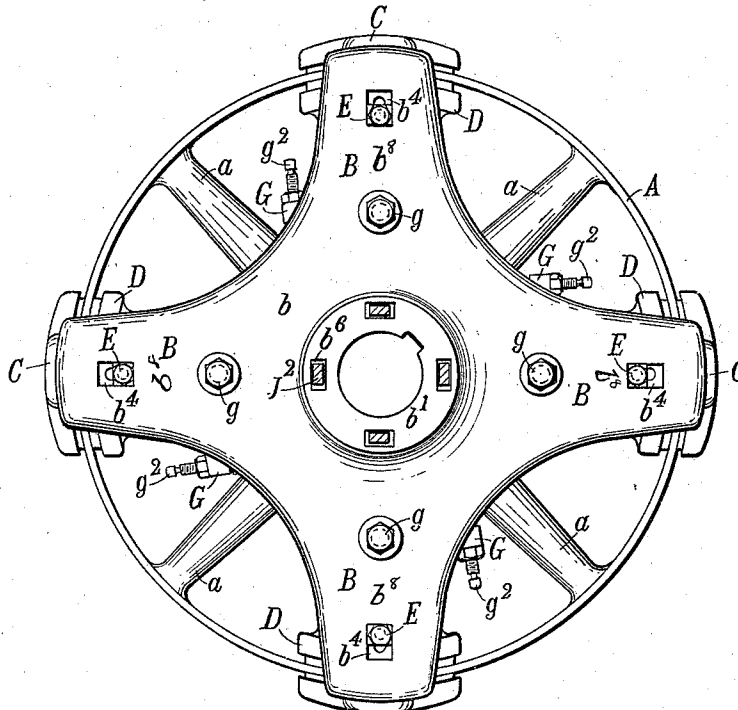
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4 Sheets—Sheet 1.

H. W. HILL.
CLUTCH.

No. 535,376.

Patented Mar. 12, 1895.



7-1-

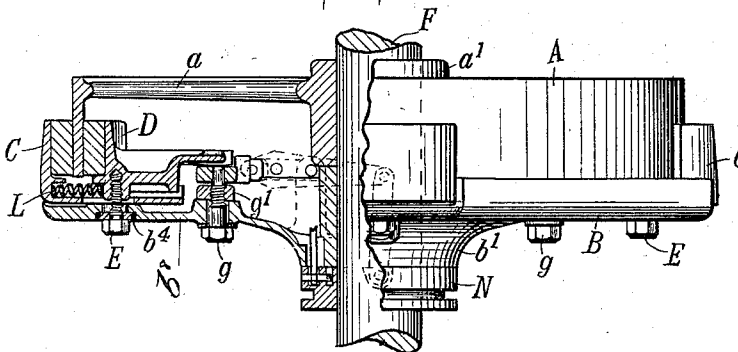


Fig-2-

WITNESSES.

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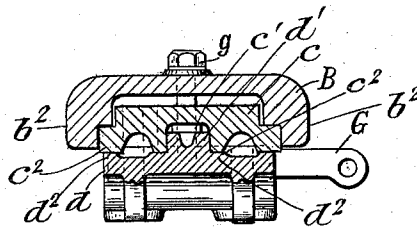
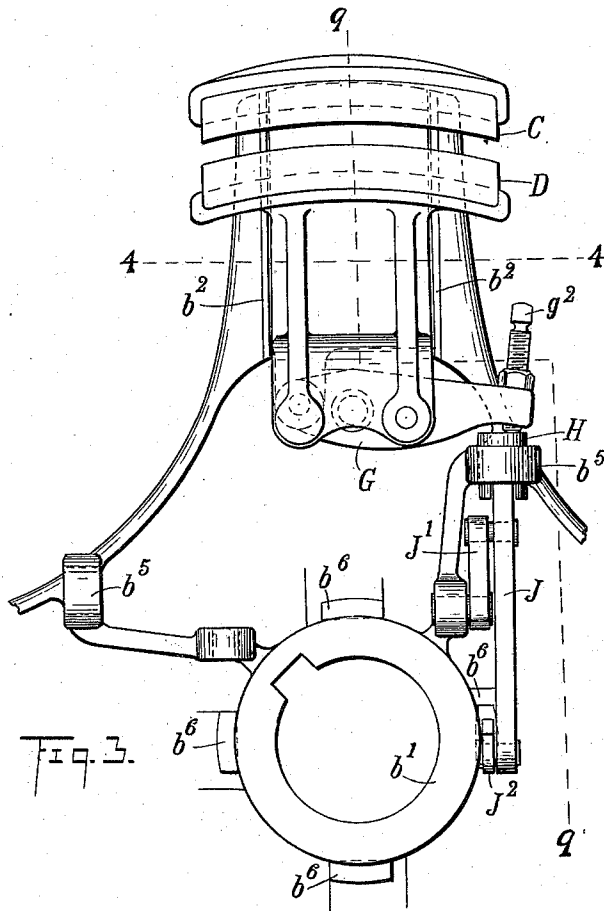
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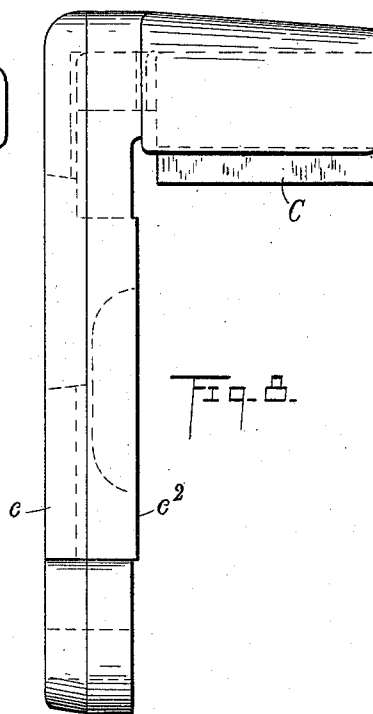
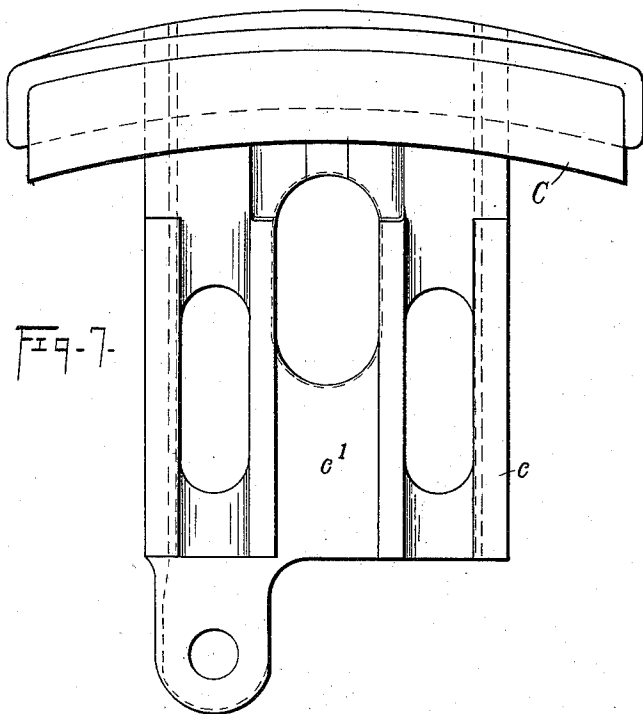
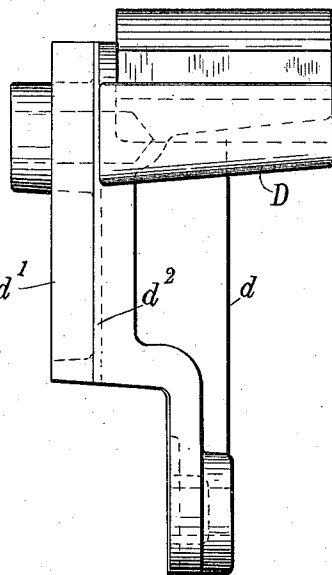
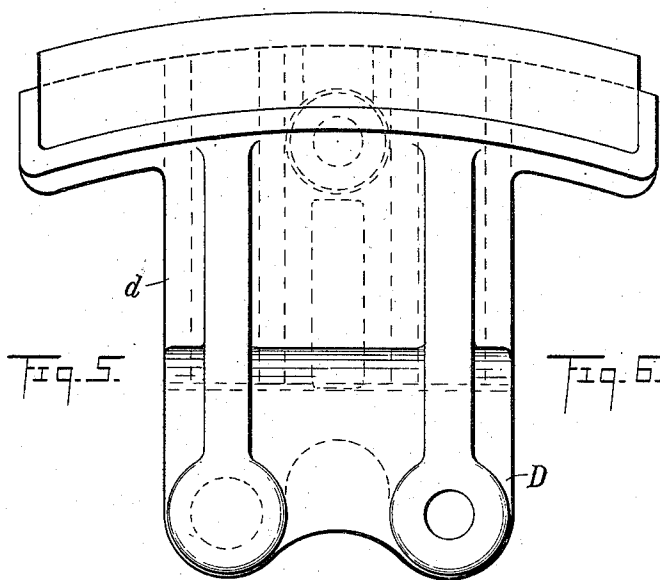
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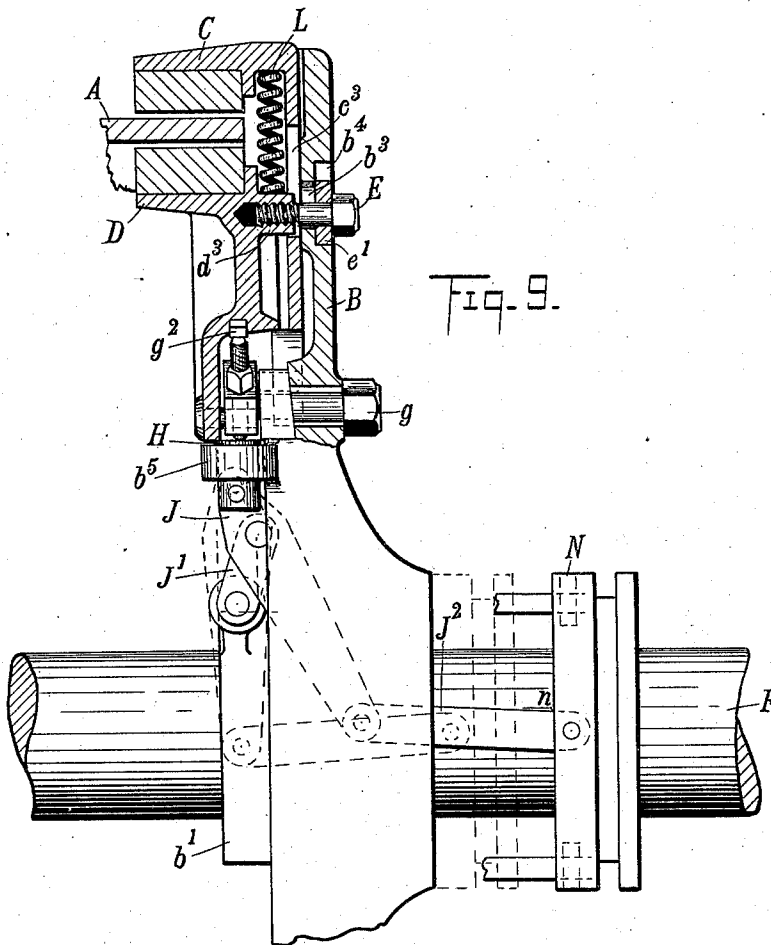
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UNITED STATES PATENT OFFICE.

HARRY W. HILL, OF CLEVELAND, OHIO, ASSIGNOR TO LOUISA A. HILL, OF
SAME PLACE.

CLUTCH.

SPECIFICATION forming part of Letters Patent No. 535,376, dated March 12, 1895.

Application filed March 16, 1894. Serial No. 503,868. (No model.)

To all whom it may concern:

Be it known that I, HARRY W. HILL, 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; 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.

The invention pertains to the class of friction clutches in which a pair of jaws are mounted on each clutch arm, and are simultaneously moved in substantially radial paths toward and from an interposed cylindrical flange, for the purpose of grasping and releasing the same.

The principal objects of the invention are to simplify the construction, and cheapen the first cost of clutches of this class; to provide novel operating mechanism which will occupy very little room on the shaft; to provide cheap and conveniently operated adjusting mechanism; and to so construct and arrange the moving parts that they are concealed from view and protected from accidental injury.

The invention relates particularly to construction of the jaws, and of the mechanism by which they are held upon the clutch arm in the proper relation to each other; to the mechanism for operating said jaws; and to the means for adjusting their throw; and the invention consists in the construction and combination of parts hereinafter described and pointed out in the claims.

It is well understood that this class of mechanism may be employed to connect and disconnect at will either a shaft and a pulley or gear loosely mounted on the shaft; or two shafts mounted in the same axial line. In the former case the clutch frame which carries the jaws and their operating mechanism is commonly keyed to the shaft, and the cylindrical flange which is grasped by the jaws is secured to the said pulley or gear. In the latter case the clutch frame is secured to one shaft and the cylindrical flange is supported by arms secured to the other shaft. I have illustrated the former construction in the drawings, in which—

Figure 1 is a side view of a four arm clutch. Fig. 2 is a top view of the same,—one half of the figure being in central section. Fig. 3 is a side view of the inner side of one clutch arm and one system of clutch mechanism. Fig. 4 is a sectional view on line 4—4 of Fig. 3. Fig. 5 is an inner side view, and Fig. 6 is an edge view of the inner jaw. Figs. 7 and 8 are similar views of the outer jaw; and Fig. 9 is a section through one of the clutch arms on the line 9—9 of Fig. 3, showing one complete clutch system.

Referring to the parts by letters A represents a cylindrical flange supported by arms a which radiate from the hub a' loosely mounted on the shaft F. Fixed to the shaft F is the clutch frame b having as many arms B, which radiate from the hub b' , as it is desired to employ pairs of jaws and associated mechanisms. Each of these arms, and the mechanism supported by it, is like every other arm and its associated mechanism, wherefore a description of one will answer for all.

The arm B consists of two parallel side bars $b^2 b^2$ and a connecting web b^3 preferably integral with the side bars.

The outer jaw C has a shank c which lies between the two side bars $b^2 b^3$, whereby it is guided in a substantially radial path. The opposing faces of said side bars, and the outer edges of the jaw shank, are smoothly finished, whereby said jaw shank may slide freely.

A radial groove c' is formed in the front side of the jaw shank; and a rib d' on the shank d of the inner jaw D fits and slides in this groove. On the contiguous faces of the jaw shank c and d are the ribs c^2 and d^2 respectively; and these ribs c^2 and d^2 lie in contact with each other when the jaws are held on the clutch arm in the described relation to each other, thereby reducing the friction between the two jaws. Both jaws are held upon the clutch arm by a bolt E, which passes through a slot b^3 in the clutch arm, and a slot c^3 in the outer jaw shank, and screws into a boss d^3 on the inner jaw. The head e of the bolt bears upon a plate e' which lies in a recess b^4 in the clutch arm; and as the jaws move, this plate slides upon said clutch arm.

In all prior constructions of clutches of this

class both of the clutch jaws have had a bearing upon the clutch arm. In order to provide this bearing in a clutch in which both jaw shanks lie on the same side of the clutch arm the side bars have had to be made wider than they are in the clutch herein shown and described, wherefore the prior clutch frames have been, of necessity, heavier than that shown in the present drawings.

G represents a rocking lever, or rocker, as it is sometimes called, which lies between the two jaw shanks. It is pivoted to the clutch arm on a pivot parallel to the shaft F; and, on opposite sides of this pivot, it is pivotally connected with the jaw shanks. The pivot of said rocker is the inner end of a bolt *g* which passes loosely through the web of the clutch arm, and screws into the beveled nut *g'*, which is thereby drawn against the inner beveled side of said clutch arm, thereby fixing the bolt in the clutch arm. The lower end of the shank of the outer jaw is cut away as shown, so that the said bolt may pass beneath it. One end of said rocker projects out from between the two jaw shanks and lies just outside (with reference to the shaft) of the sliding block H. This block is mounted in a strap *b⁵* on the side of the clutch arm, and is movable in a path substantially parallel to the path traveled by the jaws. As the block is moved outward, it rocks the lever G, whereby the jaws are moved, in opposite directions, toward each other and the interposed flange. When the block is moved inward, the spring L which lies between the two jaws forces them apart.

In order to adjust the throw of the jaws so that a given movement of the block may move the jaws more or less close to each other, an adjustment screw *g²* screws through the end of lever G and bears upon the block H.

The block is moved by a toggle mechanism consisting of the following parts: a link J which is pivoted at its outer end to said block, and which extends therefrom inward by the side of the shaft F; and a link J' which is pivoted at its inner end to the clutch frame, and at its outer end to the link J at a point between its ends. A link J² is pivoted to the inner end of the link J, and extends therefrom out through a slot *b⁶* in the hub of the clutch frame, and it enters a socket *n* in the face of the sliding sleeve N, to which sleeve the link is pivotally connected.

From the drawings and the foregoing description it will be seen that the heads of the bolts *g* and E are the only parts which lie outside the clutch frame. Even the link J² is entirely hidden from view when the jaws are closed. There is very little danger of any accidental damage to the parts; and the clutch presents a very compact appearance. Because all of the mechanism for operating the jaws lies behind the clutch frame, between it and the pulley which carries the flange A, the clutch occupies a very small space compara-

tively upon the shaft,—a desirable feature much sought for in friction clutches.

Having described my invention, I claim—

1. In a friction clutch, in combination, the clutch arm having two parallel sides and a connecting web, a radially movable outer jaw mounted on said clutch arm between said sides, a radially movable inner jaw mounted on the outer jaw, said jaws having respectively a radial groove and a radial rib which lies and moves in said groove, a bolt which passes loosely through slots in the web of the clutch arm and the shank of the outer jaw and is rigidly connected with the inner jaw, and mechanism for moving said jaws simultaneously in opposite directions, substantially as and for the purpose specified.

2. In a friction clutch, in combination, the clutch arm, having parallel side bars and a connecting web, the outer jaw mounted on said arm between said side bars and having a longitudinal groove in its shank, the inner jaw having a rib which lies and slides in said groove, a screw bolt passing through slots in the web of the clutch arm and in the outer jaw shank and screwing into the inner jaw, and mechanism for moving said jaws simultaneously in opposite directions, substantially as and for the purpose specified.

3. In a friction clutch, in combination, a clutch arm, two radially movable jaws having shanks which are supported on said clutch arm, a rocking lever which lies between the two jaw shanks in a plane parallel thereto and is pivoted to the jaw shanks respectively, and, between said pivots, to the clutch arm, and mechanism for rocking said lever, substantially as and for the purpose specified.

4. In a friction clutch, in combination, the clutch arm, two radially movable jaws having shanks which are supported on said clutch arm, a rocking lever which lies between the jaw shanks in a plane parallel thereto having an arm which projects from between said shanks, pivots connecting said lever with the clutch arm and with the two jaw shanks respectively, a sliding block H mounted on the clutch arm, an adjustment screw passing through the projecting end of said lever and bearing against said block, and mechanism for actuating said block, substantially as and for the purpose specified.

5. In a friction clutch, in combination, the clutch arm, two radially movable jaws having shanks which are supported on said clutch arm, a rocking lever lying between said shanks in a plane parallel thereto having an arm which projects from between said shanks, said lever being pivoted to the clutch arm, and, on opposite sides of said pivot, with said jaws respectively, a sliding block mounted on the clutch arm and engaging with said lever, and a toggle for operating said block, substantially as and for the purposes specified.

6. In a friction clutch, in combination, the

clutch arm, two radially movable jaws mounted on the inner side thereof, a rocking lever lying between the jaw shanks and pivoted to them and to the clutch arm, a sliding block
5 mounted on the clutch arm, a toggle one link J' of which is pivoted to the clutch arm at its inner end and to the other link at its outer end, the other link J being pivoted to said block at its outer end and to a link J² at its
10 inner end, the last named link which passes through a slot in the clutch frame, and a sliding sleeve to which said link is connected, substantially as and for the purpose specified.

7. In a friction clutch, in combination, the
15 clutch arm, two radially movable jaws having

shanks which are supported on said clutch arm, a rocking lever pivoted to the clutch arm on a pivot which is parallel to the axis of the clutch arm, which rocker is pivotally connected with the two jaw shanks on opposite sides of its pivot above named, and mechanism for actuating said lever, substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

HARRY W. HILL.

Witnesses:

E. L. THURSTON,
L. S. GRISWOLD.