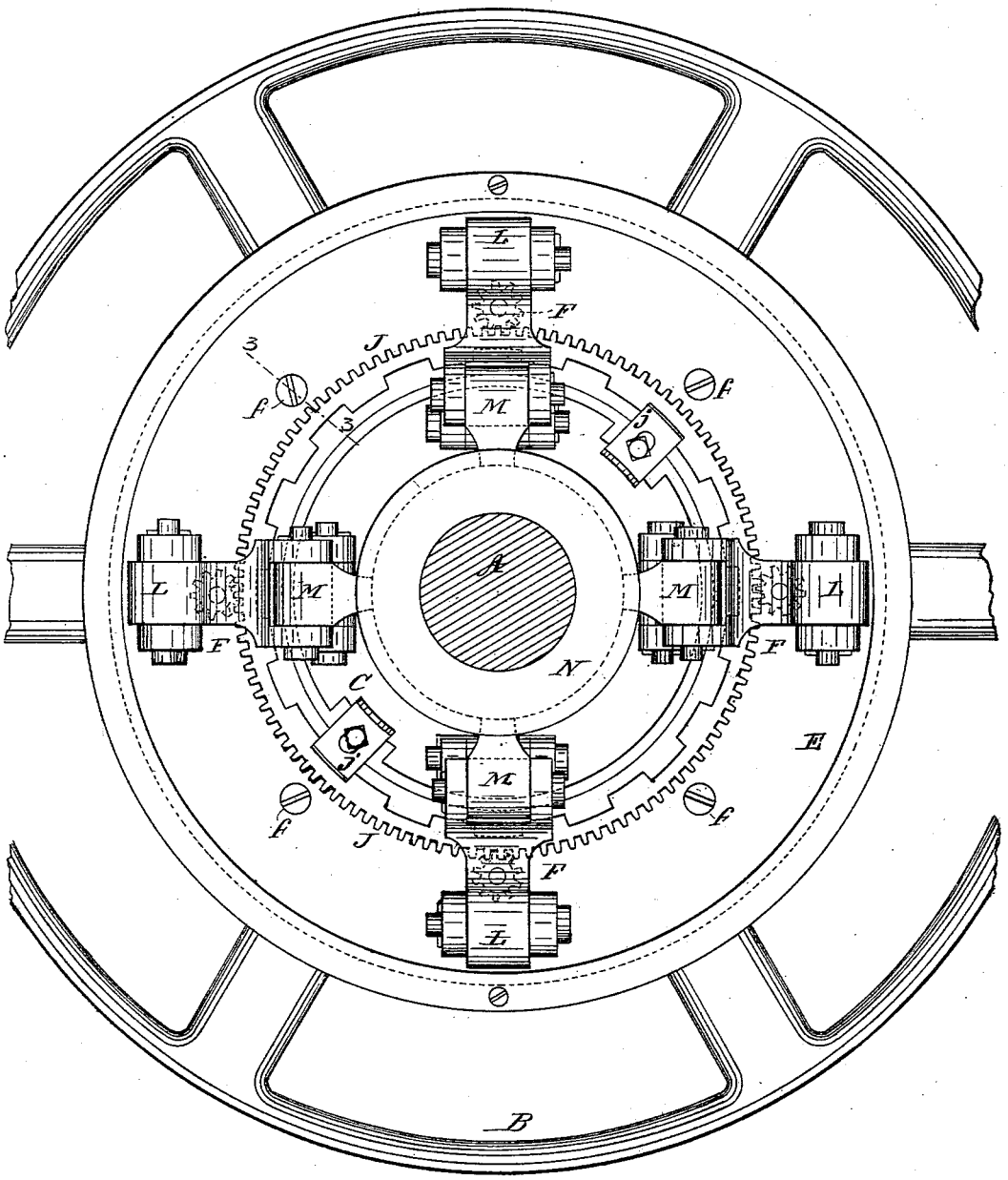
(No Model.) 2 Sheets—Sheet 1.

A. NELSON.

FRICTION CLUTCH.

No. 457,539. Patented Aug. 11, 1891.

Fig. 1.



Witnesses.
Francis C. Dean.
John R. Snow.

Inventor.
Anthony Nelson
by Maynadier & Beach
attys

(No Model.) 2 Sheets—Sheet 2.

A. NELSON.

FRICTION CLUTCH.

No. 457,539. Patented Aug. 11, 1891.

Fig. 4.

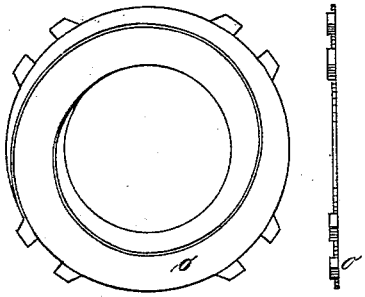


Fig. 2.

Fig. 3.

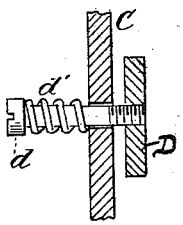


Fig. 5.

Witnesses.

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UNITED STATES PATENT OFFICE.

ANTHONY NELSON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO JAMES BENNETT FORSYTH, OF SAME PLACE.

FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 457,539, dated August 11, 1891.

Application filed January 30, 1891. Serial No. 379,636. (No model.)

To all whom it may concern:

Be it known that I, ANTHONY NELSON, residing in Boston, in the county of Suffolk and State of Massachusetts, a subject of the King of Denmark, have invented an Improvement in Friction-Clutches, of which the following is a specification, reference being had to the accompanying drawings, making a part hereof, in which—

Figure 1 is a side elevation with the shaft in section, and Fig. 2 a diametrical section illustrating a clutch embodying my invention. Fig. 3 is a sectional detail on line 3 3 in Fig. 1. Fig. 4 is a plan and edge view, on a small scale, of the plate of one set; and Fig. 5 like views of a plate of the other set.

My invention is an improvement on the clutch described in my Patents, No. 384,268, dated June 12, 1888, and No. 406,109, dated July 2, 1889, and relates to the arrangement and adjustment of the follower, to the means for actuating the follower, and to the construction of the friction-plates.

The follower D forces the plates *o* and *p* together when shaft A is to be connected to pulley B, for plates *o* are fast to flange *b* of pulley B, and plates *p* are fast to the hub of sleeve B′, which is fast to shaft A, as is usual in this class of friction-clutches.

The first feature of my invention relates to the mounting of the follower D, and consists in the combination of the follower D with a plate C by means of studs *d* and springs *d′*, as clearly shown in Fig. 3. Plate C forms a cover for the chamber formed by flange *b*, and is conveniently supported by a hub around sleeve B′. Follower D is drawn toward plate C by the springs *d′* and studs *d* as soon as the mechanism which forces it against the plates *o* and *p* ceases to act. This combination is simple and effective and is far preferable to any other plan of supporting the follower known to me. It also allows of a ready adjustment of the follower with relation to the plates *o p* and the mechanism for actuating the follower, by means of pinions F, screws *f*, and gear J, as shown in the drawings, and it is this combination of the follower with pinions F, screws *f*, and gear J which constitutes the second feature of my invention. The screws *f* are fast to the follower D, and the pinions F are also nuts, so that when these pinions are turned they move toward or away from the follower, and as they all mesh with gear J the pinions F are readily adjusted by a slight motion of gear J on its axis. Gear J is formed with notches to receive dogs *j j*, each of which fits in a recess formed for it in the outer face of plate C, and is held in that recess by a screw, as clearly shown in Fig. 1.

The cams L act against the follower D through pinions F and adjusting-screws *f*, and these cams are actuated by the levers M, the levers being actuated by the sliding sleeve or cone N, and it is this actuating mechanism—namely, cam L, its lever M, and sleeve N—which constitutes the third feature of my invention.

The plates *o* and *p* are castings, preferably of malleable iron, and are made thicker at their notched portions than at those portions where they touch one another. This is also one feature of my invention, as a plate so made operates much better than if made of a uniform thickness, as was the common mode, and is much cheaper and also better than if each plate was formed of two thicknesses of sheet metal, one of full size, the other a reenforcing plate about the notches, and the two united together.

The operation is as follows: The cone or sliding sleeve N, when in the position shown in the drawings, spreads levers M, and thereby forces the working-faces of cams L against pinion F, for when levers M are raised cams L are also forced outward, and the cam-slots riding on the cam-rolls S force the cams against pinions F, and thereby force follower D inward, which forces the plates *o* and *p* into close contact, thereby causing pulley E, to which plates *o* are connected, to move with sleeve B′, to which plates *p* are connected. When cone N is moved back, the levers M and cams L move back also, the follower D being pulled away from plates *o* and *p* by the springs *d′* about studs *d*.

It will be obvious that pulley E may be fast to shaft A and sleeve B′ loose on that shaft instead of vice versa, as shown, and also that pulley E may be fast on one shaft and sleeve

B′ fast to a separate shaft, the axis of the two shafts coinciding. It will also be clear that instead of using cone N the pinions F may be rotated so far by gear J that they will force follower D against the plates, and this is in some cases desirable.

What I claim as my invention is—

1. In a friction-clutch, the combination of pulley B, having a flange *b*, follower D, plate C, studs *d* and springs *d′*, and the plates *o* and *p*, plate C covering the chamber formed by flange *b*, and follower D and plate C being connected together by the studs *d*, substantially as described.

2. In a friction-clutch, the actuating mechanism consisting of lever M, cam L, jointed to and carried by the lever, and cam-roll S in the inclined slot of cam L, all substantially as set forth.

ANTHONY NELSON.

Witnesses:
EDWARD S. BEACH,
JOHN R. SNOW.