

No. 719,434.

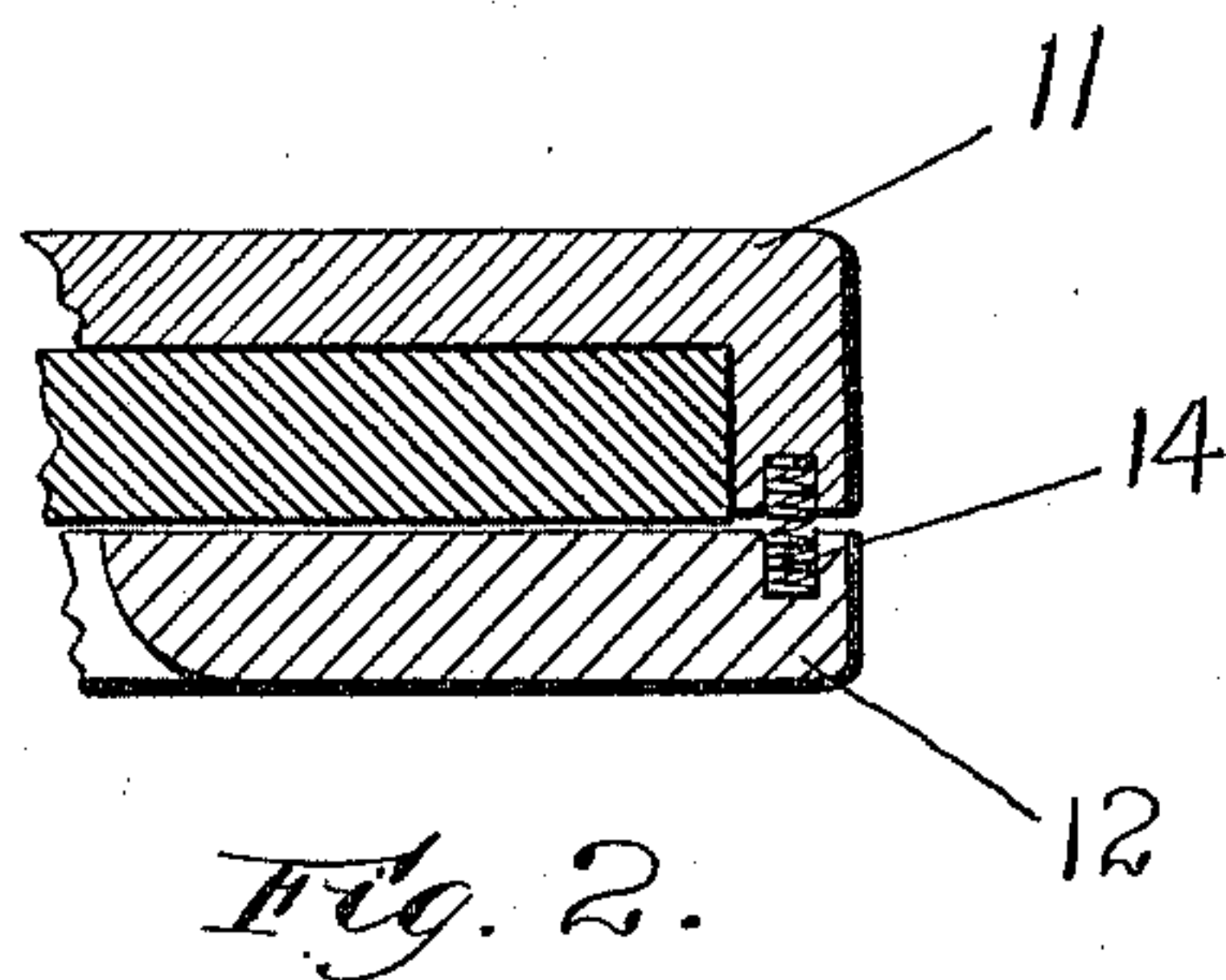
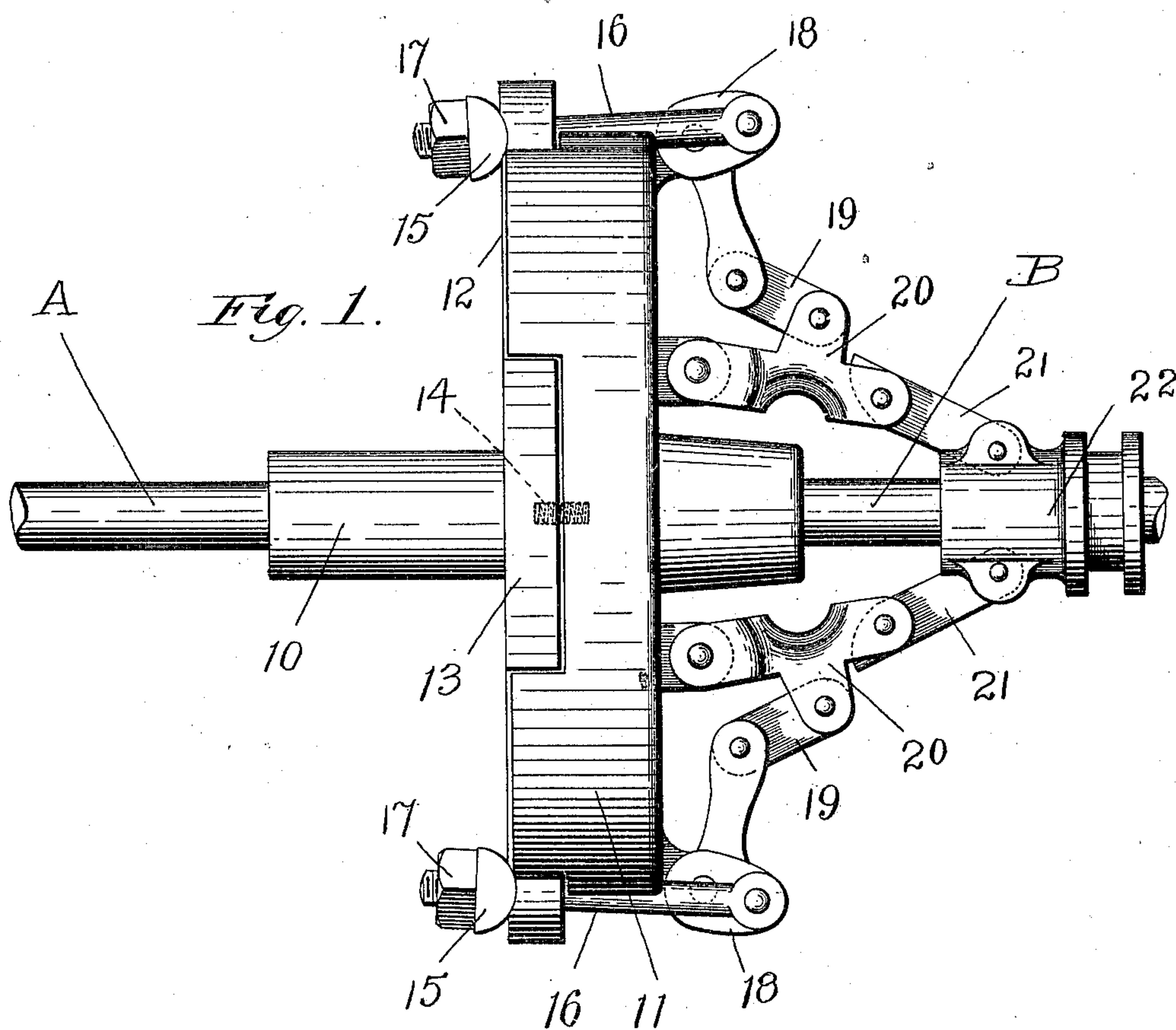
PATENTED FEB. 3, 1903.

T. F. CARVER.
FRICTION CLUTCH.

APPLICATION FILED APR. 26, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:
L. F. Wesson.
M. C. Regan.

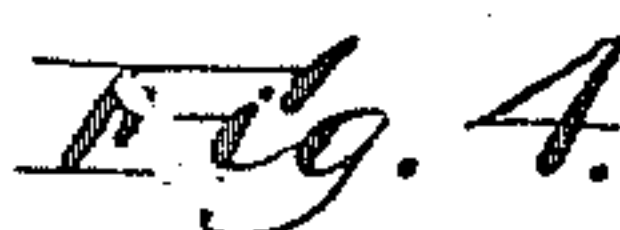
Inventor:
T. F. Carver.
By
Southgate & Southgate
Attorneys.

PATENTED FEB. 3, 1903.

APPLICATION FILED APR. 26, 1902.

NO MODEL.

2 SHEETS--SHEET 2.



Witnesses:
C. F. Wesson.
M. E. Regan.

Inventor:
T. E. Carver.
By
Southgate & Southgate
Attorneys.

UNITED STATES PATENT OFFICE.

THOMAS F. CARVER, OF WORCESTER, MASSACHUSETTS.

FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 719,434, dated February 3, 1903.

Application filed April 26, 1902. Serial No. 104,740. (No model.)

To all whom it may concern:

Be it known that I, THOMAS F. CARVER, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Friction-Clutch, of which the following is a specification.

This invention relates to that class of friction-clutches for connecting two shafts in which one of the shafts is provided with a friction-disk which turns within a clutch-head which may be clamped into engagement therewith when the shafts are to be connected.

The especial objects of this invention are to provide a form of clutch in which the adjusting-nuts will not be jarred or shaken loose, in which the clamping-pressure will be more nearly equalized over the entire surface of the friction-disk by employing an increased number of draft-rods, in which the parts of the clutch-head are fitted together in a simpler and more direct manner, and in which the operating connections are arranged in such manner as to secure a more efficient leverage for operating the clutch.

To these ends this invention consists of the friction-clutch and of the combinations of parts therein, as hereinafter described, and more particularly pointed out in the claims at the end of this specification.

In the accompanying drawings, Figure 1 is a side view of a friction-clutch constructed according to my invention, showing the clutch open and the two shafts disconnected from each other. Fig. 2 is a fragmentary sectional view taken on the line 2 2 of Fig. 4. Fig. 3 is a view similar to Fig. 1, partially broken away, showing the clutch in its closed position; and Fig. 4 is a partial side view of a friction-clutch constructed according to my invention.

In that class of clutches to which this invention relates it has heretofore usually been customary to operate the clamping-plate of each clutch-head by means of two draft-rods. These draft-rods have been arranged at diametrically opposite sides of the clamping-plate, and in practice I have found this arrangement to be objectionable, as the clamping-plate as thus actuated is free to oscillate about its diameter, connecting the draft-rods as an axis. In addition to this I have found

that this oscillation of the clamping-plate, although comparatively slight, is sufficient to cause the adjusting-nuts to gradually become loosened, so that clutches of this class have required frequent readjusting, even when screw-threads have been tightly fitted and check-nuts have been employed. To overcome this objection, I have provided a form of clutch in which the clamping-plate is operated by four draft-rods, so that when the clamping-plate is drawn up to its clamping position it will be held in fixed position, so that it cannot have any oscillation or wobbling motion. The draft-rods are arranged in two sets or pairs, each pair of draft-rods extending through a rock-piece which has only a comparatively slight rocking or oscillating movement, so that when the clamping-nuts are tightened up against the rock-pieces there will be no tendency for the same to work loose.

The parts of the clutch-head in a friction-clutch constructed according to my invention are of simpler form than have been used in previous constructions of clutches of this class—that is to say, the body of the clutch-head comprises a cup-shaped part having notches in its rim for receiving projections which extend radially from the clamping-piece, and instead of employing a single set of toggle-levers for directly actuating eccentrics to operate the draft-rods I preferably employ special linkwork constituting, in effect, primary and secondary sets of toggle-levers, which actuate the draft-rods through crank-pin connections.

Referring to the accompanying drawings for a detail description of a clutch constructed according to my invention, A and B designate the shafts to be coupled together, which shafts A and B are arranged end to end or in line with each other. Secured on the shaft A is a hub 10, carrying a friction disk or plate, which fits inside the clutch-head, as shown most clearly in Fig. 3. The clutch-head, which is secured on the shaft B, consists of a cup-shaped piece 11 and a clamping-plate 12. The cup-shaped piece 11 is provided with recesses in its flanges for receiving arms or projections 13, which extend radially from the clamping-plate 12—that is to say, a clutch-head constructed according

to my invention preferably comprises a cup-shaped piece combined with a flat clamping-plate rather than a construction in which two cup-shaped parts are combined to form the clutch-head. Fitting into sockets in the parts 11 and 12 are small separating-springs 14 for normally separating the clamping-plate from the friction-disk.

To operate the clamping-plate 12, I preferably employ two opposite rocker-pieces 15, each one of which receives two draft-rods 16, having tightening-nuts 17 threaded thereon. The draft-rods 16 are connected at their opposite ends to crank-pins carried by the bell-crank levers 18. The bell-crank levers 18 are each connected by links 19 to the three-armed levers 20. The three-armed levers 20 are connected by links 21 to the sliding hub 22. The sliding hub 22 is grooved to receive any of the ordinary forms of operating connections for opening and closing the clutch.

In the use of a friction-clutch as thus constructed it will be seen that by the use of four draft-rods the clamping-plate will be held up to its work, so that the same will have no tendency to wobble or oscillate, and the tightening-nuts 17 will have no tendency to work loose, as the rocking-piece 15 will be held in fixed position, with no tendency to loosen the nuts.

In the use of the operating connections of my clutch it will be noted that the links 21 form, in effect, a primary toggle mechanism, while the links 19 and bell-crank levers 18 form, in effect, two secondary toggle mechanisms. As the leverage of the primary toggle mechanism 21 diminishes the leverage of the secondary toggle mechanism increases, and I have found in practice that this provides a desirable form of clamping mechanism, which will have a more uniform leverage for setting the clutch than constructions which have heretofore been employed. The crank-pins which operate the draft-rods 16 are preferably set to throw slightly past their centers of motion, so as to provide additional means for holding the clutch in its clamped or set condition when the same is in operation, although in some cases I have found in practice that the primary toggle mechanism formed by the links 21 will form a sufficient lock for keeping the clutch in its operative condition when desired.

I am aware that changes may be made in the construction of my friction-clutch by those who are skilled in the art without departing from the scope of my invention as expressed in the claims. I do not wish, therefore, to be limited to the details of construction I have herein shown and described; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. In a friction-clutch, the combination of a clutch-head, a friction-disk fitting therein, and means for clamping the clutch-head onto the friction-disk, comprising two sets of clamping connections, each consisting of a rock-piece, a pair of draft-rods connected to each rock-piece, a bell-crank lever actuating each pair of draft-rods, and linkwork for operating the bell-crank levers.

2. In a friction-clutch, the combination of a clutch-head, comprising a cup-shaped piece having recesses in its flange, a clamping-plate having radially-extending projections fitting into said recesses, a friction-disk fitting into the clutch-head, and two sets of operating connections, each comprising a rock-piece, two draft-rods connected to each rock-piece, a bell-crank for each pair of draft-rods, and linkwork for operating the bell-cranks.

3. In a friction-clutch, the combination of a clutch-head, comprising a cup-shaped piece having recesses in its flange, a clamping-plate having projections engaging said recesses, a friction-disk fitting into the clutch-head, and two sets of connections, each comprising a rocker-piece, a pair of draft-rods extending through the rocker-piece, and each having a tightening-nut thereon, a bell-crank connected to operate each pair of draft-rods, and linkwork operating said bell-cranks, comprising a longitudinally-movable sleeve, a pair of three-armed levers, and two sets of links connecting the longitudinally-movable sleeve with the three-armed levers, and the three-armed levers with the bell-cranks respectively.

4. In a friction-clutch, the combination of a clutch-head, a friction-disk fitting therein, and a clamping mechanism for the clutch-head, comprising two bell-crank levers, a pair of draft-rods connected by crank-pins to each of the bell-crank levers, each pair of draft-rods extending through a rock-piece, and having tightening-nuts, and linkwork for operating said bell-crank levers, comprising a longitudinally-movable sleeve, a pair of three-armed levers, and two sets of links connecting the longitudinally-movable sleeve with the three-armed levers and the three-armed levers with the bell-crank levers respectively.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

THOMAS F. CARVER.

Witnesses:

PHILIP W. SOUTHGATE,
J. ELMER HALL.