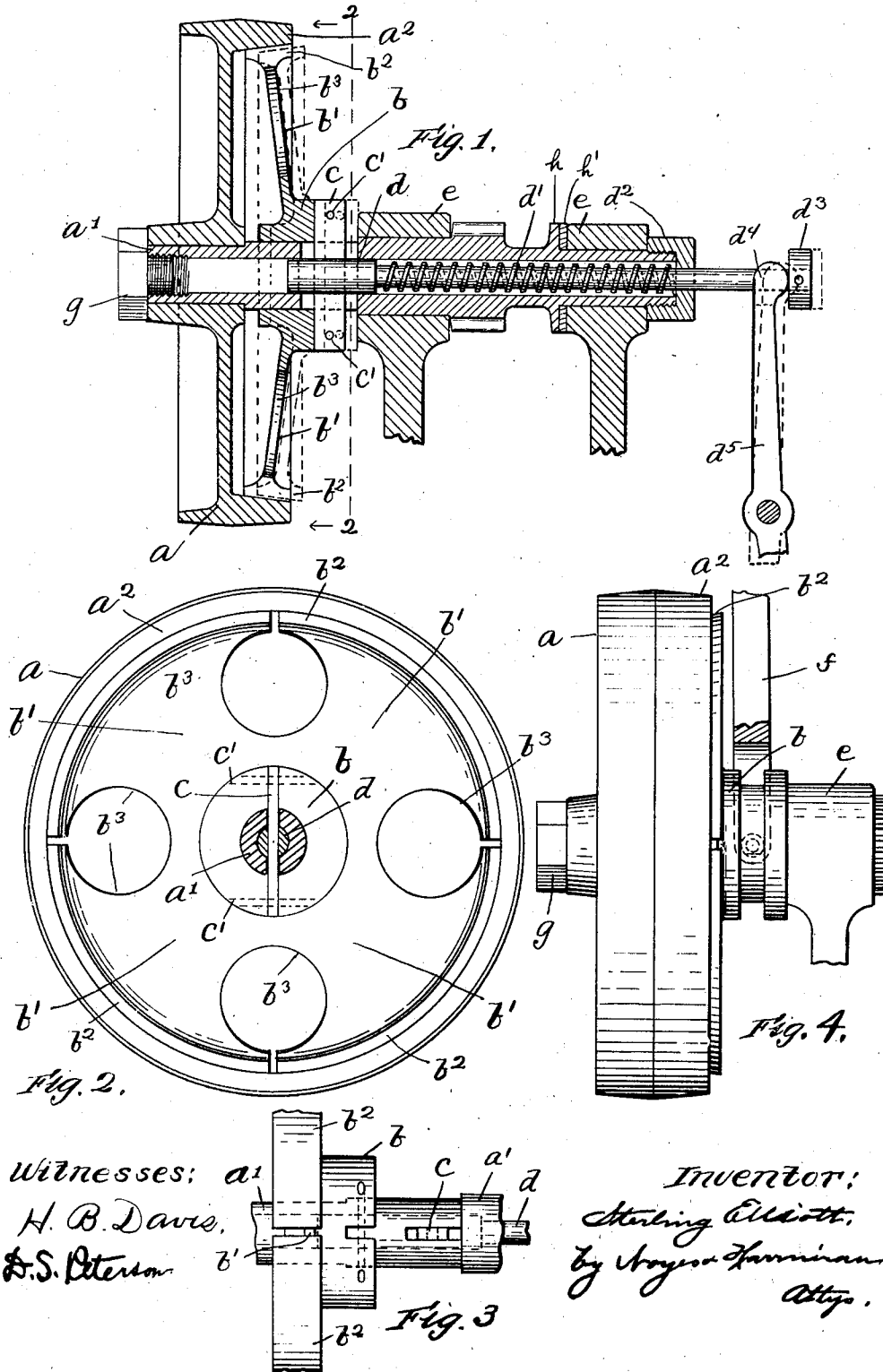


S. ELLIOTT.
FRICTION CLUTCH.
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1,047,011.

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UNITED STATES PATENT OFFICE.

STERLING ELLIOTT, OF NEWTON, MASSACHUSETTS.

FRICTION-CLUTCH.

1,047,011.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, STERLING ELLIOTT, of Newton, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Friction-Clutches, of which the following is a specification.

This invention relates to friction-clutches, and particularly to friction-clutches comprising a driving-member having a flange provided with an under conical engaging-face, and a driven-member comprising a hub having a plurality of spring-arms provided at their extremities with curved clutch-rims having conical engaging-faces adapted to engage the flange of the driving-member; and has for its object to improve the construction of the driven-member to the end that the spring-arms bearing the clutch-rims may be bent at points intermediate their length, whereby a thrust is exerted in the direction of the length of the arms, tending to move the clutch-rims bodily in a direction radial to the axis of the hub, as contrasted to rocking said clutch-rims, whereby the area of contact between the clutch-rims and flange is maintained; also to arrange the clutch-rims on their supporting-arms, so that they extend both forward and rearward of the arms, and, being thus supported intermediate their width, are prevented from rocking to any appreciable extent when moved in an outward direction by the supporting-arms; also to provide improved spring-actuated means for operating the clutch-members; and also to provide a brake for the driven-shaft adapted to be operated by said spring-actuated means with a yielding pressure.

Figure 1 is a longitudinal vertical section of the friction-clutch embodying this invention, Fig. 2 is a cross-section of the same taken on the dotted line 2-2, Fig. 1, Fig. 3 is a detail to be referred to, Fig. 4 is a side view showing modified means for moving the driven-member.

a represents a loose pulley arranged on a hollow shaft a' which constitutes the driving-member of the clutch, said shaft being supported by suitable bearings e, e . The flange a^2 of said pulley has formed on its under side a conical engaging-face, adapted to be engaged frictionally by the driven-member.

b represents the hub of the driven-member, which is slidably arranged on said hol-

low shaft, and from said hub a plurality of spring-arms b' extend in a radial direction, which are arranged in a conical plane, being thereby disposed diagonally with respect to the axis of the hub. Said arms have at their extremities curved clutch-rims b^2 , formed with conical engaging-faces adapted to engage the conical engaging-face of the driving-member. The diagonal deflection or arrangement of the supporting-arms b' from a perpendicular is such that they occupy a position approximately at right angles to the conical engaging-faces of the clutch-rims. As here shown, the clutch-rims are extended both forward and rearward of, or in opposite directions from, the supporting-arms, so that they are supported by said arms at points intermediate their width. Said supporting-arms instead of being constructed to move relatively to the hub by bending at their points of junction with or adjacent to the hub, and thereby swinging the clutch-rims bodily in arcs of a circle, causing them to rock as the hub is moved inward on the shaft, are here shown as recessed at b^3 at their opposite sides, at points intermediate their length, to purposely form points of greatest weakness at such intermediate points, which, it will be observed, are quite remote from the hub, so that said arms will bend at such intermediate points and cause bodily movements of the rims in directions radial to the axis of the hub. Such movements are of course slight, yet appreciable, and sufficient to enable the entire engaging-faces of the clutch-rims to continue to engage the flange of the driving-member; whereas, if said rims are permitted or caused to move in arcs of a circle, or to rock, the angles of their engaging-faces correspondingly change with relation to the engaging-face of the flange of the driving-member, and the areas of the engaging-surfaces are correspondingly reduced.

By my invention when the hub is moved inward on the shaft the spring-arms and clutch-rims remain in their normal positions until the rims first engage the flange of the driving-member; then, as the hub continues to move inward, said rims will be moved inward farther only a slight distance, while the spring-arms will be bent at points intermediate their length, and, acting as toggles, will exert upon the clutch-rims, at points intermediate their width, thrusts

in the direction of the length of the arms, causing a bodily movement of said clutch-rims in a direction radial to the axis of the hub, which is slight, yet appreciable, to obtain the necessary friction-grip.

For the accomplishment of the results which I obtain it is necessary that the supporting-arms be disposed at approximately right angles to the conical engaging-faces of the clutch-rims, and that said arms be constructed with points of greatest weakness intermediate their length and sufficiently remote from the hub to bend at such points and act as toggles, and it is very desirable that the clutch-rims be supported at points intermediate their width. As here shown, the rims and supporting-arms therefor and the hub are integrally formed, and such integral formation is preferred. The recesses b^3 , formed in the opposite sides of the spring supporting-arms, may be of any desired shape, but the location of said recesses is of the greatest importance, as it is necessary that they be formed remote from the hub to enable the arms to bend at points intermediate their length to cause a bodily movement of the rims in a direction radial to the axis of the hub.

As shown in Fig. 1, a key c is arranged diametrically with respect to the hub b , in radial slots therein, which extends through longitudinal slots in the hollow shaft a' , and through a hole in a rod d , arranged in said shaft, and said key is fixed at its ends to the hub by pins c' . The rod d is moved longitudinally in the hollow shaft a' for the purpose of moving the driven-member into and out of engagement with the driving-member. For the accomplishment of this result said rod is encircled by a spring d' bearing at one end against a shoulder on the rod and at the other end against a cap d^2 , which is screwed on to the end of the shaft, the tendency of said spring being to move the rod inward and thrust the driven-member into engagement with the driving-member, when permitted to act. Said rod has fixed to it a collar d^3 , which may be engaged by the bifurcated end d^4 of a lever d^5 , which is employed for moving said rod outward against the stress of said spring. The hollow shaft has a headed screw g , or it may be a collar, at its end, which extends over the end of the hub of the loose pulley a , to thereby hold said pulley against end-wise movement of the shaft in one direction.

The shaft has a circumferential flange h at a point intermediate its length, having a flat face provided with a friction-disk h' , which is adapted to engage a flat face formed on one end or side of the bearing, e . When the rod d is moved outward by the lever d^5 moving from the full to the dotted line position shown to disengage the clutch-members, the spring acts against the end-

cap d^2 , moving the hollow shaft longitudinally, and, although such movement is slight, yet it is sufficient to move the flange h into engagement with the flat-faced bearing e and thereby check rotation of the shaft. Said flange serves as the movable member of a brake, and the flat-faced bearing e as the stationary member thereof. Said stationary member, however, may be otherwise constructed.

The force employed to move the movable brake-member into engagement with the stationary brake-member is yielding, being caused by the spring d' when the rod d is moved outward. When the lever d^5 is moved toward the left, Fig. 1, from the dotted to the full line position, the rod d is moved inward by the spring, and the hollow shaft is permitted to move longitudinally, or may be caused to move longitudinally by the clutch-members moving the loose pulley against the headed-screw g ; such longitudinal movement of the shaft, however, being slight yet sufficient to disengage the brake-members.

Any other means may be employed for moving the driven-member, as, for example, referring to Fig. 4, the hub may be provided with a circumferential groove which is engaged by an operating-lever f .

I claim:

1. In a clutch, a driving-member having a flange with an under conical engaging-face, and a driven-member consisting of a hub having a plurality of spring-arms extended radially from it, arranged in a conical plane and having curved clutch-rims at their extremities, which are formed with conical engaging-faces arranged at right angles to the plane of the arms, said arms having recesses at opposite sides, at points intermediate their length, permitting them to bend at such intermediate points when subjected to end thrust, substantially as described.

2. In a clutch, a driving-member having a flange with an under conical engaging-face, and a driven-member consisting of a hub having a plurality of spring-arms extended radially from it, arranged in a conical plane and having curved clutch-rims at their extremities, which extend forward and rearward of the arms and which are formed with conical engaging-faces arranged at right angles to the plane of the arms, substantially as described.

3. In a clutch, a driving-member having a flange with an under conical engaging-face, and a driven-member consisting of a hub having a plurality of spring-arms extended radially from it, arranged in a conical plane and having curved clutch-rims at their extremities, which extend forward and rearward of the arms and which are formed with conical engaging-faces arranged at right

angles to the plane of the arms, said arms having recesses at opposite sides, at points intermediate their length, permitting them to bend at such intermediate points when
5 subjected to end thrust, substantially as described.

name to this specification, in the presence of two subscribing witnesses.

STERLING ELLIOTT.

Witnesses:

B. J. NOYES,
H. B. DAVIS.

In testimony whereof, I have signed my