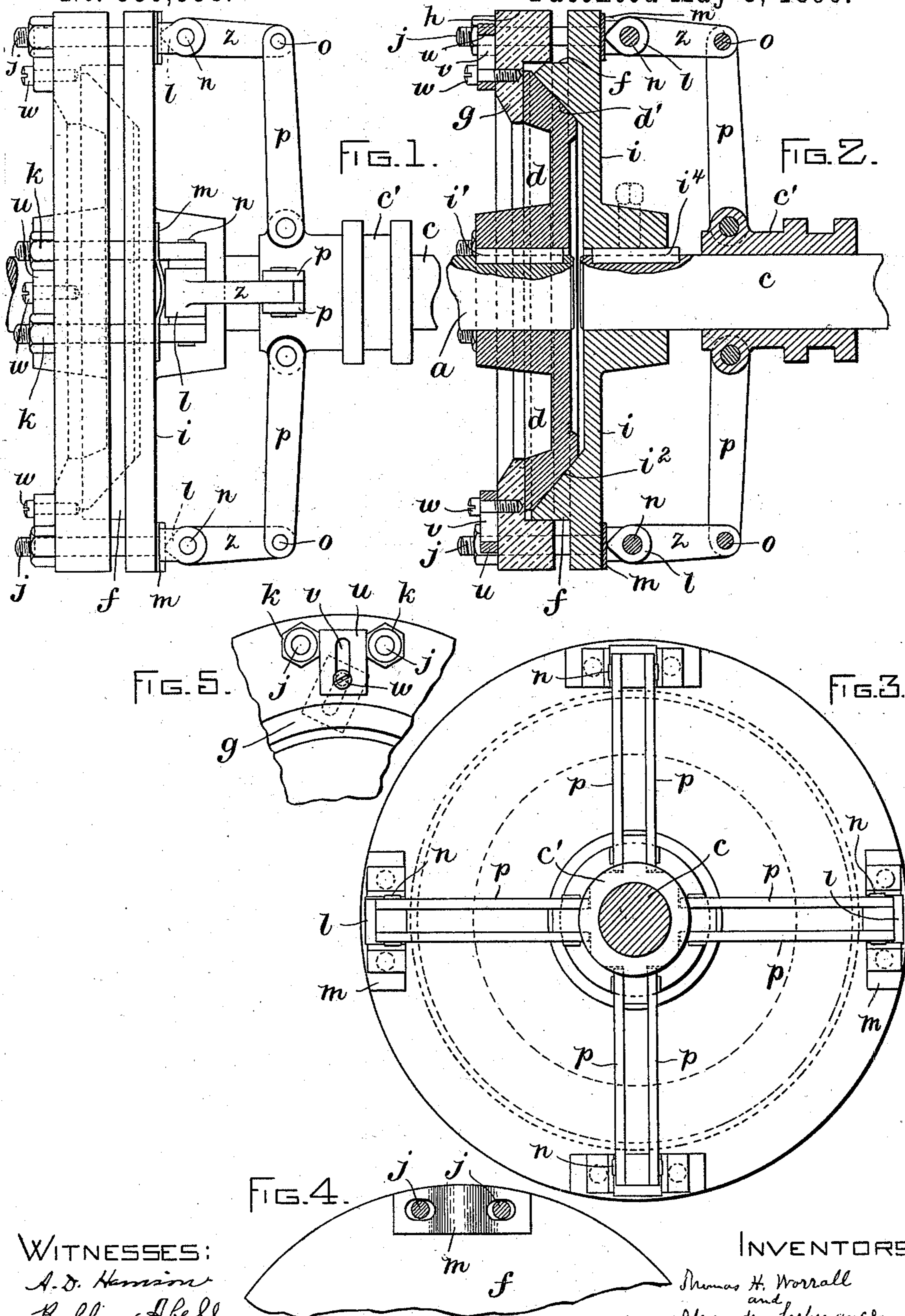


(No Model.)

T. H. WORRALL & A. LESPERANCE.
FRICTION CLUTCH.

No. 559,558.

Patented May 5, 1896.



WITNESSES:
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UNITED STATES PATENT OFFICE.

THOMAS H. WORRALL AND ALEXANDER LESPERANCE, OF LACONIA, NEW HAMPSHIRE; SAID LESPERANCE ASSIGNOR TO SAID WORRALL.

FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 559,558, dated May 5, 1896.

Original application filed March 18, 1893, Serial No. 466,585. Divided and this application filed November 11, 1895. Serial No. 568,515. (No model.)

To all whom it may concern:

Be it known that we, THOMAS H. WORRALL and ALEXANDER LESPERANCE, of Laconia, in the county of Belknap and State of New Hampshire, have invented certain new and useful Improvements in Friction-Clutches, of which the following is a specification.

This invention relates to a new and useful improvement in friction-clutches; and it consists in the novel features of construction and relative arrangement of parts hereinafter fully described in the specification, clearly illustrated in the drawings, and particularly pointed out in the claims.

Reference is to be had to the accompanying sheet of drawings, forming a part of this application, in which like characters are used to indicate like parts wherever they occur.

Figure 1 represents, in side elevation, a clutch constructed in accordance with our invention. Fig. 2 represents a longitudinal sectional view thereof. Fig. 3 represents an end elevation thereof. Fig. 4 represents a detail view of the spring and the manner in which it is attached to the bolts. Fig. 5 represents a detail view of the nut-locking device.

In carrying out our invention we provide, among other things, a frusto-conical-shaped head, arranged to be engaged by a correspondingly-shaped ring, these two members being so constructed and arranged that they are limited in their movement toward each other, solely by contacting the opposing frusto-conical faces, thereby greatly increasing the life of the clutch, since it is enabled to automatically provide for its own wear and also to provide a clutch in which the power of the clutch is largely in excess of the power applied to force the members of the clutch into engagement.

Referring now to the drawings, *a* designates a driving-shaft, which may be operated by a pulley secured thereto or by any other suitable driver.

c designates the driven shaft.

d is a friction-disk, which, as shown, is connected with the shaft *a* by means of a spline or key *i'*, so as to turn therewith, and is formed with a frusto-conical head *d'*.

i is a friction-disk secured by a key *i'* upon

the driven shaft *c*, so as to turn therewith. This disk is formed with a frusto-conical-shaped ring *i²*, arranged to engage the head *d'*, these two members being limited in their movement toward each other solely by the contacting-faces of the frusto-conical head *c'* and the frusto-conical ring *i²*.

g is a ring provided with a flange *h*, which extends over the periphery of the disk *d* and upon a shoulder or offset *f*, formed on the disk *i*.

j represents bolts, which pass through the outer portion of the disk *i* and the flange *h* and the outer portion of the ring *g*. These bolts are threaded on their free ends and have nuts *k* arranged thereon. On pins *n*, passing through the offset ends of said bolts, are fulcrumed cam-levers *z*, the outer ends of said levers *z* being pivoted by a pin *o* upon the outer ends of levers *p*, the inner ends of the levers *p* being pivoted in turn upon the collar *c'*, arranged to slide upon the driven shaft *c*. The inner ends of the cam-levers *z* are provided with cam projections *l*, which act upon spring-plates *m*, arranged between the heads of the bolts *j*. With this construction and arrangement of parts, by moving the collar *c'* toward the disk *i* the cam-levers *z* may be operated, through the medium of the levers *p*, to draw the ring *g* toward the disk *i* and so force the frusto-conical head *d'* into engagement with the frusto-conical ring *i²*, thereby driving the shaft *c*. The springs *m*, interposed between the cam projections *l* of the cam-levers *z* on the outer face of the disk *i*, serve to equalize the bearings of the cam-levers, so as to press the two disks together with equal force at all points. The said springs also serve to take up the wear between the parts, which is a matter of considerable importance in the use of the invention.

u represents locking-plates of such form and construction that they may be secured in position between the nuts *k* on a pair of bolts *j*, and so serve to lock the nuts upon the said bolts, and also as a gage to take up the nuts by, since, as the locking-plates act against the flat sides of the nuts, the latter must be turned to definite or certain positions in order to employ the locking-plates in connection

tion therewith. As a means for adjusting the plates *u* in and moving them out of the nut-locking position, the said plates may be arranged with slots *v* for the reception of the
 5 shanks of screws *w* in the ring *g*. When the wear upon the parts becomes more than the springs *m* will take up, adjustment can be effected by loosening the plates *u*, moving the
 10 said plates out of the way, as shown in dotted lines in Fig. 5, and turning up the ends *k*, as desired, when the plates may be again screwed in place, as shown in full lines in Fig. 5. As both of the disks will be preferably secured to the shaft one or both of the
 15 shafts will be arranged to be movably lengthened sufficiently to permit the clutch members to engage.

This application is filed as a division of our application, Serial No. 466,585, dated March
 20 18, 1893, and includes the subject-matter of said application involved in interference recently terminated in our favor.

Having thus explained the nature of our invention and described a way of construct-
 25 ing and using the same, though without attempting to set forth all of the forms in which it may be made or all the modes of its use, what we claim, and desire to secure by Letters Patent, is—

30 1. In a friction-clutch, in combination, a

frusto-conical head carried by one rotary part, a frusto-conical ring carried by another rotary part, and means for frictionally connecting said ring and head, substantially as
 35 and for the purpose set forth.

2. In a friction-clutch, in combination, a frusto-conical head fixed to one rotary part, a disk fixed to another rotary part, a frusto-conical ring formed on said disk, and arranged to engage said head, said head and
 40 frusto-conical ring being limited in their movements toward each other solely by the contacting of the opposing conical surfaces, a ring carried by said disk, confining said head between said ring and said disk, and
 45 means, including cam-levers, for forcing said ring toward said disk, and thereby forcing said frusto-conical head into and out of engagement with said frusto-conical ring, substantially as and for the purpose set forth. 50

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 5th day of October, A. D. 1895.

THOMAS H. WORRALL.
 ALEXANDER LESPERANCE.

Witnesses:

CHARLES F. LOCKE,
 EDGAR E. SMITH.