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PATENT



SPECIFICATION

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COMPLETE SPECIFICATION.

Improvements in Friction-clutches.

I, LEON DUFOUR, Engineer, of 109, Route de Lyon, Geneva, Confederation of Switzerland, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

5 This invention relates to friction clutches more especially intended for use in motor-cars and has for its object to provide an improved friction clutch in which the required effort for uncoupling is small, while the coupling, though gradual is certain and effective.

In most known friction clutches as for instance in those employed in auto-cars, the cross-section of that part of the coupling shaft, on which the coupling-cone slides, is square or of maltese cross formation or other like forms whereby the cone is enabled to carry the shaft along whilst rotating. This movement will be imparted to the shaft very abruptly, if the cone is not allowed to slide somewhat and therefore if it is desired to obtain a certain softness of coupling and to effect this coupling progressively the cone must be caused to slide a certain amount. In doing so it becomes necessary to cause the cone to slide on the shaft in an axial direction while a part of the torque has already been transmitted to this shaft and the leverage of the forces thus transmitted is very small owing to the relatively small diameter of the shaft, while the force to be transmitted is considerable. For this reason the friction depending on this force and acting against an axial sliding movement of the cone and thereby acting also against a complete coupling will be very considerable. On this account in order to effect a complete coupling a spring of much greater power will have to be employed, than would be needed for simply maintaining the coupling parts together and therefore also an excessive effort has to be made to uncouple the excess of effort being unnecessary.

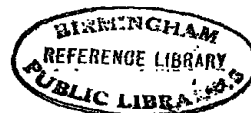
This inconvenience is avoided or minimised by the present invention owing to the fact that the torque is transmitted to the driven shaft by means of a laminated spring, the middle portion of which is secured to either the driving or driven shaft, the ends being secured between contact pieces arranged on the surface of a sliding coupling cone, in such a manner that the sliding surfaces are as far distant as possible from the axis of rotation in order to diminish the friction and thereby also the power of the coupling spring, and therefore also to diminish the effort required for uncoupling.

In the annexed drawing two working examples of the invention are shown, both adapted for use in motor cars.

Figures 1 and 2 are an axial section and a front view of a construction in accordance with this invention.

Figure 3 is an axial section of a modification.

[Price 6d.]



According to Figures 1 and 2, the driving shaft *a* is provided with a disc *a*¹ serving as fixed coupling cone, that is to say the disc *a*¹ is not slidable axially. The disc *a*¹ presents a hollow shape like a truncated cone whereof the greater base is located on one of the side faces of the disc *a*¹.

The driven shaft *b*, is arranged in alignment with regard to the driving shaft *a* and near its end a coupling cone *c* is mounted loosely thereon so as to slide and turn, while at its end the centre portion of a laminated spring *d* is attached the ends of which are held between contact pieces *f* arranged on the surface of the said cone *c*, these contact pieces consisting for instance of cylindrical pieces of fibre. The contact pieces are adjusted so as to slide on the ends of the spring *d* whenever the cone *c* slides on the shaft *b*, that is to say when either the coupling is produced by spring *e* or during the uncoupling by the lever *g*.

The operation is as follows:

When coupling is effected progressively by leaving the spring *e* free to move cone *c* to the left, the torque is transmitted to the shaft *b* by means of the contact pieces *f* and spring *d*; but as the contact pieces are relatively at some distance from the common axis of rotation the lever arm of the transmitter force is long, while the force is small, as this force is produced by the friction of the cone *c* pressed by the spring *e* into engagement with the disc *a*¹. The spring *e* may therefore be chosen very weak and the required effort for uncoupling will be very small.

Owing to the fact that the laminated spring *d* forms a resilient connection between the cone *c* and the shaft *b*, the coupling is gradual even when the cone *c* and disc *a*¹ are sufficiently engaged to cause rotation of both shafts.

In the modification of the invention shewn in Figure 3 the disc *a*¹ on the driving shaft *a* is hollow and shaped like a truncated cone whereof the smaller base being located within that side face of the disc which is opposite to shaft *a* adapted to engage the cone *c*.

In both forms shown the torque is transmitted from the shaft *a* to the shaft *b*, but the reverse might take place without departing from the nature of this invention.

The friction-coupling forming the subject of this invention may also be employed elsewhere than in motor-cars.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a friction clutch device the combination with a hollow coupling cone, forming one part of the coupling and rigidly secured to one shaft, and with a coupling cone, forming the other part of the coupling, and mounted on a coaxial shaft so as to be free to slide and turn thereon when operated in a known manner by a spring and a hand lever in coupling and uncoupling, of laminated springs having the co-axial shaft secured between the symmetrical parts of the laminated springs at their middle portion, the coupling cone having contact pieces and adapted to slide relatively to the ends of the springs which remain stationary.

2. A friction-clutch constructed substantially as hereinbefore described and illustrated with reference to Figures 1, 2 and 3 of the accompanying drawing.

Dated this 11th day of March, 1916.

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Fig. 1.

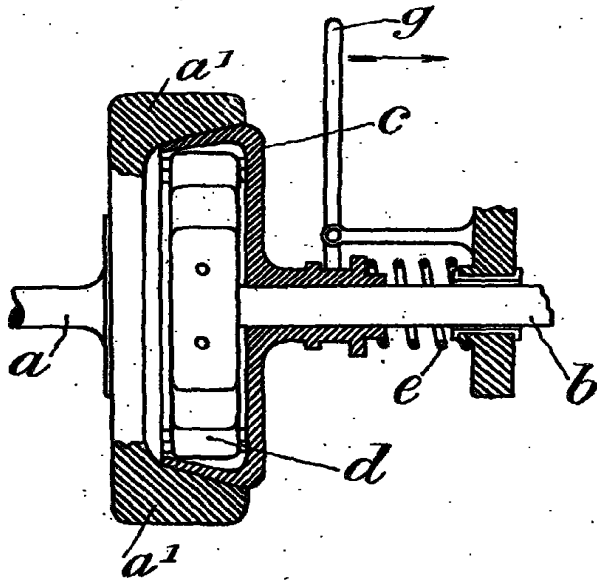


Fig. 2.

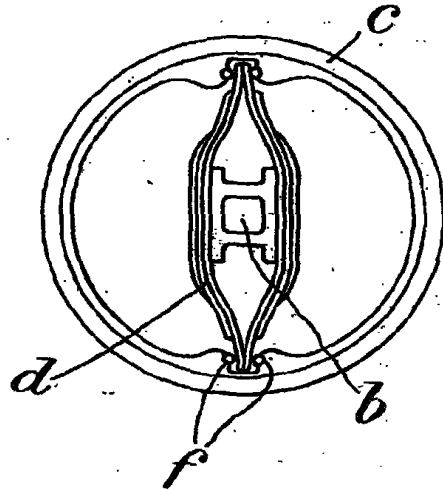
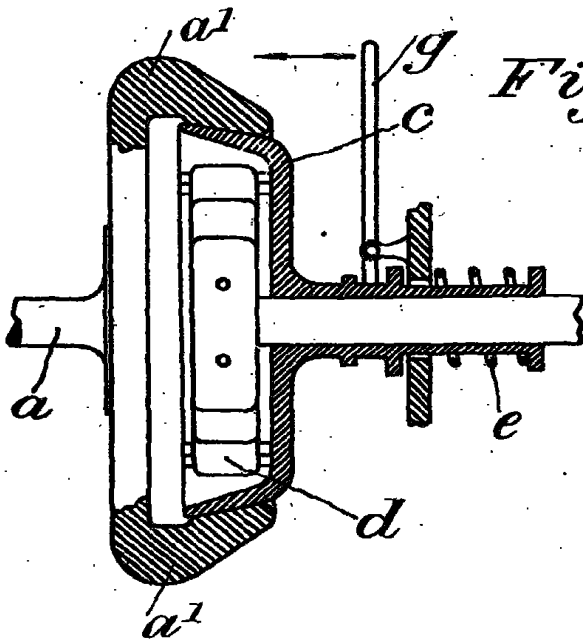


Fig. 3.



[This Drawing is a reproduction of the Original on a reduced scale.]

