No. 801,726. PATENTED OCT. 10, 1905.

W. H. LINDSAY & H. R. COUPER.

COIL FRICTION CLUTCH.

APPLICATION FILED AUG. 26, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

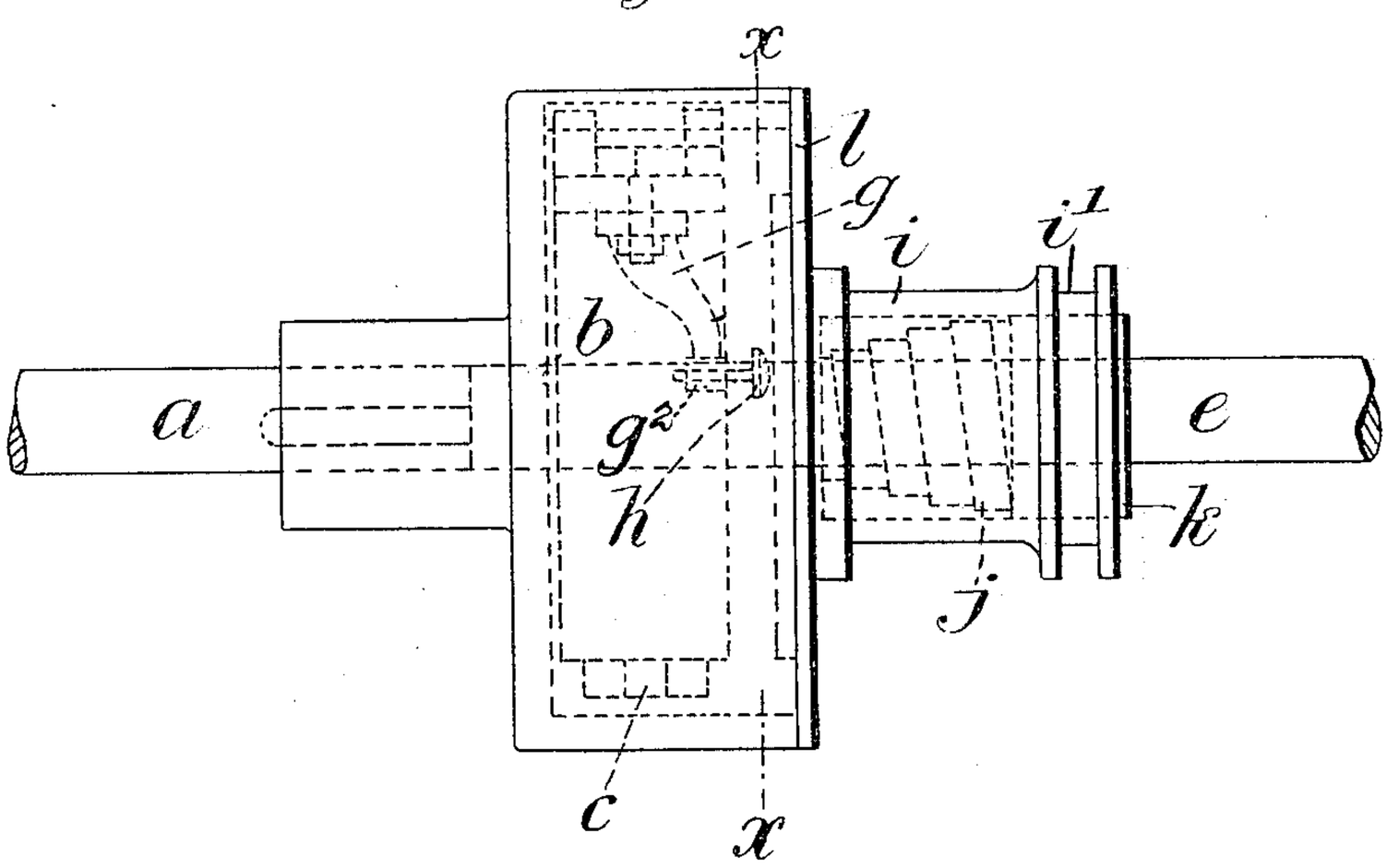
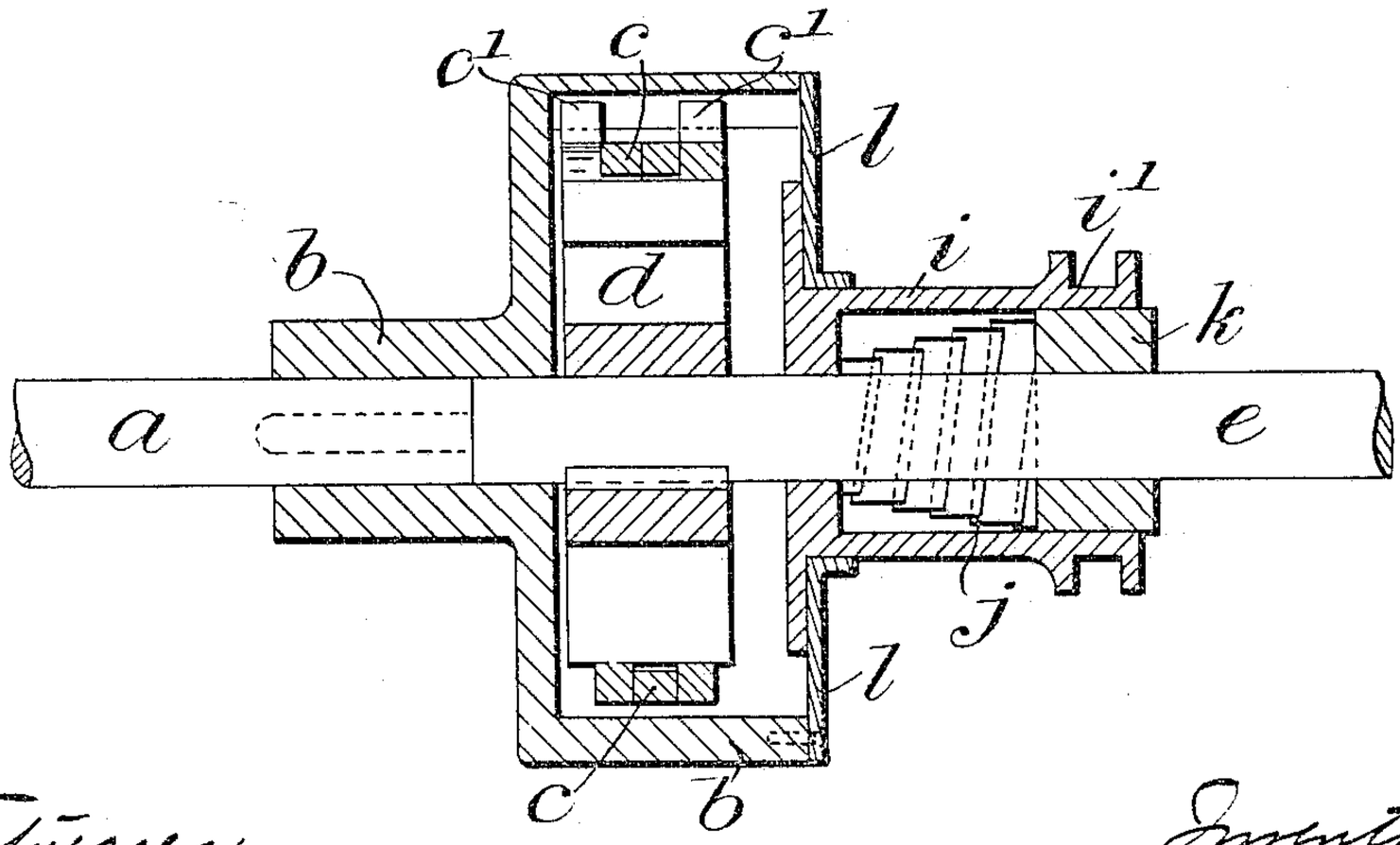


Fig: 2.



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2 SHEETS—SHEET 2.

Fig: 3.

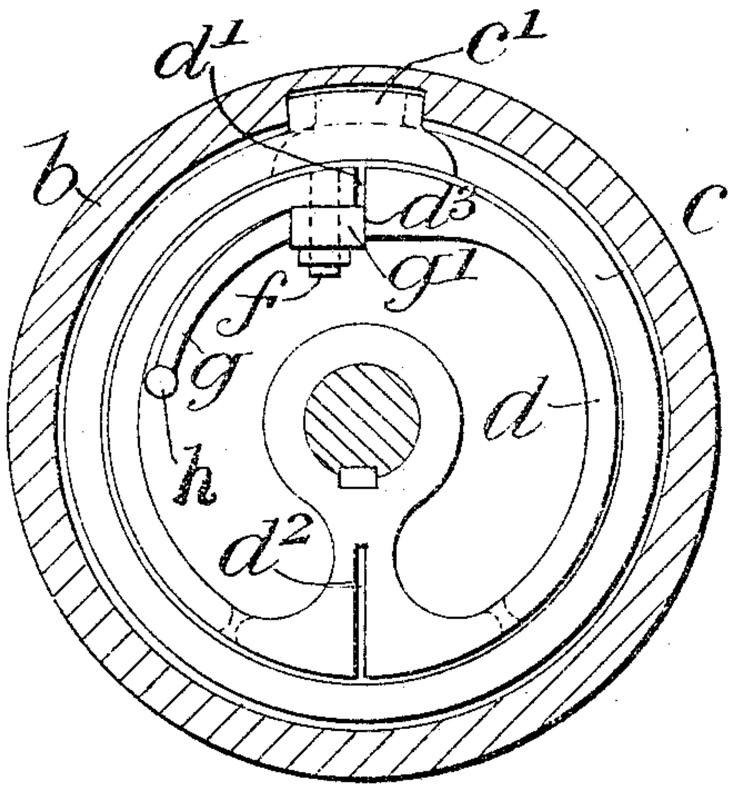


Fig: 4.

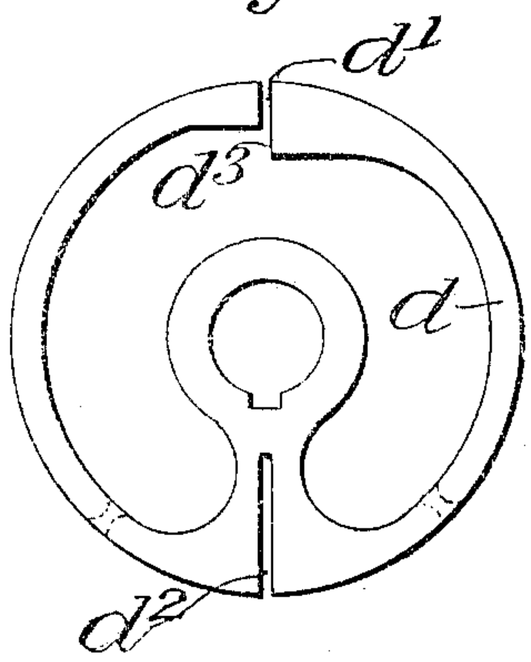


Fig: 5.

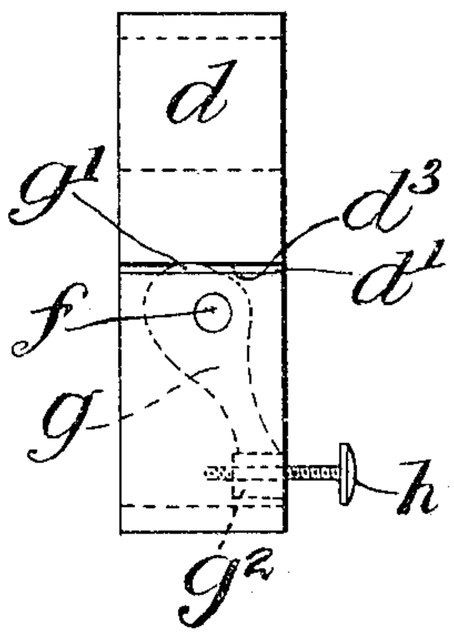
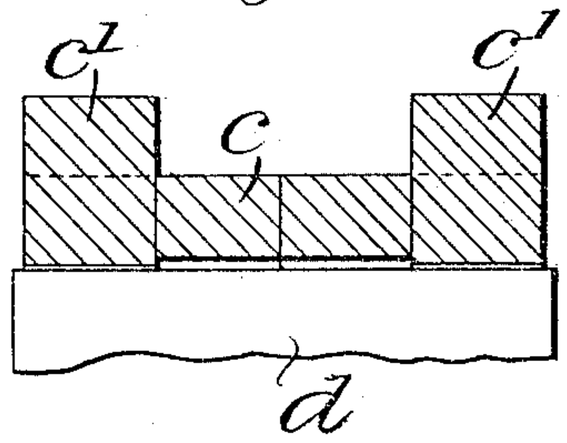


Fig: 6.



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UNITED STATES PATENT OFFICE.

WILLIAM HENRY LINDSAY AND HADEN RICHARDSON COUPER, OF JOHNSTONE, SCOTLAND.

COIL FRICTION-CLUTCH.

No. 801,726. Specification of Letters Patent. Patented Oct. 10, 1905.

Application filed August 26, 1904. Serial No. 222,322.

To all whom it may concern:

Be it known that we, WILLIAM HENRY LINDSAY and HADEN RICHARDSON COUPER, subjects of the King of Great Britain and Ireland, residing at Johnstone, in the county of Renfrew, Scotland, have invented certain new and useful Improvements in Coil Friction-Clutches; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention consists in a coil friction-clutch in which the coil friction is created by the expansion or opening out of a split or divided wheel which is surrounded by the coil. The clutch is specially designed for use in driving at high speeds, as in automobiles.

In the accompanying drawings, Figure 1 represents in elevation a clutch constructed and arranged in accordance with this invention. Fig. 2 is a longitudinal section. Fig. 3 is a transverse section on the line x x, Fig. 1. Fig. 4 is an end view, and Fig. 5 a plan, of the split or divided wheel. Fig. 6 is a sectional view, drawn to an enlarged scale, of the coil and part of the split or divided wheel.

Keyed on the driving-shaft a is a driving-plate b, which is a cup-shaped shell recessed to take the heads c' of the coil c, which surrounds the wheel d, which is split or divided at d' and grooved at d^2. The wheel d is mounted and keyed on the driven shaft e. The division d' enables the wheel d to be sprung open with little pressure. The groove d^2 facilitates this and increases elasticity in the wheel d. In the wheel d is a pin f, on which is pivotally mounted a lever g, having a head or boss g', which is in the nature of an eccentric, as seen more particularly at Fig. 5. The enlarged part of the boss g' bears against the face d^3 of the split or division d' of the wheel d. At the tail of the lever g is a boss g^2, into which is screwed a set-pin h. The coil c has two heads c', which fit into recesses provided for them in the driving-plate b. The turns of the coil c between the heads c' are bored inside to a slightly larger diameter than the turns on which the heads c' are formed. Normally—that is to say, when the clutch is out of action—the split wheel d rotates within the coil c and driving-plate b.

To put the clutch into action, the sliding collar i is moved along the driven shaft e into contact with the set-pin h. Under the pressure exerted on the set-pin h by the collar i the lever g turns about its pivot f, and the wheel d is opened out or expanded at d' and binds against the inner face of the coil c. The driving-shaft a is thus made to rotate with the driven shaft e. The binding action of the coil c is first set up by the outer turns of the coil—that is to say, by the turns on which the heads c' are formed. The remaining turns of the coil are tightened after the said outer turns, and thus the binding action between the wheel d and the coil is set up gradually. The collar i is slid along the shaft e by a lever engaging with the neck i' or by any other suitable means.

In the clutch as adapted for motors or machines in which the clutch is required to go into gear automatically and requires no holding-in gear a helical spring j is fitted inside the sliding collar i. At one end the spring j bears against the collar i and at the other against a collar k, fixed on the shaft e. The collar i has axial motion along the collar k. When the collar i is slid back—that is to say, away from the coil c—by the action of a pedal or lever, the spring j is compressed and allows the sliding collar i to be withdrawn from acting on the set-pin h of the lever f, and the clutch is put out of gear; but on release of the pedal or lever aforesaid the spring j rebounds and forces the collar i inward against the set-pin h and puts the clutch into gear and exercises sufficient pressure to keep it in gear.

To exclude dust from the shell b and other working parts, a cover-plate l is bolted to the shell.

The clutch requires a small range of movement of the collar i in being put into and out of gear.

What we claim is—

1. In a friction-clutch, the combination with shafting, of a pair of clutch members carried thereby, one of said members comprising a coil composed of a plurality of convolutions encircling said other member and having its central convolutions of a greater bore than the end convolutions, and means for throwing said clutch members into clutch.

2. In a friction-clutch, the combination with shafting, of a pair of clutch members carried thereby, one of said clutch members compris-

ing a one-piece resilient split wheel, and the other of said clutch members comprising a flexible band adapted to peripherally engage said split wheel when expanded, and means for expanding said split wheel.

3. In a friction-clutch, the combination with shafting, of a pair of clutch members carried thereby, one of said clutch members comprising a resilient split wheel, and the other of said clutch members comprising a flexible band adapted to peripherally engage said split wheel when expanded, and means for expanding said split wheel, comprising a lever pivotally secured to one end of said wheel, provided with a cam in engagement with the opposite end of said split wheel and operative in a plane substantially parallel to said shafting, and means for operating said lever.

4. In a friction-clutch, the combination with a driving and a driven shaft, of a disk keyed to one of said shafts, a clutch member keyed to the other of said shafts adjacent said disk comprising a resilient split wheel, a second clutch member, comprising a coil composed of a plurality of convolutions encircling said split wheel, and secured at one end to said disk, and means for expanding said wheel within said coil.

5. In a friction-clutch, the combination with a driving and a driven shaft, of a disk keyed to one of said shafts, a clutch member keyed to the other of said shafts adjacent said disk comprising a resilient split wheel, a second clutch member, comprising a coil composed of a plurality of convolutions encircling said split wheel, having its central convolutions of greater bore than the end convolutions, and having one of its ends secured to said disk, and means for expanding said split wheel within said coil.

6. In a friction-clutch, the combination with shafting, of a pair of clutch members carried thereby, one of said clutch members comprising a one-piece resilient split wheel and the other of said clutch members comprising a flexible band adapted to peripherally engage said split wheel when expanded, means for expanding said split wheel, comprising a lever pivotally supported on one end of said wheel and having a cam engaging the other end of said split wheel and operative in a plane substantially parallel to said shafting, and means for operating said lever.

7. In a friction-clutch, the combination with a driving and a driven shaft, of a disk keyed to one of said shafts, a clutch member keyed to the other of said shafts adjacent said disk comprising a resilient split wheel, a second clutch member, comprising a coil composed of a plurality of convolutions encircling said split wheel, having its central convolutions of greater bore than the end convolutions, and having one of its ends secured to said disk, and means for expanding said split wheel within said coil, comprising a lever pivotally connected to one end of said split wheel and having a cam-surface engaging the other end of said split wheel, and means for operating said lever.

8. In a friction-clutch, the combination with shafting, of a pair of clutch members carried thereby, one of said clutch members comprising a resilient split wheel and the other of said clutch members comprising a coil composed of a plurality of convolutions encircling said split wheel, means for expanding said split wheel, comprising a lever pivotally supported on one end of said wheel and having a cam engaging the other end of said split wheel and operative in a plane substantially parallel to said shafting, and means for operating said lever.

9. In a friction-clutch, the combination with shafting, of a pair of clutch members carried thereby, one of said clutch members comprising a one-piece resilient split wheel and the other of said clutch members comprising a coil composed of a plurality of convolutions encircling said split wheel, means for expanding said split wheel, comprising a lever pivotally supported on one end of said wheel and having a cam engaging the other end of said split wheel and operative in a plane substantially parallel to said shafting, and means for operating said lever.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM HENRY LINDSAY.
HADEN RICHARDSON COUPER.

Witnesses:
JNO. MCFADZAN,
JOHN W. MCCOLB.