(No Model.) 2 Sheets—Sheet 1.

O. DAHL.

FRICTION CLUTCH FOR ELECTRIC MOTORS.

No. 499,183. Patented June 6, 1893.

Fig. 1.

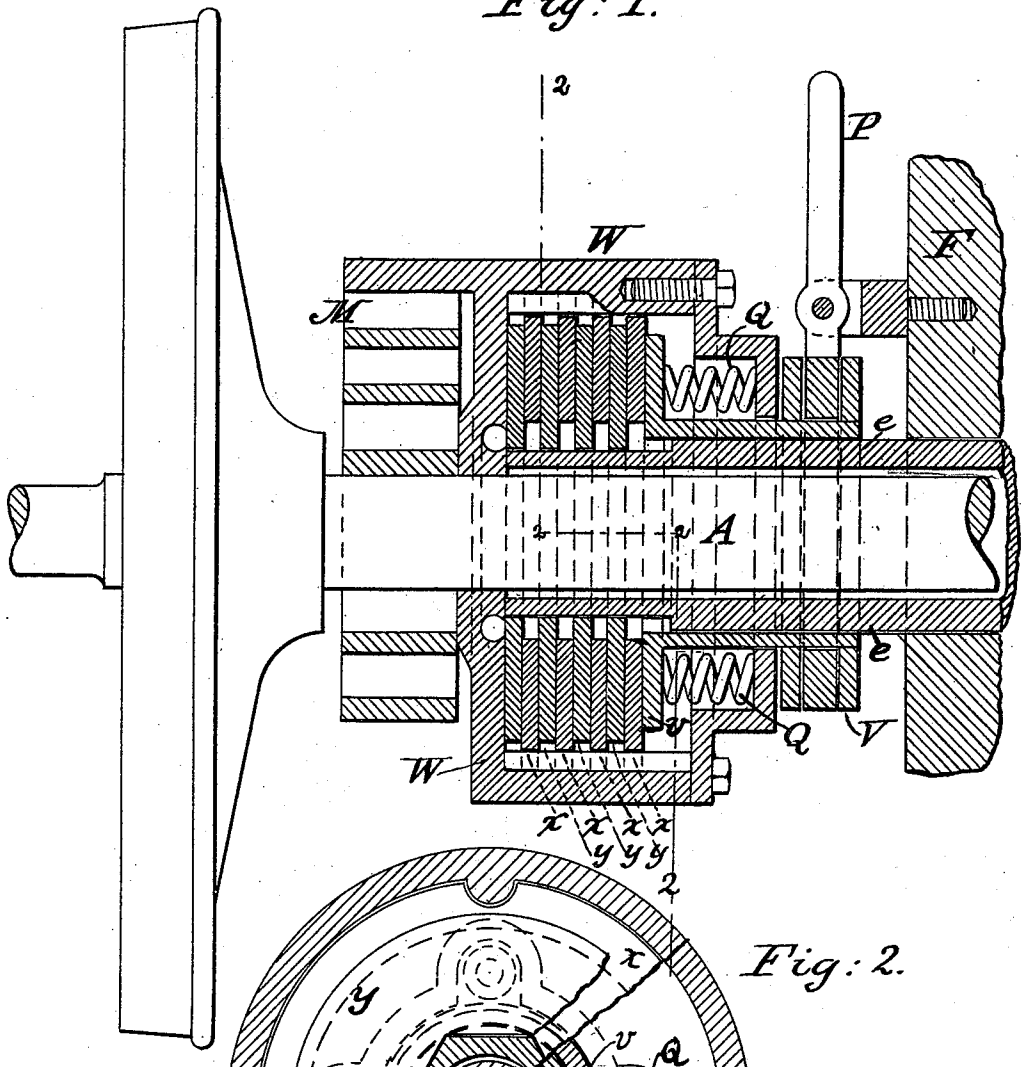
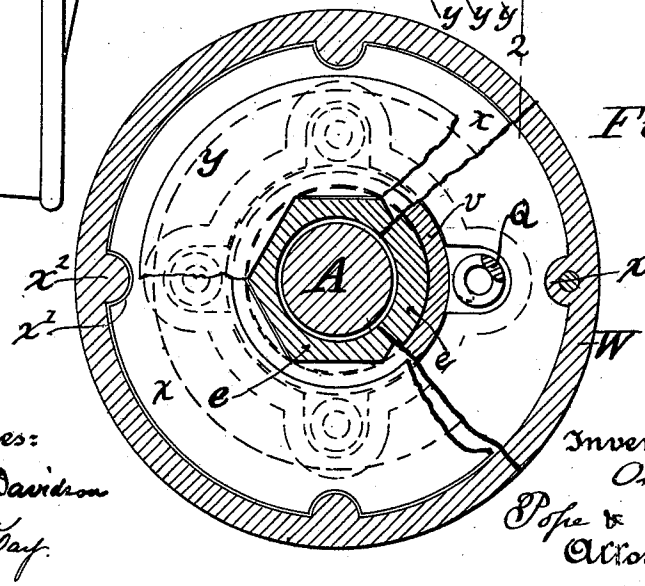


Fig. 2.



Witnesses:
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Jessie B. Kay.

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(No Model.) 2 Sheets—Sheet 2.

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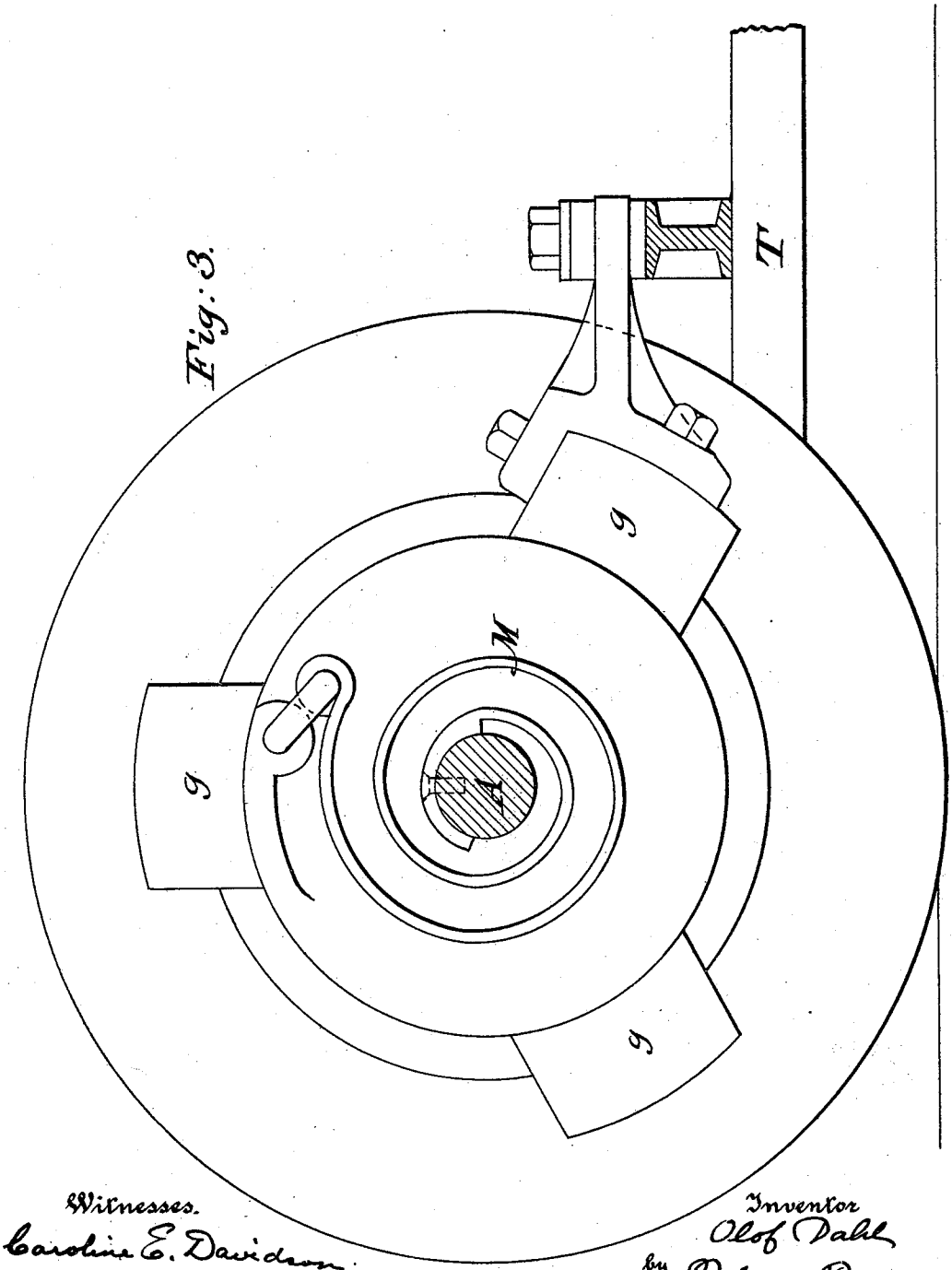
Fig. 3.



Witnesses.
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Inventor
Olof Dahl
by Pope & Rogers
Attorneys.

UNITED STATES PATENT OFFICE.

OLOF DAHL, OF PATERSON, NEW JERSEY, ASSIGNOR TO THE DAHL ELECTRIC COMPANY, OF NEW JERSEY.

FRICTION-CLUTCH FOR ELECTRIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 499,183, dated June 6, 1893.

Application filed October 26, 1892. Serial No. 450,013. (No model.)

To all whom it may concern:

Be it known that I, OLOF DAHL, a subject of the King of Sweden and Norway, at present residing in Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Friction-Clutches, of which the following is a specification.

My invention relates to friction clutches, which are employed to mechanically connect and disconnect the load carried by an electric or other motor, and it comprises certain means and appliances whereby the motor may be started, either without load, or with a comparatively small portion of its load, and also means whereby the action of said appliances may conveniently be regulated or controlled. In this way an electric motor may be made to take up its full load gradually, and not until after a sufficient counter-electromotive force has been generated by the sudden and rapid initial movement of the motor, to check the excessive current which would flow through the helices of the armature if the full load were attached to it at the time of starting.

In the accompanying drawings, Figure 1 is a longitudinal vertical section of an apparatus embodying my invention, showing the manner of its attachment to the axle of a railway car. Fig. 2 is a transverse section of the frictional clutch (taken in the plane of the dotted line 2 2 in Fig. 1), whereby motion is transmitted from the motor to the axle, and Fig. 3 is a longitudinal section of the truck of the said car in a plane perpendicular to the section in Fig. 1.

In the drawings, A represents the main driving-shaft, which in the case of an electrically propelled vehicle is the driving-axle. The hub of the armature or other rotating part of the motor extends longitudinally as shown at *e*, forming a sleeve concentric with the axle A, to which it imparts motion by means of the frictional clutch illustrated in the drawings. A number of sheet-metal disks are placed side by side, concentric with the sleeve *e*, and are arranged in two series, the individual disks of one series alternating with the individual disks of the other series. One series or group of disks *x x* turns loosely upon the axle, but each disk of the series is provided with notches $x' x'$ formed in its periphery, which engage with corresponding projections $x^2 x^2$ formed upon the inner surface of the cylindrical box W, which incloses the disks and turns concentrically upon the sleeve *e*. The other alternating series or group of disks *y y* is fixed upon the sleeve *e* so as to turn with it. I have shown in Fig. 2 one method of effecting this result, which is by making a portion of the sleeve *e* polygonal in cross-section, and giving a corresponding form to the central aperture of each individual disk of the series. The faces of the several disks are in frictional contact with one another, and are capable of a limited longitudinal movement along their transverse axes. A hollow cylindrical follower V encircles the sleeve *e* and is provided with a flanged head *v*, which bears against the group of disks, and is normally forced against them by strong springs Q. The force of these springs is carefully adjusted, once for all, so that if the load on the motor at any time exceeds a predetermined maximum amount, the friction of the disks against each other, due to the pressure of the springs, will be overcome, permitting the motor to run faster than the axle, so that it is rendered impossible for the motor to be injured by excessive currents. By means of the hand-lever P, which terminates in a fork embracing the follower V, the pressure of the springs Q against the disks may be reduced to any required extent, or, as may be desirable in starting with a heavy load, taken off altogether.

The hollow box W containing the friction-disks may be mechanically connected with the axle A by means of a strong helical spring M, which transmits motion from one to the other, as illustrated in Figs. 1 and 3.

The cores, yokes and pole-pieces *g g* of the motor are arranged symmetrically about the axle A of the vehicle so that they balance themselves thereon. They are prevented from freely revolving, but are permitted to rotate about the axle to a limited extent, by reason of a mechanical connection extending to some stationary portion of the vehicle, preferably some portion of the truck-frame.

I claim as my invention—

1. A frictional clutch consisting of the combination of two series of disks arranged in alternation, a yielding connection between the individual disks of one of said series and the driven axle, a sleeve concentric with said axle and connected with the motor, the individual disks of the second series being connected with said sleeve, a compressible spring tending to force said alternating disks against each other, and means for varying the extent of compression of said spring, substantially as set forth.

2. A frictional clutch consisting of the combination of two series of disks arranged in alternation, a yielding connection between the individual disks of one of said series and the driven axle, a sleeve concentric with said axle and connected with the motor, the individual disks of the second series being connected with said sleeve, a compressible spring tending to force said alternating disks against each other, and means for diminishing and removing the pressure of said spring upon said disks, substantially as set forth.

3. A frictional clutch consisting of the combination of two series of disks arranged in alternation, a yielding connection between the individual disks of one of said series and the driven axle, a sleeve concentric with said axle, and connected with the motor, the individual disks of the second series being connected with said sleeve, a compressible spring tending to force said alternating disks against each other, and means for maintaining a frictional connection between said alternate disks, whereby motion is transmitted from said sleeve to said axle, substantially as set forth.

In testimony whereof I have hereunto subscribed my name this 30th day of September, A. D. 1892.

OLOF DAHL.

Witnesses:
F. H. LEONARD, Jr.,
S. L. PHILLIPS.