No. 840,685. PATENTED JAN. 8, 1907

O. BÖHM.

AUTOMATIC ENGAGING AND DISENGAGING DEVICE FOR DYNAMOS AND STORAGE BATTERIES.

APPLICATION FILED SEPT. 14, 1906.

2 SHEETS—SHEET 1.

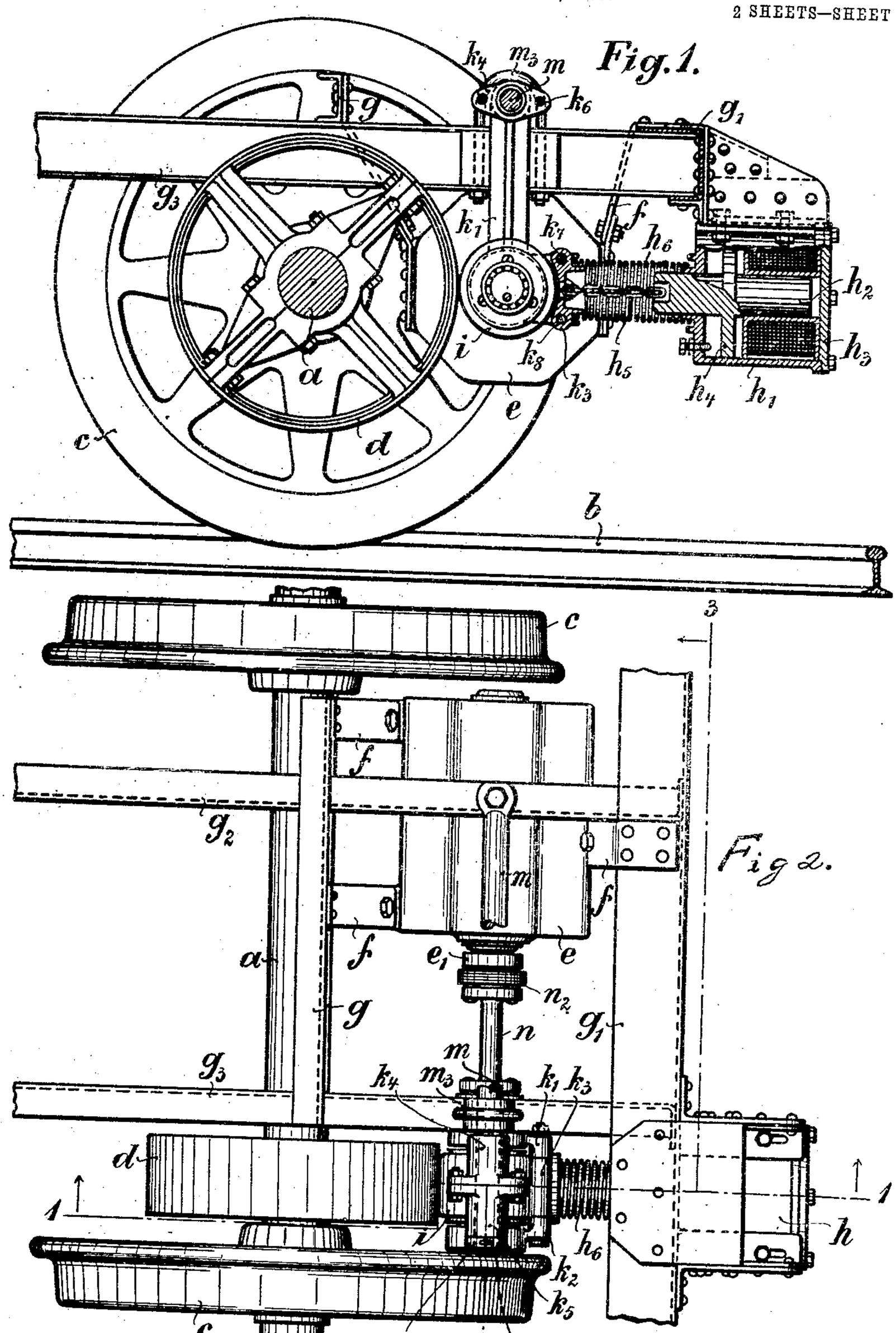


Fig. 1.

Fig 2.

WITNESSES

L. Middleton

Edward N. Sarton

INVENTOR

Otto Böhm

By Richards & Ff

ATTYS.

No. 840,685. PATENTED JAN. 8, 1907.

O. BÖHM.

AUTOMATIC ENGAGING AND DISENGAGING DEVICE FOR DYNAMOS AND STORAGE BATTERIES.

APPLICATION FILED SEPT. 14, 1906.

2 SHEETS—SHEET 2.

Fig. 3.

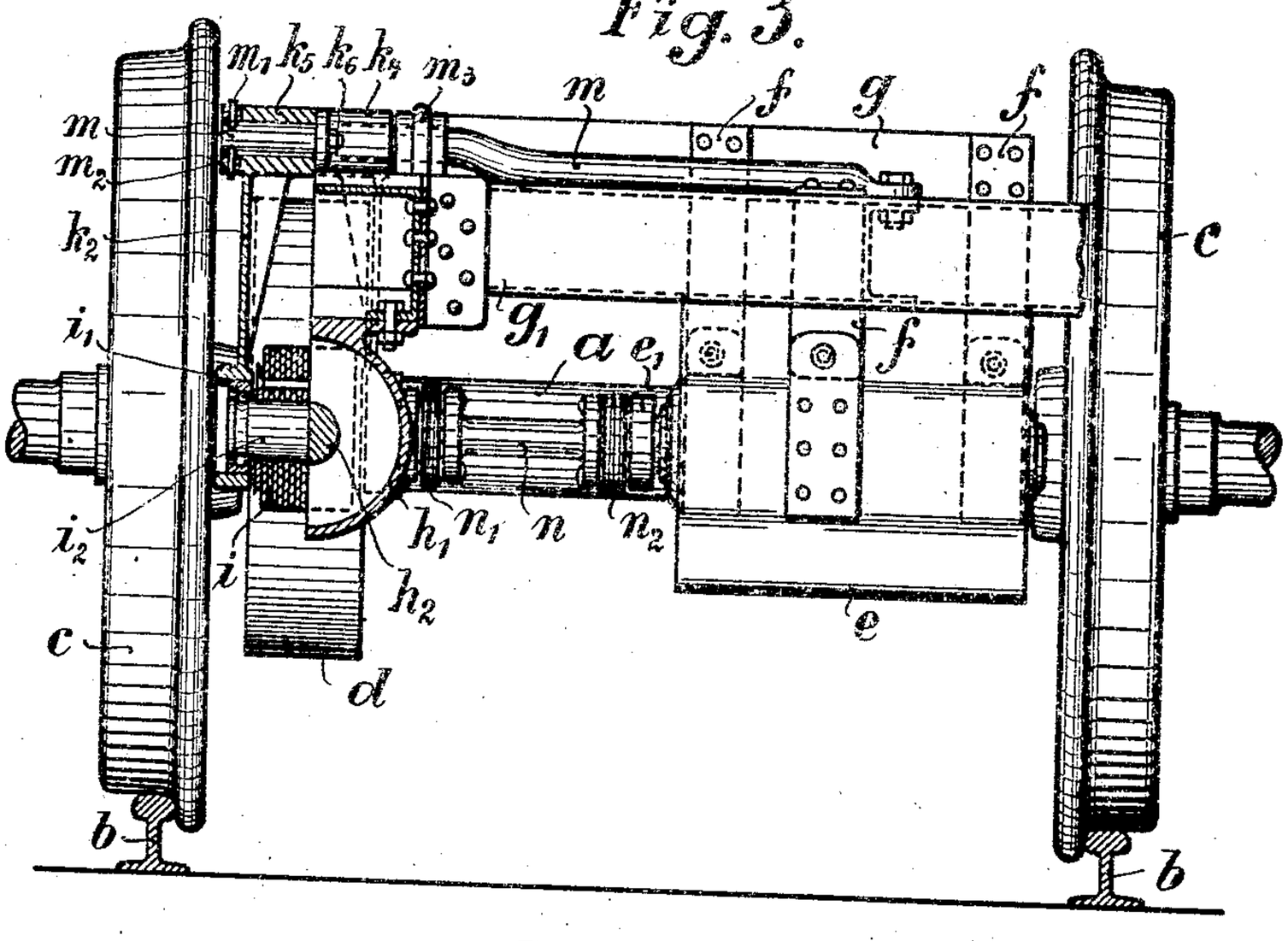
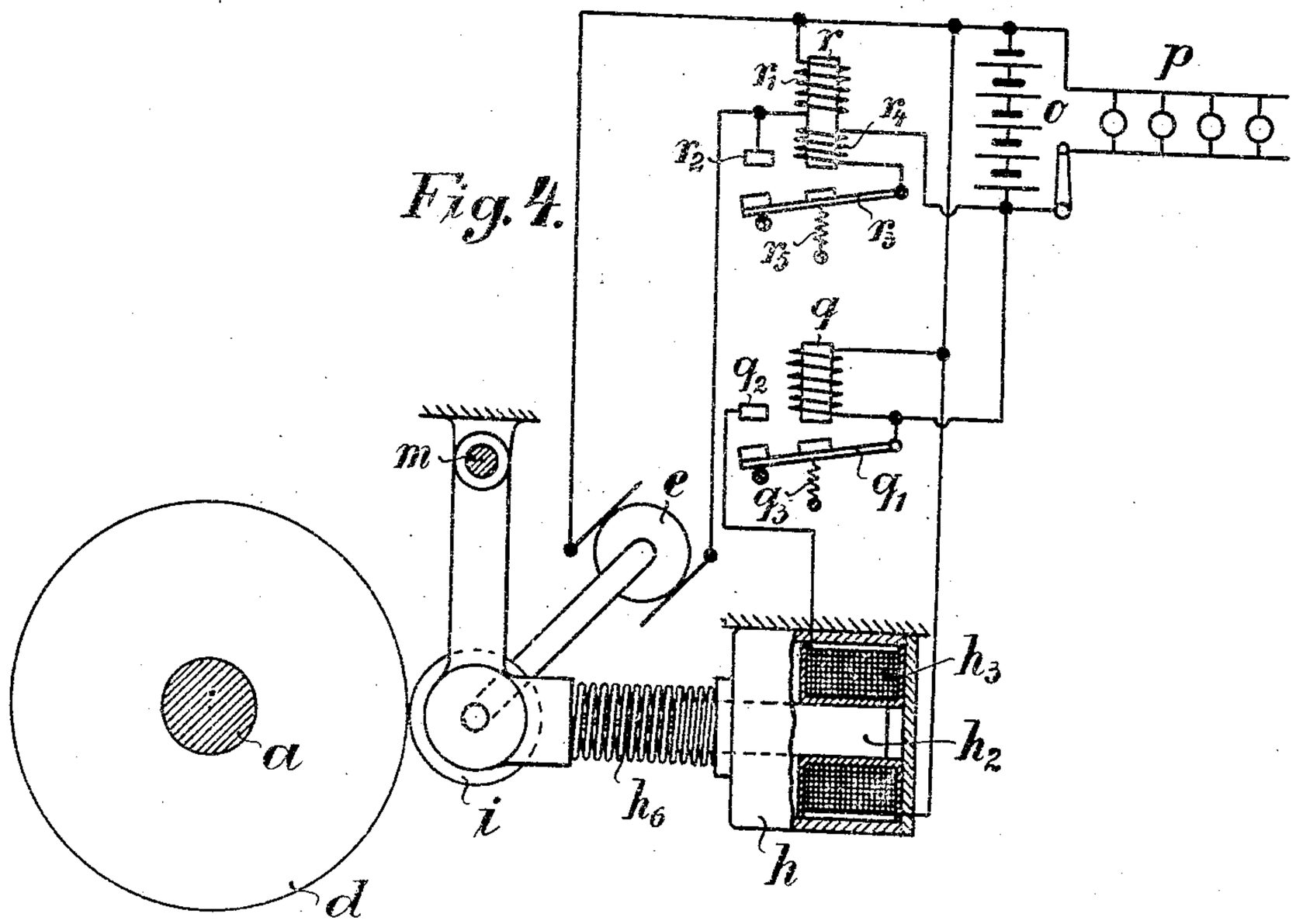


Fig. 4.



WITNESSES

E. L. Macdonald

Edward N. Sarton

INVENTOR

Otto Böhm

BY Richards & Geo

ATTYS.

UNITED STATES PATENT OFFICE.

OTTO BÖHM, OF BERLIN, GERMANY.

AUTOMATIC ENGAGING AND DISENGAGING DEVICE FOR DYNAMO AND STORAGE BATTERIES.

No. 840,685. Specification of Letters Patent. Patented Jan. 8, 1907.

Application filed September 14, 1906. Serial No. 334,694.

To all whom it may concern:

Be it known that I, OTTO BÖHM, a citizen of the Empire of Germany, residing at Berlin, in the Empire of Germany, have invented a new and useful Automatic Engaging and Disengaging Device for Dynamo and Storage Batteries, of which the following is a specification.

My invention relates to a device for automatically engaging and disengaging a friction-gear which controls a shaft for driving a dynamo that coöperates with a storage battery.

The purpose of my invention is to automatically stop the dynamo on the tension of the current exceeding a certain maximum and to automatically start the dynamo on the tension of the curent sinking below a certain minimum.

The new engaging and disengaging device is particularly suitable for vehicles or cars in which a dynamo to be driven from the wheels and a storage battery are disposed for furnishing the curent which is required for feeding various lamps in the vehicle or car.

I will now proceed to describe my invention with reference to the accompanying drawings, in which it is assumed that the dynamo is to be driven from the wheels of a vehicle or car for feeding, in conjunction with a storage battery, the lamps of the vehicle or car.

Figure 1 is a vertical longitudinal section through a frame part of the vehicle or car provided with the automatic engaging and disengaging device on the broken line 1 1 in Fig. 2, the two friction-wheels and the dynamo being shown in elevation. Fig. 2 is a plan view of the same. Fig. 3 is a vertical cross-section through the broken line 3 3 in Fig. 2; and Fig. 4 is a diagram of the two driving friction-wheels, the dynamo, the storage battery, the automatic engaging and disengaging device, and the circuit.

Similar letters of reference refer to similar parts throughout the several views.

a denotes a wheel-shaft of the vehicle or car, which is in any known or special manner mounted to turn in journals (not shown) disposed on the frame. Of this frame only parts of two longitudinal beams g_2 g_3 and a cross-beam g_1 are shown. On the shaft a are fastened the two wheels c c, running on the rails b, and also a driving friction-wheel d. The dynamo e of any known construction is suspended from the cross-beams g and g_1 by means of suitable strips f f or the like. Opposite to the friction-wheel d an electromagnet h of the following construction is disposed on the cross-beam g_1. It comprises a metallic cylindrical casing h, a movable iron core h_2, and a coil h_3. The core h_2 is shown as made in one piece with a piston h_4, which is mounted in the casing h_1 to reciprocate within the space not occupied by the coil h_3. It will be seen that the piston h_4 and the casing h_1 serve as an air-brake, which prevents the core h^2 from moving too rapidly and suddenly. In line with the core h^2 and also with the dynamo e the second friction-wheel i, of any known construction, is disposed and arranged to move as follows: It is fastened on a short shaft i_2, the two ends of which are mounted to turn in suitable ball-bearings i_1, provided in the eyes of a yoke formed by two arms k_1 and k_2. A cross-rod m is shown as fastened with its one end on the longitudinal beam g_2 (see Fig. 2) by means of a bolt or the like. It is bent and passes through a block which is secured on the longitudinal beam g_3 by means of a doubled bolt m_3. (See Fig. 1.) At the other end of the rod m a loose collar m_2 is fastened by means of a pin m_1 or the like. Between this collar m_2 and the said block the naves k_4 and k_5 of the said two arms k_1 and k_2 are mounted to rock on the rod m, while they are rigidly connected one with another by means of bolts k_6, as is shown in Fig. 2. The eyes of the two arms k_1 and k_2 are provided with ears, between which a cross-head k_3 is secured by means of two bolts k_7 and k_8. The cross-head k_3 is connected with the core h_2 by means of a chain h_5, while a helical spring h_6 is inserted between the cross-head k_3 and the casing h_1, its two ends engaging in suitable annular recesses.

The short shaft i_2 of the friction-wheel i is in any known manner yieldingly connected with the armature-shaft e_1 of the dynamo e, preferably by means of an intermediate shaft n and elastic couplings. The shaft n may be provided at its two ends with disks which are coupled with corresponding disks of the two shafts i_2 and e_1 by means of inserted leather disks n_1 and n_2 and pins alternately engaging from both sides in suitable holes, as is shown. The helical spring h_6 is given such a tension as to press the small friction-wheel i against the large friction-wheel d and to produce between them a friction sufficient for driving the dynamo e. The coil h_3, on the contrary, is so proportioned as to be able to attract the

core h_3, and thereby to detach the driven friction-wheel i from the driving friction-wheel d, while overcoming the tension of the helical spring h_6 the moment the tension of the current in the coil h_3 exceeds a certain maximum.

A storage battery o (see Fig. 4) of any known and approved construction is disposed on the vehicle or car and may, for example, serve for feeding a circuit p, comprising a plurality of incandescent lamps. Moreover, on the vehicle or car two relays q and r are disposed, the armatures q_1 and r_3 of which are normally pressed on rear contacts by means of springs q_3 and r_5, respectively, as is shown. The coil h_3 of the electromagnet h is connected, on the one hand, direct with the one pole of the storage battery o and, on the other hand, with the front contact q_2 of the relay q. The one pole of the dynamo e is connected with the one pole of the storage battery o and also with the one end of the one coil r_1 of the relay r. The other pole of the dynamo e is connected with the other end of the coil r_1 and also with the front contact r_2 of the relay r. The armature r_3 of this relay is connected over the second coil r_4 with the other pole of the storage battery o. The coil of the relay q is shunted to the storage battery o in the manner shown.

The plant described operates as follows: If the vehicle or car stops, of course the dynamo e will be idle, so that the storage battery o alone supplies the current to the circuit p for feeding the lamps. On the vehicle or car starting, its wheels $c\,c$ will by means of the two friction-wheles d and i drive the dynamo e, which, therefore, will produce a current for circulating in the circuit comprising the coil r_1 of the relay r. On the vehicle or car attaining a certain speed—in other words, on the tension of the current circulating in the said circuit attaining a certain amount—the relay r will be so much energized as to attract its armature r_3, while overcoming the tension of the spring r_5. The armature r_3 will then come in contact with the front contact r_2, so that the dynamo e will now be connected in multiple with the storage battery o for supplying current to the circuit p or for charging the battery, as the case may be. The other relay q will remain inactive, although the current at the same time passes through its coil. If, however, the tension of the dynamo e, and thereby, also, the potential difference at both poles of the storage battery o, exceeds a determined maximum, the relay q will be enabled to attract its armature q_1, while overcoming the tension of the spring q_3, so that the armature q_1 will come in contact with the front contact q_2 and will close the circuit of the electromagnet h. The latter will therefore be energized for attracting its core h_2, and thus detaching the driven friction-wheel i from the driving friction-wheel d by means of the chain h_5, while overcoming the tension of the helical spring h_6. Then the dynamo e will stop, and the storage battery o alone will continue supplying the current to the circuit p. Should the tension of the circulating-current sink below a determined minimum, the spring q_3 will overbalance the force of the coil of the relay q and will detach the armature q_1 from the front contact q_2 for opening the circuit of the electromagnet h. Then the helical spring h_6 will press the driven friction-wheel i against the driving friction-wheel d, and the dynamo e will restart and work. Should the tension of the dynamo e sink below that of the storage battery o, the relay r will release its armature r_3 under the action of the spring r_5, and thus disconnect the dynamo e from the storage battery o. Thereby the storage battery o will be prevented from discharging over the dynamo e.

The automatic engaging and disengaging device described above may be varied in many respects without departing from the spirit of my invention. Where so preferred, the shaft of the driven friction-wheel i may be mounted to turn in slides moving in straight guides instead of in the rocking yoke, as described above.

I claim—

1. In an arrangement of the class described, the combination with a driving friction-wheel having its shaft mounted to turn in fixed journals, of a friction-wheel adapted to work with said driving friction-wheel and having its shaft mounted to turn in movable bearings, a dynamo, a yielding coupling between the shaft of said friction-wheel and that of said dynamo, a spring adapted to press said friction-wheel by means of its bearings against said driving friction-wheel, and an electromagnetic device adapted to detach said friction-wheel by means of its movable bearings from said driving friction-wheel.

2. In an arrangement of the class described, the combination with a driving friction-wheel having its shaft mounted to turn in fixed journals, of a friction-wheel adapted to work with said driving friction-wheel and having its shaft mounted to turn in movable bearings, a dynamo, a yielding coupling between the shaft of said friction-wheel and that of said dynamo, a spring adapted to press said friction-wheel by means of its bearings against said driving friction-wheel, an electromagnetic device adapted to de-ach said friction-wheel by means of its bearings from said driving friction-wheel, a storage battery, a working-circuit connected in multiple with said storage battery and said dynamo, a shunt-circuit connecting said electromagnetic device with said storage battery, and a relay shunted to said storage battery and adapted to close said shunt-circuit on the tension of the current exceeding a determined maximum.

3. In an arrangement of the class described, the combination with a driving friction-wheel having its shaft mounted to turn in fixed journals, of a friction-wheel adapted to work with said driving friction-wheel and having its shaft mounted to turn in movable bearings, a dynamo, a yielding coupling between the shaft of said friction-wheel and that of said dynamo, a spring adapted to press said friction-wheel by means of its bearings against said driving friction-wheel, an electromagnetic device adapted to detach said friction-wheel by means of its bearings from said driving friction-wheel, a storage battery, a working circuit connected in multiple with said storage battery and said dynamo, a shunt-circuit connecting said electromagnetic device with said storage battery, a relay shunted to said storage battery and adapted to close said shunt-circuit on the tension of the current exceeding a determined maximum, and a second relay adapted to disconnect said dynamo from said storage battery on the tension of the current sinking below a determined minimum.

4. In an arrangement of the class described, the combination with a driving friction-wheel having its shaft mounted to turn in fixed journals, of a shaft mounted in movable bearings to turn, a friction-wheel fastened on said shaft and adapted to work with said driving friction-wheel, a dynamo with a rotor-shaft, an intermediate shaft, yielding couplings connecting said intermediate shaft with said shaft and the rotor-shaft of said dynamo, a spring adapted to press said friction-wheel by means of said shaft and its bearings against said driving friction-wheel, an electromagnetic device adapted to detach said friction-wheel by means of said shaft and its bearings from said driving friction-wheel, a storage battery, a working circuit connected in multiple with said storage battery and said dynamo, a shunt-circuit connecting said electromagnetic device with said storage battery, a relay shunted to said storage battery and adapted to close said shunt-circuit on the tension of the current exceeding a determined maximum, and a second relay adapted to disconnect said dynamo from said storage battery on the tension of the current sinking below a determined minimum.

5. In an arrangement of the class described, the combination with a driving friction-wheel having its shaft mounted to turn in fixed journals, of a rocking yoke, a shaft mounted to turn in the free end of said rocking yoke, a friction-wheel fastened on said shaft and adapted to work with said driving friction-wheel, a dynamo with a rotor-shaft, an intermediate shaft, yielding couplings connecting said intermediate shaft with said shaft and the rotor-shaft of said dynamo, a spring adapted to press said friction-wheel by means of said rocking yoke against said driving friction-wheel, an electromagnetic device adapted to detach said friction-wheel by means of said rocking yoke from said driving friction-wheel, a storage battery, a working circuit connected in multiple with said storage battery and said dynamo, a shunt-circuit connecting said electromagnetic device with said storage battery, a relay shunted to said storage battery and adapted to close said shunt-circuit on the tension of the current exceeding a determined maximum, and a second relay adapted to disconnect said dynamo from said storage battery on the tension of the current sinking below a determined minimum.

6. In an arrangement of the class described, the combination with a driving friction-wheel having its shaft mounted to turn in fixed journals, of a rocking yoke, a shaft mounted to turn in the free end of said rocking yoke, a friction-wheel fastened on said shaft and adapted to work with said driving friction-wheel, a dynamo with a rotor-shaft, an intermediate shaft, yielding couplings connecting said intermediate shaft with said shaft and the rotor-shaft of said dynamo, an electromagnetic device, a helical spring between said rocking yoke and said electromagnetic device and adapted to press said friction-wheel against said driving friction-wheel, a chain connecting said yoke with said electromagnetic device and adapted on the latter being energized to detach said friction-wheel from said driving friction-wheel, a storage battery, a working circuit connected in multiple with said storage battery and said dynamo, a shunt-circuit connecting said electromagnetic device with said storage battery, a relay shunted to said storage battery and adapted to close said shunt-circuit on the tension of the current exceeding a determined maximum, and a second relay adapted to disconnect said dynamo from said storage battery on the tension of the current sinking below a determined minimum.

OTTO BÖHM.

Witnesses:
HENRY HASPER,
WOLDEMAR HAUPT.