

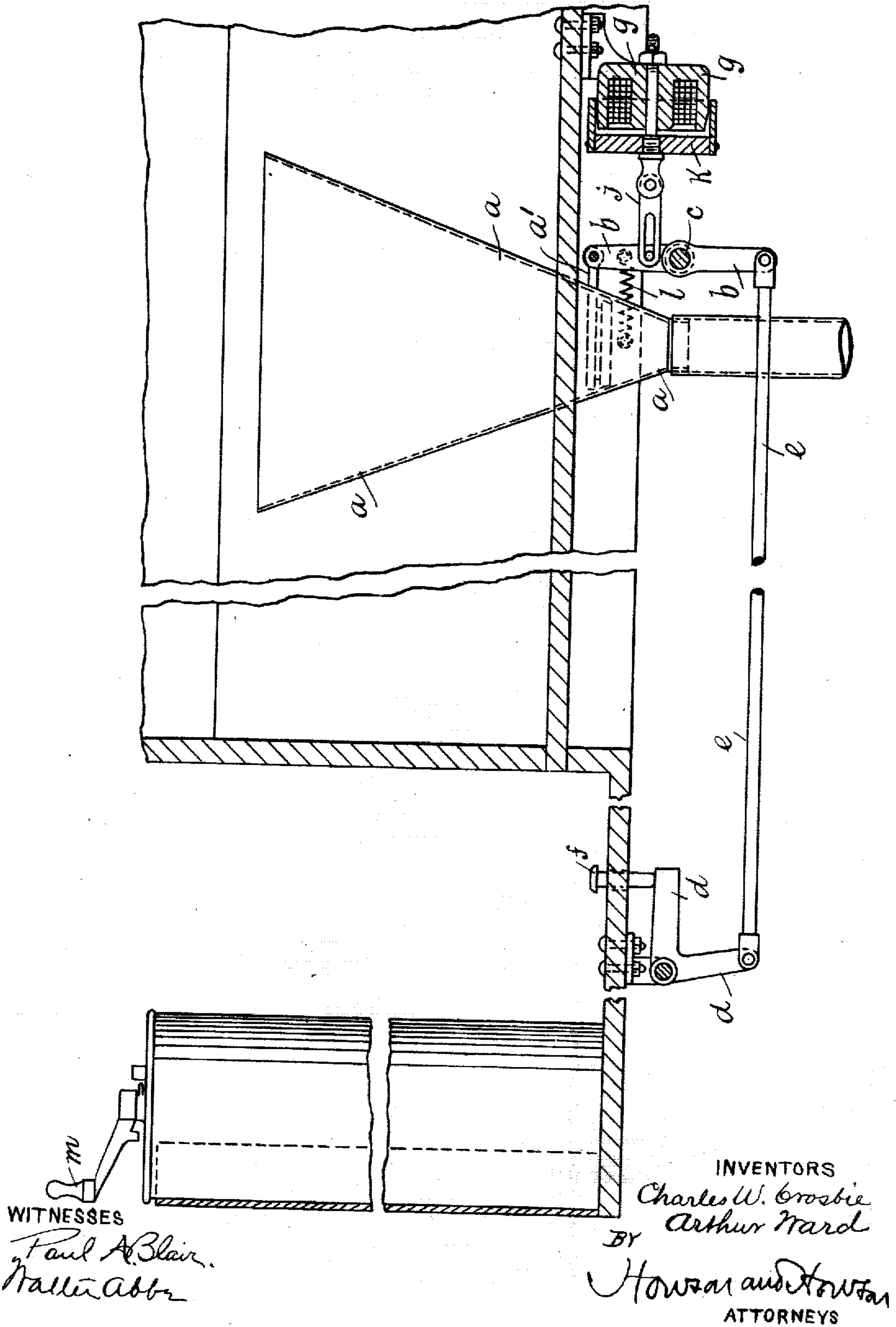
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C. W. CROSBIE & A. WARD.

AUTOMATIC ELECTROMAGNETIC SANDING GEAR FOR USE ON ELECTRIC
RAILWAYS AND TRAMWAYS, &c.

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WITNESSES

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CHARLES W. CROSBIE, OF SANDHILL ROARKEE, INDIA, AND ARTHUR WARD, OF MACCLESFIELD, ENGLAND, ASSIGNORS TO MARK CUMMINS, OF MANCHESTER, ENGLAND.

AUTOMATIC ELECTROMAGNETIC SANDING-GEAR FOR USE ON ELECTRIC RAILWAYS AND TRAMWAYS, &c.

No. 828,717.

Specification of Letters Patent.

Patented Aug. 14, 1906.

Application filed April 3, 1905. Serial No. 253,646.

To all whom it may concern:

Be it known that we, CHARLES WILSON CROSBIE, residing at Sandhill Roarkee, in the Northwest Provinces, India, and ARTHUR WARD, residing at Springfield, Beech Lane, Macclesfield, in the county of Chester, England, subjects of the King of Great Britain and Ireland, have invented new and useful automatic electromagnetic sanding-gear for use on electric railways and tramways operated instantaneously with the electric brake from the controller-handle, of which the following is a specification.

This invention relates to a combination with the sand-valves or sanding-gear as at present in use on electric tramways and railways of a magnetic device that may be either an electromagnet or other device that will exercise a magnetic pull when energized by an electric current.

The object of the said invention is to automatically operate the sand-gear by utilizing the current generated by the motors when acting as generators to energize a solenoid or other magnetic device attached to the sand-gear when the motorman in cases of emergency applies the magnetic, rheostatic, or other types of electric brakes, and thereby minimize the risk of accident by sanding the track instantaneously with the application of the electric or magnetic brakes if the motorman, owing to excitement or other causes, neglects to open the sand-valves in the ordinary manner by the application of the foot to the levers connected therewith.

In the accompanying drawing one method of application of the said invention is illustrated as applied to a tram-car; but we do not confine ourselves to the precise method shown, as the connections and design of the magnetic device may be varied without departing from the nature of our invention.

a is the sand-box.

b is a lever on the rocking shaft, the valve or slide *a'* being connected to one end of said lever and the opposite end of the lever *b* connected to the bell-crank lever *d* by the rod *e*.

f is the pin, which the motorman presses down with his foot when the rails require to be sanded on ordinary occasions.

According to and for the purpose of our invention we connect a solenoid or the armature of an electromagnet, such as *g*, to the

lever *b* by means of a slotted link, as *j*, so as not to affect the ordinary action of the sanding-gear. We connect the solenoid or other magnetic device to the motor and controller wiring, so that the current of the motors when working as generators will flow through its windings, the pull of the device increasing in proportion to the current generated. Said solenoid or other electromagnetic device is supported in close proximity to the valve or gear of the sand-boxes, and when the magnet *g* is energized by the current from the motors acting as generators it draws or pulls the armature *k* to said magnet *g*, which opens the valve *a'* and allows the sand to fall from the sand-boxes through the pipes to the track. One or more tension-springs, such as *l*, can be attached to the valves of the sand-boxes or the lever *b*, as shown, by which said valve is caused to close immediately the current is switched off by the controller-handle *m* being moved round to the off position or by the car coming to a stop, when current will not then be generated by the motors. By means of these tension-springs the pull of the device can also be regulated, so that the valves will open at any desired amount of current before skidding would take place. A sand box or boxes, a controller, and a solenoid or other electromagnetic device in connection therewith are fitted at each end of the car; but the solenoid or electromagnetic device is only actuated on the same end of the car as the controller operated, which would be the one on the end of the car that would be the front end when running in regular service.

By these means the magnetic brake or the rheostatic brake (which is operating the motors as generators through resistances) is able to produce not only a strong retarding effect on the motor-armatures, and consequently to the car-wheels through gears, but also at the same time provides increased friction between the car-wheels and the rails, thereby minimizing or preventing skidding, thus bringing the car or vehicle to rest in the shortest possible distance. The combination of controllers used on electric cars for connecting motors in such a way as to propel the cars and by throwing the handle in the other direction, connecting them so that they become generators to retard the cars, is so

well known that explanation is not considered necessary.

We claim as our invention—

1. Electromagnetic sanding-gear for use
5 on electric railways, comprising a solenoid
connected with the motor and controller wiring,
and means connected therewith for opening
the sand-valve when the motors are used
as generators, in combination with
10 means for operating said sanding-gear independent
of the solenoid.

2. Electromagnetic sanding-gear for use
on electric railways, comprising a solenoid
connected with the motor and controller wiring,
15 means connected therewith for opening
the sand-valve when said motors act as gen-

erators for applying the sand direct to the
wheels and rails, said valve adapted to be
kept open until the car stops.

In testimony whereof we have signed our 20
names to this specification in the presence of
two subscribing witnesses.

CHARLES W. CROSBIE.

ARTHUR WARD.

Witnesses to the signature of Charles Wil-
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Witnesses to the signature of Arthur
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