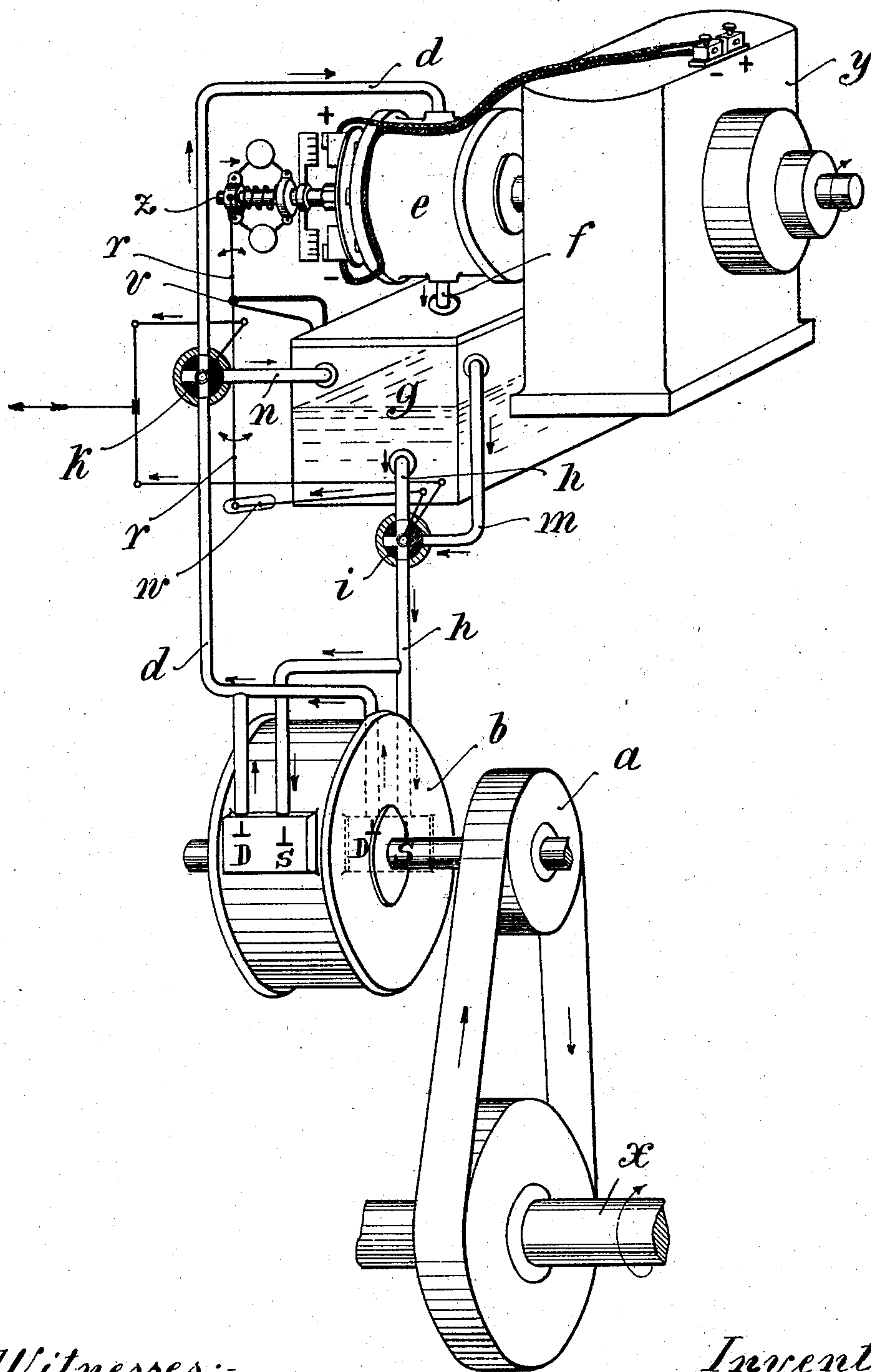


No. 743,484.

PATENTED NOV. 10, 1903.

H. GERDES.  
POWER TRANSMISSION DEVICE.  
APPLICATION FILED NOV. 24, 1902.

NO MODEL.



Witnesses:-  
K. Munter  
[Signature]

Inventor  
Henrich Gerdes  
by Eustace W. Hopmann  
Atty.



# UNITED STATES PATENT OFFICE.

HEINRICH GERDES, OF BERLIN, GERMANY.

## POWER-TRANSMISSION DEVICE.

SPECIFICATION forming part of Letters Patent No. 743,484, dated November 10, 1903.

Application filed November 24, 1902. Serial No. 132,671. (No model.)

*To all whom it may concern:*

Be it known that I, HEINRICH GERDES, a subject of the German Emperor, and a resident of Berlin, Germany, have invented a new and useful Power-Transmitting Device, of which the following is a description.

The present invention relates to driving mechanisms for the dynamo-machines employed for lighting railway-trains and similar purposes—i. e., to that class of driving devices which are of the secondary order, which do not generate the power necessary, but transmit it. Driving or power-transmitting mechanisms of this class are often driven or derive their rotation from a source of power which varies in speed, while it is necessary that the dynamo-machine run at an even speed. For instance, in the case of lighting railway-carriages by electricity the dynamo-machine is often driven from the car-axle, the speed of which varies between very large limits; and the object of the present invention is to provide a power-transmitting mechanism which within certain obvious limits will drive the dynamo-machine from the car-axle at an even speed in spite of the variations of the speed of the axle due to the varying speed of the train.

In order to render the present specification easily intelligible, reference is had to the accompanying drawing, which shows the arrangement of the various parts in perspective view.

The rotation of the car-axle X is transmitted to the dynamo-machine *y* by means of a pump *b* and a rotary or other motor *e*, driven by the fluid circulated by the pump. In the present instance and for the purposes of the present specification a rotary pump *b* has been chosen, but obviously any other system might be employed, and the pump is driven by means of a belt and a pulley *a* from the car-axle X. The liquid-receptacle *g* contains any suitable liquid, such as glycerin, and this liquid is circulated from the said receptacle through the throttle-valve *i* and pipe *h* by the pump, through the pipe *d* to the motor *e*, and thence through pipe *f* back to the receptacle *g*. A three-way cock *k* is arranged in the pipe *d*, and a branch pipe *n* leads from the same to the liquid-receptacle above the level

of the liquid. The throttle-valve *i* is also a three-way cock and has a branch *m*, also leading to the liquid-receptacle above the level of the liquid. The throttle-valve *i* is controlled by a governor *z*, driven by the motor *e*, the said governor working a lever *r*, pivotally supported at *v* and having its lower end linked at *w* to the lever-arm of the plug of the throttle-valve *i*. Each side of the rotary pump is provided with a pressure-valve D and a suction-valve S, and both the pressure-valves are connected up to the pipe *d* and the suction-valves to the pipe *h*. By this means the pump will always work the rotary motor in one direction whatever be the direction of motion of the car-axle X, which changes with the direction of motion of the car. This device works automatically, since the suction-valve, which is out of operation, will always be kept closed by the pressure, and the pressure-valve, which is not working, will be kept closed by suction, as indicated in the drawing by the arrows.

The device operates in the following manner: Assuming that the required speed of rotation of the dynamo corresponds with the speed of rotation of the car-axle X when the train is running at twenty miles an hour and that the governor *z* is adjusted to this speed, as soon as the speed of the train rises above twenty miles an hour the governor will work the lever *r* and by means of the link *w* will partially close the throttle-valve *i* and cut off the liquid-feed to the pump, thereby correspondingly regulating the speed of the motor *e* as the driving medium for the same—viz., the liquid-feed—is reduced.

When the train is running by daylight, it is not necessary for the dynamo-machine to run, and in order to enable this machine to be cut off the cocks *i* and *k* are three-way cocks. When the plugs of the same are turned ninety degrees by any suitable mechanism, the pump will be placed in connection with the part of the receptacle *g* above the liquid and will pump air or gas from and back to the receptacle without driving the motor, as will be readily understood. The pump may also be allowed to pump liquid without driving the motor by merely turning off the cock *k*, instead of both the cocks, in which case the



liquid will circulate through the pump along pipes *h* and *d* and through *n* back to the receptacle.

If the train is lighted by a combined system of dynamo-machines and accumulators, the governor may be arranged to make the circuit to the accumulators when the train stops and to break the circuit again when the train is running as soon as the tension falls below that of the accumulators or reaches it, as the case may be.

If necessary, an air-bell may be provided in the pipe *d* to prevent shocks.

Owing to the fact that the dynamo-motor is always driven in one and the same direction, by means of the present device no complicated apparatuses, such as commutators, are necessary.

I claim—

1. A device for driving a dynamo-machine at a substantially even speed from a varying source of power, consisting of a liquid-receptacle, a pump driven by the source of power, a motor to drive the dynamo and pipe connections to enable the pump to circulate the liquid and drive the motor, a governor on the motor-shaft and means in connection therewith for controlling the liquid-supply to the motor according to the speed of the latter substantially as described.

2. A power-transmitting device of the class specified, consisting of a pump driven from the source of varying power, a liquid-receptacle and pipe connections from the same to the pump, a rotary motor to drive the dynamo and pipe connections from the pump to the same, said pipe connections being adapted to conduct the pressure fluid to drive the motor in one and the same direction, whatever the direction of rotation of the source of

varying power may be, a throttling device in the pipe leading from the holder to the pump and means for controlling the same from the motor-shaft substantially as described.

3. A power-transmitting device of the class specified consisting of a pump driven from the source of varying power, a liquid-receptacle, pipe connections from the same to the pump, a motor to drive the dynamo and pipe connections from the pump to the same whereby the motor is always driven in one direction whatever the direction of rotation of the driving-shaft for the pump may be, means for throttling the liquid-feed to the pump, means for controlling the throttling mechanism from the motor-shaft and means for cutting out the motor from the circulation and for confining the latter to the pump and liquid-holder substantially as described.

4. A power-transmitting device of the class specified, consisting of a pump driven by the source of varying power, a liquid-receptacle and a motor to drive the dynamo, pipe connections to enable the circulation of the liquid from the holder to the motor so as to drive the latter in one and the same direction whatever the direction of rotation of the driving-shaft may be, means for controlling the liquid fed to the pump from the motor-shaft and means for cutting the liquid out of circulation, when the motor is not running and for establishing communication to and from the pump and the upper part of the liquid-holder substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

HEINRICH GERDES.

Witnesses:

WALDEMAR HAUPT,  
HENRY HASPER.