

(No Model.)

J. COCHRAN.
Electro-Magnetic Car Brake.

No. 231,276.

Patented Aug. 17, 1880.

Fig. 1.

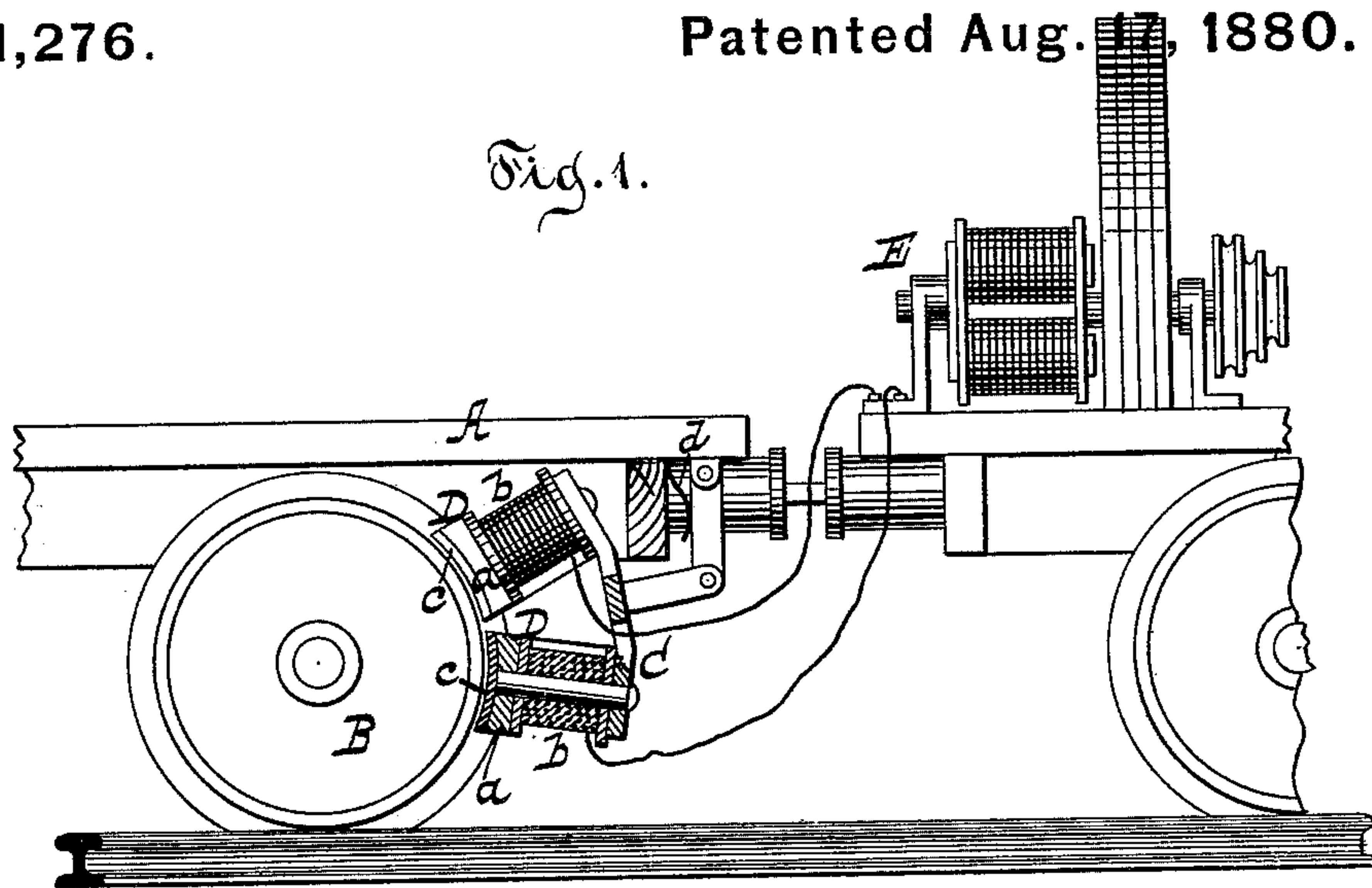


Fig. 2.

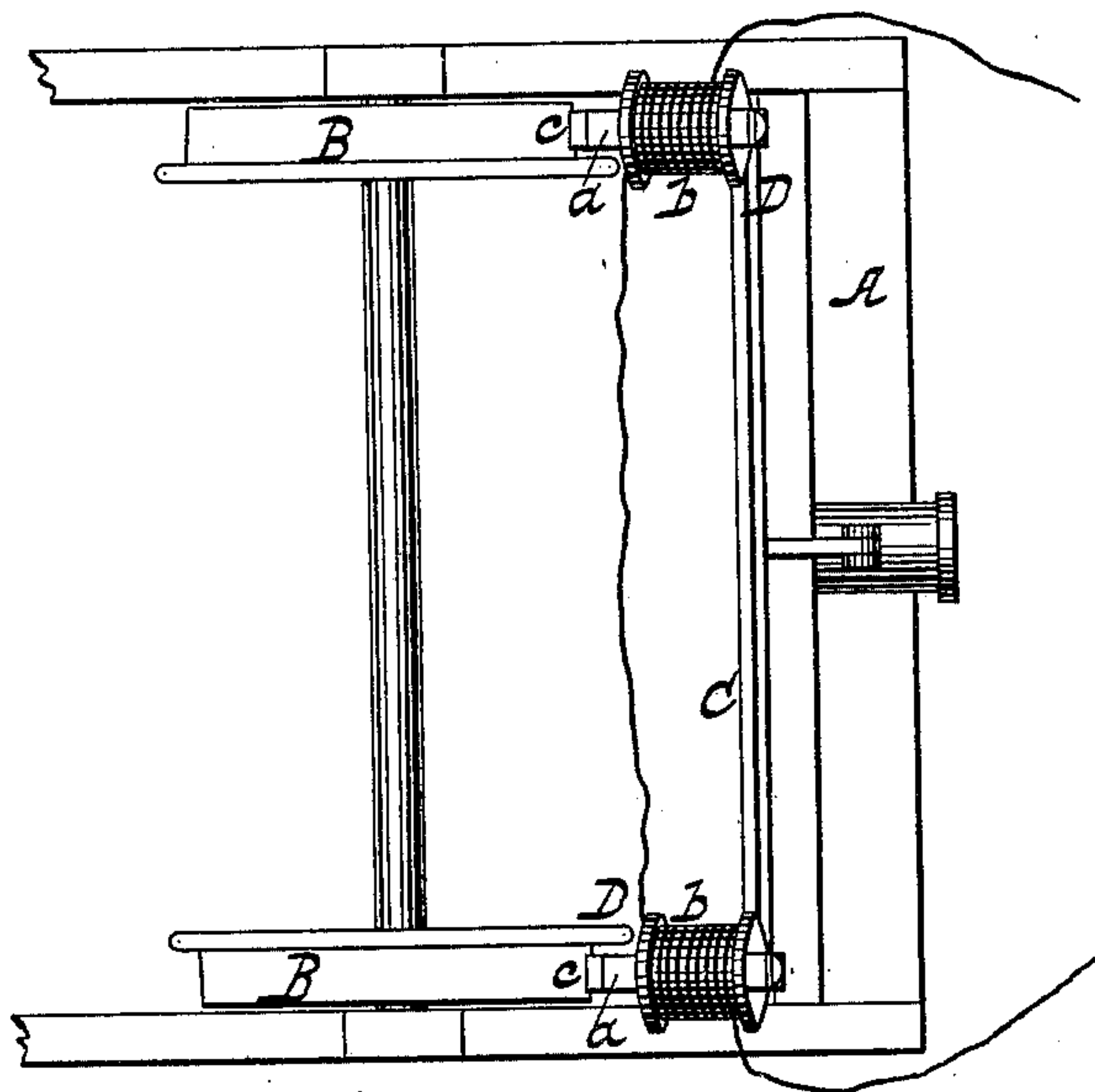
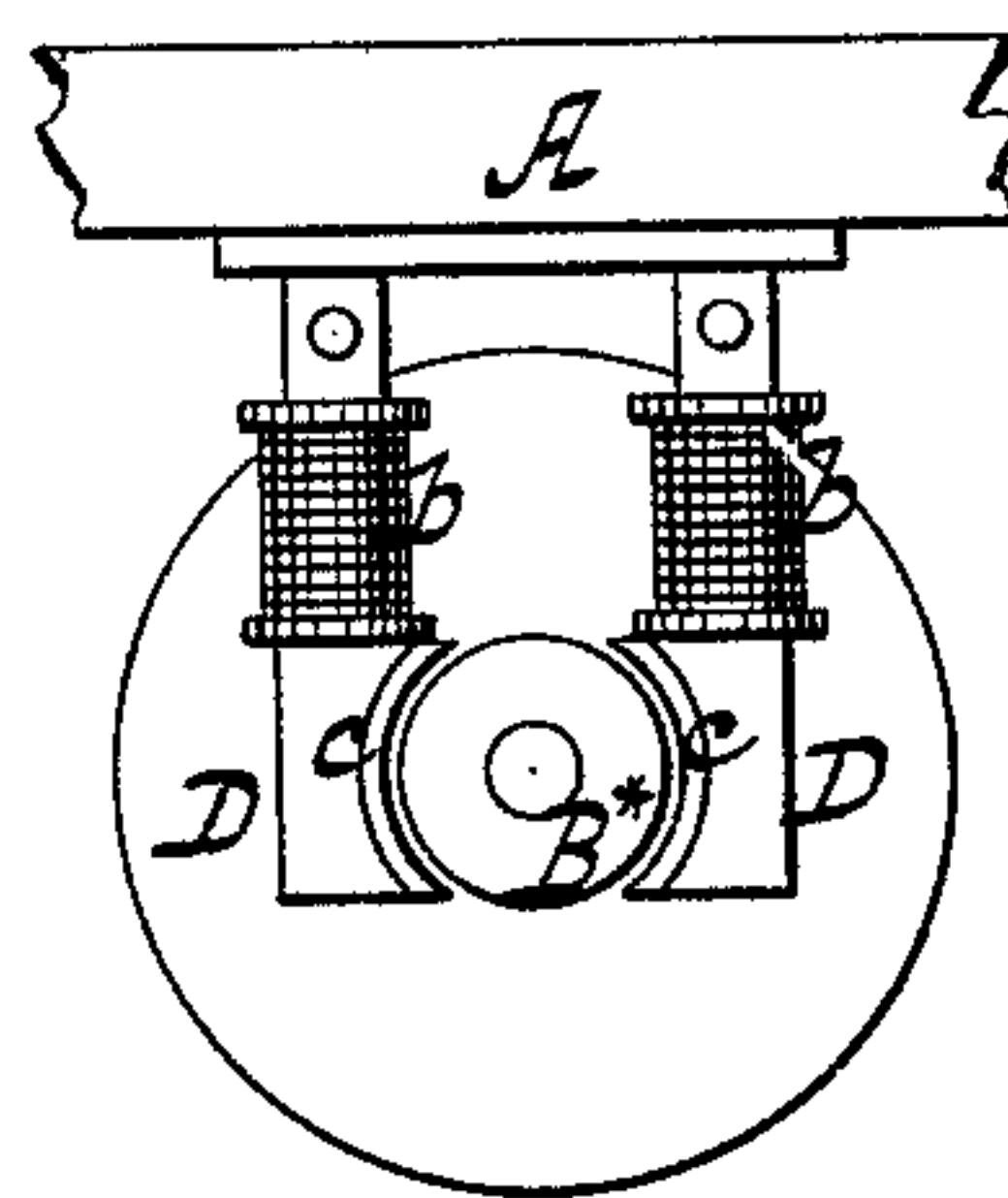


Fig. 3.



Witnesses

Chas Wahlen
William Miller

Inventor.

James Cochran
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his attys.

UNITED STATES PATENT OFFICE.

JAMES COCHRAN, OF EAST NEW YORK, N. Y.

ELECTRO-MAGNETIC CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 231,276, dated August 17, 1880.

Application filed June 21, 1880. (No model.)

To all whom it may concern :

Be it known that I, JAMES COCHRAN, a citizen of the United States, residing at East New York, in the county of Kings and State of New York, have invented new and useful Improvements in Magnetic Brakes for Railroad - Car and other Wheels, of which the following is a specification.

This invention consists in the combination, with the wheel of a railroad-car or other device, of one or more electro-magnets adapted to move toward and from said wheel, a protecting-plate of brass or other suitable material incapable of being magnetized, said protecting-plate being fastened to the cores of the electro magnet or magnets opposite to the surface of the wheel or drum on which the same is to act, and a suitable generator of electricity, which connects with the helix of the electro-magnets.

This invention is illustrated in the accompanying drawings, in which Figure 1 represents a sectional side view of my magnetic brake as applied to a railroad-car. Fig. 2 is an inverted plan of the same. Fig. 3 is a side view of a modification thereof.

Similar letters indicate corresponding parts.

In the example shown in Figs. 1 and 2 of these drawings the letter A designates a railroad-car, which is supported by the wheels B B. C is a brake-head, to which are firmly secured the brake-shoes D, and which is hung so that it can swing toward and from the wheels B B. Each of said brake-shoes consists of an iron plate, *a*, to which are fastened one or more electro-magnets, *b b*, the cores of which are so placed that they point toward one of the wheels B B. To said cores is firmly secured a plate, *c*, of brass or other material incapable of being magnetized, and the helix of the electro-magnet is connected with a suitable generator of electricity. The plate *c* forms the face of the brake-shoe, and with the brake-head is combined a spring, *d*, (one or more,) which has a tendency to throw the brake-shoes back clear of the wheels. When the generator of electricity is set in operation, or whenever a current of electricity is passed through the helix of the electro-magnets *b b*, the wheel B attracts the brake-shoe and the motion of the car or vehicle is retarded.

Instead of placing the electro-magnets *b b* in the position shown in Figs. 1 and 2, I can also place them in the position shown in Fig. 3, so that the sides of the cores form the brake-shoes; and in this case the plates *c* are secured to the cores, as shown in this figure. Two brake-shoes may be applied to each wheel; or, if it is desired, the brake-shoes may be made to act on a drum, *B**, secured to the axle between the wheels B B.

For the purpose of generating electricity I propose to use an electro-magnetic machine, E, intended to be placed on the locomotive and to be driven from one of the axles; but any other suitable generator may be used, such as galvanic batteries placed in the different cars or arranged in the proper position in relation to the wheel the motion of which is to be stopped.

The great advantage which I gain by the application of the protecting-plate *c* will be more fully understood by the following explanation: The cores of electro-magnets are necessarily made of soft iron, on account of the rapidity with which this metal becomes magnetized and demagnetized, so that when these cores are brought to bear against the steel tire or hard cast-iron tire of a car-wheel the wear is very great, and the expense attending the frequent renewal of the same is a matter of considerable importance. In order to avoid this waste and expense, shoe-blocks made of steel have been tried, but without satisfactory results, as they become permanent magnets and adhere to the wheel when the circuit is opened, and steel, when used without magnetism, becomes so polished and smooth that all gripe is lost on the wheel. Furthermore, the application of powerful electro-magnetic currents directly to wheels or axles of a car would tend to permanently magnetize them if these parts are made of steel, as is frequently the case. Besides, it is a well-known fact among those who are versed in the science that when a magnet is permitted to come into direct contact with a conductor, such as iron or steel, a discharge of magnetism takes place and great loss of power is the result. Therefore, taking advantage of the law of magnetism, which, unlike electricity, is incapable of insulation, and will attract iron or steel through any known

substance, I have discovered that a layer of composition brass or other similar metal of proper thickness applied to the brake-shoes, as described, prevents the magnetic discharge, while the magnet yields as powerful an attraction as when in close contact, for in the latter case the discharge of magnetism decreases the attractive power as much as the loss resulting from placing a substance incapable of being magnetized between the magnet and the object of its attraction. Besides, brass is not subject to molecular changes producing brittleness, which is so peculiar to the metal, iron, when exposed to magnetic action.

It is obvious that my magnetic brake can be applied to elevators or other machines as well as to railroad-cars.

I am aware that there is a method of arresting the motion of bodies through the intervention of magnetic attraction without contact; but a more powerful action is required when the motion of heavy bodies is to be stopped suddenly. This can be attained by contact of a hard and durable metal forcibly held in position by powerful magnetic attraction, as described.

I am aware of the magnetic brake described in the English Patent No. 374 of 1876. This I do not claim.

What I claim as new, and desire to secure by Letters Patent, is—

The combination, with the wheel of a railroad-car or other device, of one or more electromagnets adapted to move toward and from that wheel, a protecting-plate of brass or other suitable material incapable of being magnetized, said protecting-plate being fastened to the cores of the electro magnet or magnets opposite to the surface of the wheel or drum on which the same is to act, and a suitable generator of electricity which connects with the helix of the electro magnet or magnets, all constructed to operate substantially as and for the purpose shown and described.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

JAMES COCHRAN. [L. S.]

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.