

F. F. A. ACHARD.
ELECTRO MAGNETIC CAR BRAKE.

No. 59,805.

Patented Nov. 20, 1866.

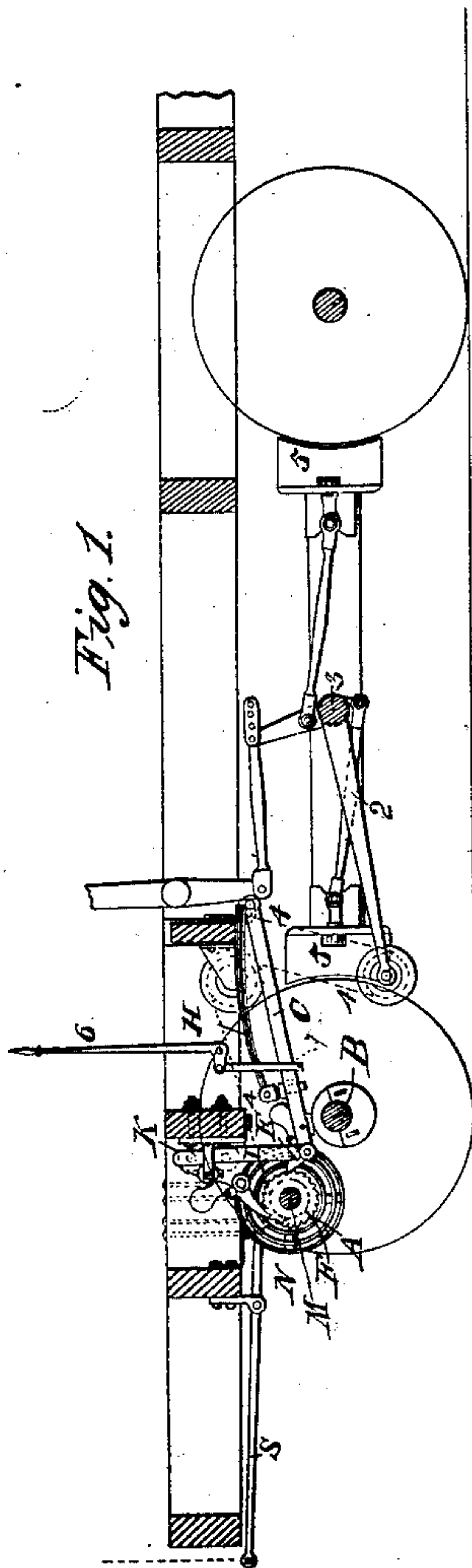
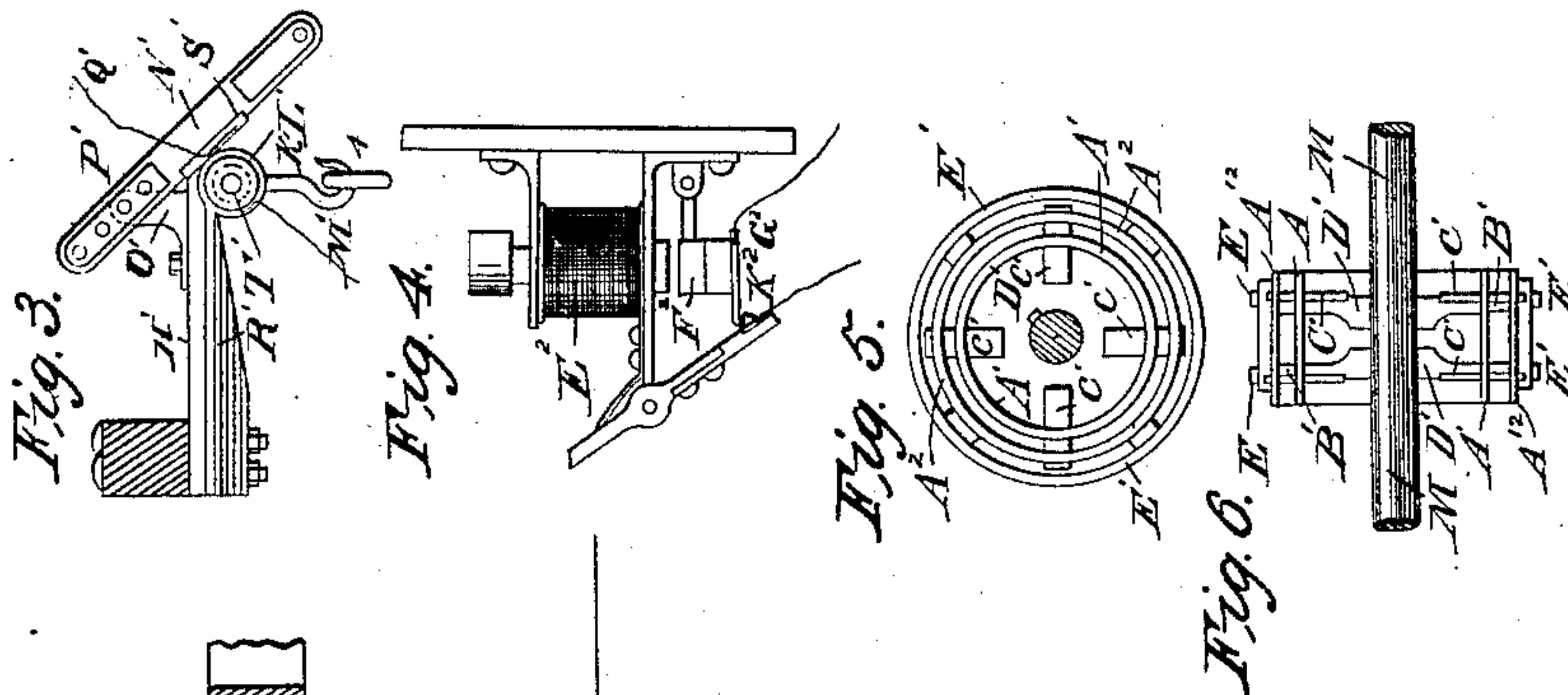
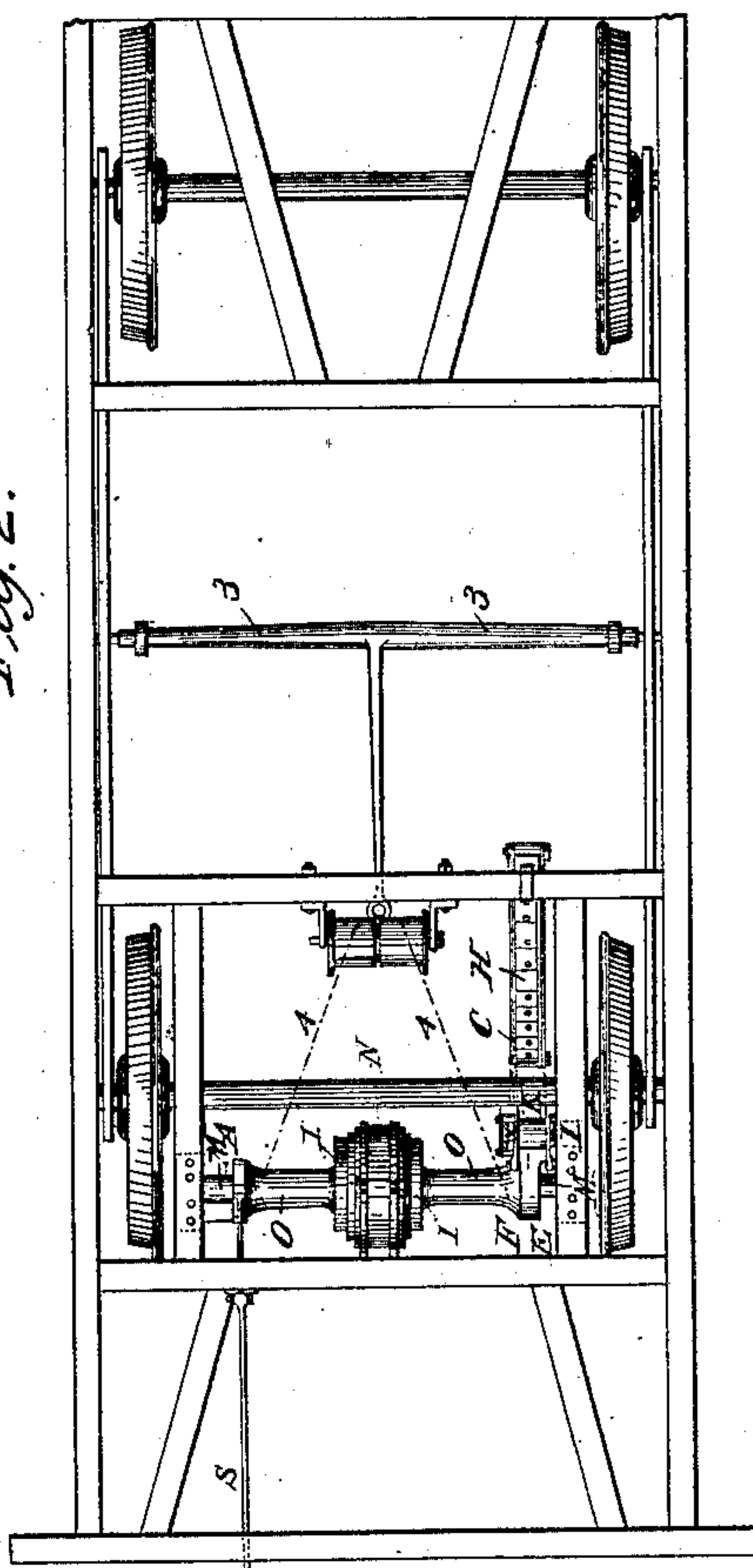


Fig. 2.



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2 Sheets—Sheet 2.

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Fig. 7.

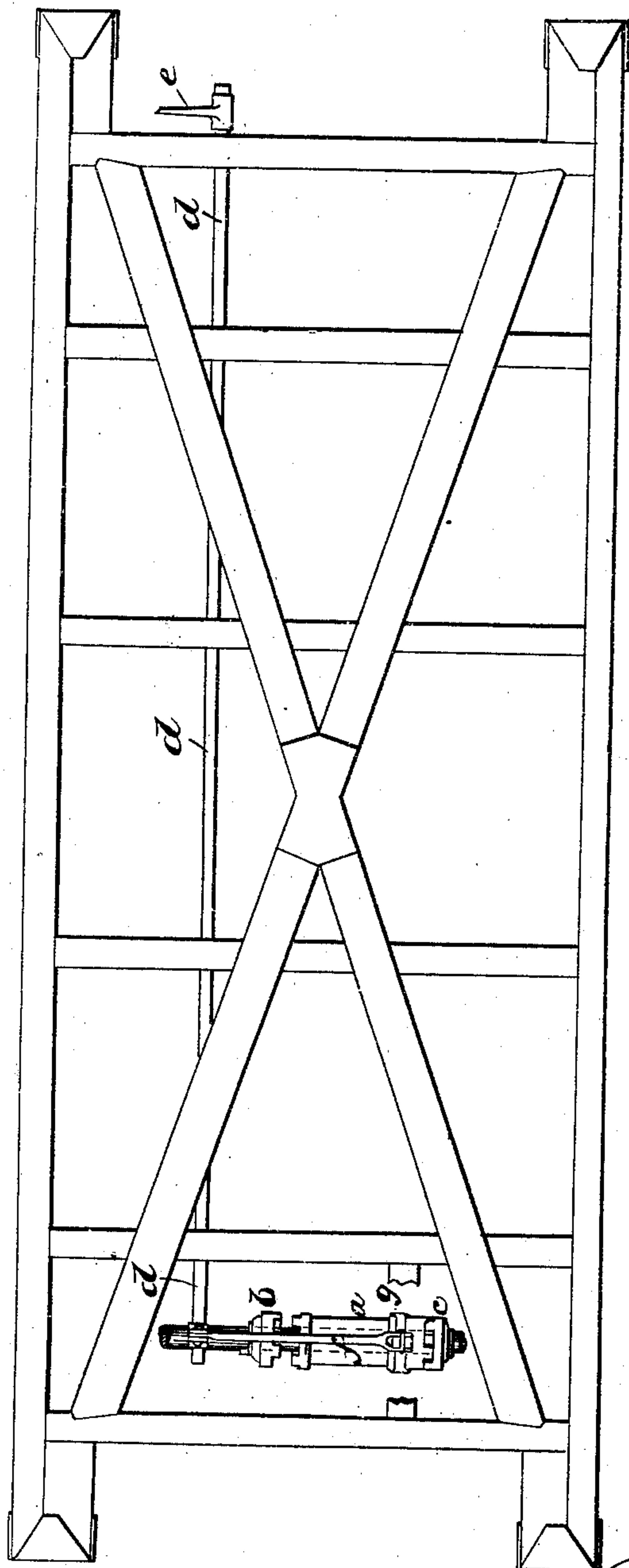


Fig. 9.

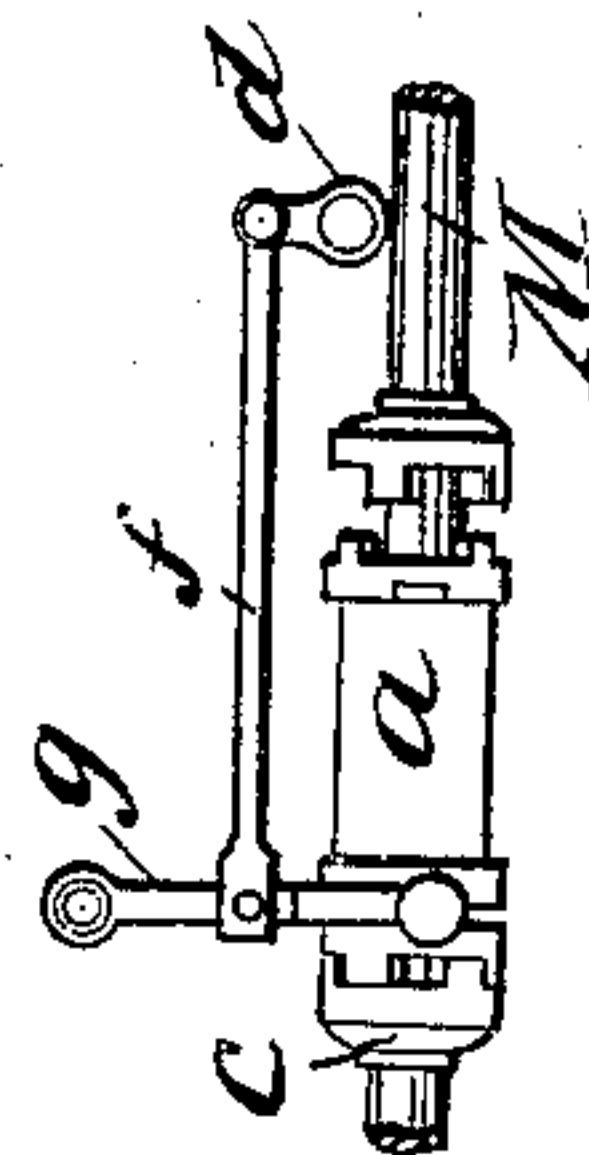
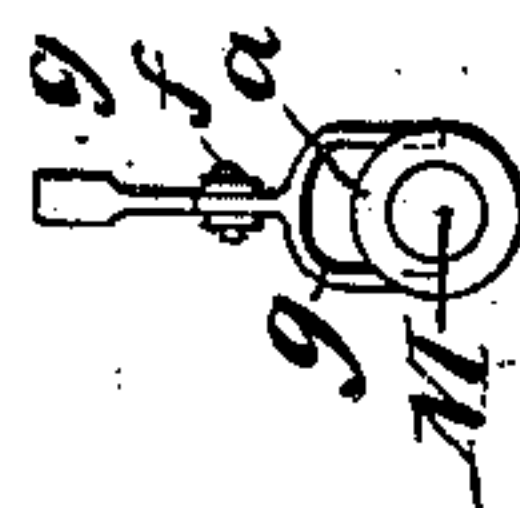


Fig. 8.



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UNITED STATES PATENT OFFICE.

FRANCOIS FERDINAND AUGUSTE ACHARD, OF PARIS, FRANCE.

IMPROVEMENT IN ELECTRO-MAGNETIC CAR BRAKES.

Specification forming part of Letters Patent No. 59,805, dated November 20, 1866.

To all whom it may concern:

Be it known that I, FRANCOIS FERDINAND AUGUSTE ACHARD, of Paris, France, have invented a new and Improved Electro-Magnetic Car Brake; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings forming part of this specification, in which—

Figure 1 represents a sectional side elevation of a railroad car provided with one of my brakes.

Fig. 2 is a plan or top view of the same.

Figs. 3, 4, 5, and 6 are details in a larger scale than the previous figures, to be referred to as the description progresses.

Fig. 7 is a plan of my invention when operated by hand.

Figs. 8 and 9 are details of the same.

Similar letters of reference indicate corresponding parts.

The object of this invention is to use the force which is developed by the rotation of the wheels for the purpose of putting on the brakes.

For the purpose of transmitting the power from one of the axles to the brakes, an eccentric or cam, B, is keyed to said axle, which imparts an oscillating motion to the main lever, C, which is hinged to the truck frame and held in contact with the eccentric by the action of a spring H.

The lever C is furnished with a click, E, which engages with the teeth of a ratchet wheel F, mounted on the brake shaft M. To this shaft is firmly keyed a cylinder, N, which carries a quantity of copper wire wound between its flanges, and this electro-magnetic cylinder is situated between two drums, O O, which rotate loosely on the shaft until the flanges l l on their inner ends are attracted by the electro-magnetic cylinder, N, whereby said drums are compelled to revolve with the shaft M. From the drums O O extends a three-ended chain, 4, over a guide roller which has its bearings in suitable bearings secured to the truck frame, and thence round another pulley which is mounted in the end of a forked lever, 2, extending from a rock-shaft, 3. This rock-shaft has its bearings in two bars supported by the ends of the car axles, and it is

provided with four arms, which connect by suitable rods with the brake shoes, 5. In order to prevent the brakes from being applied prematurely, or as soon as the wheels begin to rotate, the lever C is raised by the action of an electro-magnet, K, which is secured to the truck frame, and which connects with said lever by two slides or armatures, I. A constant current of magnetism is passed around the electro-magnet, K, causing the same to attract the armatures and to raise the lever C to such a position that the eccentric B will not come in contact with it.

The ends of the helices of the magnetic cylinder, N, and of the electro-magnet, K, are insulated in a small India-rubber tube, and they terminate in the bed plate of an electro-magnetic switch of any desirable construction, which is secured in a convenient position in the engineer's stand or on the tender. When the engineer desires to apply the brakes, he turns the switch so that the circuit of the electro-magnet K is opened and that of the magnetic cylinder N closed. As soon as this motion is made, the lever C descends upon the eccentric B, and the motion of the axle is transmitted to the shaft M. At the same time the flanges of the drums O O are attracted by the magnetic cylinder N, and the chain 4 winds on said drums, thereby applying the brakes with considerable force, and with a strain which constantly increases until the motion of the wheels stops.

In order to take off the brakes, the switch is returned to its original position, whereby the circuit of the magnetic cylinder N is opened and that of the electro-magnet K is closed. By this operation the lever C is raised from the eccentric B, and the flanges of the drums O O drop off from cylinder N, and the weight of the lever 2 causes the brakes to drop off from the wheels.

The engineer is thus enabled to apply and take off the brakes at short intervals, and all danger or injury which would be caused by a too sudden application of the brakes, is avoided.

To the ratchet wheel F, which is mounted on the shaft M, is secured a tappet wheel, A; and if the circuit of the electro-magnet, K, and also that of the magnetic cylinder, N, are opened, the ratchet wheel F, together

with the tappet wheel A, are caused to rotate, and, by the action of the tappets c' , (see fig. 5) an oscillating motion is imparted to the lever, S, which is intended to connect to an alarm bell secured to the head car. This bell indicates to the parties having charge of the train that the circuit is everywhere open; and said bell also sounds whenever the brakes are applied, until the rotation of the wheels ceases. But whenever, from any cause whatever, the circuit is opened while the brakes are to be applied, the bell continues to sound as long as the train is in motion.

If desired, the lever C can be raised from the eccentric B by the action of a hand lever, b , which connects with said lever by a slotted slide, 7. By this lever the entire apparatus can be thrown out of gear at any desired moment.

If desired, the connecting wires may be so arranged that the circuits of the electro-magnets K and N are opened and closed automatically in consequence of the rupture of a coupling or from other causes, and for this purpose I have successively employed relay magnets of suitable construction, such for instance as those shown in fig. 4, to accomplish this purpose.

By placing a series of switches along the line, the persons attached to the train and also the travellers are enabled to apply the brakes at any moment. At the same time, if it is desired to produce merely a signal, a temporary interruption of the circuit of the electro-magnet K will produce the desired result.

The construction of the electro-magnetic cylinder N is shown in detail in figs. 5 and 6. It consists of two centering tubular or solid rings or cylinders, A^1 and A^2 , of soft iron, which are firmly connected together by two copper rings B B^1 fitted between the same so as to let their edges project beyond said cylinders A^1 A^2 about three-fourths of an inch.

Between the two rings B B^1 and upon the inner cylinder A^1 is wound a helix of copper wire or other good conductor of electricity, which fills the entire annular space between the two cylinders. These cylinders and rings are firmly connected to two copper plates, D^1 D^2 , which are keyed on the shaft, the connection between said cylinders and rings being

effected by a series of keys, C^1 , of brass or other suitable material, which traverse the outside cylinder A^2 , the two rings, B^1 and the plates, D^1 . The conducting wires are carefully insulated, and they pass through the brass rings B^1 and the end of the upper cylinder, A^2 ; each being attached to a ring, E^2 , which is insulated from the other ring by wooden cross-bars fixed on the outside cylinder.

The power by which the brakes are forced up against the faces of the wheels may be regulated by securing the hook, K^1 , from which the traction chain is suspended, to the end of a strong spring, R^1 , as shown in fig. 3 of the drawing, instead of fastening said spring will be gauged so that it yields and opens the circuit of the magnetic cylinder N whenever the strain on the chain 4 exceeds a certain limit.

Instead of operating my brakes by electricity, they may, however, also be operated by hand, and in that case for the magnetic cylinder N a clutch box a is substituted, (as shown in figs. 7 and 8,) which slides freely on the shaft, M, and can be thrown in gear with either of the clutch boxes b or c by means of a suitable hand lever 6.

An intermittent rotary motion is imparted to the clutch box a by the eccentric B and ratchet wheel F, previously described; and by throwing said box in gear with either of the boxes b or c , on which the traction chain is wound, the brakes are applied.

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

1. The eccentric B and lever C, in combination with the magnetic cylinder N, flanged drums O, and brakes 5, all constructed and operating substantially as and for the purpose described.

2. The sliding armatures I, and hand lever 6, in combination with the electro-magnet K, lever C, and eccentric B, constructed and operating substantially as and for the purpose set forth.

The above specification of my invention signed by me this 7th day of October, 1865.

FRANCOIS FERDINAND AUGUSTE ACHARD.

Witnesses:

EDWARD TUCK,
DEMOS.