No. 671,426. Patented Apr. 2, 1901.

P. F. L. R. H. K. VOIGT & W. C. KUSTERER.

ELECTROMAGNETIC BRAKE.

(Application filed Oct. 12, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1

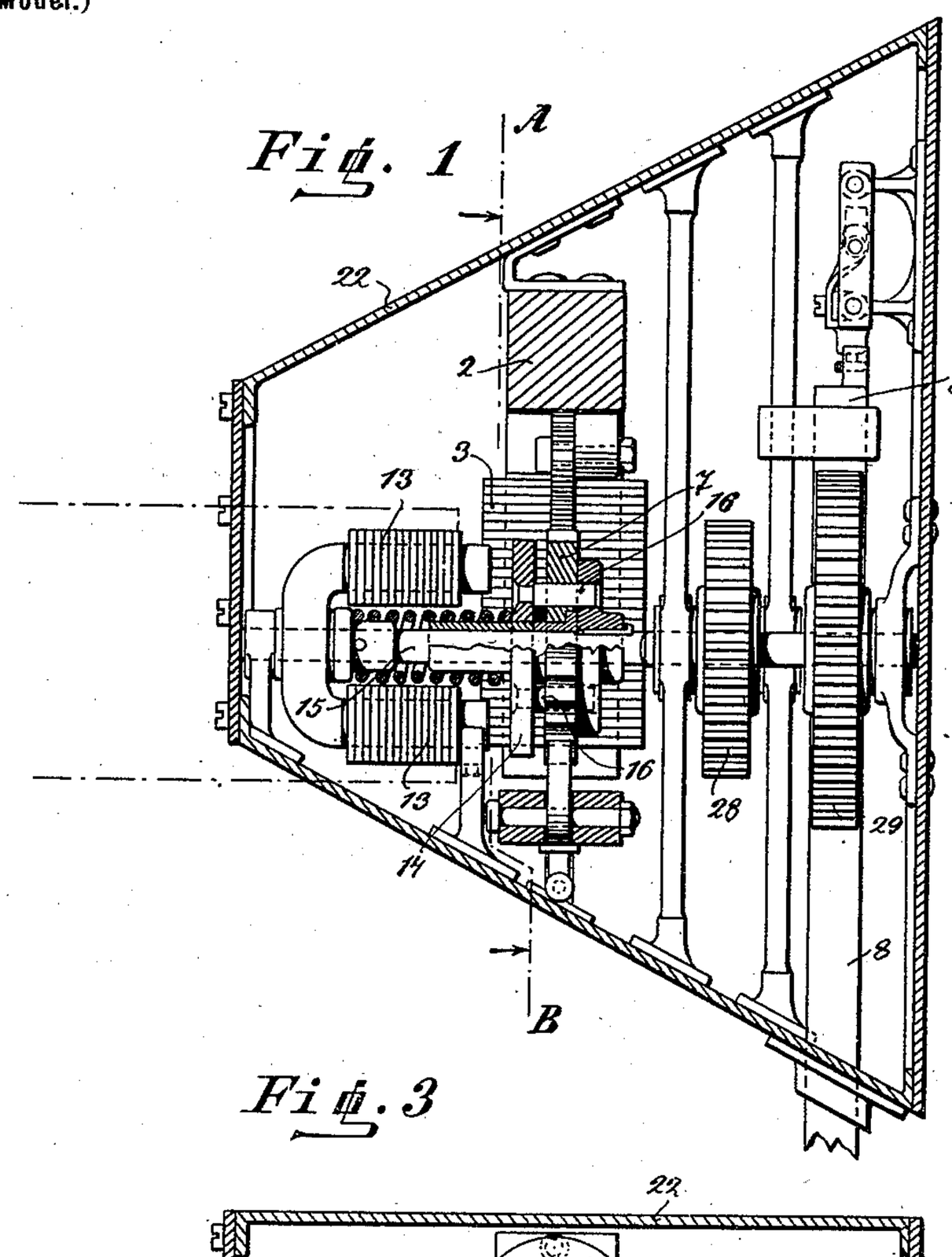
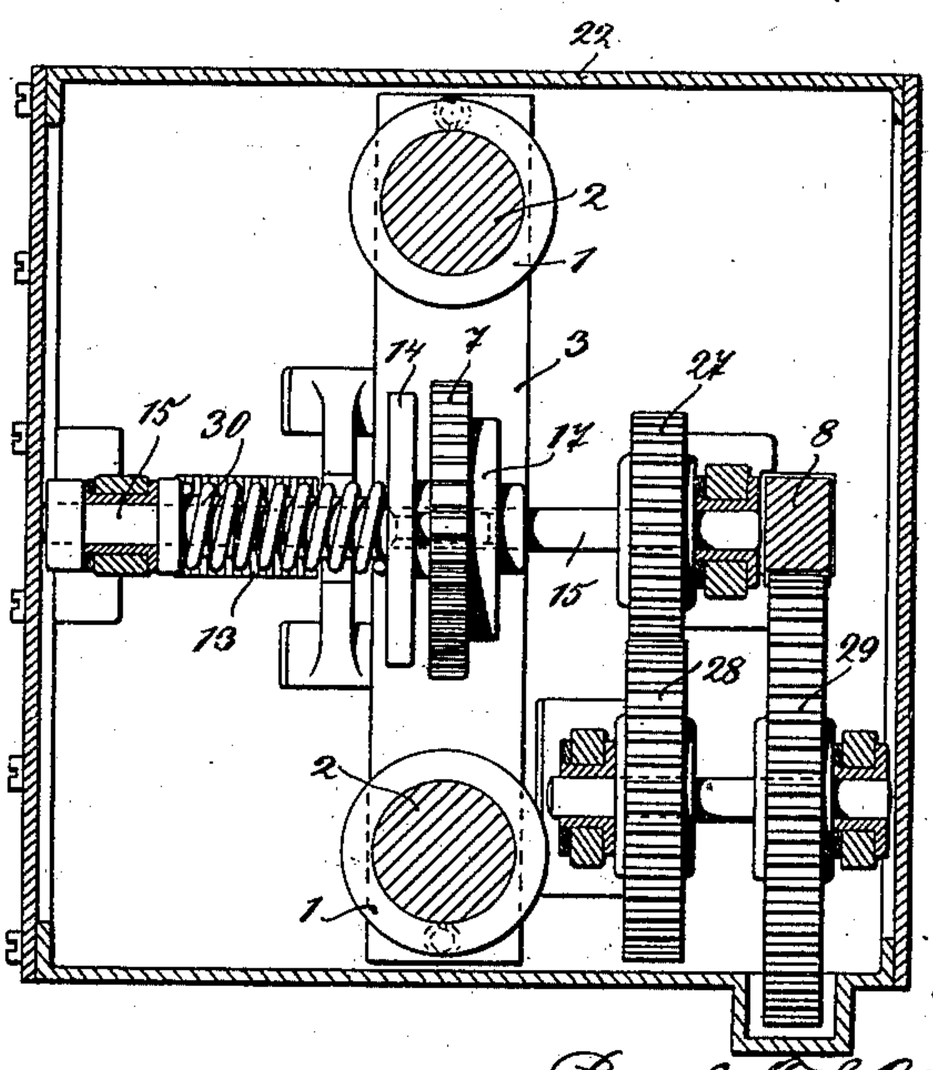


Fig. 3



Witnesses
W. K. Boueler
[illegible]

Inventors
Paul F. L. R. H. K. Voigt,
Wilhelm C. Kusterer
By Wm. E. Boueler attorney

No. 671,426. Patented Apr. 2, 1901.

P. F. L. R. H. K. VOIGT & W. C. KUSTERER.

ELECTROMAGNETIC BRAKE.

(No Model.) (Application filed Oct. 12, 1899.) 3 Sheets—Sheet 2.

Fig. 2

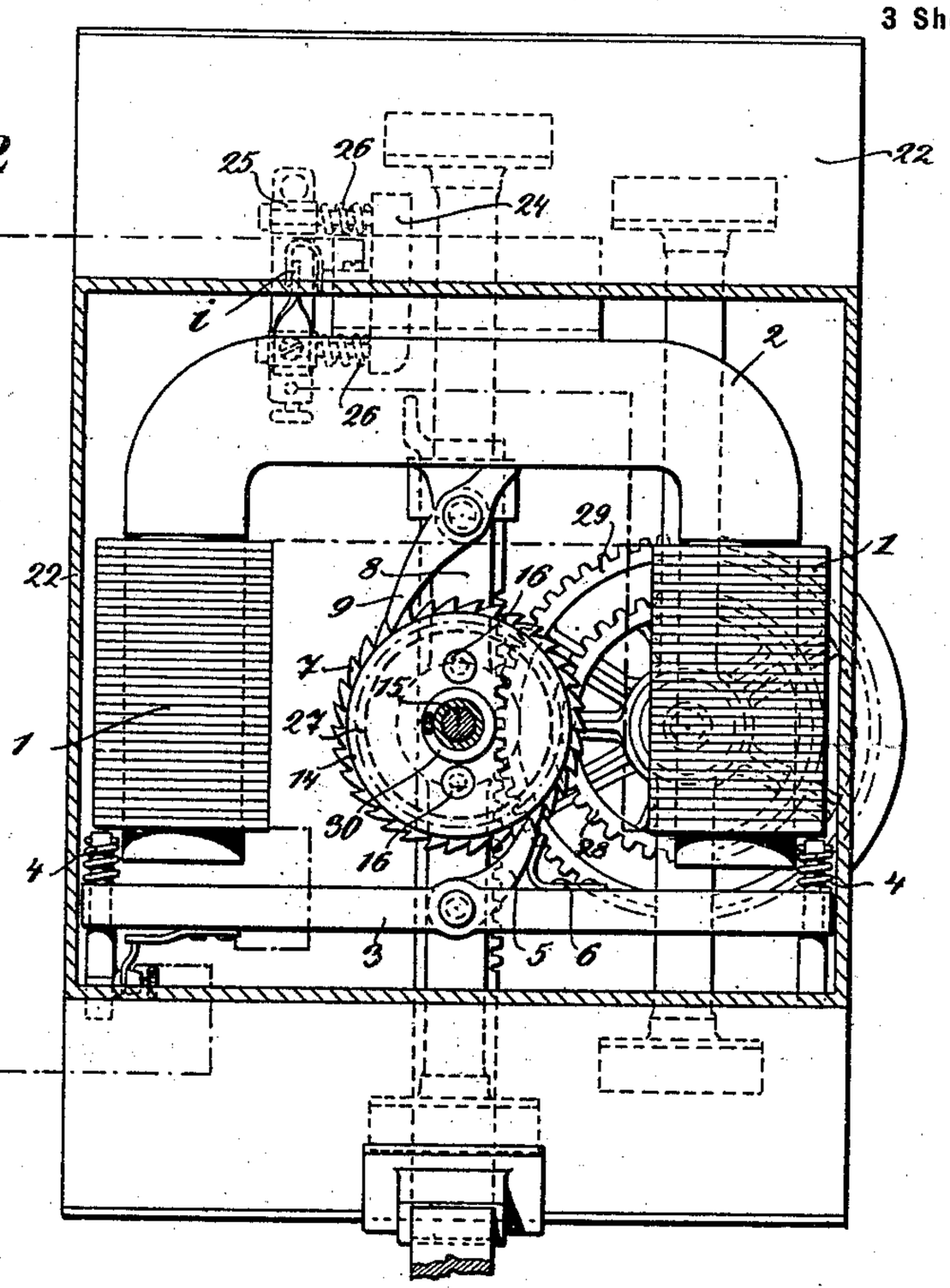
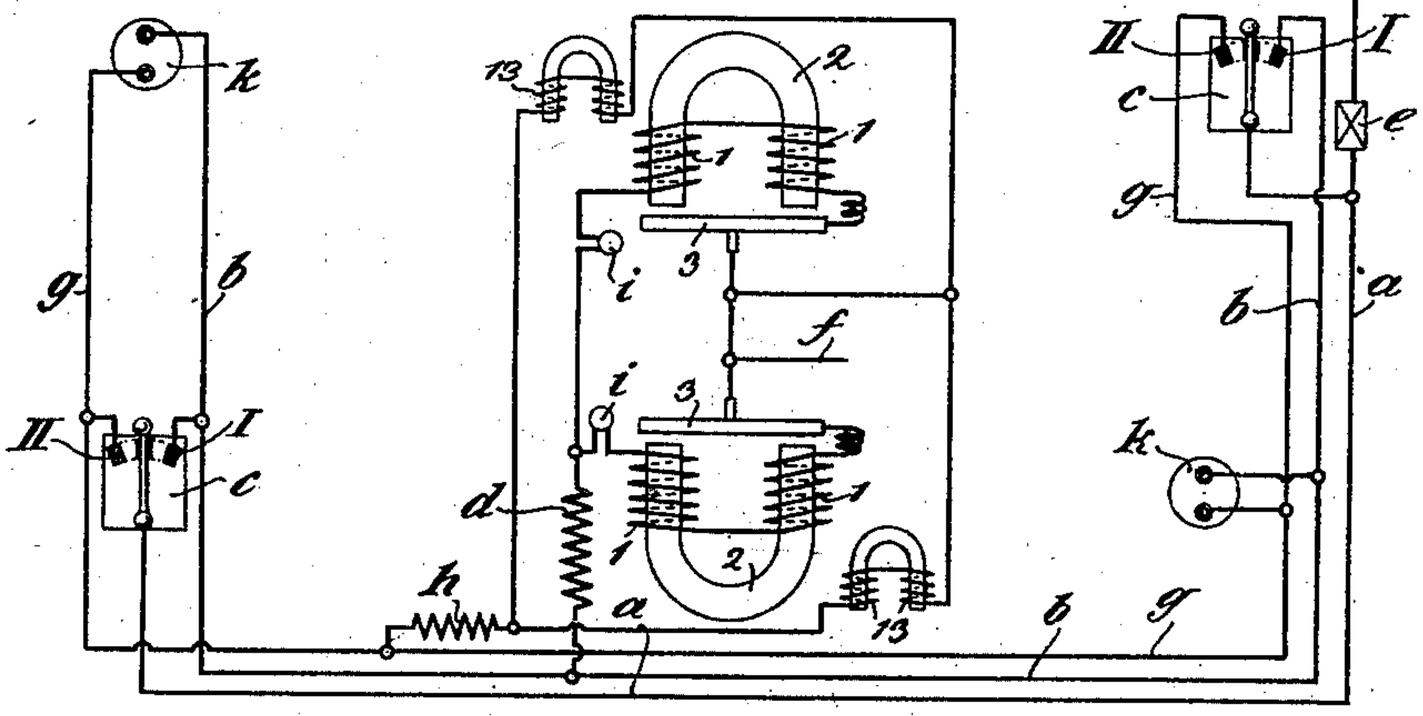


Fig. 4



Witnesses
J. H. K. Boneta
C. Hinrichs

Inventors
Paul F. L. R. H. K. Voigt
Wilhelm C. Kusterer
By Dewey & Boulder,
Attorneys

No. 671,426. Patented Apr. 2, 1901.

P. F. L. R. H. K. VOIGT & W. C. KUSTERER.

ELECTROMAGNETIC BRAKE.

(Application filed Oct. 12, 1899.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 5

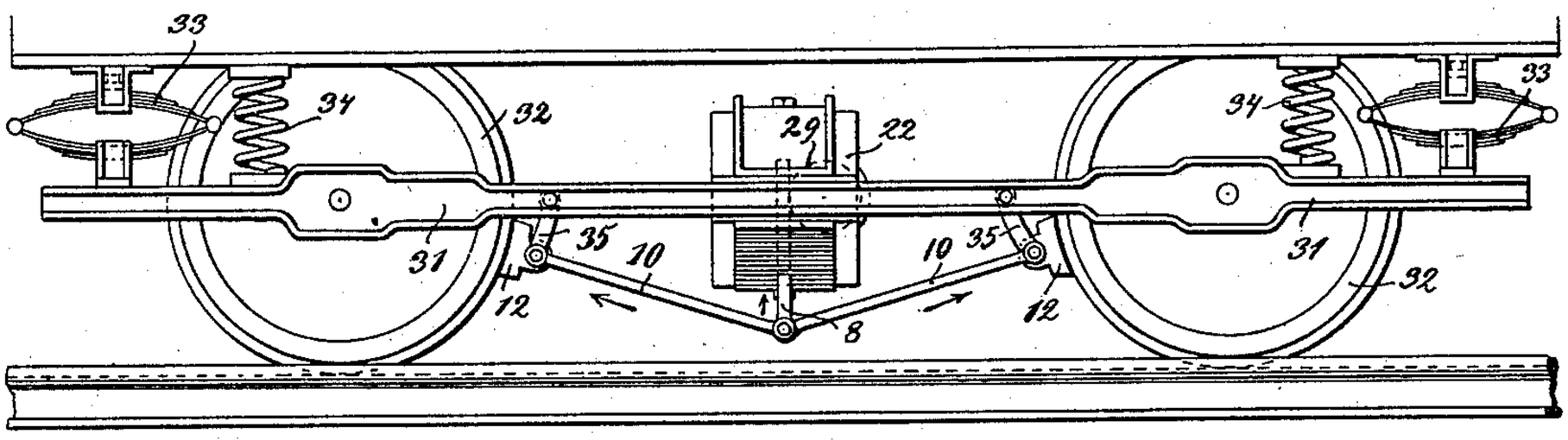
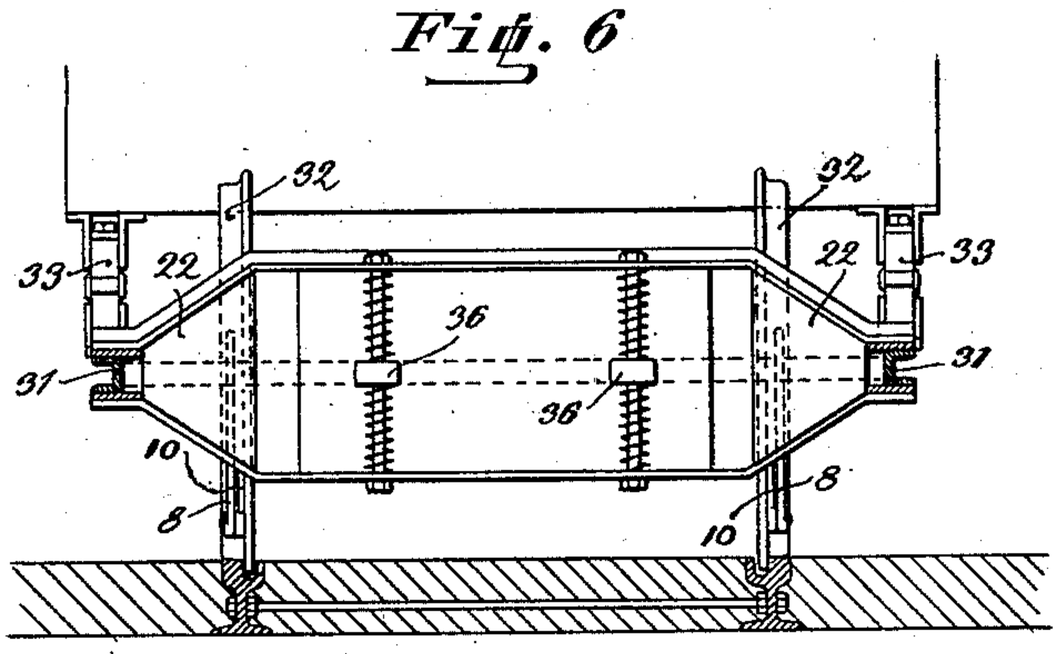


Fig. 6



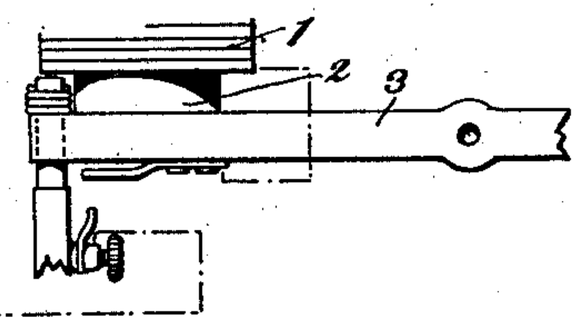


Fig. 7

Witnesses
H. K. Bowden
C. Sherbrooke

Inventors
Paul F. L. R. H. K. Voigt
Wilhelm C. Kusterer,
By Wm. C. Boulden Attorney

UNITED STATES PATENT OFFICE.

PAUL FRANZ LOUIS ROBERT HERMANN KARL VOIGT AND WILHELM CHRISTOPH KUSTERER, OF ILMENAU, GERMANY.

ELECTROMAGNETIC BRAKE.

SPECIFICATION forming part of Letters Patent No. 671,426, dated April 2, 1901.

Application filed October 12, 1899. Serial No. 733,433. (No model.)

To all whom it may concern:

Be it known that we, PAUL FRANZ LOUIS ROBERT HERMANN KARL VOIGT, fitter, and WILHELM CHRISTOPH KUSTERER, engineer, subjects of the Grand Duke of Saxe-Weimar, residing at 3 Schlossstrasse, Ilmenau, in the Grand Duchy of Saxe-Weimar and Empire of Germany, have invented certain new and useful Improvements in Electromagnetic Brakes, of which the following is a full, clear, and exact description.

The object of the present invention is a magnetic brake for cars with electric motive power.

In order that our invention may be more clearly understood and easily carried into practical effect, we have appended hereunto drawings, upon which we have illustrated examples of our improvements.

Figure 1 is a longitudinal section. Fig. 2 is a section from A to B in Fig. 1. Fig. 3 is a partial top view of the brake. Fig. 4 is a view of the controlling mechanism. Figs. 5 and 6 are views of the brake under the car. Fig. 7 is a detail view.

When the brake is required to be put into action, the current is conducted into the wrapping 1 of the electromagnet 2, which thereupon attracts the plate 3, and this plate when the electromagnet is not acting is kept away from it by springs 4. On this plate 3 is a catch 5, which by means of a spring 6 is continuously pressed against a ratchet-wheel 7. Fitted to the plate 3 is a controlling mechanism, so that consequently the plate is moved up and down continuously. At each upward movement the ratchet-wheel 7 is moved one tooth forward, and therefor by further gearing the ratchet-bar 8 is raised, while a catch 9 prevents the ratchet-wheel from moving backward. Through this raising of the ratchet-bar 8 brake-blocks 11 and 12 are forced against the wheels by means of pressure-rods 9 and 10. (See Fig. 5.)

To release the brake, the current is conducted into the wrapping of a second electromagnet 13, (see Fig. 1,) which attracts a plate 14, mounted, as is also the ratchet-wheel 7, loosely upon an axle 15. By this means pegs 16 of the disk 14, which pass through the ratchet-wheel 7, and consequently couple this with the plate 14, are drawn out of corresponding holes in a coupling-disk 17, keyed onto the axle 15, so that the fixed connection of the gearing with the ratchet-wheel is done away with. In consequence of this the ratchet-bar 8 moves downward by virtue of its own weight and the brake is released.

Fig. 4 shows the controlling mechanism of this brake.

The conductor *a* brings the current through the contact *b* to the controlling-lever *c*. If this is applied to the contact 1, the current passes through *b* to the resistance *d* and from this to the wrapping *i* of the electromagnet 2, and therefore pulls up the plate 3 to pass through the earth-conductor *f*. If now the lever *c* is applied to the contact 2, the current passes from *c* through the conductor *g* and resistance *h* into the wrapping 13 of the other electromagnet. The ratchet-bar falls and puts into operation, by means of arms or a spring, the cut-off *i*, which consequently cuts off the current, which passes back to earth.

The construction and operation of the cut-off are as follows: On the inner side of the block 22 a pillow 25 is secured. (See Fig. 1.) In this pillow a slide 24 is guided, Fig. 2. At the conclusion of the braking operation a part of the ratchet-bar 8 presses upon the slide 24, influenced by springs 26, (which latter have nothing to do with the current,) and puts out of circuit the cut-off *i*, which is insulated from the parts 24, 25, and 26. The cut-off *i* in circuit is shown in Fig. 2. A spring 30 causes the plate 14 to engage with the ratchet 7 and disk 17. A part of the plate 3 and the coils 2 are shown in Fig. 2. During the turning of the axle 15 the connecting-gearing 27 28 moves the gear 29 by means of ratchet-bar 8, which latter are in engagement with each other.

By means of a plug-contact *k* the brake mechanism of different cars can be coupled together and put into action simultaneously.

In Figs. 5 and 6, 12 represents the brake-blocks; 10, the pressure-rods; 31, the longitudinal bars of the truck; 32, the car-wheels;

33 34, the supporting-springs, and 35 the links pivoting the rods 10 to the bars 31.

What we claim, and desire to secure by Letters Patent, is—

1. An electromagnetic brake for cars comprising an electromagnet, a plate adapted to be attracted by said magnet, a catch on the plate, a ratchet-wheel with which the catch engages and adapted to be thereby revolved step by step, a ratchet-bar, a connection between the latter and the ratchet-wheel whereby the ratchet-bar will be raised at each upward movement of the plate, brake-blocks, a connection between the latter and the ratchet-bar whereby the said blocks will be operated to brake the wheels when the ratchet-bar is raised, and means for controlling the energizing and deënergizing of the electromagnet, for the purpose set forth.

2. An electromagnetic brake for cars comprising an electromagnet, a plate adapted to be attracted by said magnet, a catch on the plate, a ratchet-wheel with which the catch engages and adapted to be thereby revolved step by step, a ratchet-bar, a connection between the latter and the ratchet-wheel whereby the ratchet-bar will be raised at each upward movement of the plate, brake-blocks, a connection between the latter and the ratchet-bar, whereby the said blocks will be operated to brake the wheels when the ratchet is raised, a second electromagnet, a plate 14 adapted to be attracted by the second electromagnet, pins on the said latter plate passing through openings in the ratchet-wheel, a disk 17, an axle on which the disk is keyed and the plate 14 and ratchet-wheel are loosely mounted, and means for switching an electric current from one electromagnet to the other, as and for the purposes set forth.

In witness whereof we subscribe our signatures in presence of two witnesses.

PAUL FRANZ LOUIS ROBERT
HERMANN KARL VOIGT.
WILHELM CHRISTOPH KUSTERER.

Witnesses:
ALVIN FLORSCHIS,
FRIEDRICH HAAS.