(No Model.) 4 Sheets—Sheet 1.

F. F. ARNOLD.

AUTOMATIC CAR BRAKE.

No. 301,200. Patented July 1, 1884.

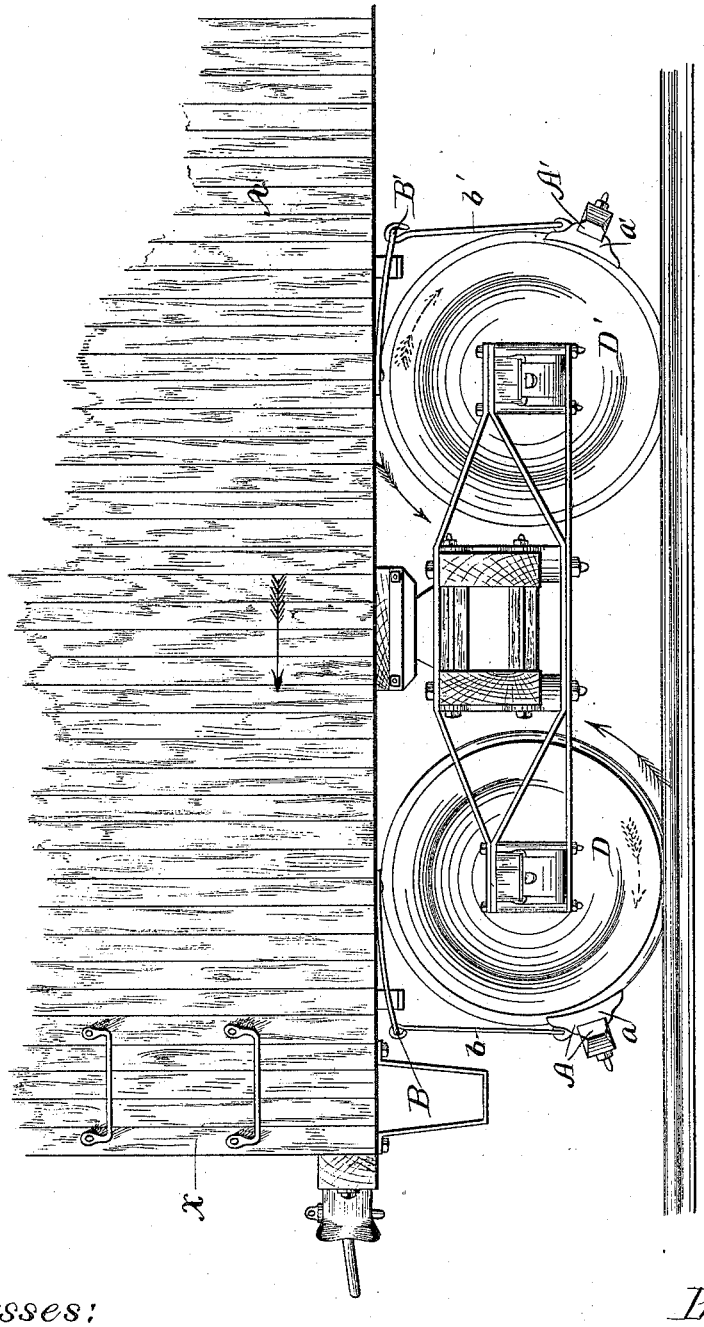

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

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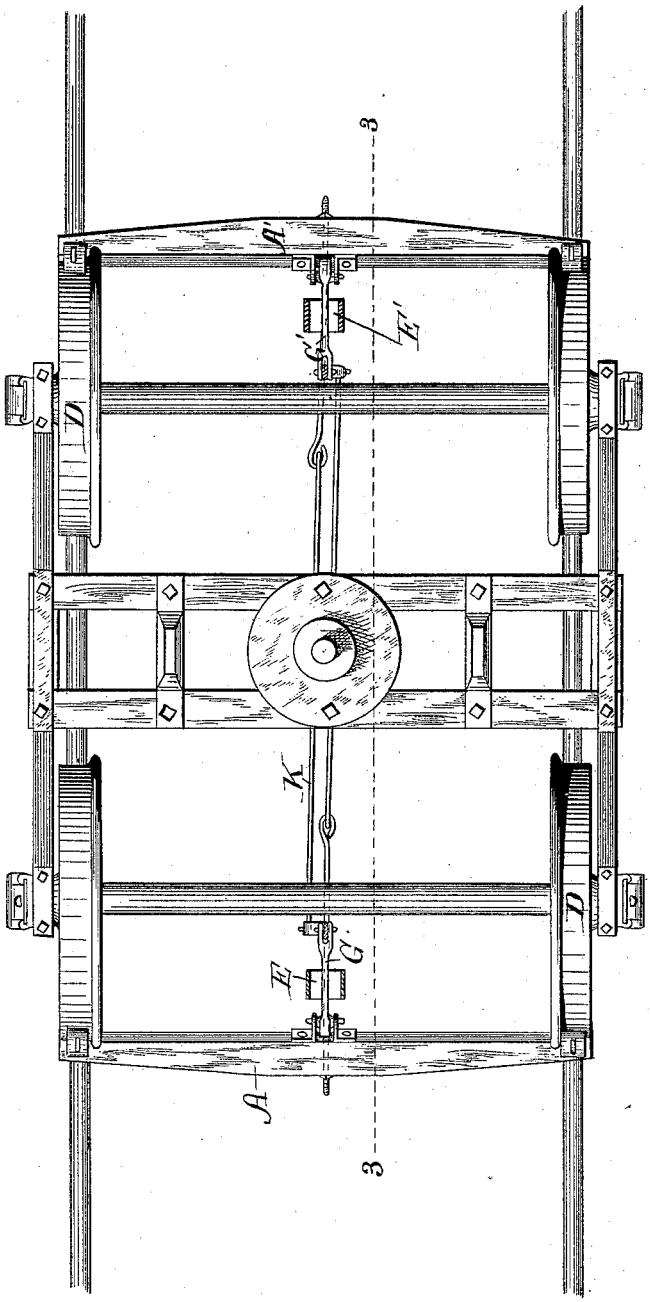

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

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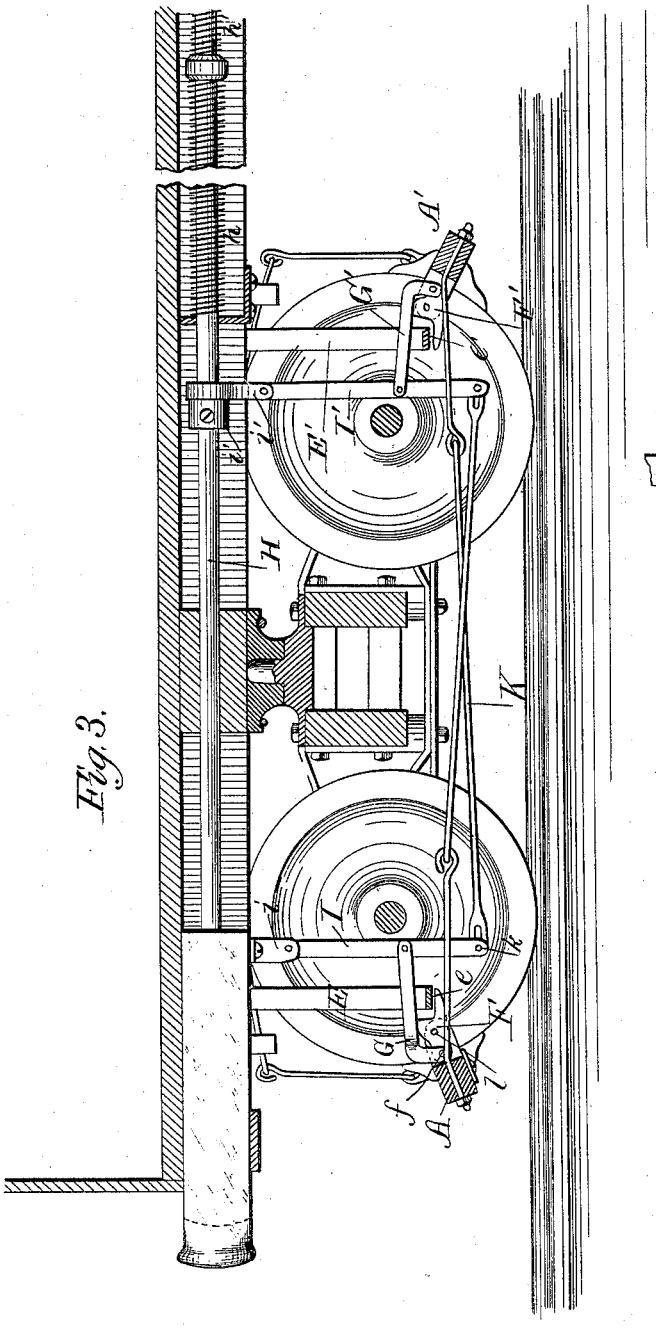

Fig. 3.

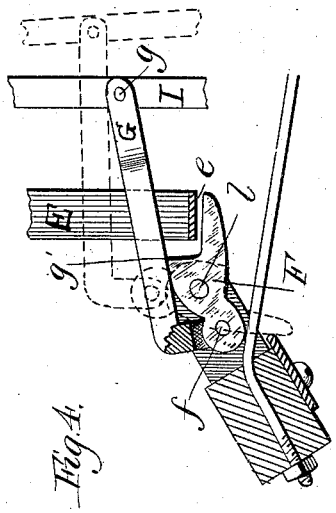

Fig. 4.

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(No Model.) 4 Sheets—Sheet 4.

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AUTOMATIC CAR BRAKE.

No. 301,200. Patented July 1, 1884.

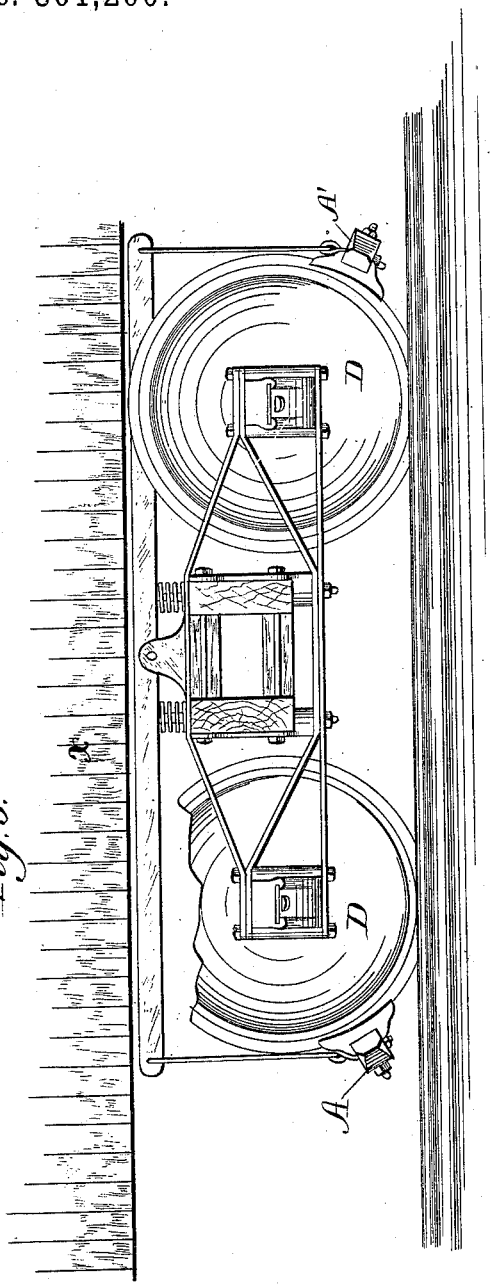

Fig. 5.

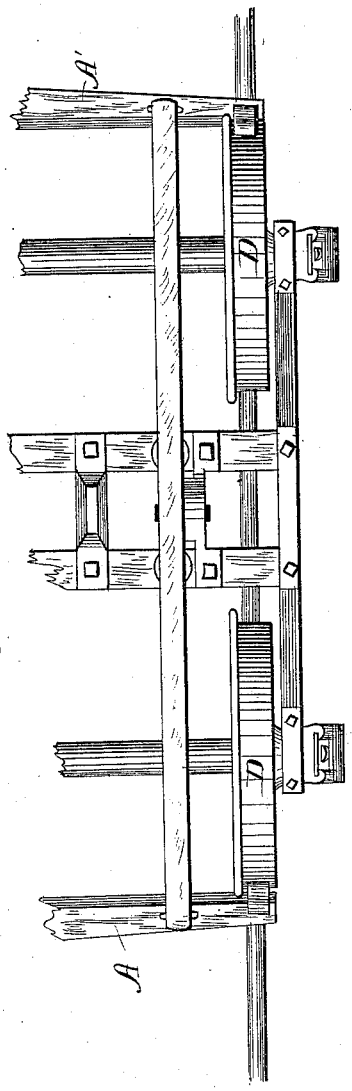

Fig. 6.

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UNITED STATES PATENT OFFICE.

FRED F. ARNOLD, OF CHICAGO, ILLINOIS.

AUTOMATIC CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 301,200, dated July 1, 1884.

Application filed February 23, 1883. (No model.)

To all whom it may concern:

Be it known that I, FRED F. ARNOLD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Car-Brakes, of which the following is a specification.

My invention relates to automatic car-brakes, or brakes that work automatically in unison with the motion of the locomotive; and the object of my invention is to construct a brake that will at once act automatically with a positive and direct action when the speed of the locomotive shall be checked by the engineer, and shall continue to act until the train has come to a standstill, or until the engine shall be made to make a new forward motion; and, further, a brake that as soon as the train shall have stopped will allow the train to be again set in motion in either direction, backward or forward, the brake being automatically released by said backward or forward motion of the locomotive or train. I attain the objects by the mechanism illustrated in the drawings accompanying this specification, and which form a part thereof, in which—

Figure I is an elevation showing the manner in which the brake-beams may be hung on the cars, and also the manner in which the brake is applied to the car-wheel. Fig. II is a plan of a part of the mechanism used by me in constructing my invention. Fig. III is a section on line 3 3 of Fig. II. Fig. IV represents, on a larger scale, the arms or levers whereby the automatic releasing of the brake is secured when the motion of the train is reversed.

Like letters refer to like parts throughout the several views.

The frame-work of the car supports or maintains the brake-beams A A′ through the medium of springs B B′ or other equivalent device and rods or chains *b b′*. The purpose of springs B B′ is to allow brake-beams A A′, carrying brakes *a a′*, to have a slight upward motion or to rotate with the car-wheels D D′ when its motion or rotation is reversed from the motion which wheels D D′ had at the time the brakes were automatically applied, and is a well-known method of attaining this result. Hangers E E′ or their equivalent serve as a fulcrum, at point *e e′*, for levers F F′ when the motion of the car is so reversed. Arms or bars G G′ connect levers F F′ to levers I I′. Through the center of the car is placed draw-bar H, held in proper position by springs *h h′*. Suspended from draw-bar H, by means of journal or bearing *i i′*, are levers I I′. Lever I and lever I′, with all the connections made thereto, are identical in their character and purpose, one being intended to operate while the car is in motion in one direction, and the other while the car is in motion in the reverse direction. For this reason I shall describe only lever I and its connections and the manner of operation of the same. Lever I is connected with lever, arm, or bar G at point *g*. Arm or bar G is connected at point *f* with lever F. Point *g* is also a fulcrum around which lever I partially turns when the brake is automatically set by the momentum of the car or car and load acting through the medium of draw-bar H. Lever I is connected at *k* with brake-beam A′ by rod or chain K. Lever F is connected at point *l* with brake-beam A. Point or journal *l* also acts as a fulcrum around which lever F turns when the brake is automatically released by the reversing of the direction in which the train or car was moving at the time the brakes were set.

Figs. V and VI show a different and well-known way in which the brakes or brake-beams may be attached to the car attaining the same result, and I consider it the mechanical equivalent of the method above described. An inspection of the drawings will sufficiently indicate its method of operation.

In order to explain the action of my improved automatic car-brake, I assume the train to be moving in the direction of the arrow in Fig. I. By the action of springs *h h′* the draw-bar H is in the center of the car. The car-wheels revolve in the direction of the arrow, as shown in Fig. I. The motion or speed of the locomotive is slackened, and the momentum of the car carries the car-body X, with its load, and the draw-bar H forward against the draw-head of the locomotive or tender. Draw-bar H strikes against or runs into the said draw-head and the speed of draw-bar H is checked. The trucks, body of the car,

and load, if any there be on the car, are still carried forward by their momentum, spring *h* not being of sufficient power to prevent the same, this being the ordinary manner in which the momentum of the train is utilized, through a sliding draw-bar, in order to automatically set a brake. By this forward movement of the car or the backward movement of the draw-bar H, as I shall consider it, in the body of the car, lever I is carried backward at points *i*, turning or rotating on point *k*. Lever G is carried backward by lever I, lever G carrying backward, by means of the connection at point *f*, lever F. Lever F, while being thus carried backward, has a tendency to revolve, in a direction contrary to the movement of the hands of a clock, around pin *l*. This tendency to revolve in this direction is caused by the relative positions of points *f*, *g*, and *l*, and by the action of brake *a*, pressing against car-wheel D, rotating as shown in Fig. I, the brakes are prevented from accidentally unlocking. This rotating or tendency to rotate in lever F is checked by the top of upper side of said lever F coming in contact with the bottom or lower side of the lever G. Lever F in its backward motion carries with it brake-beam A, and sets brake *a* against car-wheel D. As brake-beam A becomes thus set against car-wheel D, as just described, the backward motion of lever F and bar G is arrested and the further backward movement of draw-bar H causes lever I to rotate around point or journal *g*, giving to point *k* on said lever I a forward motion, thus carrying forward bar or chain K and setting brake *a'* against wheel D' of the car through the medium of brake-beam A'. Both brakes are now set on the car, and will continue thus set, arresting the forward motion of the car until the pressure from the draw-bar H is removed. The train will thus come to a stand still. If the locomotive is again started forward, the draw-bar is again pulled forward, and the pressure on the brakes thus released, when the car is at liberty to proceed forward. If the motion of the locomotive is reversed, the brake *a* still set fast to car-wheel D, is carried upward or rotates with car-wheel D. In this rotation or upward movement (shown by the dotted arrow on car-wheel D) it carries brake-beam A upward. As the brake-beam A is carried upward, lever F is also carried upward at point *l;* but as fulcrum E prevents that part of lever F in contact with it from being carried upward, a rotary motion is imparted to said lever F around point or journal *l* and fulcrum E. This rotation of lever F is continued until point *f* is carried above a line passing through points *l* and *g*. The instant this position is reached the backward strain on lever G causes lever F to further revolve suddenly, and this further revolution releases the brakes from the car-wheels, and the car may proceed without resistance from the brakes. When the motion of the car is in an opposite direction from that just described, lever I' and its connections perform the same functions as here described with lever I.

Having thus described my invention and its manner of operation, what I claim, and desire to secure by Letters Patent, is—

1. In an automatic car-brake, a compound lever, to one end of which compound arm or lever is attached a brake-beam, and to the other end of said compound arm or lever strain or tension may be applied, the compound arm or lever being composed of two simple arms or levers, the one attached to the other and forming a continuous compound arm or lever to which a direct strain or tension may be applied, while a rotary movement in the other end of either of said simple arms or levers around said point of attachment shall unlock said compound arm or lever and lengthen the same, the whole arranged, operated, and controlled substantially as described, and for the purpose specified.

2. In an automatic car-brake, a draw-bar extending the whole length of the car and projecting at the ends, and held in proper position in the car by springs, in combination with operating lever or levers suspended from said draw-bar, said suspended lever or levers being connected to a brake beam or beams by means of the compound arm or lever described and shown, or its equivalent, the whole arranged, operated, and controlled substantially as described, and for the purpose specified.

3. In an automatic car-brake, the combination of a draw-bar having levers suspended therefrom, one of said suspended levers being connected to a brake-beam by means of the compound arm or lever described and shown, or its equivalent, the other of said suspended levers being connected to a second brake-beam by means of a like compound arm or lever, each of said suspended levers being connected to the other brake-beam of the car, the whole arranged, operated, and controlled substantially as described, and for the purpose specified.

4. In an automatic car-brake, the combination of a draw-bar having levers suspended therefrom with the brake-beams of the car, each of said suspended levers being connected to a brake-beam by means of the compound arm or lever described and shown, so that an upward motion in said brake-beam will cause a rotary movement in one of the two arms of said compound lever around their point of attachment, and each of such suspended levers being connected to the other brake-beam, the whole arranged, operated, and controlled substantially as described, and for the purpose specified.

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