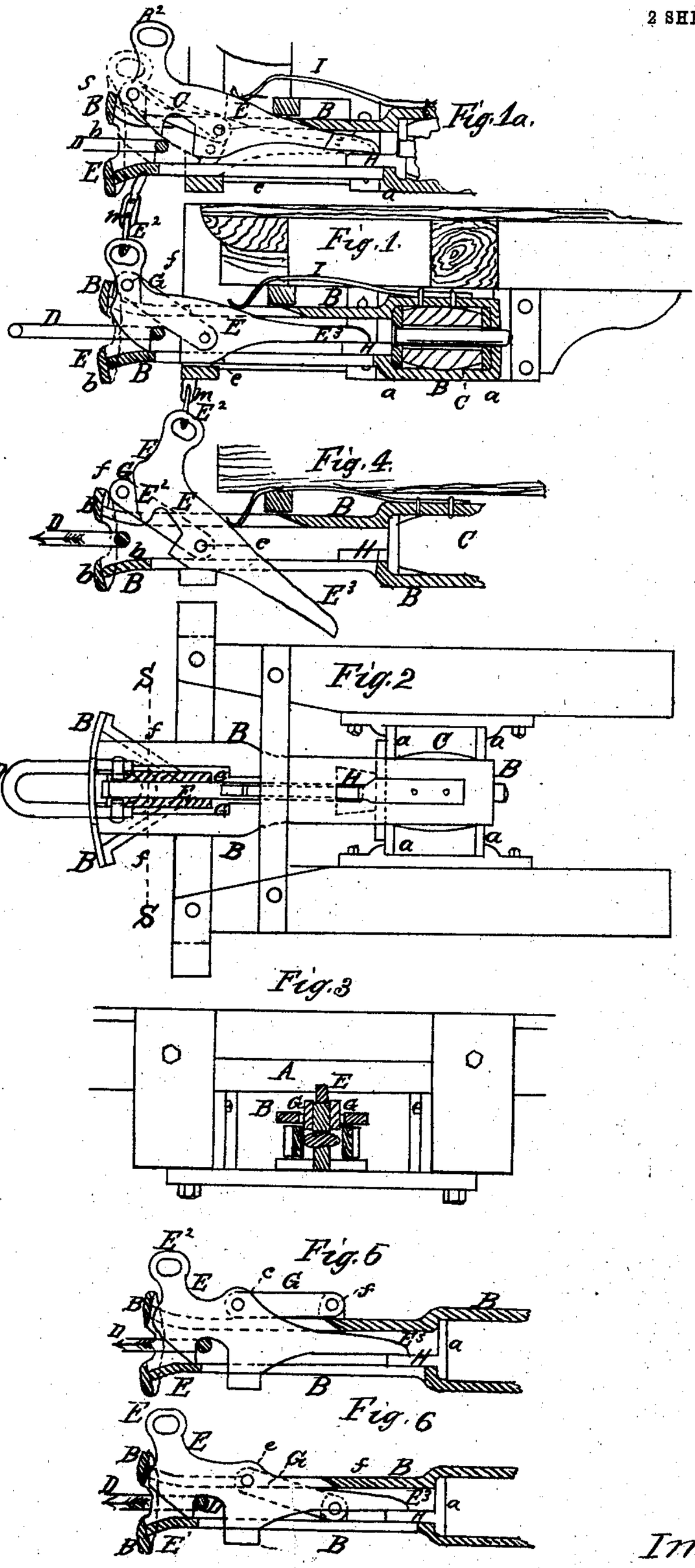
No. 80,271. PATENTED JULY 28, 1868.

# C. T. BURCHARDT.
# CAR COUPLING.

2 SHEETS—SHEET 1.




Witnesses
C. C Lungs
M C Dey

Inventor
Charles T Burchardt

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# C. T. BURCHARDT.
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2 SHEETS—SHEET 2.

Fig. 7a

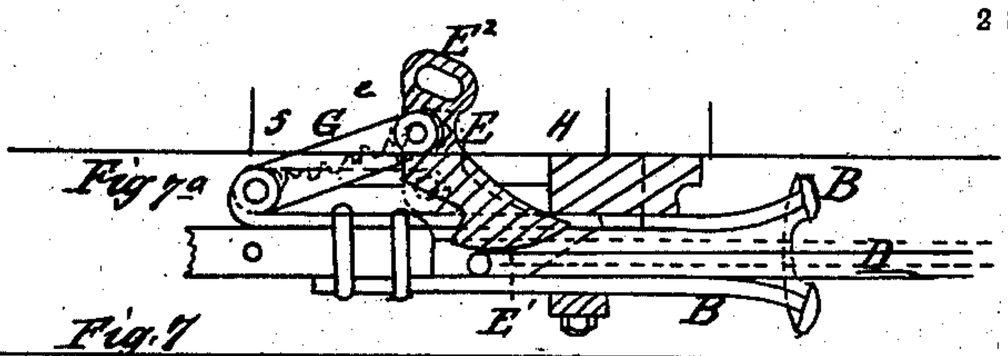


Fig. 7

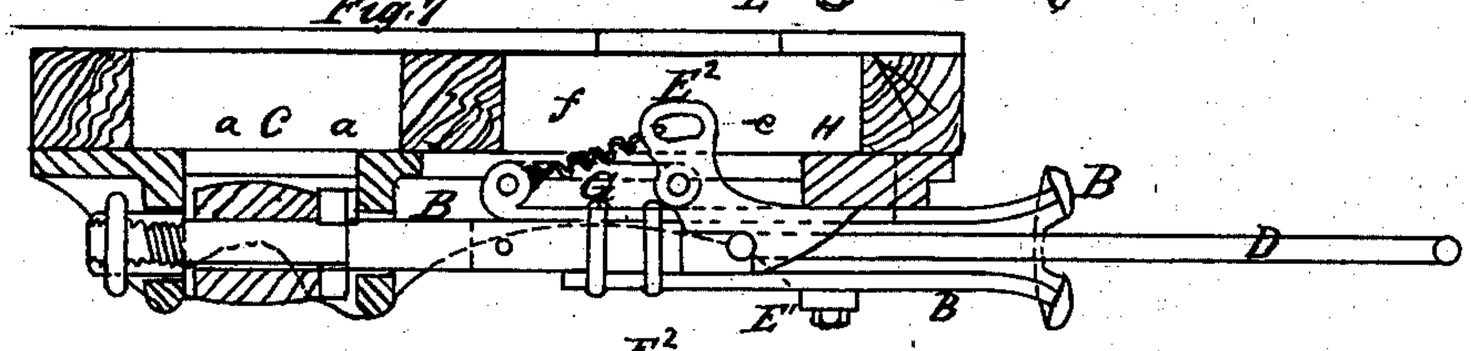


Fig. 11

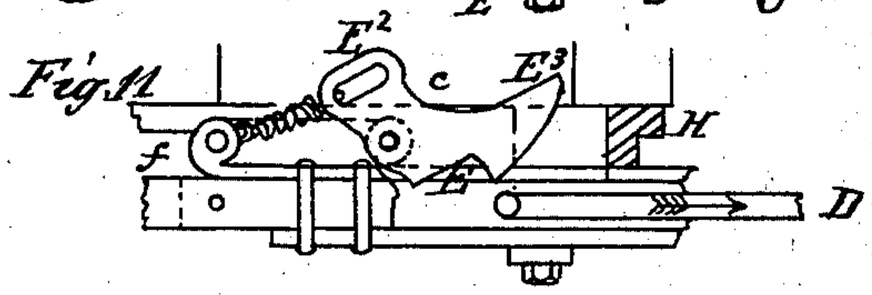


Fig. 8

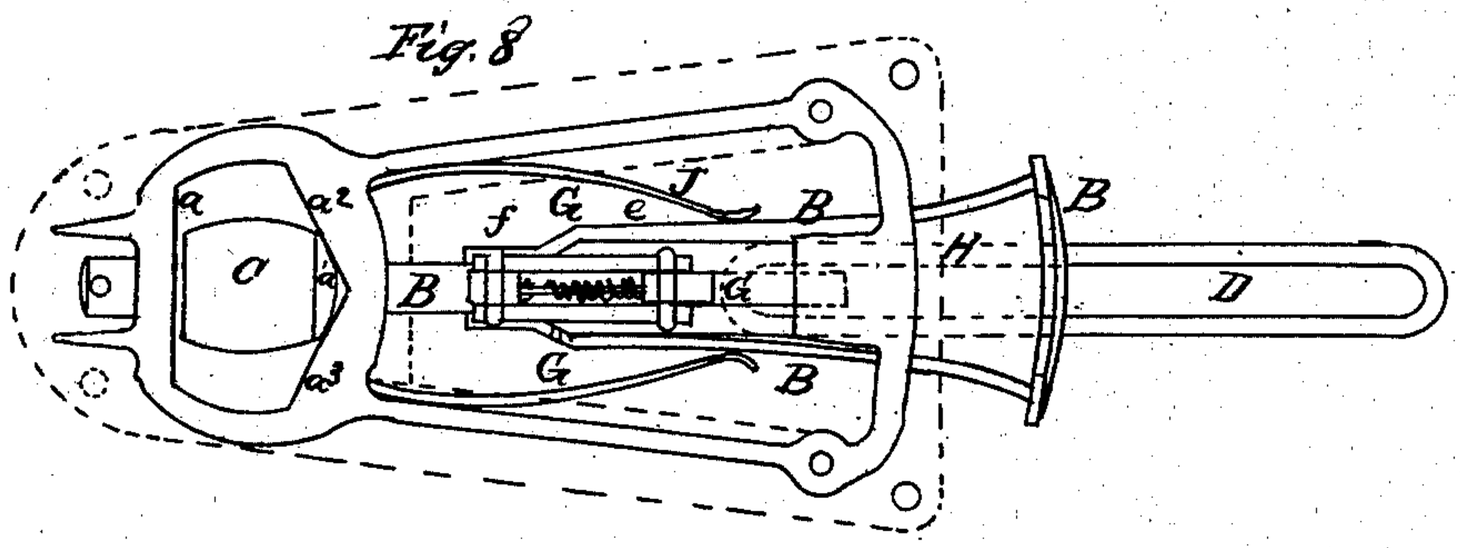


Fig. 9.

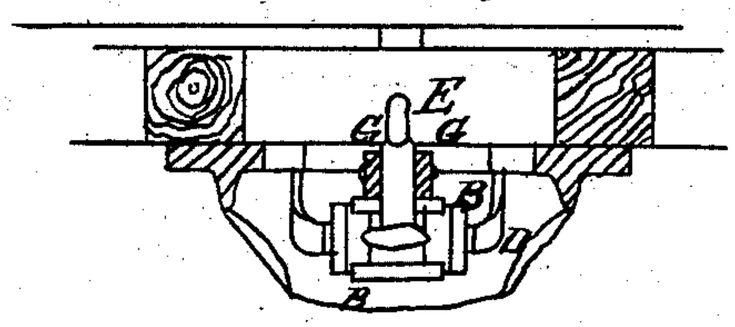


Fig. 10

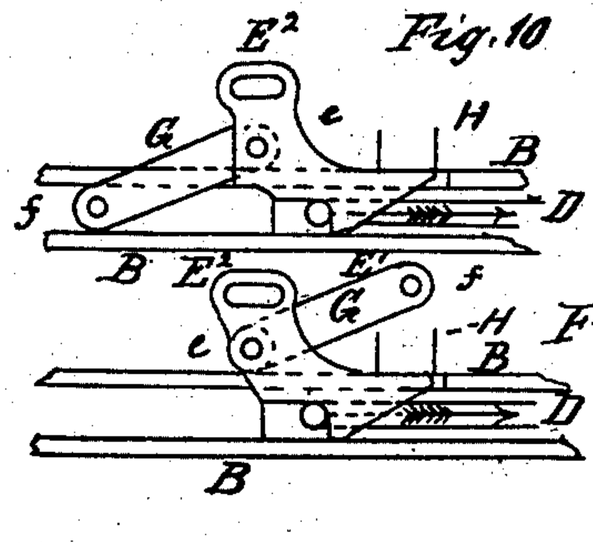


Fig. 12.

Witnesses
C. C. Livings
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# United States Patent Office.

CHARLES T. BURCHARDT, OF NEW YORK, N. Y.

*Letters Patent No.* 80,271, *dated July* 28, 1868.

## IMPROVED CAR-COUPLING.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, CHARLES T. BURCHARDT, of the city and county of New York, in the State of New York, have invented certain new and useful Improvements in Car-Couplings; and I do hereby declare that the following is a full and exact description thereof.

My invention is adapted to provide two of the important qualities in car-couplings, universally recognized as such, and in a manner more practicable and convenient than has been before known. These qualities are—

First, that of being self-coupling, and,

Second, that of being self-detaching in case of getting off the track.

I will first describe what I consider the best means of carrying out my invention, and will afterwards designate the points which I believe to be new therein.

The accompanying drawings form a part of this specification.

Figure 1 represents a vertical longitudinal section of one form of my car-coupling, with the car-link being in connection with the hook of the coupling.

Figure 1ª is a corresponding section, showing the hook of the coupling in position raised to receive the car-link for connection.

Figure 2 is a top view of the same.

Figure 3 is a cross-section, on the line *s s*, in fig. 2.

Figure 4 is a longitudinal section, showing the car-link detaching itself and escaping from the hook, the strain having been brought to one side by a car running off the track.

Figures 5 and 6 represent vertical longitudinal sections of modifications of the construction of the coupling, varying in the manner of attaching the hook of the same.

Figure 7 is a vertical longitudinal section, showing the hook of the same in a different form.

Figure 8 is a top view, and

Figure 9 a cross-section of the same.

Figure 7ª is a central longitudinal section, showing the hook in the act of being connected to the car-link.

Figure 11 shows the car-link delivering itself from the hook, in case of accident.

Figures 10 and 12 exhibit modification of the coupling, varying in the manner of connecting and holding the coupling-hook.

Similar letters of reference indicate corresponding parts in all the figures. Tints are employed merely to aid in distinguishing parts, and do not necessarily imply differences of material. The material of all the metallic parts may be of iron.

A is a part of the body of the car, and *a a* are the slides in which the coupling, which may be of the ordinary character at this part, moves forward and backward, according as it is pressed inward or drawn out by the forces to which it is subjected.

B is the main framework of the coupling. I will describe it as the spring-frame. It is widened and faced at its outer end, *b*, to receive and transmit force from one car to the other, and it is suspended, so as to be free to move forward and back, as above indicated.

C is a rubber spring, mounted in the ordinary approved manner, with an improvement, which will be described below, and D is the link which connects this car with another, when required.

E is a peculiarly-formed and peculiarly-mounted hook, which, with its adjuncts, forms one of the chief novel portions of my coupling.

I will designate the several parts by distinguishing marks, E¹, &c., below.

G G are links, connected by a pin, *e*, to the hook E, and by pins, *f f*, to the spring-frame B of the coupling. When the coupling is in use, the links G G are subjected to a strain, either of tension or compression, according as it is arranged. The hook E is free to turn on the centre, *e*. It is provided with a cord or chain, *m*, by which it may be lifted to uncouple. The front edge of the hook E, which lies in the spring-frame B, is inclined or

bevelled, as represented, so that, on forcing in the link D against this inclined face, the hook is lifted, and the coupling is effected by the automatic dropping of the hook again into place, as soon as the link D has passed in, and without the aid of the attendants.

I designate this acting part of the hook by $E^1$. It is square on the rear face, and bevelled on the front face. The bevel of the front face is only important when it is desired to use the device as a self-acting coupling. The rear face is subjected to the whole strain transmitted through the link when in use.

I designate the arm, or part to which the cord *m* is attached, by $E^2$. This must be so situated as to present a reasonable leverage for lifting the part $E^1$. It is not ordinarily practicable to uncouple, either with my device or any other, while the cars are being pulled apart with full force. In ordinary practice, the steam is shut off, and the cars are allowed to slacken the couplings, before it is practicable to uncouple. My coupling must be operated in the same manner in that respect.

$E^3$ is a portion of the hook which performs an important function, not yet referred to, that of keeping the hook in place while in use. The pull of the link D on the part $E^1$ induces a tendency in the hook to partially revolve around the centre, *e*. This is resisted so long as the pull on the link D is in line, or nearly in line, with the centre line of the car. This resistance is offered by a stout metal part, H, the width of which is limited. When the cars are travelling on a straight portion of the road, or even on a sharp curve or switch, or are moved over the ordinary inequalities of the track, the link D is pulled in line, or nearly in line, with the centre line of the car. But when, in consequence of a car leaving the track, the link between it and the succeeding car is pulled at a very great angle, the link D, with the spring-frame B and its connections, is drawn to one side to such an extent that the bearing-surface $E^3$ of the hook travels past the edge of the bearing-piece H. When this condition is attained, the hook E is free to turn, and it is turned on its centre *e*, and liberates the link D, thus uncoupling the cars.

The location of the narrow bearing H, and the form of the hook and of the bearing part $E^3$, which rests against the piece H, may be varied indefinitely. It is only essential that the surface H be fixed on the car A, or on some part connected therewith, so that it shall stand independent of the side-motion of the hook and its connections, and that the hook, especially that part of it which bears against the surface H, and which I have designated as $E^3$, shall be drawn to one side or the other sufficiently to pass clear of the surface H, when the link D is drawn at too great an angle to either side.

I have represented in the figures two principal modifications, which I consider preferable to any other forms in which the invention may be carried out. The above general description applies with sufficient accuracy to each, but a few words will be devoted to the differences.

Referring to figs. 1 to 4, the strain on the links G G is compressive, that is, it tends to crush the links in the direction of their length, and make them shorter. The links being sufficiently strong to endure all such strain to which they can be subjected, it will be observed, from their position and arrangement, that the angle at which they stand when the coupling is in use tends to hold the centre-pin *e* down with considerable force. It would require a great strain on the cord *m* to uncouple the car while the coupling is subjected to any considerable strain, because the operation of uncoupling, by drawing up the part $E^2$, moves the acting part $E^1$ of the coupling-hook backward, or, in other words, the links G G, in swinging apart, swing the centre, *e*, to a certain extent backward, as well as upward, in the spring-frame B. I will presently show that a backward motion closely analogous to this is induced in the act of uncoupling the other form of my device. In either form, the fact that a backward motion of the link is involved in the act of uncoupling, avoids the possibility of the coupling detaching itself under any direct strain short of that required to break the parts.

When the link D, in figs. 1, 2, 3, and 4, is drawn severely to one side, it swings the spring-frame B and its connections to that side, and the part $E^3$ of the hook moves therewith to one side or the other, to a limited extent, without uncoupling. But, although the part $E^3$ of the hook is near the spring C, or, in other words, near the centre of the swinging motion, it is still sufficiently removed to produce the effect intended; that is to say, the part $E^3$ of the hook E moves sensibly to the right and left, as the spring B and its connections are correspondingly moved, and the width of the bearing H being made narrow, the part $E^3$ slips off the edge of the part H whenever the spring-frame is drawn too much to either side. The moment the part $E^3$ slips off the bearing H, it drops down, both by the action of gravity and by the force of the link D, which tends to turn the hook on its centre. The dropping-motion of the part $E^3$, and the corresponding lifting of the part $E^1$, release the link D, and the cars are uncoupled.

Referring to figs. 7 to 11, although a very different form of the hook and a somewhat modified arrangement of the parts are introduced here, the action is substantially the same as above described. Here the acting part $E^1$ of the hook is further back in the spring-frame B, and the link D requires to be longer. This is of trifling consequence. The strain on the links G G, instead of tending to crush, as in the previous example, here tends to stretch or rend the links, and, instead of drawing the links at an angle, it draws them in a line nearly or exactly parallel to the line of strain on the link D. These links rest on the upper surface of the spring-frame B in such manner that they cannot sink lower. The only way in which they can turn is to rise. In the act of uncoupling, the part $E^2$ being drawn upward, the links G G turn on the fixed pins *f*, and the centre *e* of the hook is drawn back as before. This motion, as also the peculiar relation of the hook to the bearing-surface H, in this form of the invention, answers a very sufficient backward motion of the active part $E^1$ of my hook in the act of uncoupling, as shown in fig. 7ª.

In this form of the invention, the surface H should be wider than in the form before described. It is mounted at a greater distance from the centre of motion. The bearing-surface $E^3$ of the hook is, in this form, in close proximity to, and in fact may be described as forming a part of, the active part $E^1$ of the hook. The strain due to the tension of the link D against the surface H is upward. When, in this form of my invention,

the link is drawn too much to one side or the other, so that the bearing-surface $E^3$ slips off the edge of the bearing H, the surface $E^3$ rises, instead of falling, as before, but this motion instantaneously liberates the link D, and uncouples the car. As I have drawn the parts in this specification, the liberating-motion will be more prompt and positive with this form of the invention than with the other. It will be understood that, in the act of coupling with the last-described form of my invention, the link D is pressed against the inclined surface of the part $E^1$, and lifts it, and the hook E rises and lifts the links G G. It may be said to turn around the bearing H as a centre. It will be observed that, in the other form of my invention, the action is precisely equivalent in this respect. The forcing in of the link D lifts the hook, which, in this case also, may be said to turn on the bearing H as a centre.

With either form of my coupling, I employ side-springs, J, (see fig. 8,) which tend to keep the coupling always in a central position. I also adopt a form and arrangement of the parts immediately about the main bumper-spring C which greatly assists in effecting the same, and is able even to effect this alone. It will be understood that the force of the spring or springs holding the spring-frame B and its connections in or near the central line of the car, as now referred to, must not be so great as to prevent its being deflected greatly one side or the other, when a car leaves the track.

Referring to fig. 8, $a$ $a^1$ are the front and back plates to the spring C. The front plate $a^1$ is rounded at the front, as shown, and the corresponding face or surface of the framing A, or its attached castings, is bevelled, as shown at $a^2$ $a^3$. While the spring-frame B and its contents maintain the central position, the plate $a^1$ rests in the angle between the bevels $a^2$ $a^3$, but when the spring-frame is deflected to either side, it traverses, as is obvious, upon one or the other of these bevels, and is thereby more compressed. It follows that the peculiar construction and arrangement tends to hold the spring-frame at or near the central line, and, when it has been deflected, tends to return it to such line. Thus it performs an important and useful function in this respect.

I can either build new bumpers or alter those already in use. I can set the hook close to the front bumper-plate, or more back, so as to conform to the use of short or long links. I can arrange the fixed point around which the hook swings, in case of running off the track of one car, above, or below, or in line with that point which the link works on, but always on one end of one or more connection-bars of which the other end is hinged on the bumper in such a way as to allow the raising of the first end of this bar for letting the link pass while attaching a car.

I can form the second support, H, of the hook on a place in front of the hook, or in rear of it, but always on the stationary parts of the car, so as to allow a movement of the bumper forward and backward, as may be produced by the pull or push of the cars, without interfering with the working of the self-attaching and self-detaching arrangement, and I may decrease or increase the width of this second support, to conform with the curves used on a road, so that, while traversing such curves, the self-detaching apparatus does not operate, but will act the moment a car runs off the track.

I attach some importance to the use of a weak spring, as I, in fig. 4, but stiff enough to keep the hook in its right position, notwithstanding this effect will be produced by the weight of the hook and connection-rod or rods.

Further, I use springs, steel or rubber, or other suitable material, to bring back the bumper to its central position, as often as it is drawn therefrom by slight jerks, or while turning a curve, though the springs are not of sufficient stiffness to prevent the action of the self-detaching apparatus. For the same purpose, I form the new frame of my bumpers so that the main bumper-spring will be unevenly compressed when the bumper is shifted from its central position, and will have, in this way, the tendency to force it back to its proper place.

The hook is so shaped as to retain the link in or about a level position, inasmuch as the link is supported in about its middle by the inner edge of the front bumper-plate.

I do not confine myself to the use, in all cases, of the apparatus in a form that will be both self-attaching and self-detaching, but, in cases where it may be preferred, as on freight-cars, can use it with self-attaching only, and the second support, H, of the hook, or tongue, fixed on the stationary parts of the car, will, for effecting this, be widened, so that the hook cannot yield in any oblique position of the bumper.

Some of the advantages due to certain features of my invention may be separately enumerated, as follows:

First. By reason of the fact that my bearing-piece H is formed and arranged as represented, relatively to the bearing-part $E^3$ of the hook, I am able to insure the disconnection of the coupling and the separation of the car whenever one runs off the track, because the obliquity of the tension on the coupling in such case will pull the spring-frame B and its connections to one side, so as to draw the hook-bearing $E^3$ off from the middle bearing H, and allow the hook to turn and release the link D.

Second. By reason of the fact that my links G G are constructed and arranged as represented, relatively to the hook and the other parts, I am able to couple either by hand or by the automatic action above described, and also to uncouple at will, whenever the tension on the link D is relaxed, without the necessity for interfering with the relation of bearing-part $E^3$ to the middle bearing H.

Third. By reason of the fact that, in combination with the centre bearing H, and the provision for liberating the link D by side motion, as specified, my side springs J J are of moderate force, and arranged as represented, I am able to hold the spring-frame B and its connections in the central line of the car with sufficient force to insure its holding that position under all ordinary circumstances, while allowing it to be deflected by a moderate pull on the link D when thrown in a very oblique position by an accident.

Fourth. By reason of the fact that, in combination, as described, my bevelled bearings, $a^2$ $a^3$, on the spring-frame D are constructed and arranged as represented relatively to the main-spring C, I am able to still further insure the attainment of the last-described end; or I may, by these bevels, effect this end alone, without the aid of the side springs, if required.

Having now fully described my invention, what I claim as new therein, and desire to secure by Letters Patent, is as follows:

1. I claim the car-coupling, composed of the hook $E^1$, bearing-piece H, links G, and the spring-frame B, when connected with the main-spring C, all substantially as herein described and for the purposes specified.

2. I claim the bevelled or double-inclined bearings $a^2$ $a^3$, arranged relatively to the main-spring C and spring-frame B and its connections, as and for the purposes herein specified.

In testimony whereof, I have hereunto set my name in presence of two subscribing witnesses.

CHARLES T. BURCHARDT.

Witnesses:

C. C. LIVINGS,

W. C. DEY.