

descending; a plane, where a check rail is laid when their use is not necessary, and thus avoiding the wear of them. It may be found useful too on curves in an ascending plane to withdraw the cogs of the inside wheels from action, facilitating the adjustment of the wheels to the curved rails.

Now what I claim as my invention are—

1. The retreating cogs operated upon by a spring, and the manner by which they are made to operate with trifling friction, and the combination therewith of the machinery by which they are drawn into their sockets, and their application in connection with a check rail to prevent the sliding of the wheels of a locomotive on the rails of a railroad.

2. Also the application to, and combination with the moving gear of locomotive engines, of the additional wheels, and the aforesaid described spears, and supports, and gage bars, so arranged as to produce at pleasure a multiplied tractive power, as well on railroads as on common roads: But I do not claim the said spears, supports, gage bar, and wheels of different diameters by which power, and velocity are increased, and diminished for ordinary mechanical purposes, but their application, and combination only as aforesaid, nor do I claim to be the

inventor of the check rail; I contemplate the further application of the principle of this invention by making use of a flat spring instead of a spiral applied either to the head of the cog, or to the top of a rod attached thereto; the spiral spring may also be placed at the nave, and I contemplate the application of the retreating cogs to a single wheel placed in the center between the rails, and also to a rim to be made on the inside of the flange.

3. I also propose the application of this improvement to all parts of a railroad in seasons, and regions of frosts, ice, and snows, and wherever the inclination is so great as to require the reversed power of the engine to check the descent, and where the adhesion of the wheel is insufficient for that purpose, the cogs may be so formed as to take against the check rail in descending as well as ascending; another mode of working the levers which raise the cogs is by means of a hollow cone surrounding the axle seen at *p*, in Fig. 3; as it is moved forward by the gage bar the ends of the arms slide up in shallow grooves on its surface.

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Witnesses:

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