No. 609,789. Patented Aug. 30, 1898.

G. J. CAPEWELL.

AIR RESISTANCE DEVICE FOR RAILWAY VEHICLES.

(Application filed Jan. 14, 1898.)

(No Model.) 2 Sheets—Sheet 1.

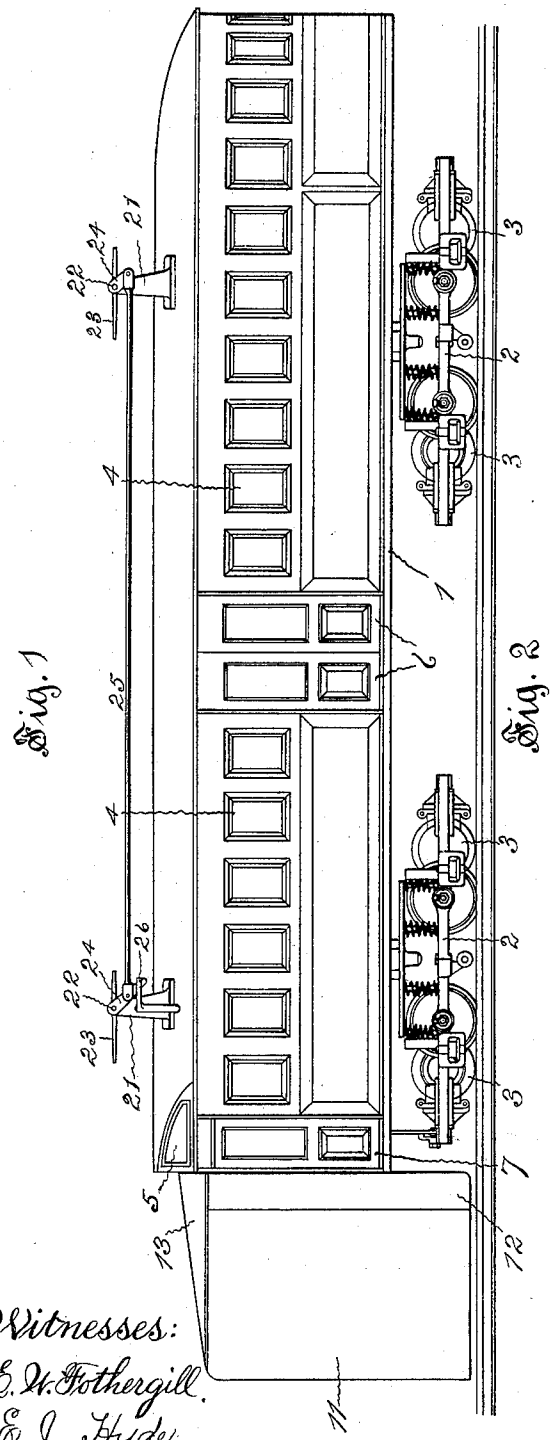


Fig. 1

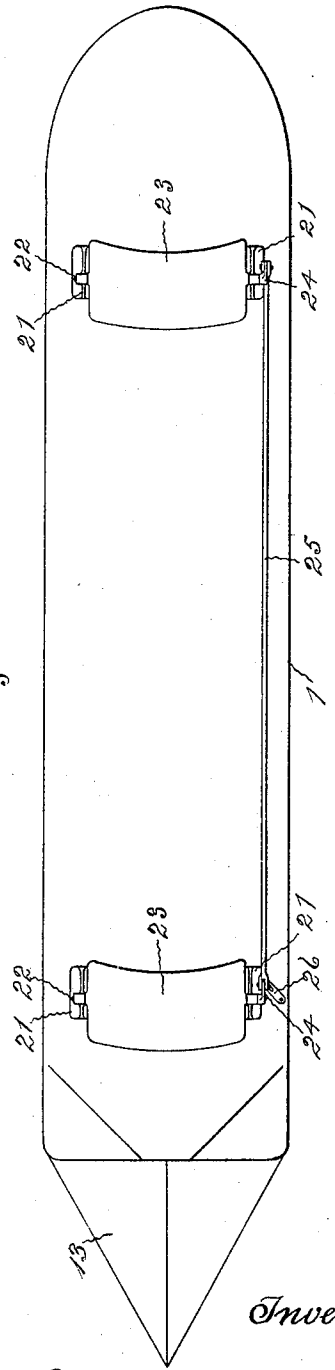


Fig. 2

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Fig. 5

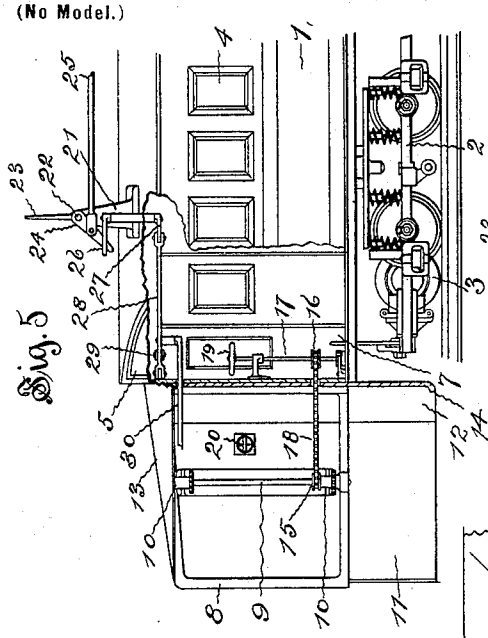


Fig. 6

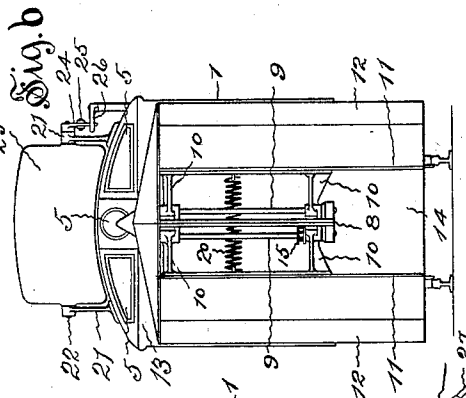


Fig. 7

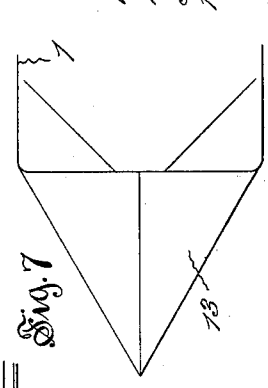


Fig. 8

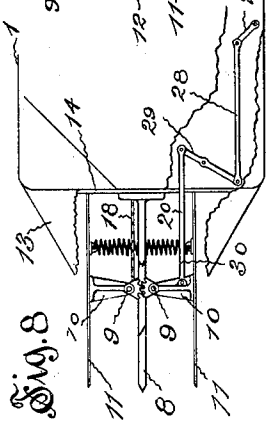


Fig. 3

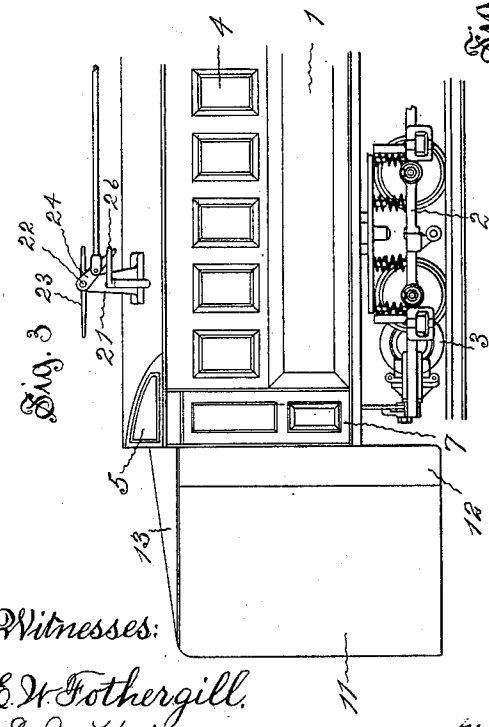
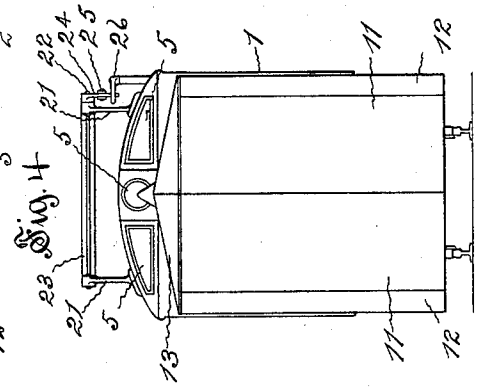


Fig. 4



Witnesses:

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UNITED STATES PATENT OFFICE.

GEORGE J. CAPEWELL, OF HARTFORD, CONNECTICUT.

AIR-RESISTANCE DEVICE FOR RAILWAY-VEHICLES.

SPECIFICATION forming part of Letters Patent No. 609,789, dated August 30, 1898.

Application filed January 14, 1898. Serial No. 666,670. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. CAPEWELL, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Air-Resistance Devices for Railway-Vehicles, of which the following is a specification.

This invention relates to a device designed to be applied to a locomotive, motor-car, or similar vehicle in such manner as to reduce the atmospheric resistance offered when traveling at high speed, and it will be changed from a form which will minimize the resistance to the atmosphere into a form which will increase the atmospheric resistance to such an extent that it may be utilized to slacken the speed of travel.

The object of the invention is to provide a simple, strong, and efficient device which can be attached to any locomotive, motor-car, or similar vehicle employing steam, electricity, compressed air, or other motive power in such manner that it may be easily and quickly changed by the engineer, driver, or motorman in charge from a form which will reduce to a minimum atmospheric resistance to the movement of the vehicle when traveling at high speed to a form which will greatly increase the resistance, thus enabling reduction of speed of the vehicle from a very rapid rate to a less rate without the application of wheel or track brakes.

The invention illustrated in the accompanying views has a wedge-shaped deflector connected point first with the front end of a motor-car, so that it will cut into and turn aside the atmosphere which it meets when running at a rapid speed, the side walls of the deflector being so hung that they can be opened and form a pocket, which will greatly increase the atmospheric resistance, and it also has wings applied to the top of the car in such manner that they will be changed from positions of minimum atmospheric resistance to positions which greatly increase the resistance when the wedge-shaped deflector is opened to expose the resistance-pocket.

Figure 1 of the views is a side elevation of a motor-car fitted with an embodiment of the invention. Fig. 2 is a plan of this car. Fig. 3 is a side elevation of a portion of the front end of this car, showing the deflector and wings in positions of minimum resistance. Fig. 4 is a front elevation of the car with the deflector and wings in positions to minimize resistance. Fig. 5 is a side elevation of a portion of the front end of the car with parts cut away to expose the mechanisms employed to operate the resistance device. Fig. 6 is a front elevation with the deflector and wings in positions to minimize resistance. Fig. 7 is a plan showing the deflector closed to reduce resistance, and Fig. 8 is a plan of the deflector with a portion of the top wall broken away and with the movable side walls opened to increase resistance.

This invention may be applied to any class of locomotive, motor-car, or similar vehicle utilizing steam, electricity, compressed air, or other motive power and having a cab, housing, or body of any design.

In the views the device is shown as applied to a car-body 1, which is mounted upon trucks 2, that are provided with electric motors 3. This car-body has observation-windows 4, lookout-windows 5, doors 6 for the entrance and exit of passengers, and doors 7 for the passage of the motorman who will run the car.

Connected with the front end of the car-body and projecting forwardly is a vertically-arranged frame 8. Held by bearings attached to the frame are vertical shafts 9, and borne by these shafts, near the top and bottom of the frame, are brackets 10. The inner ends of these brackets are provided with gear-teeth, and they are arranged so that the gear-teeth of the two brackets in the same plane will intermesh.

Attached to the outer ends of the brackets are the movable portions 11 of the side walls of the deflector. The stationary portions 12 of the side walls of the deflector fill in the spaces between the back edges of the movable portions and the front corners of the car-body. The side walls of the deflector extend vertically from just above the plane of the rails to just below the roof of the body. Projecting forwardly from the body, just below the lookout-windows to the front end of the frame, is the top wall 13 of the deflector. This top wall is formed of triangular sections that decline toward the front and slope downwardly

toward the sides. Attached to the front end of the body, back of the frame, is the rear wall 14 of the deflector. The walls of the deflector are formed of as light thin material as possible having the requisite strength, so that they will not weigh down the forward end of the car.

A sprocket-wheel 15 may be mounted upon one of the vertical shafts 9, and passing around this sprocket-wheel and a sprocket-wheel 16 on the shaft 17 in the interior of the car is a sprocket-chain 18. A hand-wheel 19 may be provided for rotating the shaft 17, or this shaft may be so connected as to be rotated by electric power or compressed air from the air-brake pump.

The rotation of the shaft 17 through the sprocket wheels and chain rotates one of the shafts 9, which, through the toothed segments, rocks the brackets 10 and swings the movable portions 11 of the side walls of the deflector. When these connections are moved in one direction, the movable walls are swung so as to meet along their front edges and form a sharp vertical wedge, and when the connections are moved in a reverse direction the movable walls are swung away from each other, so as to open a pocket between them and the top and rear walls of the deflector. A spring 20 may be connected with the movable walls of the deflector to aid in the opening.

Brackets 21 are secured to the outside of the roof of the car, and borne by these brackets are shafts 22, upon which are mounted wings 23. On the ends of these horizontal shafts are rocker-arms 24, which are connected by a rod 25, so that the wings may be moved together. Engaging with one of the rocker-arms 24 is an arm 26, that is supported by bearings in the roof of the car-body and is adapted to be oscillated by a rocker-arm 27, that is connected by a rod 28 with one end of the lever 29, the other end of which is connected with the rod 30, that is attached to one of the brackets 10. By means of these connections when the movable portions of the side walls of the wedge-shaped deflector are opened the wings will be simultaneously rotated upon their horizontal axes and made to stand vertical and offer a further resistance to the atmosphere, and when the deflector side walls are closed the wings are rotated so as to lie horizontal, with their top edges toward the front of the car in positions of minimum resistance.

When a locomotive, motor-car, or similar vehicle is run at a high rate of speed—one hundred miles or more per hour—the resistance of the atmosphere becomes a feature of importance. The present invention can be fitted to such a vehicle, so as to reduce this resistance to a minimum, and can also be employed to slacken speed from high rates to less rates, so that it will be unnecessary to apply wheel or track brakes until the speed is reduced to such an extent that the friction-brakes will not be severely worn when applied to bring the vehicle to rest.

The application of this invention to locomotives, motor-cars, or similar vehicles will enable such to travel at high rates of speed without requiring much greater expenditure of power in overcoming atmospheric resistance than at present and without necessitating an increase of brake-applying power or wasteful destruction of brakes in bringing them to a stop.

The device and the connections illustrated are simple to manufacture and apply. They do not materially load down the forward end of the car. They can be changed easily and quickly by hand, if necessary, from a form which will minimize resistance to a form which will greatly increase resistance, and the parts which can be made to accomplish this are so arranged that they will not readily get out of order.

I claim as my invention—

1. In combination with a locomotive, motor-car, or similar vehicle, a vertically-arranged wedge-shaped deflector having movable side walls connected with the front end of the vehicle, and mechanisms for moving the side walls in opposite directions from oblique to the line of travel and at an angle with each other to parallel with the line of travel and each other, substantially as specified.

2. In combination with a locomotive, motor-car, or similar vehicle, a wedge-shaped deflector having horizontally-movable walls connected with the front end of the vehicle, and mechanisms for opening the front edges of the walls from and closing them against each other, substantially as specified.

3. In combination with a locomotive, motor-car or similar vehicle, a wedge-shaped deflector having vertically-arranged side walls mounted so that they may be swung toward each other to form a wedge or swung from each other to form a pocket, and mechanisms for swinging the side walls, substantially as specified.

4. In combination in a locomotive, motor-car or similar vehicle, a vertically-arranged wedge-shaped deflector having movable side walls connected with the front end of the vehicle, mechanisms for moving the side walls, wings mounted upon the roof of the vehicle, and connections between the wings and the walls of the deflector whereby they are moved simultaneously, substantially as specified.

5. In combination with a locomotive, motor-car or similar vehicle, a vertically-arranged wedge-shaped deflector having movable side walls connected with the front end of the vehicle, mechanisms for moving the side walls in opposite directions, wings movably mounted upon the roof of the vehicle with their axes extending horizontally, and connections between the wings and the walls of the deflector whereby they are moved simultaneously, substantially as specified.

6. In combination in a locomotive, motor-car or similar vehicle, a vertically-arranged frame secured to the front end of the vehicle, vertically-arranged shafts supported by the frame, brackets projecting from the shafts, walls attached to the ends of the brackets, and mechanisms for oscillating the shafts and brackets so that the walls may be swung toward each other to form a wedge and from each other to form a pocket, substantially as specified.

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