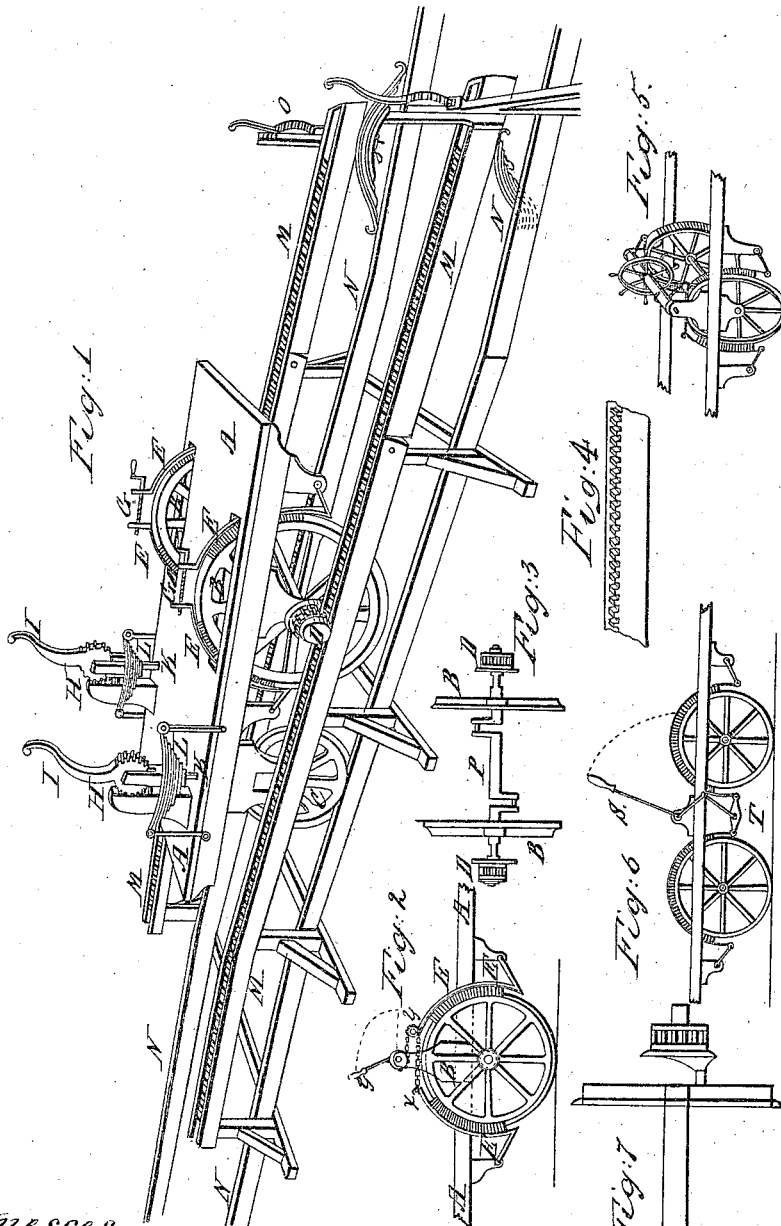


*E. F. Aldrich,*

*Inclined Railroad,*

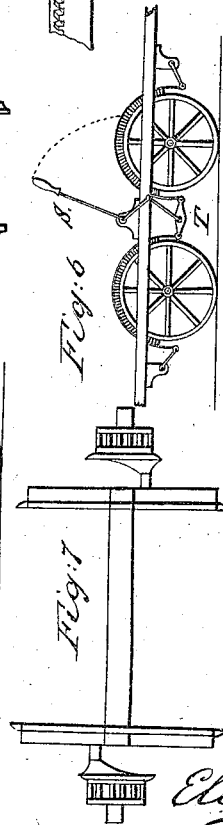
*No. 426,*

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Witnesses

*Abel S. Smith*  
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Inventor

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# UNITED STATES PATENT OFFICE.

ELISHA F. ALDRICH, OF NEW YORK, N. Y.

## METHOD OF ASCENDING AND DESCENDING INCLINED PLANES ON RAILROADS WITH LOCOMOTIVE-ENGINES.

Specification of Letters Patent No. 426, dated October 12, 1837.

*To all whom it may concern:*

Be it known that I, ELISHA F. ALDRICH, of the city, county, and State of New York, have invented a new and Improved Mode of  
5 Ascending and Descending Inclined Planes, upon Railroads, with a Locomotive-Engine; and I do hereby declare that the following is a full and exact description thereof.

Upon any railroad where the inclination  
10 takes place, outside of the main track a raised foundation is to be constructed, of wood or any other material that may be found most useful; upon said raised foundation, a rail is firmly attached, and is to be  
15 used in ascending, (and if a single track railway) in descending the inclinations by the locomotive engine.

N N, Figure 1, represents the main track upon which all the cars run as well as the  
20 forward wheels of the locomotive; M, M, Fig. 1, represents the raised rails resting upon wooden posts which are framed into the cross timbers; on the top of the posts, string pieces are framed, to which the iron rails are  
25 made fast. The raised rails are to be of cast iron in the center of which, sockets, or holes, are left running through or to a sufficient depth, to receive the cogs or projections upon the small wheels, which are to be  
30 used upon said rails: The rails may be cast with projections upon their upper surface, in which case the small wheels will be made with holes instead of cogs; the flat surface each side of the sockets or projections is to  
35 be of any width that may be found most useful; the small wheels D, D, Fig. 1, 3, are to be placed upon the ends of the axle of the driving wheels of the locomotive engine; the center of the peripheries of the  
40 small wheels, are to be made with holes, cogs or pins, to fit the rails, as described above; the flat surface each side of the holes cogs or pins upon the wheels, is to rest upon the flat surface. Each side of the projections or  
45 sockets upon the rails; upon which the said wheels run in ascending and if a single track road in descending the inclinations. If cast iron should be found too weak for the cogs upon the small wheels, sockets or holes  
50 are left into which steel or wrought iron cogs or pins are placed and keyed fast, the cogs holes or pins do not take effect as soon as the small wheels touch the raised rails, to ease the concussion that takes place when

the small wheels touch the raised rails, 55  
springs may be placed under the ends of said rails as represented in Fig. 1, by S S, in this case it will be necessary to joint the rails some distance from the ends as shown in Fig. 1. To get rid of the difficulty of  
60 running on to the raised rails the ends may be raised up and down by means of levers; O, O, Fig. 1, represents the levers which are made circular at the ends, on which cogs are made to work into racks which are made  
65 fast to the raised rails, or on which the rails rest; the levers may be either simple compound or circular; if it should be necessary to adopt this plan of getting upon the raised rails, the engine would stop at the  
70 proper place then by raising the ends of the rails, the large or driving wheels are raised from the main track to a sufficient height to keep the water in the boiler level when the small wheels D D D rest upon the rails M, 75  
M, M. When an inclination is to be descended upon a single tracked railway, the engine is to be turned or the forward part raised with the exception of the forward  
80 wheels to raise the forward part and keep the forward wheels upon the main track I have affixed levers in the following manner; K K represents large bolts or bars which run through the frame and are made  
85 fast to the bearings of the forward wheels, the springs L L, should be made double in order to allow the racks H H, and the bolts K K, to pass between them, the levers I I, are so fixed in the top of the bolts that they may  
90 work into the racks H H, which are made fast to the frame of the engine the bolts are made to slide in the frame, the bearings slide the same distance in order to allow the  
95 levers I I to be brought from a perpendicular to a horizontal position by which means the frame with the boiler are raised to a sufficient height to keep the water in the boiler level, and the forward wheels remain upon the main track N N N.

In order to retard the velocity in descend- 100  
ing I have affixed brakes of the following description, E, E, E, Fig. 1 2, represent pieces of metal of a larger diameter than the wheels and so hinged to the frame that  
105 by turning the screws G G, Fig. 1, the pieces F F, are brought in contact with the circumference of the wheels; the pieces F, F, Figs. 1, 2, may be of wood or metal and are to be

screwed or otherwise fastened to E E E, in order that they may be removed, when too much worn for use.

G, Fig. 2, represents a manner of working or applying the brakes by means of a lever and chain, the chain is to be attached to E E, at X, and passed around a small roller or cylinder in E E, at Y, by bringing the lever to a horizontal position in the direction of the dotted line the brake would have the desired effect. Fig. 5, represents a perspective view of the brake just described, with the exception that the cylinder runs across the frame of the cars with a wheel in the center similar to a rudder or steering wheel of vessels. By this mode one man can apply the brakes upon both sides of the cars.

Fig. 6, represents a mode of working the brakes with a lever in such a manner that one man can apply the brakes to all four wheels at once and thereby take advantage of the adhesion of the car to the rails, the levers should be placed in the center of the car; and by bringing the levers down in the direction of the dotted line the pieces T, would be forced down and the brake would have a powerful effect upon all four of the car wheels.

Fig. 3, shows an end view of the driving wheels B B, the small wheels D D, and the axle P, the bearings may be either inside or outside of the small wheels D D D, Figs. 1, 3.

Fig. 4 shows a segment of rail with all the bearing surface on the inside; rails made in this manner would prevent the necessity of the sockets running through, as water and other obstructions would run out at the side. Pieces are to be attached to the frame of the engine upon each side and to pass over the raised rails the said pieces are made to slide and can be forced into the sockets of the raised rails by means of a lever in order to retain the train when on the ascending inclinations; followers may be so attached to the frame as to pass over the raised rails and drop into the sockets and prevent the descent of the train in case of any accident. Saw-toothed racks may be made fast to the outside of the raised rails for the above described followers to drop

into if the sockets should not give sufficient grip or hold. A rack or ratchet of this kind may be placed in the center of the main track and followers may be attached to the engine and to each car (in such a manner that they could be let down when the inclination was to be ascended) and in the right position to be drawn over the said rail. In this manner all liability to descend in case of accident on the ascending inclinations would be prevented, the followers might be thrown down upon the earth, and if properly made would do away with the necessity of having the rail in the center of the main track, the followers would be raised up when the hill was passed. S S Fig. 1 represent springs under the ends of the raised rails in order to ease the concussion when the small wheels come in contact with the raised rails in case levers for raising the ends of said rails should be found superfluous.

Fig. 7 represents an end view of the driving wheels with the crank placed between the large and small wheels, and the bearings outside of the small wheels; in placing the cranks between the wheels the parts of the wheels from the center of motion to the crank or connection are to act as the sides of the cranks, this form of crank may be more or less than the same diameter of the small wheels, but in all cases it should be connected with them as shown in Fig. 7.

What I claim as my invention and wish to secure by Letters Patent, is—

The peculiar and various modes of constructing the raised rails and wheels to fit the same, both as described above. I also claim the method or methods of keeping the water level in the boilers of the locomotive by the means and in the manner above described. I also claim the mode of working the brakes above described and represented at Figs. 2, 5 and 6 of the drawings. I also claim the placing of the cranks or connections between the large and small wheels and the bearings outside of the small wheels.

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Witnesses:

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D. S. WATTS.