

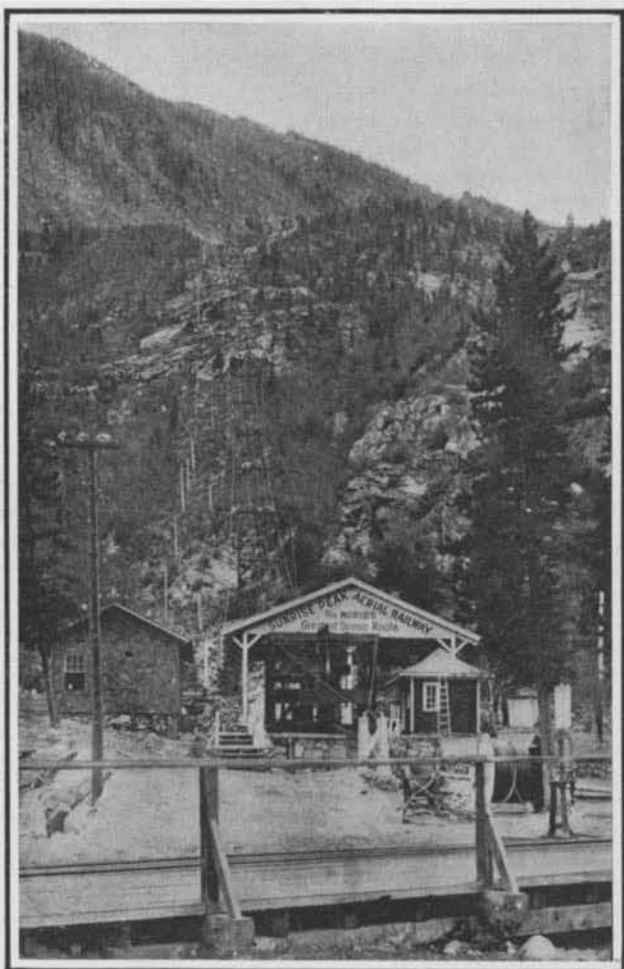
AN AERIAL PASSENGER RAILWAY.

BY ROLAND ASHFORD PHILLIPS.

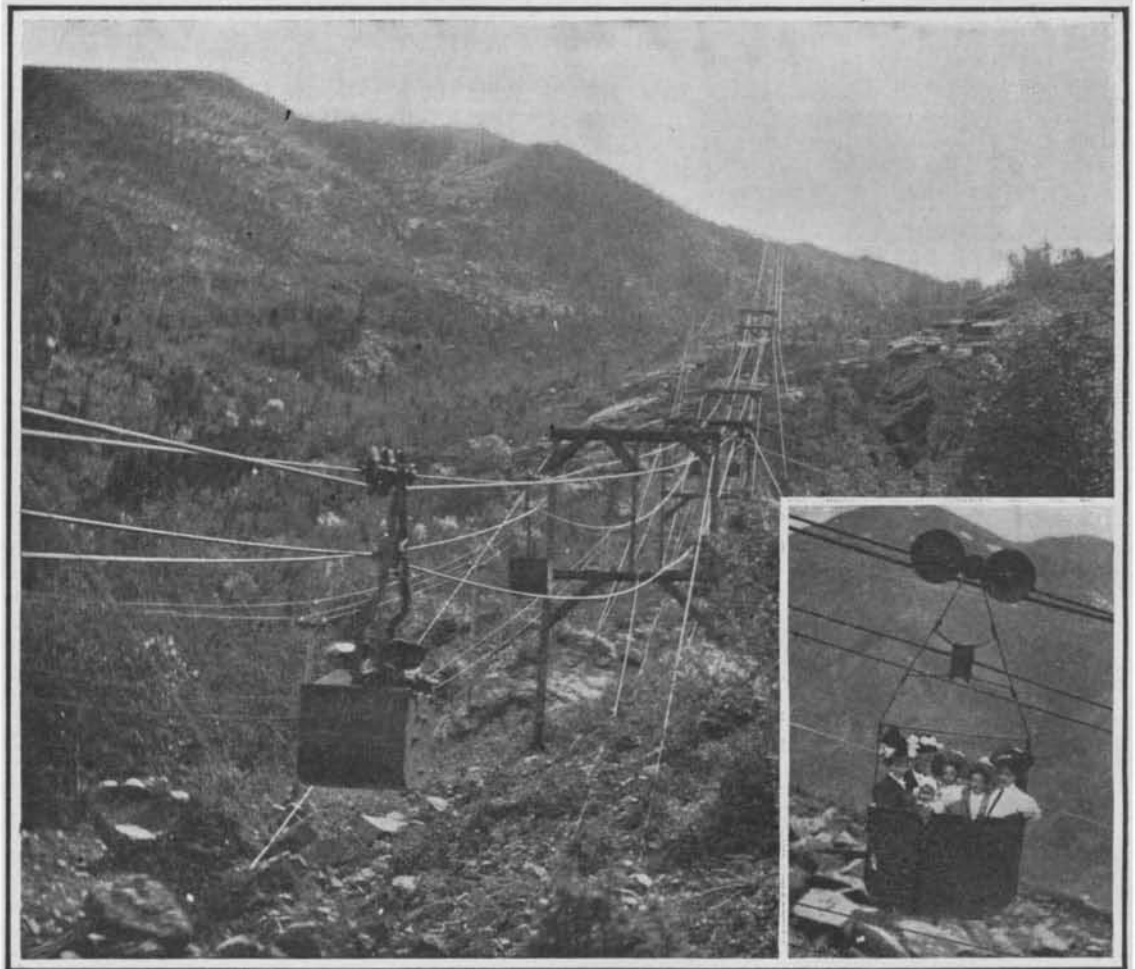
It is as easy now to ride in a bucket from the base to the very summit of the loftiest mountain chain in the Rockies, as to trolley across Brooklyn Bridge.

around. There to your right are towering cliffs, a dozen times as lofty and as massive as the tallest skyscraper. In another direction are deep cañons, rocky gorges, and steep, verdant slopes. Still you go up. Sometimes you clip the swaying tips of a monster

from view by a mantle of snow. A wonderful, bewildering half hour is gone. The bucket stops, and you step out upon the cold, snow-clad summit of the peak. At intervals fleecy clouds drift across your vision, blotting out the valley below.



The station, showing the cables leaving the drum.



The bucket has just left the power house. An empty bucket is seen coming back.

To take this wonderful ride on the Sunrise Peak road, you leave Silver Plume and walk a few blocks to the aerial station. Under this cover you wait for your bucket. As it swoops down and stops, you step

primeval pine tree, and again you are swaying over an all but bottomless cañon. Then a broad green valley slips along below you, colored with myriads of wild flowers. Now, marked like some gigantic belt,

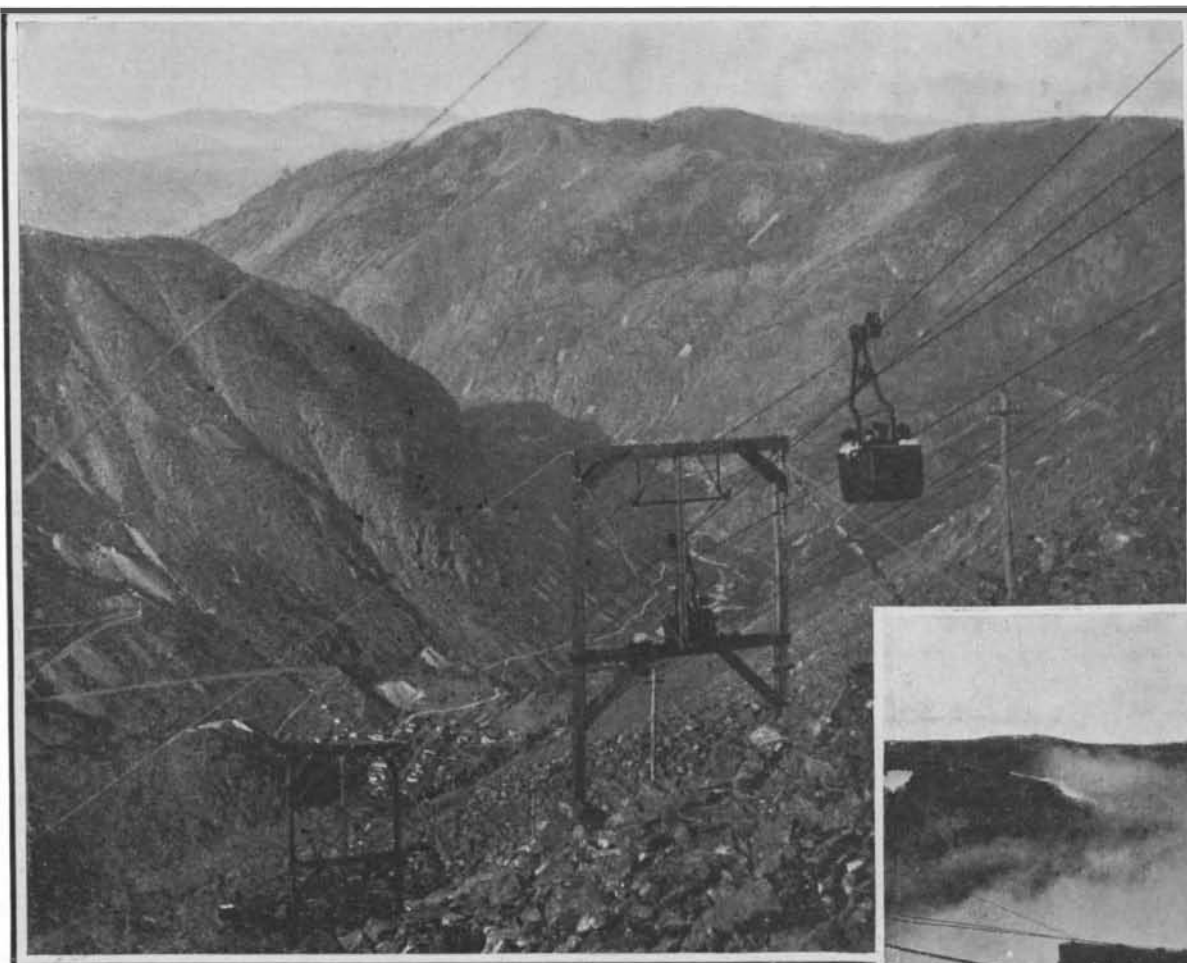
You have gone to the sky in a bucket; you are standing above the clouds, two and one-half miles higher than New York city.

When the clouds clear away, you note the filmy line of cables stretching down, from tower to tower, not unlike the silken web of some gigantic spider, swaying in the sunlight, finally to dip over a ragged shoulder of a ridge and disappear.

The idea of these traveling buckets is by no means new, particularly to readers of this journal, since the identical principle is in use throughout the mining world as a means of transporting ore from the mines to the mills. In some instances these are worked by gravity, and in others by motive power.

It remained, however, for a western engineer to utilize this system of carriers, not for business but for pleasure. For a good many years Sunrise Peak was a noted attraction for the tourist, but all methods of reaching its lofty summit were crude indeed. Confident of his success, the engineer interested a few wealthy men. The aerial railroad is the result. In Italy this method of transportation is largely in favor, especially across bodies of water, but the Sunrise Peak line is the only one in America.

There are two main cables, the stationary and the
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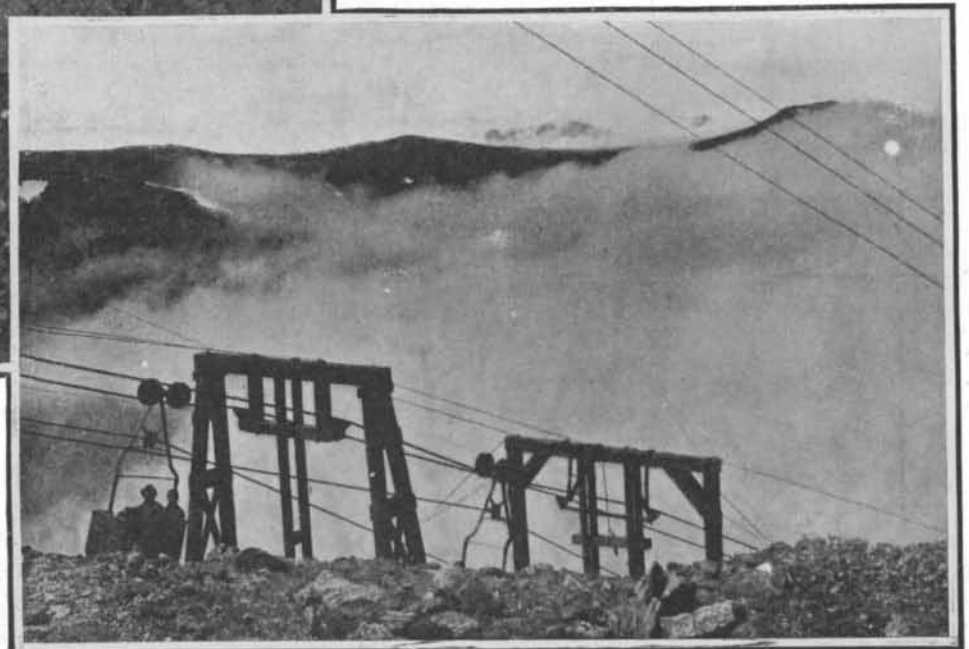


This picture was taken about half way to the summit. Silver Plume looms in the distance. The wagon road is seen winding up into the hills; also the creek, down the cañon of which the railway runs which connects with Denver.

into it. The man shuts the door and locks it secure. A bell clangs, and you are off. The bucket swings away, and you hold tightly to the iron rim. The little depot with its crowd slips away below. You look around. There are no confining walls—nothing but clear Colorado air. Your sensations are comparable with those of a balloonist.

You begin to gather a bit more courage. You look

comes the timber line. The flowers give way to stunted brush and barren stretches of dull rock. And both of these in turn are soon hid



At the summit, Sunrise Peak, high above the clouds. Elevation, 12,500 feet.

AN AERIAL PASSENGER RAILWAY.

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(Concluded from page 495.)

work but eight hours. But he would be obliged to resign from the union in the winter time; for observing starts at five in the evening and continues till seven the next morning, fourteen hours without a break.

To photograph the spectrum of a star, a spectroscope or rather spectrograph is attached to the eye end of the telescope. The object glass focuses the star's light on a fine slit not more than one hundredth of an inch in width and one-eighth of an inch in length.

This was made possible by making the slit jaws of polished silver, and watching the stray light reflected from the silver jaws by combining prisms and lenses in a rather curious fashion.

During this long exposure the temperature has probably fallen a number of degrees, and the instrument has been affected by all its parts contracting.

These buckets are constructed of heavy wrought iron, six feet long and four wide, with a door opening on the right side, which door is securely bolted when the bucket is en route.

AN AERIAL PASSENGER RAILWAY.

(Continued from page 488.)

haulage. From the haulage cable, which is one and one-half inches in diameter, the buckets are suspended, their entire weight being sustained by two steel four-inch flanged wheels running over the stationary cable.

These buckets are constructed of heavy wrought iron, six feet long and four wide, with a door opening on the right side, which door is securely bolted when the bucket is en route.

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age cable, spaced at equal distances of 485 feet apart. These buckets are held to the runners by a one-half by two-inch steel frame, allowing it to swing freely on an axle between the flanged wheels. The seating capacity of each bucket is four.

In the entire distance there are fifty towers, built of eight by eight timbers, most of which were cut within a mile of the road. Over these towers run the cables. The stationary cable is the higher one, the haulage cable being two feet below and carried midway in the frame that supports the buckets. This haulage cable is endless, winding about a huge drum at either terminal. The towers are not placed an equal distance apart, but according to the slope and the contour of the ground. On the longer stretches they are frequently two hundred feet between, while at the base and summit they are within a few feet of one another. Perhaps the best example of the entire simple working plan may be found in the large stores of a city, where package carriers are in use. The little wire baskets that carry your purchases from the clerk to the wrapper are in miniature duplicates of these huge, man-carrying buckets, save where the former are operated by springs, the latter are moved by electric power.

The entire distance covered, from base to summit, is one and one-half miles, and in traveling this you are raised from nine thousand feet at Silver Plume to something greater than twelve thousand five hundred feet at the summit. This is, approximately, one foot lift for every two feet covered. In order to attain the same elevation, any road in the world—Pike's Peak cog road a possible exception—would have to traverse several times the distance. The time is thirty minutes each way.

The motive power is electric, the current being transmitted from Georgetown, four miles distant. Two motors are used, both of thirty-five horse-power each, and both located at the upper terminal. One motor is sufficient to operate the endless cables on an average haul, but on other occasions, where the buckets are filled, both are thrown in.

The entire road is equipped with electric signals and telephones. In its length are five stations, built about the towers, each with its watchman. The slightest accident is promptly telephoned to the engineer, and the buckets stopped.

The plans were first drawn up late in 1905, and the construction commenced the year following. It was not until the summer of 1908, however, that the road was in full running order. The total cost was slightly in excess of \$70,000.

A MACHINE FOR SIMULTANEOUSLY FIRING MANY BLASTS.

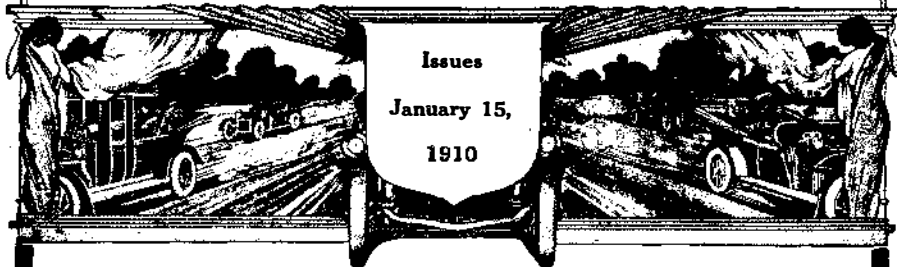
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by the shaft. When the switch is thrown to the lower contact, the fuse circuit receives the whole current from the electric generator.

All of the fuses are melted instantly by the heavy rush of current accentuated by the inductive kick of the coil, thus producing a simultaneous firing of all the charges of explosives used. In deepening the river at Sault Ste. Marie for the United States government, the contracting firm used three similar machines, but larger and more powerful, operated by compressed-air engines. These machines were perfectly automatic and unerring in operation. In all cases the fuses were arranged in parallel circuit between the two mains of the dynamos, the pressure being 12 volts. It is stated that these devices operated so simply that it required only the opening of an air valve to fire three hundred charges of dynamite at one time.

Oleat Maury.—A preparation for greasing wool, according to a French patent, is made by the saponification of mixtures of mineral oils and vegetable oils by alkaline carbonates.

THE AUTOMOBILE NUMBER of the SCIENTIFIC AMERICAN



THIS year bigger and even better than it ever was. It has been our purpose in publishing this annual review to give the automobile owner and the prospective purchaser truly helpful information, and to that end the number will contain the following articles:

- 1. The Automobile and the Farmer.**
- 2. How to Overhaul Your Car.**
- 3. The Automobile Fire Engine.**
All the latest automobile pumping engines, chemical cars, hook and ladder trucks, and hose carts are described.
- 4. The Automobile and the Road.**
The automobile has presented to the road engineer new problems for solution. He must render his roads impervious to water and practically proof against the destructive effect of tires. The United States Government through the Office of Public Road Inquiry is now studying this subject. The article written by Mr. Page, Director of the Office of Public Roads, describes what has been done.
- 5. Anti "Joy Ride" Devices.**
This article is a complete description of devices which have been invented for the purpose of preventing chauffeurs from taking out their owners' machines.
- 6. The Modern Electric Automobile.**
- 7. Making Your Own Repairs.**
- 8. The Cars of 1910.**
- 9. Automobile Identification Chart.**
Sometimes you have wondered what make of car was that which skimmed past your admiring eyes. The 1910 Automobile Number will enable you to identify any car by its radiator and engine bonnet. About thirty-five automobiles are thus illustrated for identification in a sketchy, artistic way.
- 10. The Inexpensive Car.**
Any man with a good salary can now afford to own some kind of an automobile. How the machines are constructed and what may be expected of them is lucidly set forth.
- 11. The Wonderful Rise of the Automobile Industry.**
- 12. Automobile Novelties.**

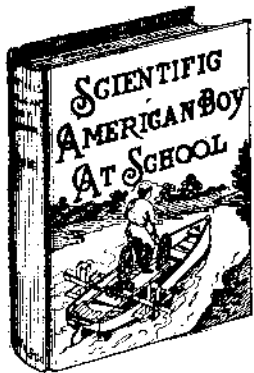
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THIS book is a sequel to "The Scientific American Boy," many thousand copies of which have been sold, and has proven very popular with the boys. The main object of the book is to instruct how to build various devices and apparatus, particularly for outdoor use. The construction of the apparatus, which is fully within the scope of the average boy, is fully described and the instructions are interwoven in an interesting story, a feature which has assisted in making the "Scientific American Boy" so popular with the boys. It takes up the story of "Bill" and several of his companions at boarding school. They form a mysterious Egyptian society, whose object is to emulate the resourcefulness of the ancients. Their Chief Astrologer and Priest of the Sacred Scarabaeus is gifted with unusual powers, but his magic is explained so that others can copy it. Under the directions of the Chief Engineer, dams, bridges, and canal-locks are constructed. The Chief Admiral and Naval Constructor builds many types of boats, some of which are entirely new. The Chief Craftsman and the Chief Artist also have their parts in the work done by the Society, over which Pharaoh and his Grand Vizier have charge. Following is a list of the chapters:

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