

SCIENTIFIC AMERICAN

[Entered at the Post Office of New York, N. Y., as Second Class Matter.]

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

Vol. XLIV.—No. 5.
[NEW SERIES.]

NEW YORK, JANUARY 29, 1881.

\$3.20 per Annum.
[POSTAGE PREPAID.]

AN IMPROVED MOUNTAIN RAILWAY SYSTEM.

The construction, maintenance, and operation of mountain railways have long occupied the attention of engineers. Many methods of climbing steep inclines and of rounding curves of small radius have been proposed, and several of these methods have been reduced to actual practice. The systems of Fell and Riggensbach are very well known, and the ancient system of rope tramways is in use in many

places. A distinguished engineer, M. L. Edoux, has conceived a project which is based upon the application of a system of hydraulic elevators to the lifting of cars to any height. This system may be applied to great advantage, when an abundance of water under high pressure is available. These conditions will be frequently met in a mountainous country. Although this project has not yet been realized it seems to possess sufficient merit and novelty to

render it interesting to our readers. The illustrations have been specially arranged for the SCIENTIFIC AMERICAN from the author's plans, elevations, and sectional views.

The particular railway under consideration is intended to establish communication between Caunterets and the baths of La Raillère, France. Caunterets is situated in a narrow valley, at an elevation of more than 900 meters. It is a noted water-

[Continued on page 66.]



IMPROVED SYSTEM FOR MOUNTAIN RAILWAYS.

AN IMPROVED MOUNTAIN RAILWAY SYSTEM.

[Continued from first page.]

ing place, and during the season is filled with numbers of invalids, who go there in search of health. The hot sulphur springs for which this region is noted, are located at La Raillere. 125 meters higher up the mountain, and more than 915 meters distant.

To travel over this fatiguing route, to go and return, often twice in the same day, in the capricious weather of the mountains and in the crowded omnibuses, is uncomfortable and even dangerous for infirm persons. The waters cannot be conveyed from La Raillere to Cauterets without modifying their temperature and their chemical composition to which their therapeutic properties are due. It is, therefore, necessary to convey the sick to the springs that they may receive the full benefit of the water. This railway has been projected for the purpose of conveying the bathers from Cauterets to La Raillere rapidly and comfortably.

All systems, with the exception of that of M. Edoux, require the consumption of a large amount of fuel, which in this region is very expensive. This inventor utilizes the powerful waterfall at La Raillere, which, in connection with gravity, constitutes the motive power of the railway.

The mode of operating the railway is as follows: The car is raised vertically by means of hydraulic elevators to a greater height than its destination, which, in the present case, is La Raillere, and is then allowed to descend as far as that place by its own gravity upon an inclined railway. To return, the car is transferred by its own gravity to a second railway inclined in the opposite direction. The cars are provided with efficient brakes, by means of which the speed may be effectually controlled.

In practice, the car is not raised the vertical distance of 125 meters at a single lift, but this distance is divided into five parts of 25 meters each. There are five towers at intervals of about 40 meters. In each one is placed a hydraulic elevator, similar to those introduced by M. Edoux into the hotels and houses of Paris. The top of each tower is a little more elevated than the foot of the next one, and is connected with it by an inclined bridge. The car is raised by the hydraulic elevator to the top of the first tower, runs by its own gravity to the base of the following one, is raised to the next level, and so on. Together they form a gigantic staircase with steps 25 meters high. The last landing place is 135 meters above Cauterets.

The return way, which is on the side of the mountain, terminates in the second tower. The cars descend vertically only in the first two towers, which contain two compartments, one for hoisting the car and one for lowering it.

At La Raillere the inclination of the car is reversed, and the car is transferred to the return track by means of a platform supported on wheels and provided with rails. The car on arriving from Cauterets rolls upon the platform. The latter moves by its own gravity on rails slightly inclined in opposite directions (see Fig. 3), so that when the rails of the platform join the return track their inclination will have been reversed, and the car will, of its own gravity, return to the second tower. The movement of the transferring car is controlled by a hydraulic piston. The gradient of the railway to La Raillere is 0.005125 per meter, and of the return road 0.043961 per meter.

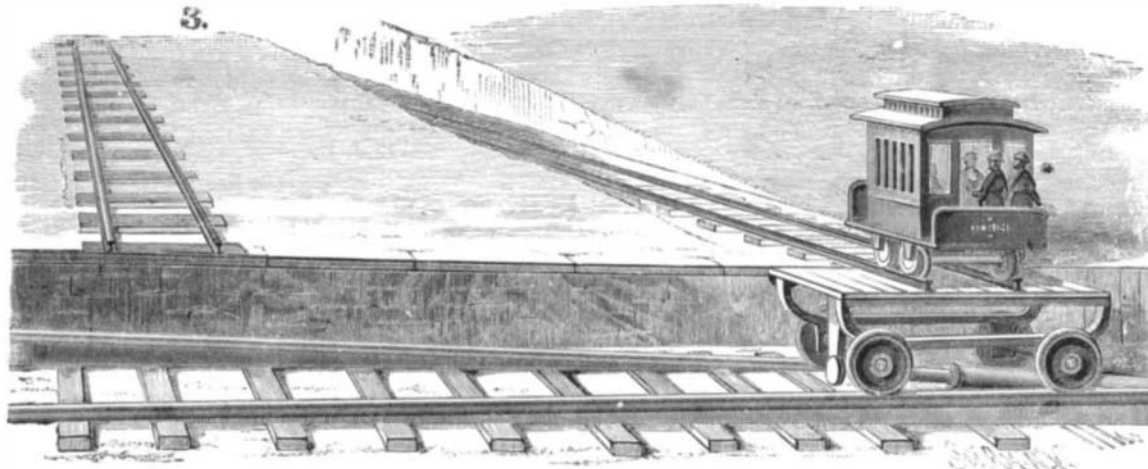
The department engineers prefer this plan to all others. The question of construction will be taken up at the next session of the Chambers.

NEW MECHANICAL MOVEMENT.

The engraving represents a novel mechanical movement for converting a continuous rotary motion into an intermittent rotary motion. The driving shaft carries a triple sprocket wheel, which is keyed on or otherwise fastened, and the driven shaft has three sprocket wheels, two of which are secured to it, while the third is movable on the shaft. The endless chain which connects the chain wheels of the two shafts is made of three separate sections—a median section alternating with two outer sections arranged parallel to each other and separated by a space equal to the width of the openings in the narrower section. This chain thus formed, as will be noticed, is double for a portion of its length, while the remainder is single.

When the driving shaft is revolved the chain is carried forward at a regular rate of speed. When the single por-

tion of the chain comes into contact with the loose central sprocket wheel on the driven shaft, only the loose wheel is revolved, the shaft remaining stationary; but when the double portion of the chain engages the outer wheels, which are fixed on the driven shaft, the shaft is revolved until the double portion of the chain has passed over it, when it rests until engaged by another double portion. By means of this ingenious contrivance the driven shaft may be rotated either regularly or irregularly according to the relative proportion of double and single chain. This movement should find a ready application in textile machinery, and in fact in all



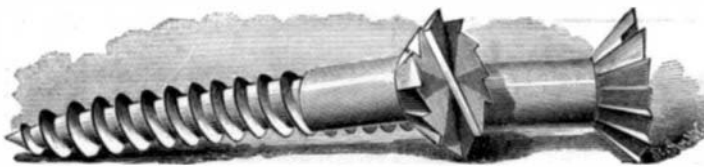
MOUNTAIN RAILWAY SYSTEM.—TRANSFERRING THE CAR.

classes of machines where intermittent rotary motion is employed.

This invention was recently patented by Mr. William P. Drew, of Preston, Minn.

IMPROVED WOOD SCREW.

The engraving shows a self-countersinking wood screw, recently patented by Mr. John Eckford, of San Antonio, Texas. It will work in all kinds of wood, and clears itself of the chips made in boring. The screw has on the underside or bevel a series of bits or cutting edges alternating with deep interspaces, which completely fill the under surface of the head. These notches increase in width and



ECKFORD'S IMPROVED WOOD SCREW.

depth from the screw shank to the crown of the head. This form allows the chips to escape readily.

The cutters are formed on the screw head by forcing it while hot into suitable dies. In other respects the manufacture of this screw does not differ from that of the common form. In use, this form of screw saves a great deal of time and insures a good fit between the head and the wood in which it is bedded.

RECENT INVENTIONS.

An adjustable tension, with sufficient power for springs for folding or cabinet bedsteads, is secured by a spring patented by Mr. Herman A. J. Rickett, of New York city.



DREW'S MECHANICAL MOVEMENT.

This is a spiral spring sustained at one end and having a shaft connected with the opposite end and extending through the coil. On the free end of the shaft is a drum on which winds a belt extending to and connected with the hinged bed. Two of these arrangements for each bed are preferably used. The tension of the spring can be adjusted by shortening the belt.

A rotary engine, patented by Mr. Gabriel Jasmagy, of Brooklyn, E. D., N. Y., is a cylinder with interior slotted cylinder half the diameter of the exterior cylinder, mounted on shaft journals in the end pieces of the outer cylinder.

The slotted cylinder has overlapping sliding piston plates provided at the ends with a pin and pivoted curved guide bar fitting in an annular groove on the inside of the end pieces of the outer cylinder, which devices draw the piston plates inward and outward, forming a piston of variable size as the shaft rotates.

An improved machine for packing boned hams and shoulders has been patented by Mr. William Hoefjen, of New York city. The invention consists of a cylindrical receptacle, the upper half of which is pivoted on its longitudinal edge and is provided with a lever lock, by means of which the lid can be gradually closed, compressing the meat in the cylinder; the meat is then further compressed by closing the front of the cylinder by means of a suitable disk and driving a piston forward, after which the disk at the front of the cylinder is removed, and an envelope of suitable material is drawn over the front of the cylinder; into this envelope the meat is forced by the piston.

A gate that may be opened by an approaching vehicle or by a person on horseback without dismounting, and closed in the same manner, has been patented by Mr. Nathan Scarritt, of Kansas City, Mo. The invention consists of a gate made in two like sections that are pivoted on horizontal axes, and of novel mechanical devices for operating the gate sections.

A simple and amusing game that can be played by any desired number of persons, and does not require any special skill to understand its operation, has been patented by Mr. Niels C. Larsen, of New York city. The invention consists of a spirally-grooved cone contained within a figure with an aperture in its upper part, which figure rests upon a flat conical base having a spiral groove provided with a series of numbered recesses in its upper surface, so that a small ball that is passed into the aperture of the figure will run through the spiral grooves of the cone and along the spiral grooves of the base, and will finally stop in one of the numbered recesses a greater or less distance from the end of the spiral.

Mr. George O. Keiter, of Spring City, Pa., has patented a meat and vegetable cutter so constructed that the substance to be cut is fed to the cutter automatically. The cutters can be adjusted to cut thicker or thinner slices, and can be used to slice substances smaller than the cavities of the feed boxes.

An improved copybook, which prevents the scholar from copying his own writing as he approaches the bottom of the page, and enables

him to see and study the original copy very distinctly, has been patented by Elmer P. Newman, of Dimondale, Mich.

A sand guard for car axle boxes, patented by Mr. Henry Roth, of New York city, consists in a band fastened upon the inner end of the journal box, and open at the lower side. The opening in the inner end of the box is thus protected from sand.

A fire escape, patented by Messrs. Eduard Kamin and Heinrich Egberts, of Bremen, Germany, seems to be simple, compact, and reliable. It is of the life rope variety. The velocity of descent is regulated by a vibrating balance mechanism.

Mr. Gorham N. Winslow, box 290, Newton, Mass., has patented an improved velocipede or tricycle in which the driving wheel is propelled by hand power, connection being made between the crank shaft and drive-wheel shaft by a shaft and bevel gearing.

An improved glass button and a mould for attaching the eye thereto, has been patented by Mr. August Hamann, of Hoboken, N. J. In this improved button the strain upon the eye is distributed through the cap, which is firmly attached to the glass at all parts of the circumference of the cap.

Mr. Erwin B. Newcomb, of Cumberland Mills, Me., has patented an improved machine for winding paper and similar materials from a loose condition into hard rolls, especially materials of a brittle nature—such as, for

instance, enameled paper, which is usually wound by hand on account of its liability to curl at the edges and become broken.

A device for stretching and smoothing thread, more especially of silk in twists, sewings, embroidery, organzine, and tram, has been patented by Messrs. Lewis E. Leigh and Lewis Leigh, of New Haven, Conn., whereby through special construction of the bobbin stand and cap and correlated appliances, an even tension of any desired degree upon all threads in the different processes of manufacture is secured.