

PHANTOM CURVE.—DENVER AND RIO GRANDE RAILWAY.

The romantic scenery of Colorado and New Mexico, traversed by this line of railway, which runs southward from Denver, along the base of the Rocky Mountains, finding a Pass over these to the foot of the Sierra de San Juan, thence descending from Taos to Santa Fe and the Rio Grande, has been celebrated by travelers. In the neighborhood of Denver, or a few hours' journey from that city to the south, is some of the finest mountain scenery. At the "Garden of the Gods," visitors are astonished to find themselves in the midst of a hundred towering piles of white and red sandstone, moulded into a variety of fantastic shapes, but mostly rising to spires higher than any cathedral that ever was built. The president of the railway company, General Palmer, has a villa in Glen Eyrie, a secluded recess walled in by cliffs of imposing height.

Monument Park, at no great distance, is a place of the same natural character, where the multitude of rock pillars and rock pyramids resemble the crowded monuments of a vast cemetery, and have a very curious effect. The San Juan section of this line, on the other side of the mountain range, presents terrific gorges and singular rock formations.

AN EXTRAORDINARY BOILER EXPLOSION AT ORLEANS, FRANCE.

On Monday, April 28, the city of Orleans was set in a flurry by a serious accident that occurred under curious circumstances, and the consequences of which might have been appalling.

Toward seven o'clock in the morning, a steam engine, mounted on a cart and belonging to Mr. G. Colas, a manure farmer, had stopped in Illiers Street in front of the house of Mr. Lebordais-Grenet, a grocer who lives in Porte-Saint-Jean Street, but whose front entrance is in the former street. The gang of workmen who were employed to operate the apparatus were just getting ready to go to work, when suddenly a fearful explosion was heard. The generator, which stood vertically at the rear of the cart, breaking the bolts that held it firmly fixed to the iron frame of the vehicle, shot up all in one piece, like a sky rocket, parallel with the front of the house before which the vehicle was standing. Reaching the roof (a distance of about ten meters from the ground), the enormous and heavy mass came in contact with the cornice, and, although it but slightly grazed it, the shock was sufficient to cause it to deviate from its course, describe a curve over the block of houses between Illiers and Porte-Saint-Jean Streets, and fall in a blind alley off the latter, at thirty-five meters to the south of its starting point.

In its fall, the immense projectile caught the gutter and cornice of a house numbered 45, inhabited by Commander Coutant, and fell upon the shafts of a dust cart whose driver had left it standing in the alley in order to lead his horse to a farrier's in the neighborhood. It makes one shudder to think of the massacre this explosion might have occasioned, without speaking of the material havoc that it might have caused. It will suffice to say that if Mr. Lebordais's store had been struck, a fire might have at once broken out in his petroleum reservoirs. In fact, at the moment of the accident, a regular storm of fiery cinders, bolts, and various debris swept Illiers Street and the ground floors of the neighboring houses. Breaking the window panes, these fragments entered a fruit store in which there were three persons, and also started a fire in the house of Mr. Coudiere, former Municipal Counselor of the city of Orleans.

Two young children who were seated at the window of the first story of house No. 126 Illiers Street merely received a fright, as the projectiles did not rise as far as to them. As for the five workmen in Mr. Colas's employ, four of them were slightly harmed or burned, and one was severely wounded. The cart, which was violently overturned upon the ground, carried along in its fall the horse that was harnessed to it, and, strange to say, neither was harmed.

The generator, less its firebox and smoke stack, fell, as we have

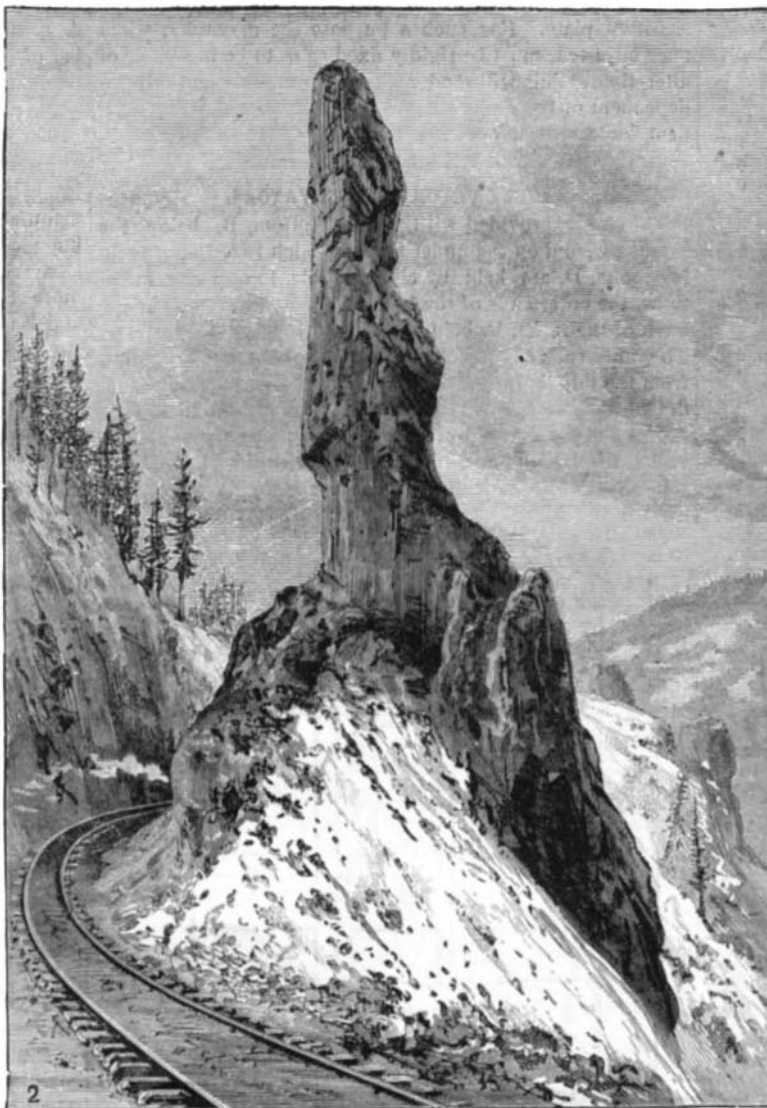
said, upon the pavement of Saint-Jean Alley. Its tubes and its jacket were as flattened and crushed as if they had been made of lead, while the pressure gauge and the glass tube of the water level were intact. The different parts of the firebox had been scattered in all directions, and the smoke stack had fallen at about seventy meters from the place of explosion, and in a northeast direction.

These facts seem so improbable, as a whole and in detail, that we have thought it indispensable to call upon photo-

graphy to preserve a souvenir thereof, in order that we might back up with material proofs the faithful account of it that we have just given.—*Leon Dumuys, in La Nature.*

Extension of Cotton Spinning in England.

Undoubtedly the manufacture of cotton goods is now being conducted on very close margins for profits, as is the

**PHANTOM CURVE.—DENVER AND RIO GRANDE R.R.**

case with most other staple products at the present time. Those who think, however, that England is losing any of its old time prominence in this branch of business, would do well to look at the facts before making rash conclusions. The spinners there plan new mills and extensions from September to April, as the general rule, that the building operations may be conducted in the more favorable summer months. Figuring on the extensions of the cotton manufacturing plant for the present season, after this plan, the *Textile Manufacturer* places the increase, with the new companies formed, at one and a half million spindles in Lancashire, Cheshire, and Yorkshire. This is a larger number

solid matter is present. Professor Dewar said that there is some truth in Frankland's hypothesis that the luminosity of flames is due to highly condensed gases, and a great deal of truth in Davy's original hypothesis that the luminosity is due to liberated particles of carbon or other solid matter in the majority of cases. He next proved that the luminosity of the electric spark increases under extra pressure of air, but said that the result might be explained by a variety of hypotheses, so that its real cause is difficult to unravel.

The lecturer further stated that some hydrocarbon compounds enter, like paraffine, into combination with other substances with difficulty; others, like olefiant gas, acetylene, and naphthaline, are easily decomposed, or easily enter into new combinations. In illustration of this he experimentally proved that a small quantity of bromine will quickly absorb a large volume of olefiant gas, and also that bromine readily unites with naphthaline, giving off vapor of hydrobromic acid in the act.

Professor Dewar remarked that in scientific research it is sometimes necessary to use a flame free from superheated steam. Such a flame can be most readily obtained by burning a jet of chlorine and hydrogen, mixed near the nozzle of the burner, for safety, and care being taken to carry off the hydrochloric acid gas, which is the product of the combustion.

Red Toning.

The following is the formula employed successfully by M. Balagny for the red toning so much in vogue at present. Dissolve 1 gramme of chloride of gold in a liter of distilled water, then add 200 c. c. of a filtered solution, made at boiling point, of 30 grammes of borax and a liter of water. The toning bath is brought up to the temperature of 70° or 80° Centigrade, and then the prints are plunged into it for thirty or forty seconds only.

They are afterward fixed in hypo containing one to two per cent of ammonia.

**BOILER EXPLOSION AT ORLEANS, FRANCE.**

of cotton spindles than Lowell now has, or any other city in the United States except Fall River.

On the night of July 7, the steam tug H. C. Coleman exploded its boilers at Elliott's Landing, on the Missouri River, seven miles from Booneville, and all the crew, three white men and four negroes, excepting Captain Thompson, were killed. The boat was torn to pieces and the pilot house was blown two hundred yards away.

A Floral Time Table.

It is a most interesting fact that certain flowers open and close their blossoms at least once every twenty-four hours, although the cause of this action is as yet but imperfectly known. In some cases it may depend on heat, in others on light being present in sufficient force. The fact has long been known. It was known to Linnaeus, and some of the early gardeners mention floral clocks and dials among the quaint conceits offered to the readers of their books. Here is a list of plants which open at different hours during the day. The first column of figures gives the time of opening in the morning, and the second column shows the time of closing.

	H.	M.	H.	M.
Goat's beard— <i>Tragopogon luteum</i>	3	5	9	10
Late flowering dandelion— <i>Leontodon serotinum</i>	4	0	12	1
Hawkweed— <i>Picris echinoides</i>	4	5	12	0
Alpine hawk's beard— <i>Crepis alpina</i>	4	5	12	0
Wild succory— <i>Cichorium intybus</i>	4	5	8	9
Naked stalked poppy— <i>Papaver nudicaule</i>	5	0	7	0
Copper colored day lily— <i>Hemerocallis fulva</i>	5	0	7	8
Smooth sow thistle— <i>Sonchus oleraceus</i>	5	0	11	12
Field bind weed— <i>Convolvulus arvensis</i>	5	6	4	5
Common nipple wort— <i>Lapsana communis</i>	5	6	10	0
Spotted cat's ear— <i>Hypochaeris maculata</i>	6	7	4	5
White water lily— <i>Nymphaea alba</i>	7	0	5	0
Garden lettuce— <i>Lactuca sativa</i>	7	0	10	0
African marigold— <i>Tagetes erecta</i>	7	0	3	4
Mouse ear hawkweed— <i>Hieracium pilosella</i>	8	0	2	0
Proliferous pink— <i>Dianthus proliferus</i>	8	0	1	0
Field marigold— <i>Calendula arvensis</i>	9	3	3	0
Purple sandwort— <i>Arenaria purpurea</i>	9	10	2	3
Creeping mallow— <i>Malva caroliniana</i>	9	10	12	1
Chickweed— <i>Stellaria media</i>	9	10	9	10

—The Garden.

Focusing Screens for the Camera.

Says the *British Journal of Photography*: When glass is coated with a thin solution of starch and allowed to become dry, a focusing surface is secured which possesses certain advantages over all others. It possesses a very fine grain—one which, better than any other, is adapted for arresting the rays from the lens under circumstances conducive to the examination of the image either by a single powerful magnifying glass or by the compound tube. The objection to the employment of a single or simple magnifier, even if it be composed of a doublet or triplet, is this: that when used in conjunction with a plain glass focusing screen there is a certain degree of latitude in the determination of the precise plane upon which the virtual image is projected—a latitude that does not exist when the rays are arrested by any image-receiving surface on the one hand, or, as already explained, by any polished surface on the other, when used in conjunction with a compound magnifier.

An ethereal solution of wax has sometimes been recommended as a coating upon which to receive an image. In such experiments as we have made with this substance the result, although exceedingly pleasing when employed as a backing for a transparency, is not successful when used as a focusing screen. Much better is a film of collodion modified in its physical structure by the admixture with it of an alcoholic solution of lac or the other gum resins which form the solid constituents of a good negative varnish. It is, doubtless, known to many of our readers that if collodion and negative varnish be mixed in certain proportions—the precise nature of which could not be stated unless the exact constituents of each were known—a varnish results which, when applied to a glass plate, dries with an appearance possessing singular beauty. Although both constituents are in themselves transparent, and give transparent films when used separately, yet when mixed the film given by their union is neither opaque nor transparent, but it possesses a remarkably beautiful opalescence.

This, although pleasing and useful as a backing for transparencies, is still of too purely an opalescent character to render it useful for receiving or arresting an image. It gives a surface too nearly conforming to that of opal glass to be of any utility as a focusing screen. This also applies in some measure, although not to such an extent, to the employment of a bromo-iodized, collodionized plate, which, having been immersed in a silver bath, is afterward charged with atoms of reduced silver through the intervention of a developing solution, these silver particles being exceedingly fine. In this category, too, may fittingly be included emulsions composed of such amorphous salts as sulphate of barytes suspended in either collodion or gelatine.

We may here observe that this last named preparation forms an admirable backing for transparencies, especially for those which are intended to be viewed through powerful magnifying glasses. The best way of forming the barium sulphate is by adding a little sulphate of soda to a solution of gelatine, and afterward a solution of chloride of barium. If this be done well, with constant agitation, the resulting sulphate of barytes is very fine and evenly distributed throughout the entire substance of the gelatine.

If, by accident, a focusing screen has been broken when the photographer is at a distance from any point of supply, the best substitute he can adopt is starch, which, happily, is procurable everywhere. To apply this substance to plain glass all that is requisite is to level the plate, and, having previously boiled and strained the starch, to pour it upon the glass, allowing it to remain quite level until by the evaporation of the water the film becomes hard and dry.

There are some photographers who adjust the subject to be photographed by sights placed on the top of the camera. This is an excellent system, especially when photographing at a distance from home. We have no hesitation in saying

that the cameras of every traveler should have such sights affixed to them in case of accident to the ground glass.

Further: to permit of sharp focusing when such accident happens, it would be well to have provided a small but rigid strip of wood capable of being laid across the frame of the focusing screen, and carrying in its center a magnifier adjusted in such a manner as to enable a sharp image to be received in air when there is no ground glass at all to intercept it. This air image must, of course, be made to correspond in position with that which falls upon the surface of the sensitive plate. For such a purpose the magnifier, when once adjusted, must be rigidly fixed so as to be incapable of alteration. This will render the photographer entirely independent of the ground focusing screen should it by accident become destroyed.

SAFETY CATCH FOR ELEVATORS.

The car is provided with a false bottom, B, below the bottom, C, and on the under side of which two sliding locking bolts, D, are held by clips to slide in opposite directions, the outer ends of the bolts being beveled to fit in the teeth of the racks, F, held on the upright guide posts, G. The inner ends of the bolts are connected by a toggle joint, from the middle hinge of which a weight is suspended that draws the bolts toward each other. On the bottom of each bolt is a check lug, a, to limit the movements of the bolts in either direction by coming in contact with the clips, E. A rope fastened to the middle hinge of the toggle passes over

Fig. 1.

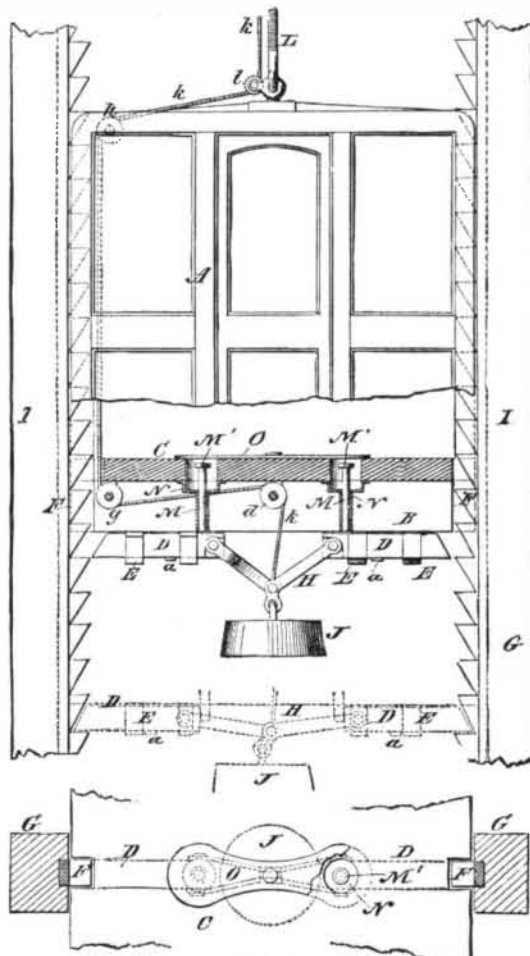


Fig. 2.

WEEKS' SAFETY CATCH FOR ELEVATORS.

a pulley, d, under the pulley, g, over the pulley, h, and under the pulley, l, on the middle of the top of the car. This rope is wound on the same drum with the hoisting cable, L, or on another drum. Two vertical locking pins, M, held in casings, N, project downward from the bottom, C; they are formed with the heads, M', on the upper ends, and rest on the inner ends of the bolts. The aperture leading to the casing and pins is covered by the plate, O. The weight of the block is greater than that of the bolts and the safety rope, so as to keep the bolts withdrawn.

If the hoisting cable break, all the strain will be on the safety rope, k, which would pull the middle of the toggle upward, thereby forcing the bolts outward and engaging their outer ends with the teeth of the rack, thereby locking the car in place. As the bolts are pushed outward their inner ends pass from under the locking pins, M, which drop down behind the inner ends to prevent the weight, J, from drawing them toward each other in case the safety rope should also break. By turning the plate, O, access may be had to the locking pins. Although the device operates automatically, it can also be worked by a person in the car pulling the safety rope. Fig. 2 is a sectional plan view through I I. If desired, the bolts can be arranged on the under side of the top of the car, and a spring can be used in place of the weight for shifting the bolts.

This invention has been patented by Mr. Frank A. Weeks, of Enniskillen, Ontario, Canada.

ORANGE PEEL is now said to be collected, dried in ovens, and sold for kindling fires. It burns readily and with great fierceness, and is safer than kerosene.

System in Shop Management.

An article under the above heading from the *Iron Trade Review* contains suggestions which it seems to us may be advantageously adopted into many large establishments other than those devoted to manufacturing.

Any changes may be made in the rules to render them better adapted for special localities, or modified to meet the requirements of some peculiar kind of business; but the rules seem reasonable, and the employe does not seem to have any good cause to complain of its requirements. A great many establishments who employ a large number of persons would derive great benefit by the introduction of a system similar to that given below into their works.

It is an encouraging sign of sound business conservatism, says the *Review*, that more attention has been paid of late to the matter of systematizing the work and accounts of our manufacturing establishments than ever before. Within our knowledge several of the largest concerns in the country have recently remodeled their system of accounts to conform more strictly with the economical necessities of the times; and it is no reflection on their business sagacity, but quite the contrary, that the heads of our leading manufactories are each year paying more and more attention to the small economies. We are aware that too much system is often worse than little or no system, but it is undeniable, at the same time, that just in proportion as the various lines of work of a great establishment are drawn to one center, and the record of work done and expenditures made condensed to a few words in few books, just so is that establishment enabled to pay dividends in good times and to weather through hard times when other concerns are floundering about and going under.

For the purpose of illustrating what may be done in this line, we refer briefly to a system adopted recently, after extensive correspondence and investigation, by one of the leading manufacturing establishments of Ohio. Succinctly stated, this system provides for a perfect record of each man's time and work, kept by himself and approved by the foreman of his department. Upon going to work in the morning each man receives a blank something like this:

Report of Department.

Report of 18....

LOT. Foreman to fill in.	No. Pieces.	Name of Piece.	Class of Work.	Finished.	No. HOURS.		RATE.		Amount.
					Day Work	Piece Work	Day Work	Piece Work	

If a man come in late, he is given a similar blank but printed on paper of a distinctive color, with an additional space in which to mark the number of minutes or hours tardy. The effect of this has been to materially lessen the cases of tardiness—the men don't like to get the colored blanks. On the back of these blanks are printed the following rules:

WORKING HOURS.

These shall be such as may be designated from time to time. No extra time will be credited except by special agreement.

The blowing of the whistle will be the signal for commencing and quitting work.

All employes will be required to be present before, and begin work as soon as signal is given.

Should it be necessary to leave work before quitting time, the case must be laid before the foreman in charge and his consent obtained.

Necessity will alone excuse absence from place during working hours; other absence from post, without special agreement with foreman, will be sufficient cause for discharge.

Piece workmen are required to work the same hours as day workmen, unless especially excused by foreman in charge.

FOREMEN.

Foremen are required to observe these rules, and secure from the men under their charge proper compliance.

They will in all cases report to the superintendent or assistant any necessary absence.

They should be on hand at least five minutes in advance of signal for commencing work.

WATCHMEN.

The night watch must report for duty at 5:50 P.M., from May to October; and at 4:50 P.M. from October to May; at 4:50 P.M. Saturdays, Sundays, and holidays throughout the year, and must remain on duty till relieved.

The day watch must relieve the night watch at 6:30 A.M., and must remain on duty until in turn relieved.

ENGINEER.

The engineer must see that his fires and engine are in proper condition, must start his engine at least two minutes before time for commencing work, and run for two minutes after blowing whistle.

STRICTLY PROHIBITED.

Conversation among employes and the reading of books and papers during working hours is strictly forbidden.

Smoking or the lighting of cigars or pipes in the shops is strictly forbidden, except that during the noon hour it will be allowed in the foundry, blacksmith shop, and boiler shop, and nowhere else.

ABSENCE FROM WORK.

Should it become necessary for workmen to absent themselves from the shop for one or more days at a time, proper notice, with reason therefor, should be given to the foreman in charge.