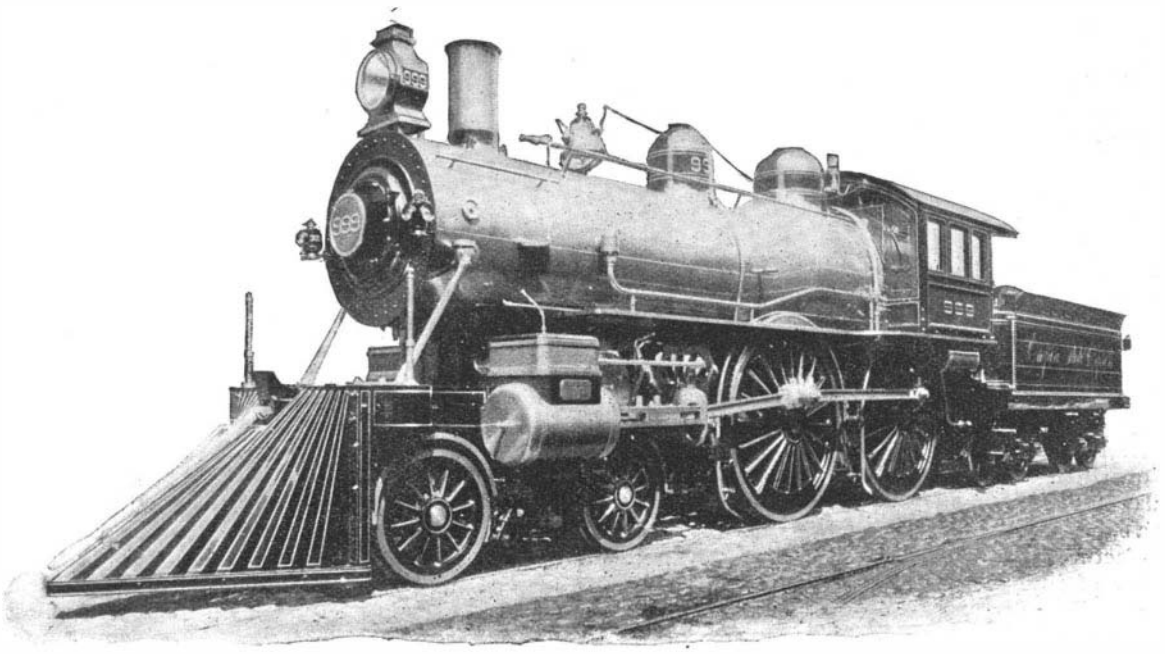
NO. 999.

Of the many locomotives at the World's Columbian Exhibition, English, French, American, the towering form of No. 999 is particularly attractive by reason of the great exploit made therewith on the 10th of May last, when it was run at the wonderful rate of 112 miles per hour between Batavia and Buffalo.

We here give a photo-engraving of this remarkable machine. For the more full details of dimensions and particulars reference is made to the SCIENTIFIC AMERICAN of May 13 last, in which another engraving also appears. The machine weighs 124,000 pounds. There are four drivers. The cylinders are 19 inch diameter and 24 inch stroke. Built at the shops of the New York Central & Hudson River Railway, West Albany, New York.



THE WORLD'S COLUMBIAN EXPOSITION—THE FAMOUS 999.

Presence of Mind in Applying an Antidote.

An instance of rare presence of mind attended by success in the use of an antidote to poisoning occurred recently at Sag Harbor, N. Y.

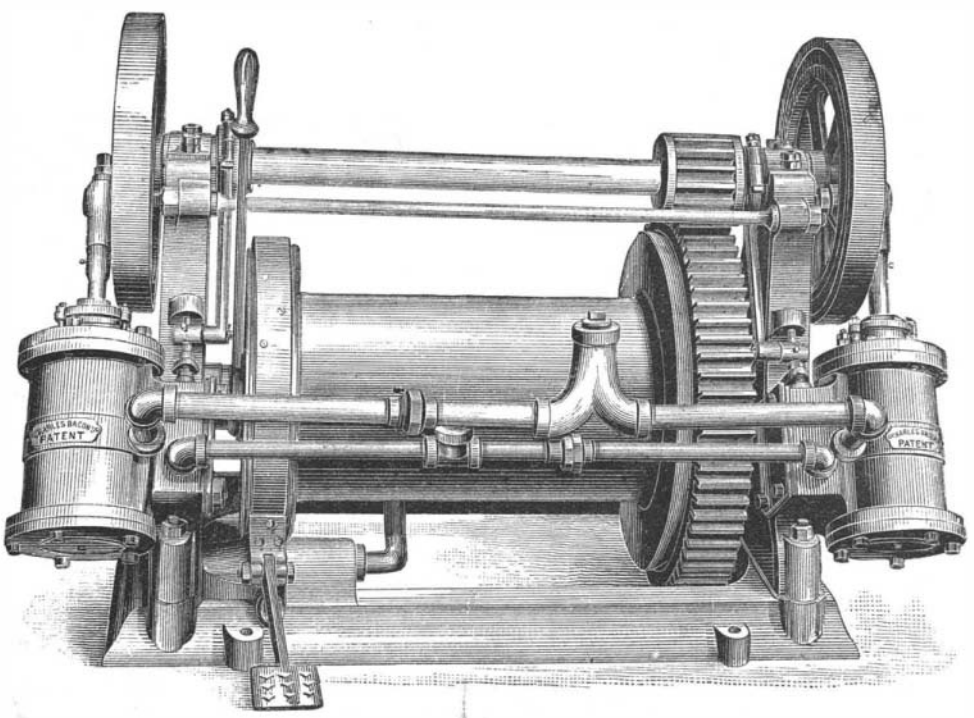
Flora Sterling, the five-year-old daughter of Dr. Sterling, while playing about the house found a bottle which had formerly contained citrate of magnesia and still bore the label. The child put it up to her lips and took a long swallow.

With a scream she dropped the bottle, and began to clutch her little throat in an agony of pain. Her father, who had heard her screams, found that what the little one had taken for citrate of magnesia was oxalic acid. Seeing that not a moment was to be lost, if he wished to save the child's life, the doctor looked about for an alkaline antidote.

Seizing his penknife the doctor sprang to the white-washed wall and scraped some of the lime into his hand. This he threw into the glass partly filled with water, and poured the mixture down the almost dying child's throat. The antidote took effect at once. The intense pain caused by the burning acid was alleviated, and soothing, mucilaginous drinks to cool her blistered mouth and throat did the rest.

HOISTING AND WINDING ENGINES.

The accompanying illustration, representing Bacon's double cylinder "special" hoisting engine, is from the catalogue of Messrs. Copeland & Bacon, well-known builders of mining machinery and hoisting and winding engines, 85 Liberty Street, New York. The drum is driven by means of a V friction on its end, and the lowering of the load is controlled by a foot brake. An engine with 6½ inch cylinders, and occupying a floor space of but 3 by 4½ feet, will hoist 2,500 pounds 100 feet per minute. These engines are especially recommended for inside working of mines, steam lighters, coal yards, ice companies and other light hoisting.



BACON'S DOUBLE CYLINDER HOISTING ENGINE.

Welding the Ends of Railroad Rails.

Tests have been made at Johnstown, Pa., it is said with great success, of an apparatus designed to weld the track rails together as they are laid in the roadbed, in place of fastening them with fish plates, bolts, chains, etc. The machine which produces the welding resembles somewhat a car, but is much more massive than the ordinary electric car. The current is taken from an overhead trolley wire. Inside the car is what is known as a "motor dynamo," which transforms and changes the direct current into a current of the desired kind for the electric welding process. A big crane of special construction extends through the open end of the car, and carries a peculiar apparatus, which is the welder proper. The interior of the car is lined with water tanks, which provide hydraulic motor power for some of the adjustments, and a circulation of water for cooling the copper contacts which are used in the welding. At various points are independent electric motors, which operate emery grinders for cleaning off the rail preparatory to the welding.

The machine was stopped over a joint, where the ends of two rails rested on the same sleeper, and after the necessary connections were made a powerful electric current was turned on. In less than a minute the rails at the ends began to change color, and inside of three minutes the metal was raised to a white heat. Then the ends of the rails were brought together under pressure and a perfect weld was made in all cases where the conditions were favorable.

The advantages which will arise from the success of this machine are that as the rails wear off speedily at the joints, the life of the rail is increased; the increase of the life of the motors attached to each car, in the running of electric street cars, the comfort of the passengers, by relief from the constant jar now experienced in passing over the joints, the great decrease in the noise of the electric cars, and—what may be considered the greatest advantage—the fact that these continuous rails will carry back the current to the dynamo, so that the wastage of electricity, which has in many cases seriously affected the gas and water pipes, will be prevented.

An Accident on a Chicago Cable Road.

Recently Chicago people had an illustration of the dangers of running cable roads in narrow and crowded streets. The down-town loop of the Northside cable road commences at the mouth of the La Salle Street tunnel, runs south three blocks to Monroe Street, east two blocks to Dearborn Street, north four blocks to Randolph Street, and west two blocks to the mouth of the tunnel. A cable train consisting of three large passenger cars and one large grip came out of the tunnel, and the gripman attempted to stop just south of Randolph. The grip refused to let go the cable, and the train could not be stopped. This cable runs at about six miles an hour, and, in spite of the efforts of the gripman to stop the train, it ran all the way around the loop and down into the tunnel at the speed of the cable, causing considerable damage on the trip. Horse cars were overturned and vehicles damaged, and the train was only finally stopped by a collision with the preceding train when part way down the grade into the tunnel. Several persons were injured in the collision. On an examination it was found that one of the strands of the cable had become loosened and had caught in the grip. At the collision the grip was wrenched from the car and passed under the preceding trains and damaged several grips. The result was that the whole loop was blocked until the next morning. As soon as it was discovered that the train could not be stopped, some of the employes of the road ran ahead of the train warning people to get out of the way; and had it not been that the accident occurred when the streets were comparatively free from traffic, the damage would have been much greater.

The seriousness of this accident can hardly be realized until one sees an unmanageable train of four cars running through the streets of a crowded city. Most of the streets of Chicago are very wide, being from 60 to 80 feet between curb lines, with room for a double-track railroad, with space sufficient for two trains abreast on each side between the tracks and the curb lines. Had there been a blockade in the street with teams going in both directions, the loss of life would have been considerable. The possibility of such accidents is one of the defects of the cable system, and although there have been many attempts to design a grip that will not get tangled up with a loose strand, yet cable men assert that nothing has been designed that will prevent such accidents with any certainty. If such an accident as this should take place in the vicinity of the World's Fair grounds during the coming summer, the cable railroads, on which many people will have to rely for transportation to the World's Fair grounds, would be blocked for hours. On the section of the cable road nearest the Fair grounds the cable travels at a speed of 13·8 miles an hour. The increased speed would make an accident of this kind all the more dangerous. One of the advantages of a cable road in crowded streets lies in the fact that the cable has a fixed speed and it is impossible for a car to run faster than the cable; hence there is no danger of racing in the streets, such is common with the electric railroad in Boston; but the possibility of such an accident as a cable getting entangled in a grip offsets considerably the advantage obtained by a fixed maximum speed.

Chicago people are accustomed to the most dangerous conditions of street transportation existing in the world. This is apparent from the fact that trains of four cars each, moving quite rapidly, pass each other going in opposite directions at intervals of about 15 to 20 seconds, giving just time for teams and foot passengers to dodge the trains. Crossing the cable lines are numerous street car lines in the down-town section, all of which render the heart of the city a place to be avoided by all but active people. The city authorities realize this, and have detailed policemen to watch the crossing points; but it is needless to say that one policeman has but little power over traffic so important and heavy as that just described. Practically in Chicago, the cable roads have the right of way, and the public feel that they must look out for themselves. In no other city in the world is it customary to run four-car trains in opposite directions through the principal streets; and if it were not for the fact that the cable companies give to their cables the most rigid inspection every night after the cars have stopped running at 12 o'clock, the troubles would be greater than they are. The inspection of the cable is much more thorough than the inspection of the grips; but a broken grip will only cause a delay of an hour or an hour and a half, while a broken or stranded cable may cause a delay of from four to six hours. If such an accident as this one in Chicago should occur on Broadway, New York, where there is little room for teams, the result would be very expensive for the cable company, and would, very likely, cause loss of life.—*Railroad Gazette.*

THE Languedoc ship canal, in France, by a short passage of 148 miles, saves a sea voyage of 2,000 miles by the Straits of Gibraltar.

The Industrial Uses of Sodium Silicate.

About two months since we gave in these columns an outline of the manufacture of sodium silicate. We now propose to deal with some of the ways in which this article may be applied in use. Besides the principal use of silicate of soda in the manufacture of cheap soaps, there are many purposes for which its employment is found to be advantageous or even indispensable. It may be of interest to briefly enumerate a few of the more important ones; some are still kept secret by manufacturers. Silicate of soda, combining the properties of caustic alkali and soap, is well adapted to be used either by itself or in connection with other detergent materials for cleansing all kinds of articles where the action of caustic soda is too keen, or that of carbonate of soda or soap not strong enough. Thus it is found to be extremely useful in cleaning greasy materials. Several of the Continental railway companies, for instance, are able, by the use of silicate of soda, to recover their dirty cotton waste no less than about twelve times, while formerly (when caustic soda was employed) this could only be done two or three times. This fact proves that the strength of vegetable fiber is not impaired in any material degree by treatment with the agent in question.

Very favorable results have also been obtained with silicate of soda as a substitute for caustic soda in the manufacture of paper, especially in the bleaching of jute and hemp waste; it has furthermore been successfully employed in connection with the process of sizing and waterproofing paper (wall papers, etc.), as well as a substitute for china clay.

This silicate is also a fixing agent for alumina and other mordants on cotton, while it is said to be unequaled as a sizing for cotton thread in cotton mills for preparing stock for the loom.

Its use for rendering textile fabrics incombustible is well known, and has extended over a period of nearly thirty years.

Large quantities are consumed in the manufacture of artificial stones, of enamels, and paints. The so-called silicated paints contain silicate of soda as a principal ingredient.

It is found useful in building construction for rendering timber fireproof and walls waterproof or air-tight. Its uses in chemical works are numerous. Thus it is employed for soaking bricks when it is desirable to prevent diffusion, for painting steam pipe coverings, and thereby dispensing with canvas covering.

Asbestos mixed with silicate of soda forms an excellent non-conducting material, especially adapted for jacketed pans, retorts, etc.

It may be used by itself or in connection with other materials as a cement for stone, glass, porcelain, marble, etc., and for attaching labels to metal surfaces. Certain kinds of cements owe their hardening properties to the presence of silicate of soda. Sellar's cement, for example, consists nearly entirely of barium sulphate and sodium silicate.

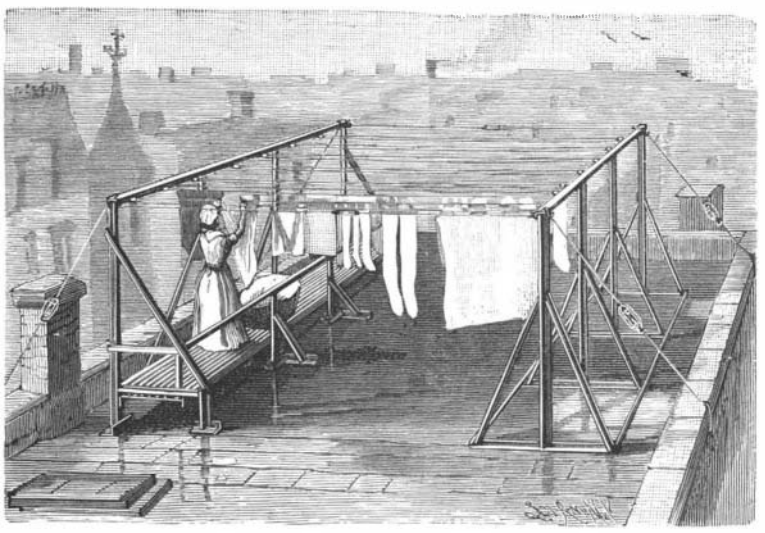
Silicate of soda is the only material from which pure hydrated silica may be prepared, such as is required in some processes for bleaching oils. For this hydrated silica probably many uses will be found as the result of further experiments.—*Chem. Tr. Jour.*

New Double Deck Screw Ferry Boats.

Two new screw ferry boats have been built by the Harlan & Hollingsworth Company, of Wilmington, Del., for the Central Railroad of New Jersey, to ply on the Hudson River between New York and Jersey City. The new boats are called the Easton and Mauch Chunk. The boats are of the same dimensions, namely, 158 feet long, 32 feet moulded beam and 54 feet beam over guards, 14 feet 4 inches depth of hold, and 9 feet draught. Plates are steel, frames iron. Their motive power consists of two 7 foot propeller wheels, one in each end, driven by two compound engines, arranged one forward of the other and working on a continuous shaft, cranks being placed at right angles. The high pressure cylinders are 16 inches diameter, low pressure 30 inches, with 22 inches stroke. There are two steel boilers of the straight through type, 19 feet long and 8 feet diameter; each boiler has two corrugated steel furnaces, and is built for working pressure of 100 pounds steam, independent feed and circulating pumps. The lower saloons, 100 feet long, are furnished with oak, in panels, with French plate glass mirrors every 10 feet. The upper saloon, finished with butternut panels, is 80 feet long, and is reached by two easy stairways leading from the lower cabins.

A ROOF CLOTHES-DRYING DEVICE.

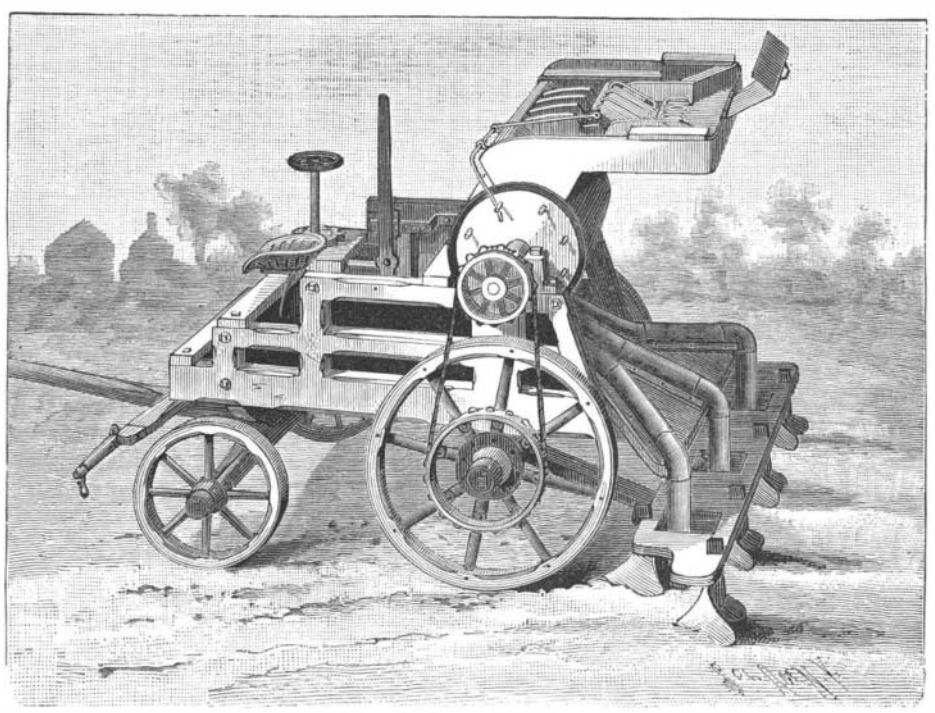
A frame for supporting clothes lines on the roofs of houses, one of inexpensive construction, conveniently adjustable, and which will be strongly held in place on the roof without the use of nails or screws, is shown in the engraving, and has been patented by Mr. Leo Oppenheimer, of No. 325 East Tenth Street, New York City. The side frames supporting the lines may be of any suitable construction, and they are adjusted toward or from each other, according to the tautness or slack of the lines, by means of cross rods connecting the ends of the top rails, each of the rods having a turnbuckle, by means of which the rods may be readily lengthened or shortened. Similar rods also extend downwardly and outwardly from the ends of the rails to hooks on the edge of the coping or other fastening on the top of the wall of the building, these rods likewise having turnbuckles, for lengthening and shortening the rods to adjust the frames and hold them securely down on the roof. By means of this improvement the frames may be readily held in the desired position, and the roof is not injured by perforations likely to cause leakage.



OPPENHEIMER'S ROOF DRYING FRAME.

AN IMPROVED POTATO PLANTER.

In the machine shown in the illustration, the seed potatoes are automatically fed from a hopper to a feed device, thence to pockets and chutes by which they are conducted to the furrows, which are made in the ground as the machine advances, and covered after the potatoes have been dropped in them. The improvement has been patented by Mr. Nathan Sturdy, of No. 4834 Halstead Street, Chicago, Ill. Within a casing surmounted by a hopper is a drum, preferably of sheet metal, upon a shaft revolved by the movement of one of the axles, the drum having on one head a series of pins, and containing a corresponding number of chambers in its peripheral surface. Each drum chamber is also divided into three pockets, and the hopper is divided into corresponding registering compartments, each partition having at its rear upper edge a recess adapted to receive a feed device, consisting of a pivoted table adapted to receive the seed potatoes. The table has skeleton transverse partitions which allow the escape of dirt, and are close enough together to insure the delivery of the potatoes endwise through the hopper. Upon a platform at the rear of the hopper are partitions forming a chamber in which the potatoes to be planted are placed, the platform being somewhat inclined and having ribs guiding the potatoes in their delivery to the feed table. The latter is rocked, as the drum is revolved on the movement of the machine, by a lever extending within the path of the pins on the drum head, the feed table when in one position receiving the potatoes, and as it rocks delivering them to the pockets of the drum, from which they are discharged through the chutes supported upon the rear platform to the furrows. The plows and covering blades are supported upon a head having near each end a forwardly extending tongue pivotally secured upon the rear axle. The tongues are connected at their forward ends by a cross-bar, connected by a link to a bell crank lever, the other arm of the lever being connected with a rack engaged by a pinion on a shaft having a hand wheel in convenient reach of the driver. By means of this wheel, or by an upright hand lever, the covering blades and plows may be raised and lowered as desired, the machine when in operation planting three rows of potatoes at the same time.



STURDY'S POTATO PLANTER.

Are Americans a Practical People?

The notion prevails in this country that we are a very practical people. We take credit to ourselves for being sensible, shrewd, and at least mindful of our own interests. This quality gets a harsher name from our foreign critics. They say that we are materialistic, grasping, and in fact sordid, as the thing we most care for is money, and that which we are most alive about is our material interests. They admit that we are "smart," but say that we are mentally commonplace and unimaginative. The critics are mistaken, and our own estimate of ourselves is more complacent than correct. We are a very imaginative people, and in many ways the most unpractical. The old stage conception of Uncle Sam as a good-natured rustic sitting in a rocking chair, whittling, was not altogether out of the way. Whittling is not a remunerative occupation, as a rule, although this quaint waiter on Providence, who seemed to imagine that if he sat at ease, all good things would in the course of time pass his way, occasionally did whittle out an invention that would save him from labor. He answered the gibes of his critics by pointing out the fact that the chair he sat in was a self-rocker—a little invention of his own. He was a man of vague dreams and imaginations.

No; brought to the test in the commercial struggle of the modern world for supremacy, the American is not practical. In rivalry with other active nations he shows himself a bungler, and lacking in practical wisdom and foresight. An inventor, yes; but lacking practical shrewdness. He is very ingenious. He has gone on doubling in the past few years the great world staples of corn, cotton, and iron, and he seems confidently to expect that Providence will market them for him; especially as he has cheapened the cost of all these products, it would only be fair for Providence to attend to the selling part. He knows that one per cent of the arable land in the cotton States will produce all the cotton the world can use, and he knows that the product of cotton and iron and grain increases in an enormously greater ratio than the population, and yet he neglects many of the most obvious means to profit by this bounty of nature and of his situation. He looks on and brags about his greatness, while his industrial and commercial rivals occupy the markets of the world. Now that he is in rivalry with them for a fair share in so plain a prize, his conduct shows him to be the most unpractical of men.—*Charles Dudley Warner, in Harper's Magazine for April.*

Ruthenium Red.

The color discovered by M. Joly in his researches on the ruthenium ammoniacal compounds rivals the most brilliant coal tar pigments by its tinctorial intensity. The author has observed that ruthenium red is the best reagent for the pectic compounds, which are always associated with cellulose in young tissues and in old tissues which have not been modified by foreign matters. It is the only reagent for the transformation products of the pectic compounds, *i. e.*, the majority of gums and mucilages.—*Louis Mangin.*

AN omnibus has been started in Glasgow furnished with pneumatic tires, which are protected from injury by sharp stones or glass by canvas and wire-wove netting. There is no jolting or jarring, and the noise is reduced to a minimum.