

3, secured by double latches, and the lever catch, R, Fig. 4, holds the car in position. A crank lever, the end shown at S, which engages in the space between the two axles, assists in holding the car in place. Cleats running along the sides of the elevator hold the top of the car, so that the elevator can be reversed without allowing the car to escape. By opening the door, Q, and lifting the lever, R, the car can be driven straight through the elevator, so that its suspension at the floor of the gallery will not prevent the passage of the car across the shaft. By the use of the yoke, shown in Fig. 4, the elevator can be completely inverted to discharge soft, cohesive mud or clay.

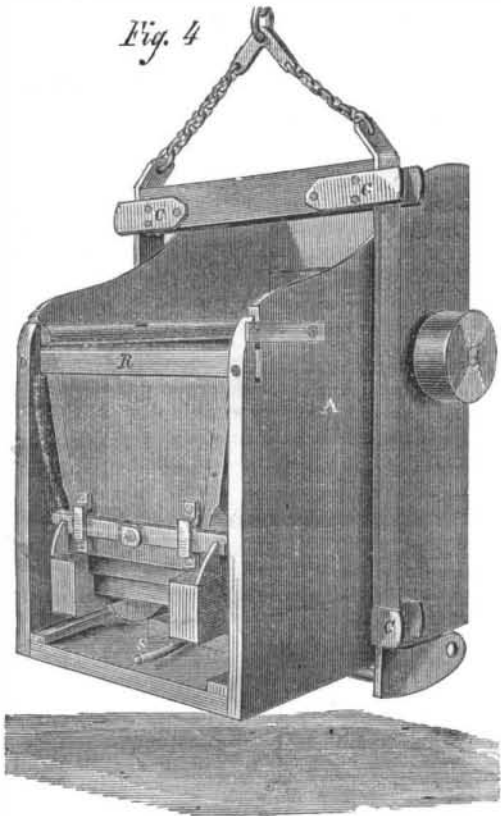
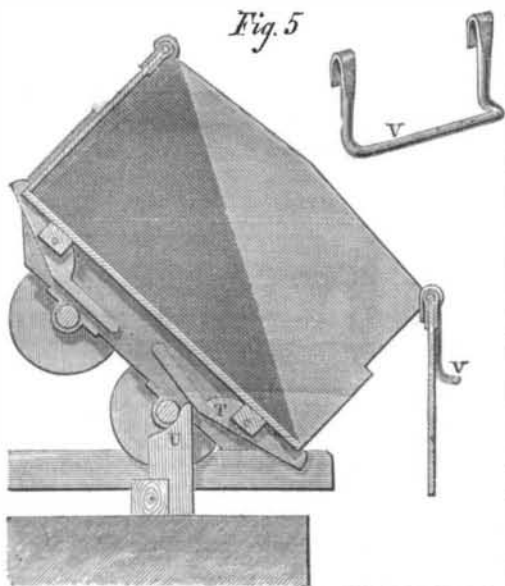


Fig. 5 represents a combined ore and timber car, provided with doors, pivoted at the top, and secured by lever catches at the bottom. By turning the doors up over the top the ends are left open for the conveyance of timber. Closed, the car is adapted for ore, coal or any other material. The engraving represents the car in the act of discharging a load. The long end of the lever, T, engages the abutment, U, which stops the car and opens the door. The hook, V, hangs on the door, and is intended to receive the propelling force of the hand nearer the wheels than the top, so that in meeting any obstruction on the rails it will not tend from the center of gravity, but will ride over the obstacle.



The practical miner will readily see and understand the varied advantages of this combined apparatus. From its rapidity of operation it is admirably adapted to raising water from mines; it can be

employed in coal yards in delivering coal, and can be used in loading or unloading ships or boats with coal, requiring the services of only one man where three are now employed.

It is the subject of two patents, through the Scientific American Patent Agency, dated July 17, 1866, by George Williams, of Sterling, Colorado, Ter.

Patents have been secured in foreign countries also through the Scientific American Patent Agency.

Mr. Williams is temporarily sojourning in New York, and for a few weeks letters will reach him addressed to the care of this office.

[Special Correspondence of the Scientific American.]  
**THE WORCESTER MECHANICS' FAIR.**

WORCESTER, Oct. 8, 1866.

In my last letter I gave you a brief summary of the attraction at the Mechanics' Fair in this city. It has just closed after nearly three weeks' session, and was a most successful exhibition. In addition to the articles mentioned in my previous letter, there are many deserving of at least a brief mention which, with your permission, I will proceed to give them.

**LAMB'S KNITTING MACHINE.**

This now celebrated machine was shown in operation. The quality of work done by it is certainly beautiful, not only beautiful but durable and reliable in all respects. It will knit *any thing*, and that tells the whole story. I saw a very modest and attractive young lady at work upon it, and therefore examined it with much care and circumspection. She knit me a scarf, and I paid her for it, so this notice is entirely gratuitous and unsolicited, being a simple act of justice to a meritorious invention. The machine runs very easy, being operated by a crank, and is sold for \$65, and if I was in the family line, as much as I used to be, I should certainly have one. The factory is in Springfield, Mass.

**CHASE'S MICROSCOPE.**

This is a simple and useful little instrument for magnifying natural objects, such as insects, etc. It is also valuable for detecting counterfeit money, as the lines in the engraving are easily distinguished from genuine; exhibited by O. N. Chase, Boston, Mass.

**ETHAN ALLEN'S GUNS.**

A splendid case of fire-arms was shown by Ethan Allen, of Worcester, Mass. They comprise breech-loading rifles, shot guns and pistols of surpassingly beautiful workmanship. They have just commenced the manufacture of Damascus barrels, and have been exceedingly successful. A shot gun shown had that beautiful mottled exterior, peculiar to this style of workmanship, the finish being brought out in great strength. They make small pistols also that load at the breech, and can be carried in the vest pocket; handy things for one of Sylvanus Cobb's heroines to pull out when the invariable "villain" appears on the scene. They also make shot guns which are sure fire, and as certain to kill as a fifteen-inch gun, at point blank range.

The awards of the Committee have made considerable excitement among the parties interested, medals being distributed without discrimination and "diplomas" being scattered about with a perfect looseness. The value of the "diploma" to a firm which transacts thousands of dollars' worth of business in the course of a year, and which has spent large sums to keep its tools running at the fair, is certainly not very great nor very satisfactory. But who shall decide when the doctors disagree? Bronze medals also were distributed to various individuals who did not value them, and to some who had no earthly right to them, but if the Committee's conscience is sound on this point, mine is. The fair was a complete success, and I hope there will be another next year.

**The First American Fire-arms.**

As early as 1748 muskets were manufactured in Massachusetts. They were made by Hugh Orr, on the order of the Province of Massachusetts Bay, at his shop in Bridgewater, Mass. He built five hundred for the colony, which were deposited in Castle William, and when the British evacuated Boston they carried off most of them. Hugh Orr came from Renfrewshire, Scotland, at the age of twenty-one, his

only possessions being a knowledge of the gunsmith and locksmith trades and a bundle tied in a handkerchief. He died in 1798, at the age of eighty-two. During the war of the Revolution he cast iron and brass cannon for the Continental army, with calibers of from three to forty-two pounds. They were first cast hollow and bored, but Mr. Orr introduced the method of casting them solid and then boring, which insured a more perfect and a stronger piece

[For the Scientific American.]

**WEST ALBANY LOCOMOTIVE WORKS.**

We were favored a few days since with a visit to the Locomotive Works of the New York Central Railroad, at West Albany, and although we had heard much of them, yet we were agreeably disappointed in finding them of greater magnitude and completeness than we had anticipated.

The location of the Works is admirably chosen, being about three miles from the city, on high ground, where fresh air and an abundance of room are always enjoyed.

The buildings are new and of immense proportions. They are built of brick and roofed with slate. They are admirably arranged with reference to each other, the various shops being situated in the most convenient manner possible. There is ample room between the buildings for roadways, drives, etc.

The grounds round about present a most pleasing and attractive appearance. They are tastefully laid out, with drives and walks; and on the south of the Works, at the foot of a hill covered with a beautiful pine grove, flows a quiet, winding stream, which gives to the whole scene an air of beauty and repose.

Instead of encountering great piles of broken cars, scattered parts of used-up locomotives, scraps of old iron and masses of unaccountable debris, all is so neat and orderly without, that one would almost fancy he was approaching the grounds of some Shaker settlement. There is absolutely a place for everything and everything in its place. There is a place for superannuated cars, and there you will find them. There is a place for scrap iron, and you will find it all there. There is a place for shop sweepings, and you will find them all there. I was told, on being shown a large mass of these scraps, that what a speculator had offered fifty dollars for, was melted up at the Works, and yielded fifteen hundred dollars worth of metal.

Inside of the buildings and workshops, the same order and good taste prevail as outside. The shops are spacious, well ventilated and well lighted. There is nothing here wearing a gloomy, dingy aspect. Every room is light, cheerful, and clean. Cleanliness, in fact, pervades every department. In the foundry, oil room, and locomotive shop it is the same.

The machinery is of the most perfect of its kind. I have visited many engine rooms on board steamboats, steamships, and at various works about the country, but have never seen equaled the one at these Works. It is a room about thirty feet square, with yellow-pine floor, as smooth and clean and bright as a Shaker dancing hall. The engine is a beam engine, and a perfect model of its kind. It would seem almost impossible that a machine in daily use could be kept so perfectly clean and bright in every part. The room is rendered doubly cheerful by having its spacious windows filled with some of the choicest plants.

The present master mechanic of the road, Mr. C. Manning, has been in charge of the Works only about a year, but has introduced some features which we heartily commend to the consideration of all master mechanics. In most shops of the kind, some of the workmen may be seen with huge pipes in their mouths, enjoying the luxury of a smoke while at work. This is not allowed here. No smoking during working hours. A whole train of evils is thus broken up. The tool room was, to us, the object of greatest interest and commendation. Instead of the tools being scattered about the shop, or kept in a hundred different tool chests and drawers, there is a small, convenient room fitted up at one end of the machine shop, and all the tools are kept there. There are inclined shelves arranged about the room and the tools are placed on these in

the most perfect order. There are shelves for drills and a place for every drill; and the drill is numbered to correspond to its place. Any particular tool is as readily found as a book in a well-arranged public library. The drills and taps are all made after the United States standard. The size of each drill or tap is marked on the head.

Every tool is polished and perfect. There are two or three men employed in this room whose business it is to furnish the workmen the tools they call for, and charge the same to them. When the tools are returned their condition is noted—"broken," "dirty," etc. When the tools need sharpening they are sent to the blacksmith shop in boxes, and when sharpened are returned to the tool room. By this means the tools are always in good condition, and much time is saved.

A steel locomotive is in process of construction by Mr. Manning, the first of the kind ever made. The steel is from the Troy Bessemer Steel Works.

A new method of tempering steel for springs has been invented by Mr. Manning, on which he has recently secured patents. It is a matter of great importance to railroads. By his method, a better spring is made from less than half the steel usually employed. These springs are now being introduced on the New York Central Railroad.

There are many features about these Works we should be glad to mention, did space permit. All parties interested in mechanical enterprises can spend half a day agreeably and profitably at the West Albany Locomotive Works.

J. WESLEY CARHART.

Troy, Oct. 1, 1866.

#### Jamaica—A Field for Inventors.

A correspondent, writing from the island, furnishes a number of interesting facts in relation to this country, concerning which, as the writer justly observes, little is known beyond the fact of its gradual decline.

The productions of the island are easily mentioned. Logwood always finds a ready market. Cotton has been tried and failed, growing into bush in the wet parts, and perishing for want of rain in the country around Kingston. Tobacco pays well when properly cultivated, but enough is not now produced on the island, to supply even its own inhabitants. The cocoanut grows abundantly near the coast; one estate mentioned, has one hundred acres of them well fenced in, the grass underneath the trees serving for pasture.

Corn and peas grow several crops per year, but cannot be kept for any length of time, so that prices range from fifty cents to two dollars per bushel.

The great evils of Jamaica are, no market for home consumption on a large scale, and the limited number of the articles of export, and the unreliability of profit, governed by the prices in England.

A new branch of industry, which promises well for Jamaica, is the increasing demand for bamboos, for the manufacture of paper in the United States. Any one who would introduce cheap machinery for converting these into pulp on the spot would make a fortune.

It is the difficulty arising from the carriage of the raw material to the wharf on the inferior roads, that prevents more people from engaging in the trade. None but the most valuable articles can stand the expense of going over hilly roads without swallowing all the profits. On the mountains the most beautiful hard-wood timber is found, but the demand is so slight that it would not be profitable to transport it to market, for the paths are so rough that the use of the block and tackle is often required.

The want of small portable saw mills to saw boards, fuel for steam boilers, or staves for hogsheads, is referred to by our correspondent, the usage now being to allow a stick to project a couple of feet from the fire, to save labor. Rotary engines for water and still-house purposes are also needed. Let inventors advertise in the island papers and appoint agents. Jamaica has also a vast quantity of fibrous plants, penguins, manilla, and the barks of many trees, which are now applied to no practical use on a large scale. If now any one would introduce machinery to clean the penguins, six feet in length, of the fleshy matter, quickly and thoroughly, it would be a source of great profit.

In reply to our correspondent's inquiries, we would state that tubular boilers are fast taking the place of the fire boilers, and are being universally adopted. The plan of Mr. Wye Williams, of introducing air behind the fire bridge, has been advantageously and extensively employed, and is highly recommended.

#### MISCELLANEOUS SUMMARY.

It is said that an artificial ivory is now made in France from a paste of *papier-maché* and gelatin. Billiard balls formed of this material, though barely a third of the price of those made from real ivory, are yet so durable and elastic that they can be thrown from the top of the house on to the pavement, or violently struck with a hammer, without injury. With this same paste, to which the name of Parisian marble is given, among many other things, the finest and most complicated moldings for ceilings can be made, or capitals of columns can be constructed in any color so as to resemble the most valuable marbles.

[In the United States various substitutes for ivory have been proposed, such as preparations of india-rubber or compounds of bone shavings with clay and suitable acids, but neither of these compounds has been fully equal to ivory, and the field is still open for our inventors. We understand that Michael Phelan, the celebrated manufacturer of billiard tables, has endeavored for some years past, to obtain a substitute for ivory from which to make billiard balls. Messrs. Phelan & Collender of this city, offered through these columns, not long ago, \$10,000 for the patent of some artificial substance which could be used for billiard balls, and which would cost less and be equal to ivory.—EDS. SCI. AM.]

AN experiment was recently tried in England to ascertain the cost of transporting goods by steam engines on common roads. The work performed was the hauling of three wagons loaded with fifteen tons of lime, sand, and coal, twenty-six miles, the entire weight of the train being twenty-one tons. The train occupied twelve hours and a-half in the journey, including thirty-three minutes' stoppage. This was a speed of two and one-sixth miles per hour. The coal consumed was 2,576 pounds, and the expense of the journey was, for tolls, \$10 54; coal \$5 67; oil and waste, 84 cents; labor, \$3 13; wear and tear and interest, 94 cents—total \$23 01. This is equal to a cost of but six cents for moving one ton one mile, nearly one-half of it being tolls collected by the road companies.

THE first iron works in this country were established near Jamestown, Va., in 1619. In 1622, however, the works were destroyed, and the workmen, with their families, massacred by the Indians. The next attempt was at Lynn, Mass., on the banks of the Saugus, in 1648. The ore used was the bog ore, still plentiful in that locality. At these works Joseph Jenks, a native of Hammersmith, England, in 1652, by order of the Province of Massachusetts Bay, coined silver shillings, sixpences, and three-pences, known as the "pine tree coinage" from the device of a pine tree on one face.

THE PARIS EXHIBITION.—We would call attention to an advertisement in another column of Dr. Evans, of Paris, who proposes to collect and exhibit, at the great Exhibition, sanitary and surgical articles which were adopted and used in the late war. Mr. Evans is an American, and is dentist to the Emperor, and possesses unequalled facilities for successfully carrying out his purpose.

THE gold and silver products of the United States for the year 1860 have been estimated at from eighty-two to one hundred and six millions. California producing twenty-five millions; Montana, eighteen millions; Nevada, sixteen millions; Idaho, seventeen millions; Oregon, eight millions; Colorado, seventeen millions; other sources, five millions.

A MARKET report dated Boston, January, 1719, shows that deer skins dressed for clothing were regularly quoted. Those dressed by Indians sold for five shillings a pound, while those dressed "in oyle" by the whites, brought eight shillings, six-pence.

SWEET OIL rubbed on the skin is said to be a sure antidote for ivy poison.

NEAR Basingstoke, in England, the ancient Roman and British capital of southern England, some excavations have recently been made which have laid bare a Roman street, with another smaller one running from it. Two large Roman houses, with tessellated pavements, the site of an amphitheater, and a portion of the walls surrounding the ancient capital, have also been dug out. Several coins, of periods anterior to the Christian era, have been found, and a brick, with parts of an inscription upon it.

TEST PAPERS are made by dipping unsized papers into a solution of a vegetable matter which changes color when exposed to the action of an acid or alkaline solution. The paper after being gently dried, is cut into slips of suitable size. By dipping the appropriate test papers into any solution, we can ascertain whether it is acid, alkaline, or neutral. Litmus and turmeric are most commonly used as a coloring matter—litmus for the detection of acids, and turmeric for that of alkalis.

THE new anemometer at Greenwich Observatory consists of a circular plate, having an area of two square feet, supported vertically on eight springs. It has a directing vane which always keeps it facing the wind, and the deflection of the springs according to the force of the wind, is registered on a revolving table in the room below.

THE public debt of the United States, on the 1st of October, was \$2,573,326,941, which shows a decrease of over twenty-two millions in the month of September. The Government holds \$86,000,000 in gold and \$41,000,000 in currency now in the treasury.

THE English river steamers are not provided with engineers' signal bells, but the captain conveys his orders to the engineer by means of a boy, who is stationed at the entrance of the engine room to repeat the word.

ENGLISH PATENTS.—It appears from the report of the Commissioners of Patents, that in the year 1865 there were 3,386 applications for patents, of which 2,186 passed the seal. The receipts of the Patent Office amounted to £115,340, during the year 1865.

THE tunnel under the Alps has reached 7,615 feet in length on the French side and 11,285 on the Italian. At the present rate of progress five years will be required to complete the work.

ONE thousand miles of telegraph are now in operation in New Zealand, while a sub-marine line, a branch of the great Anglo-Indian line, is to be completed next year.

THE capacity of iron ships built on the six principal rivers of England, during 1866, amounted to 408,206 tons of new vessels.

THE wires of the Russian-American Telegraph have been extended a distance of 715 miles above New Westminster, in British Columbia.

THE latest antiquarian sensation is the discovery of an ancient city in southeastern Africa, believed to be the Ophir of the Scriptures.

THE report of the Commissioner of Agriculture estimates the corn crop of the United States, this year, at more than a thousand millions of bushels.

OVER four hundred thousand dollars of mutilated fractional currency are destroyed by Government every week.

THE principal manufacturer of soda water, in New York, gets out 3,000 gallons per day throughout the season.

THE London Water Works Company offer to supply large consumers at three cents per tun, or twelve cents per thousand gallons.

By using delicate gold electroscopes, indications of static electricity have been obtained from living blood, nerve tissues, and muscular fiber.

A RAFT containing 2,000,000 feet of choice pine lumber and valued at \$50,000, was recently lost on Lake Huron.

ONE of the galleries in the Paris Exposition will be devoted to the display of human skulls.

A FRENCH sugar maker applies the principle of endosmose to separate the sugar from beet molasses.

BATH brick are now being manufactured in Stratford, C. W. They are said to be of excellent quality.