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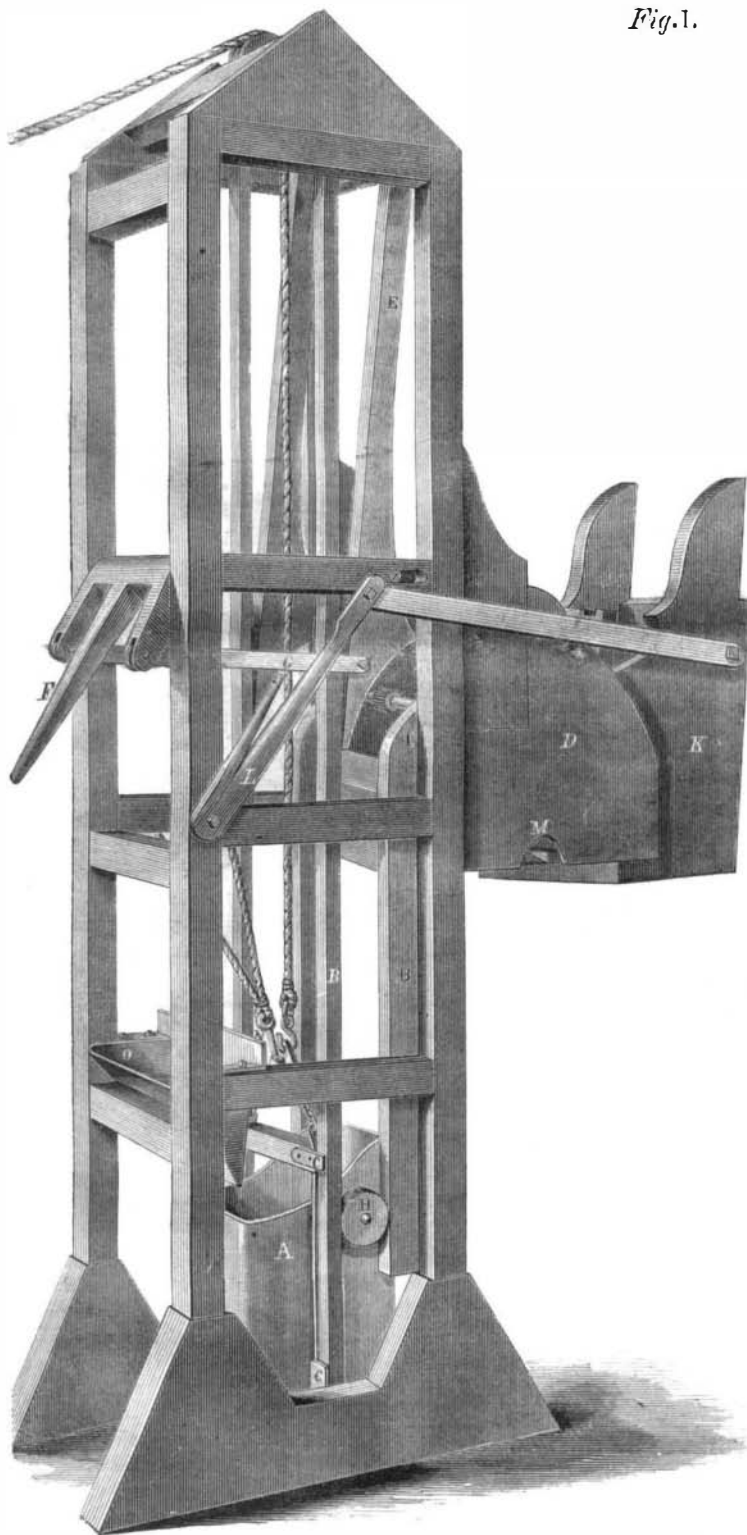
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IN ADVANCE.]

Improved Elevator for Mines.

The business of mining in this country has grown wonderfully within twenty-five years. Our coal production, which was the main mining interest, was the result chiefly of foreign talent and labor, our own peo-

of our wealth. Our mines of the precious metals are of such extent and richness, that they may be relied upon for the production of gold and silver enough for the extinguishment of our national debt, without aid from any other element of productive wealth.

Fig. 1.



WILLIAMS'S ELEVATOR FOR MINES.

ple evincing no predilection for the business. The discovery of the vast deposits of copper in the Lake Superior region, and the gradual failure of the pan diggings of California, aroused the attention of our capitalists and mechanics to the necessity of a scientific and systematic prosecution of the art of mining. So successful have been the efforts in this direction, that mining has become one of the chief resources

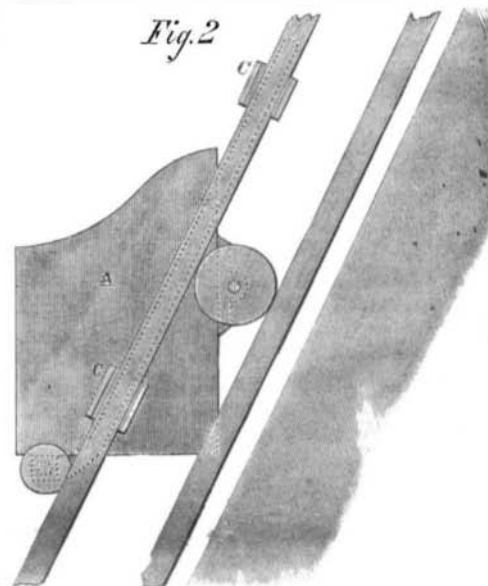
of our wealth. Our mines of the precious metals are of such extent and richness, that they may be relied upon for the production of gold and silver enough for the extinguishment of our national debt, without aid from any other element of productive wealth.

When coal, quartz or other minerals are to be discharged, that portion of the chute shown at K is closed by the lever, L; K being pivoted to the main chute, D. When, however, mud or water is raised, which is not to be discharged into cars or wagons,

The improvement illustrated in the series of engravings accompanying this article, is designed to facilitate the process of mining, by simplifying the work of extracting and conveying the mineral out of the mine from the different lodes and galleries. Fig. 1 is a perspective view of an ordinary form of the elevator. The power for raising the elevator proper, or the receptacle for the mining products, can be that of man, animals, steam, or water, and be located near, or at a distance from the frame. The elevator, A, of wood, or boiler iron, is slung by a yoke passing under the bottom, to which it is attached by pivots, to allow the vessel to be tilted or inverted. It is guided in its ascent by the rails, B, and the lips, C. A portion of the front rail is pivoted above the chute, D, as seen at E, and where it connects with the lower portion, is curved to fit a corresponding curve on B. By means of the lever, F, and arm, G, this upper portion can be detached from the lower part, closing the vertical ascent and compelling the elevator, A, to turn, by means of the roller, H, into the passage to the chute, as seen in Fig. 1, when, by means of the yoke, the elevator is reversed or tilted sufficiently to discharge its contents through the chute. It can be readily seen that by the suspension of the elevator by the yoke attached to its bottom, instead of requiring additional power at the point of tilting, the weight of the elevator is shared by the lifting rope and the incline at I.

the chute is placed in the position shown in the engraving, which closes the front opening of the chute and allows the water or mud to pass out at M. To retain and secure the elevator at any point, as the level of a gallery, a simple hook, N, is slung by two lines, which keep it always in position for use. This engages the yoke and secures the elevator in the position, by which it can be readily filled from the hopper, O.

Fig. 2.



It can be easily seen that the devices for dumping from any gallery and for loading at any point, may be repeated indefinitely, so that the apparatus is adapted for mines having numerous galleries. The hook, N, upon the raising of the elevator, unhooks automatically, so that while it prevents the descent of the elevator, it permits it to rise to another gallery.

Fig. 3.

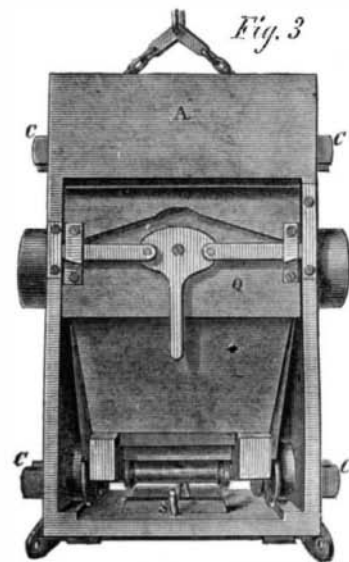


Fig. 2 shows a modification of the elevator, by which it can be made to traverse a shaft at any angle, always retaining an upright position. This is done by a yoke, shown in the dotted lines, which suspends the elevator by the rear of the bottom, and is furnished with a roller that engages with a rear rail.

Figs. 3 and 4 represent an elevator which receives a car loaded with coal, or ore. Fig. 3 is a front view, and Fig. 4 a rear view of the elevator and car. By simple devices the car is secured in the elevator, so that both can be tilted together. The door, Q, Fig.

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.

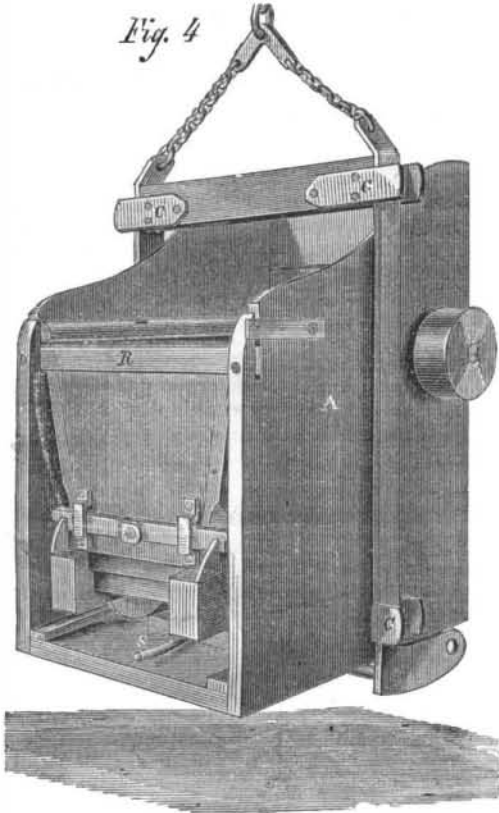
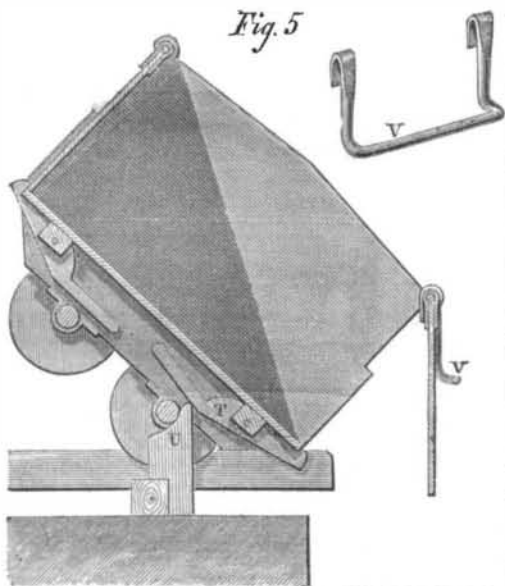


Fig. 5 represents a combined ore and timber car, provided with doors, pivoted at the top, and secured by lever catches at the bottom. By turning the doors up over the top the ends are left open for the conveyance of timber. Closed, the car is adapted for ore, coal or any other material. The engraving 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