

**THE TRAVELING GARBAGE BURNER OF CHICAGO.**

The disposal of garbage and other refuse from the household is the most serious hygienic question that municipal governments have to deal with, as the health of a city depends to a large extent upon the efficiency of the street cleaning department. The most common method of removing garbage is by means of carts that go from house to house gathering whatever refuse there may be until the wagon is loaded, then through the streets with the foul-smelling and disease-breeding load to a distant dump, which, in cities on the sea coast, may be a scow, but which in most cities is more liable to mean a depression in the ground, which is filled with this putrid matter and left to contaminate the whole region.

An effectual way to dispose of garbage is to burn it, and this can be accomplished either by the use of stationary or by portable crematories. One great hindrance to a satisfactory and economic system of collecting and destroying it is the fact that to the garbage are added ashes, old shoes, bottles, tin cans, paper and household refuse of all kinds.

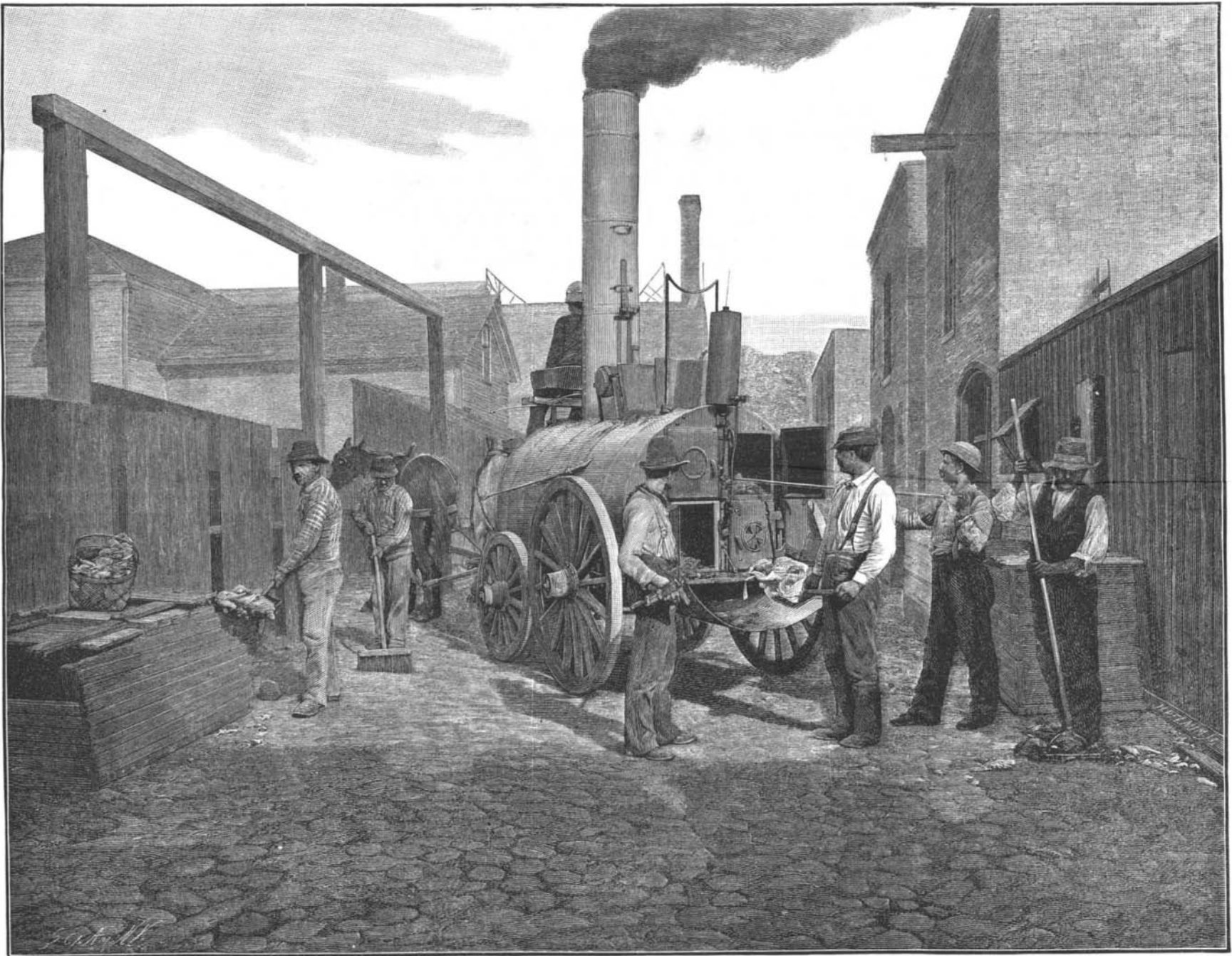
The city of Chicago has taken hold of this matter

On the top is a receiving box into which the garbage is thrown and where it is subjected to sufficient heat to drive out most of its moisture. When the box is filled a rod attached to the sliding bottom is pulled out and the contents dropped into the furnace, where the intense heat incinerates it instantly. While this burning process is going on an attendant pushes the burning mass into a forward compartment, which contains an inclined grate, in order to keep the consuming capacity of the furnace up to its highest mark. The fire is maintained by the use of crude petroleum. Two cans designed to hold this fuel are used; one is on the rear end, immediately over the furnace doors, and the other is forward. The flow of this fuel is easily regulated by a stopcock, so that if the fire becomes low it can be enkindled almost instantly, making the crematory a roaring furnace. Frequently, when in operation, the smokestack reaches a white heat, so intense is the heat generated. The capacity of this furnace is enormous, and ordinary garbage disappears in it like paper.

Only the garbage proper is fed into the receiving box on the top. All paper and other light, inflammable

casions when thirty blocks have been covered. This means a large amount of work in a city like Chicago, where in most instances eight blocks equal a mile. When the crematory and tender have been through an alleyway the transformation is surprising, as the place has been cleaned of disease-breeding refuse and other litter. It is estimated that this outfit of traveling crematory and wagon will take the place of fifteen to twenty ordinary garbage wagons, and it has a special advantage over them in that everything subject to decay is burned on the spot where it is gathered and foul odors are not stirred up and carried through busy streets, risking the spread of disease. Whatever noxious gases arise from the smokestack are soon dissipated, and the crematory, after disposing of the garbage on one block, moves along to the next, so that there is not a constant stream of such gases being poured out from one source as would be the case in a stationary furnace.

No comparison of this system of disposing of garbage over the garbage cart system has been made to a sufficient extent to admit of giving any definite figures, but enough has been learned to lead the street clean-



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with much vigor and has tried both stationary and portable crematories. Superintendent Welles, of the street cleaning department, was not satisfied with the results obtained; so devised a crematory of his own, which is shown in the accompanying illustration, as it appears in actual work in an alleyway on the west side of Chicago. It is a very simple affair and made solely for service, all regard for appearance being thrown aside. This crematory has produced decidedly satisfactory results, and Mr. Welles regards it as the most successful one that has yet been produced, all things considered.

The crematory weighs 7,700 pounds and is drawn by a pair of horses. It comprises a cylinder eight feet long and four feet in diameter, made of ordinary boiler iron covered with asbestos. A tall smokestack in front completes it, the whole being mounted on wheels. The general appearance of the crematory is not much unlike a traction engine. The cylinder is divided longitudinally into three compartments, two of which can be seen in the illustration, half of the double door to each being open. The upper compartment is the furnace proper and the lower one is the ash pit. In the forward part of the cylinder is a third compartment, the grate of which is inclined toward the front end.

material is fed into the rear door immediately into the fire. One man is represented in the illustration as about to throw a shovelful of paper into the furnace, while another has just removed a shovelful of garbage from the garbage box, preparatory to throwing it into the receiving box. The man at the right with the rake in his hands assists in separating ashes from the garbage proper, and rakes up into piles whatever cannot be burned ready for the wagon that follows the crematory to gather up. Most of the alleyways in Chicago are paved with wooden blocks, and, in order to prevent any danger of their being set on fire from hot coals, a sheet iron apron, as shown in the picture, is stretched under the furnace door to gather all falling embers.

The crematory is followed by a wagon which gathers up ashes, bottles, tin cans, and other refuse that cannot be consumed. Four or five times in the course of a day the ashes are drawn from the crematory in order to give it good draught, but this little residuum takes a very small fraction of the space that the burned garbage occupied, and all disease-breeding germs are consumed. The ordinary day's work of this traveling crematory, and the two refuse carts which follow it, is twenty-three blocks, although there have been oc-

ing department of Chicago to believe that the portable crematory is vastly more efficient than anything that has yet been attempted in that city and is less expensive. It is estimated the cost of the crematory and men to manage it and two teams to remove the ashes and other refuse is less than \$20 a day.

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**Avalanches Produced by Railways.**

A correspondent to the London *Times* records a curious and altogether unexpected result of the tunneling operations in the St. Gothard is a lawsuit instituted by the inhabitants of the adjacent valleys. They sue the federal government for damages caused by the great increase of avalanches which constantly thunder down the mountain side, produced, it is presumed, by the explosions of dynamite more than by the vibrations of passing trains in the lower tunnels of the railway. Many witnesses, who have lived in the neighborhood since the early part of the century, will swear to the greatly augmented number and force of the avalanches that now constantly sweep destruction down the mountain. The first hearing of this novel case was lately heard before the federal judges assembled at Bellinzona. We believe there is no instance in this country of an avalanche produced by railway service.

**La Navarre, New French Passenger Steamer.**

La Navarre was launched from the yard at Penhoet St. Nazaire, and is built of steel. *Engineering* says she is divided into fifteen compartments by thirteen transverse bulkheads, and a longitudinal bulkhead in the engine room. There are four complete decks; the promenade deck extends half the length of the vessel. The vessel is 494 feet in length and 49 feet 3 inches beam, with a depth of about 37 feet. Her displacement is 8,922 tons at a loaded draught of 22 feet 8 inches. The vessel is, of course, propelled by twin screws, driven by triple expansion engines. Each set develops 3,750 horse power, showing a total power of 7,500, with 90 revolutions a minute. The cylinders are 31½ inches, 50¼ inches, and 82½ inches in diameter, with a stroke of 52½ inches. Each engine has its own condenser, 14 feet 1 inch long, 6 feet broad, and 10 feet 10 inches high. The total length of the tubes is upward of 27 miles. The boilers are double ended, four in number, and having a total of twenty-four furnaces of a diameter of 47 inches. There are four ventilating fans for forced draught. The propellers are of gun metal and their diameter is 15 feet 4 inches. The funnels, two in number, are elliptical, the greater diameter being 8 feet 10 inches, and the lesser 5 feet 3 inches. She is furnished with two masts, and these do not carry yards. Accommodation is afforded for 250 saloon, 54 second and 74 third class passengers. In addition to this, on the lower deck no less than 600 emigrants can be berthed. For the purpose of the proper separation of the sexes, these are carried in three separate divisions. The first class passengers are of course amidships. The dining saloon on the upper deck will seat 152 persons at one time. There are small tables at the sides for private parties, as well as the long tables in the middle of the room. This room is 66 feet long and 32 feet 9 inches broad. The *salon de conversation*, or, as the Americans will doubtless call it, "the social hall," is about 40 feet long, and is lighted by a dome as well as by the usual side port holes. The decoration of this room has been particularly attended to, and the walls are paneled with marqueterie. The usual smoke rooms, barber's shop, and bath rooms are not forgotten. On the main deck are the children's dining saloon forward, and the second class passengers' dining saloon aft. The cabins *de luxe* and family cabins are on the promenade deck. La Navarre is lighted throughout by electricity, there being 742 lights on board. There is also a refrigerating apparatus on the Fixary system for the manufacture of ice and for the preservation of the fresh provisions. This vessel is capable of being used as an auxiliary in time of war. La Navarre attained a speed of 18 knots on trial without being forced.

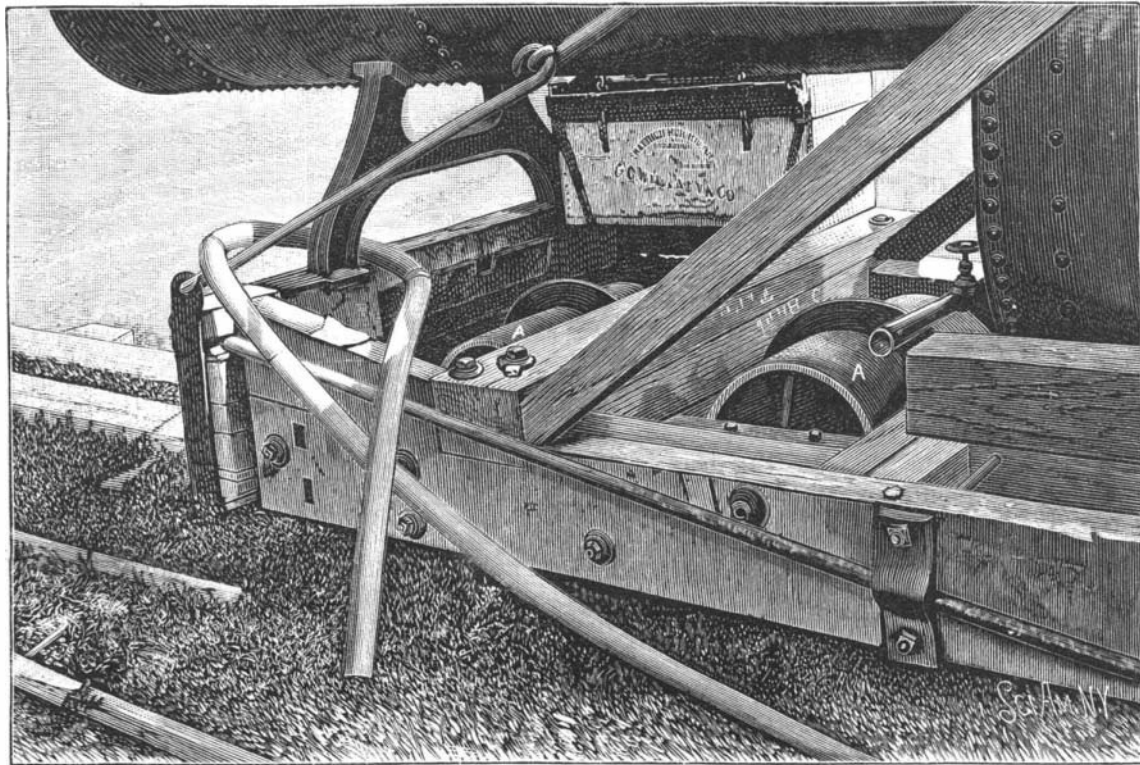
**A Work on the Railway Exhibit at the World's Fair.**

Our readers know how interesting a railway exhibit was presented at the World's Columbian Exposition. Mr. J. J. Pangborn, United States Honorary Commissioner, is preparing to issue an *edition de luxe* of a book devoted to this subject. In size it will be a large octavo, and is to be sumptuously printed and illustrated. The use of color in the cuts adds greatly to the appearance of the book, and it will meet with a warm reception at the hands of those who appreciate an interesting subject so carefully and expensively presented. It is to cover the en-

tire period of development of the locomotive and railway; it will have one hundred and fifty-three color plates, and the same number of single color plates. There will be 160 pages, printed on hand-made paper.

**The Magnetization of Steel Rails.**

Some interesting experiments have been carried out by M. Vinot, a French engineer, in regard to the magnetization of steel rails. A portion of the line between



**FRONT END OF THE BURT LOCOMOTIVE, SHOWING FLANGED WHEELS.**

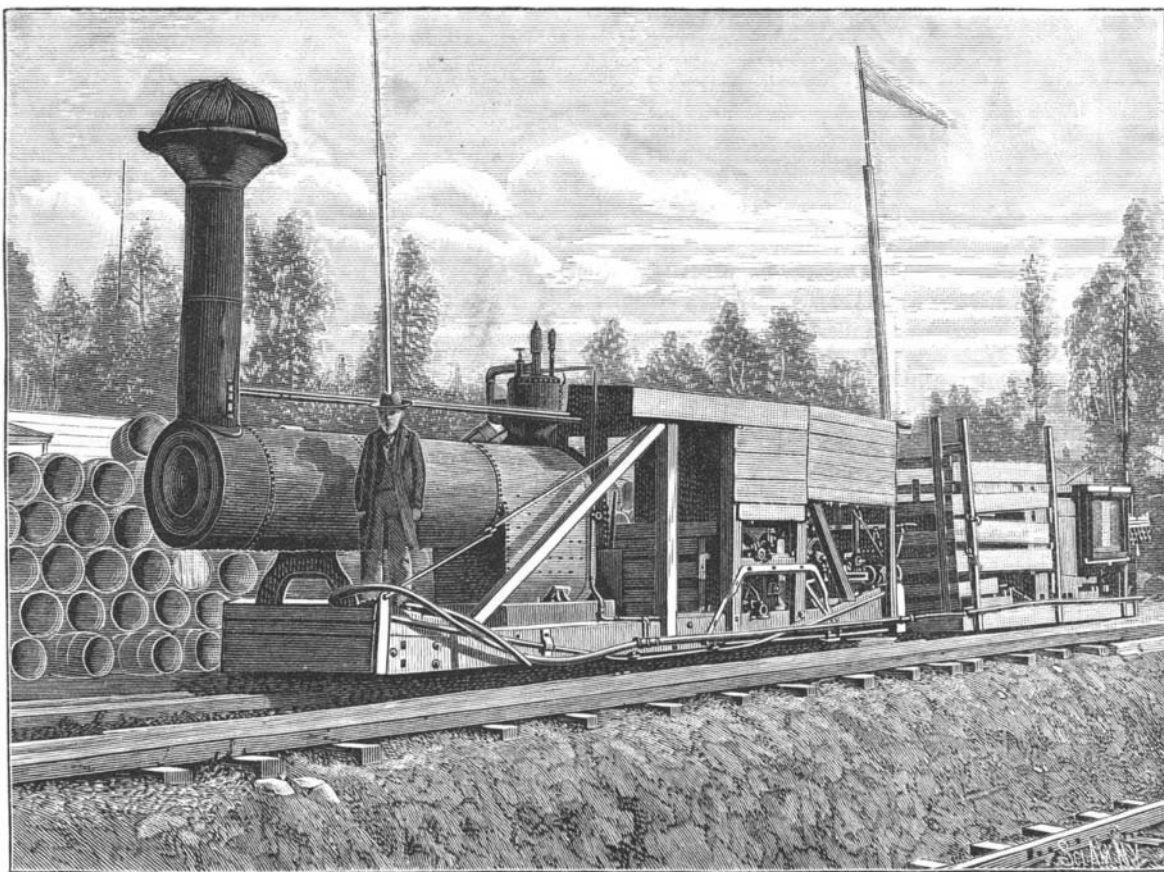
Bordeaux and Cette was utilized, the left hand track serving for the trains coming from the latter town, while on the right hand track the trains run in the opposite direction. On the experimental station chosen the rails were laid in a direction at right angles to the magnetic meridian, or in other words, from west to east, and it was found that when a pocket compass was placed on one of the joints in the left hand track, the needle pointed exactly in the direction of the line of rails, the north pole being turned toward the town of Cette. With the same compass similarly placed on the right hand track, the needle again pointed in the direction of the line of the rails, but the north pole this time was turned toward Bordeaux.

each other. This is to secure ease in turning curves. The road is a private one, its rights being granted by the county supervisor. Considerable grades exist on the road, which are readily overcome. One of our views shows the engine with one of the freight cars, Mr. Burt standing on the forward end. Another engraving (see next page) shows the lines of rail passing over a trestle and extending back into the country. The arrangement of the wheels with their central flanges is shown in the view of the front end of the boiler. The system is a novel one and has features which might make it of very great utility in some regions of the country. It may be accepted by our readers as a further contribution to the history of rails

which formed the subject of an article in a recent *SCIENTIFIC AMERICAN*.

The marble quarry of J. J. Burt, Esq., is situated in the hills at Cienega, about twelve miles from Tres Pinos, and is known as the Cienega Lime and Marble Quarry. It is one of the largest deposits of marble in the State, while none of finer quality can be found anywhere. The locality where this marble is found was purchased by Mr. Burt some years ago. He has been supplying all parts of the State with lime for some six years, and it is of such superior quality that it brings 25 cents more per barrel than any other on the market.

The mountains containing this valuable marble are 1,500 feet high and run some six miles back. This marble can be seen cropping out in every direction. In fact, there is no end to it. A remarkable fact in this connection is that the present workings are in a canyon, on the opposite side of which from the marble ledges is a vast de-



**THE BURT LOCOMOTIVE ENGINE AND FREIGHT CAR**

The secret of this singular phenomenon was conclusively demonstrated. The distances allowed for expansion between rail ends varied from about one-tenth to one-half inch, producing a very perceptible shock on the passage of trains, from the respective depressions and elevations of the ends of the rails and their influence on the car wheels, and these shocks, it was found, developed a south polarity in those rail ends in which the concussion took place.

posit of granite of good quality. Thus the two valuable building stones may be quarried out at one and the same time. There is a very large area of both marble and granite, comprising several hundred acres. To say there are a thousand fortunes in this property is putting it mildly.

Mr. Burt, up to the time of his purchasing this valuable property, was a leading lawyer in San Jose, but finding his health giving out, he decided to make