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The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

ENCOURAGING DECREASE OF IDLE CARS.

There is no surer test of the prosperity of the country than the number of idle cars on its railroads; and any reduction in the total may be taken as a sure indication that the wheels of industry are turning more rapidly. Consequently, the recent report of the Committee on Car Efficiency of the American Railway Association, which tells of a decrease of over fifty thousand in the number of idle cars in two weeks of September, is the most encouraging sign of returning prosperity that has been given for many months. At the close of April the maximum number of idle cars was 413,338; but this number, according to the report referred to, has gradually been reduced to 170,652. Now that the crisis is well passed, the fact has been made public that the total number of idle cars, as given out to the public, did not include freight cars which were in the shops for repairs. A prominent official recently stated that, if these cars had been added to the total shown by the committee's reports, the number of idle cars would have been nearly six hundred thousand.

POSTAL TUBES IN THE SUBWAYS.

Ever since the completion of the Subway in this city, it has been a matter of regret that galleries were not constructed at the sides of the tunnels, for the accommodation of gas and water pipes, and the electric power and lighting cables. All future subways will be provided with these galleries, and on the streets and thoroughfares beneath which they are located, the intolerable confusion at present occasioned by the laying or relaying of city mains will be avoided.

The importance of the pipe galleries is brought forcibly to mind by the recent action of the Post Office Department in Washington, in addressing the Public Service Commission in this city, to ascertain if it will be possible to install pneumatic tubes in any new subways that may be built, as well as in existing subways and those that are now under construction. The Postmaster-General has contracted with the New York Pneumatic Service Company for the installation of pneumatic tubes for rapid mail delivery, and the present application is an outcome of that arrangement.

THE ENORMOUS LOSS BY FOREST FIRES.

If anything can awaken the people of this country to the necessity for organizing effective systems of fire protection, it is the enormous losses which have occurred during the past few weeks through forest fires. The month of September was not two weeks old before the national forest officials in Washington estimated that the value, in money, of the standing timber that had been destroyed, up to that time, was sufficient to rebuild the greater part of the United States navy. Since that statement was made, the fires increased in area, and many fresh outbreaks occurred in districts as yet unvisited. The ravages of fire this autumn have been almost continuous throughout the various timber belts, from the Pacific coast to the New England States, The events of the past few weeks have demonstrated that, although the work done by the forest officials has been generally commendable, the force is absurdly inadequate to cope with the perilous conditions produced by a long period of drought. The organization of a sufficient fire patrol to adequately protect our forests would involve an annual cost that would represent but a small rate of insurance on a priceless national asset, which, under existing conditions, is exposed every season to unpreventable destruction.

THE SCHENECTADY CAR FENDER TESTS.

The results obtained in the tests of car fenders, which are being carried on at Schenectady for the Public Service Commission of this city, are encouraging, and give reason to believe that, as the outcome of this movement, a fender will be developed which is capable of lifting a person from the track and carrying him along without any serious injury. At present, however, the ideal device has not been found, although several of the inventions offered for test have shown more or less of the requirements of the perfect fender. Taken as a whole, the inventions display an intelligent appreciation of the problems involved and great mechanical ingenuity in meeting them. This was particularly noticeable in the case of a fender of the wheel-guard type, which, immediately on contact, dropped to the track, picked up the body, shut off the power, opened the sand box, and set the air brake; the car, although running at a speed of fifteen miles an hour, being brought to a stop in not much more than its own length. The type of fenders which drop to the track on striking a body, some of which were released automatically, and others by the action of the motorman, were successful, as a rule, in picking up standing dummies. But when the figures were prostrate, they were not always so successful. This was the case when the dummies lay on the track with the feet pointing toward the car, especially if they were laid near one of the rails; in which case the fender would climb over the body and allow it to come in contact with the trucks. The widespread interest which has been aroused by these tests is shown by the fact that they are attended not only by representatives of nearly all the street railway companies in New York, but by engineers and railroad men from all parts of the country, and by representatives of the United States army and navy. Already, over a score of fenders have been offered for the second series of tests which will commence on October 20 at Pittsburg.

A FOUR-TRACK FREIGHT TUNNEL FOR MANHATTAN ISLAND.

The offer of a powerful corporation in this city to build a four-track electric freight subway around the water front of Manhattan Island, with tunnel connections to New Jersey, seems to us to be the best solution of the freight problem which has yet been proposed. The scheme represents the results of several years study by W. J. Wilgus, formerly Chief Engineer of the New York Central Railroad, and now president of the company which proposes to undertake this gigantic work. The plan has been submitted to the Public Service Commission, and is made public with a view to securing public discussion of its merits. The subway would commence at 60th Street and the Hudson River and extend around the water front to the Bronx. There would be a large terminal for New York Central freight at 60th Street. It would extend below West Street on the Hudson River side, and near the southerly end of Manhattan connection would be made by tunnel with a large terminal on the Jersey side, where the freight from the Pennsylvania, Jersey Central, Erie, Lehigh, Lackawanna, and West Shore roads would be assembled and distributed. At some suitable point below Forty-second Street, a crosstown line would be built to a junction with the line extending along the East River water front, which would be carried north to terminate in the large freight yards of the New Haven Railroad Company in the Bronx.

As feeders to the main belt line, spurs would be built under the sidewalks and adjoining the basements, in those districts to which large amounts of freight are shipped. Small cars, carrying about 10 tons, would be used on these side lines, and they would deliver their freight direct into the basements of the business houses thus served. One immediate advantage of the system would be the elimination of the dangerous freight tracks of the New York Central Railroad, which at present run down the west side of Manhattan Island. The scheme also includes the ultimate construction of an overhead road to provide for passenger traffic, and give direct connection to and from the steamship piers of the various companies.

Outside of the great convenience afforded by the proposed freight line in putting the business centers of the city in direct rail communication with the various industrial centers throughout the country, there are other collateral advantages of considerable importance. Thus, the streets of the city would be rid of a large amount of vehicular traffic of the kind that is most destructive to the surface of the streets and most obstructive of the free movement of traffic on the street railways. The substitution of tunnels for lighterage would rid the harbor of a vast amount of traffic which is at present one of the most serious hindrances to river navigation. The various docks and piers would be relieved of their present railroad traffic, and would be released for occupation by traffic that is water-borne. The company that proposes this gigantic improvement estimates that because of the many benefits conferred, there would be net savings and profits to shippers, carriers, investors, and the public of a sum in excess of $15,000,000 per annum.

NASMYTH—THE CENTENARY OF A GREAT INVENTOR.

A recapitulation of the principal inventions of that truly great engineer Nasmyth, the centenary of whose birth occurred on the 19th of August of the present year, will be surprising to many of our readers, both because of the number, variety, and importance of these inventions, and the fact that they were made so long ago. Although he is celebrated chiefly as being the originator of the steam hammer, it is a fact that many of the most important mechanical devices of the present day owe their genesis to his fertile brain, as the following digest from an enumeration of his inventions, given by our esteemed contemporary, The Engineer of London, will show:

Nasmyth's first invention, brought out in 1825, was for "a mode of applying steam power for the traction of canal barges without injury to the canal banks." It consisted of a chain laid along the bottom of the canal, which passed between three pulleys or rollers driven by a steam engine placed in a tug-boat to which a train of barges was coupled. Two years later, he devised "a method of increasing the effectiveness of steam and superheating it on its passage from the boiler to the engine." This is claimed to have been the first introduction of superheated steam. In the following year he devised a method of "chucking" delicate metal work, which consisted of tinning the work down on a tinned faceplate which had been heated sufficiently to cause the solder to flow, the work being melted off the chuck after it was completed. In the following year he anticipated a familiar modern method of transmitting motion, when he took out a patent for "a mode of transmitting rotary motion by means of a flexible shaft formed of a coiled spiral wire or rod of steel."

How prolific was this inventor is shown by an enumeration of his patents taken out in the year 1836 alone. They included a "machine for cutting key grooves in metal wheels and belt pulleys"; a device for "finding and marking the centers of cylindrical rods or bolts about to be turned on the lathe"; "an improved form of packingless steam engine piston," and "a machine for planing the smaller or detailed parts of machinery, whether flat or cylindrical."

To Nasmyth is due the "method of reversing the action of slide lathes," which consists of a pair of meshing spur gears carried on a hand lever fulcrumed on the back of the fixed headstock, which he patented in 1837; and in the following year he brought out "a self-adjusting bearing for the shafting of machinery.' which consisted in giving a spherical form to the exterior of the bearing. In this year also he brought out that important device, the "safety foundry ladle," which has since proved of such value to foundrymen. Because of its humanitarian qualities in the prevention of death or injury, this idea was given to the public without any protection by letters patent.

In 1839 he invented the well-known wedge-shaped sluice valve for water pipes; and it was in this year that he won his greatest fame by the invention of the steam hammer. The motive for this came from the Great Western Railway Company, who wished for some means of forging a huge wrought-iron paddle shaft; and in his autobiography, in speaking of this invention, Nasmyth writes: "In little more than half an hour . . . I had the whole contrivance in all of its executant details before me in a page of my scheme book." This design consisted of a block of iron for the hammer to which a piston rod was attached, an anvil, and an inverted steam cylinder. The hammer was lifted by admitting steam, under the control of a hand-operated slide valve, below the piston, and it fell by gravity. The automatic trip-valve gear, invented by Robert Wilson, was subsequently applied, and, finally, Nasmyth improved his hammer by making it double-acting, and utilizing steam to assist gravity on the downstroke. In the same year, not satisfied with his work on the steam hammer, Nasmyth turned to hydraulic power, and invented the "hydraulic mattress press," a square or circular watertight vessel with semicircular flexible metal sides.

In 1843 he invented the steam pile-driver, and his first machine drove a 70-foot pile in 4½ minutes, in a contest against a hand-operated pile driver, which took just twelve hours to do the same work. He later invented suction fans for the ventilation of coal mines; an improved method welding; a spherical-seated direct-weighted safety valve; a machine for cutting out slots by a traversing drill; an inverted vertical steam engine; and in 1848 he devised a hydraulic punching machine. When we remember that the above is but a partial list of his inventions, we can understand with what satisfaction he retired at the early age of forty-eight from active business, "to enjoy," as he wrote in a brief record of his career, "the rest of my life in the active pursuit of my most favored occupations," chief among which was the science of astronomy.