A FIRE ALARM WHISTLE BLOWN BY GAS.

One of our correspondents, Mr. J. H. Ritchie, of Cherryvale, Kan., has sent us an interesting photograph of the fire alarm whistle used by the Pioneer Fire Company of that city. This whistle is blown by natural

FIRE ALARM WHISTLE OPERATED BY NATURAL GAS.

gas furnished by a local gas company. It is said to be the only one of its kind and can be heard several miles. One of the gas wells flows 13,000,000 cubic feet a day, and is now considered the strongest well in the Kansas gas field. Natural gas is also used for fuel, for lighting the city and is also the only fuel used by zinc smelters employing 300 hands and by two vitrified-brick plants.

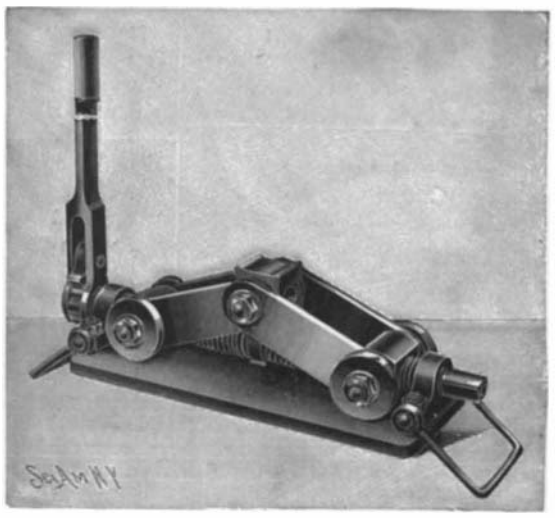
Fire on Shipboard.

Why water is not always used in extinguishing fire in a ship's hold is clear, says Fire and Water. While it can be used to great advantage in the case of fires in the open air, if it should be employed to put out a big fire in the hold of a vessel the sudden burst of steam so formed would be the parent of disastrous results. M. Diolis, a French maritime engineer, has recently suggested a new method of discovering and extinguishing a fire on shipboard, especially that arising from spontaneous combustion in the cargo. To give warning of fire, or of a rise of temperature that may lead to it, he would distribute through the cargo vertical metallic tubes. Into these tubes, from time to time, thermometers could be lowered to ascertain the temperature. His next step would be to place in the midst of the cargo a large cask containing lime and communicating by a small tube with the bridge. In case of fire in the hull, sulphuric acid is poured into the tube, and a violent production of carbonic acid gas takes place, which smothers all combustion.

LIFTING JACK FOR ELECTRIC CARS.

We illustrate herewith a lifting jack designed especially for electric car purposes, made under the patent of Mr. Golightly, and now being put on the market by Mr. George Addy, of Waverley Works, Sheffield. The arrangement is well shown by the engraving, from which it will be seen that by the combination of a toggle joint and a right and left-handed screw, worked by a ratchet lever, very great power is obtained in a compact form of apparatus and on moderate weight. The steel baseplate is 20 inches long and 8 inches wide, while the total height over all is 6½ inches. The weight complete is 96 pounds. The movement is vertical, there being no side thrust, and the motion when the jack is loaded is regular and well under control.

This appliance has been supplied, among other applications, to the Sheffield Corporation tramways, where it has been found to be admirably adapted for changing axle brasses on the road, for lifting trucks, to remove broken slipper-brake parts, sets, or other things. In one case of a broken axle it was found to be the best appliance for enabling a repair to be executed, as the jack gave a direct lift, so that every inch lifted was a clear gain. In the case of another jack placed under the platform, a movement of 10 inches is needed to lift 1 inch at the axle. It may be added that in the case of a fatal accident in Sheffield some time elapsed before the body of a man run down by a car could be released, there being no lifting jack on the car. In view of this the coroner's jury recommended that jacks should be placed on the cars, or should be provided at intervals along the road. In another case of a person being run over and getting under a car, the people in the street turned the car over to get the injured person free. This jack has also been adopted by the Bradford Corporation.—Engineering, London.



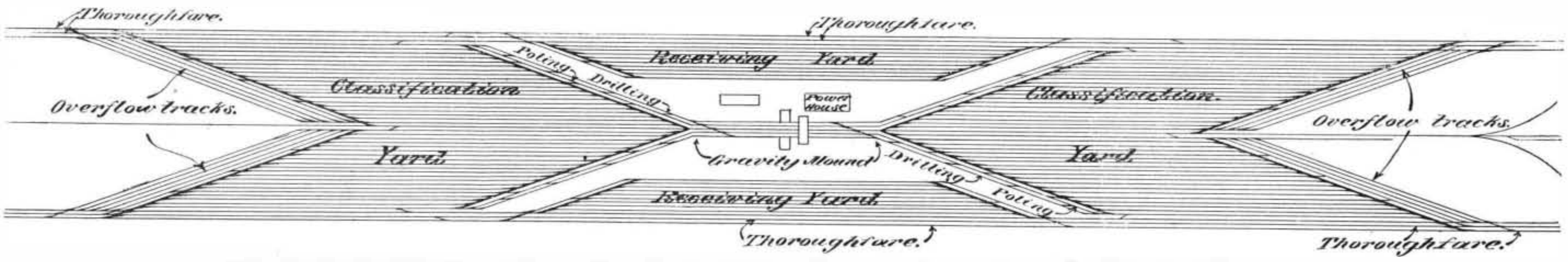
LIFTING-JACK FOR ELECTRIC CARS.

THE GREAT CLEARING YARD AT CHICAGO.

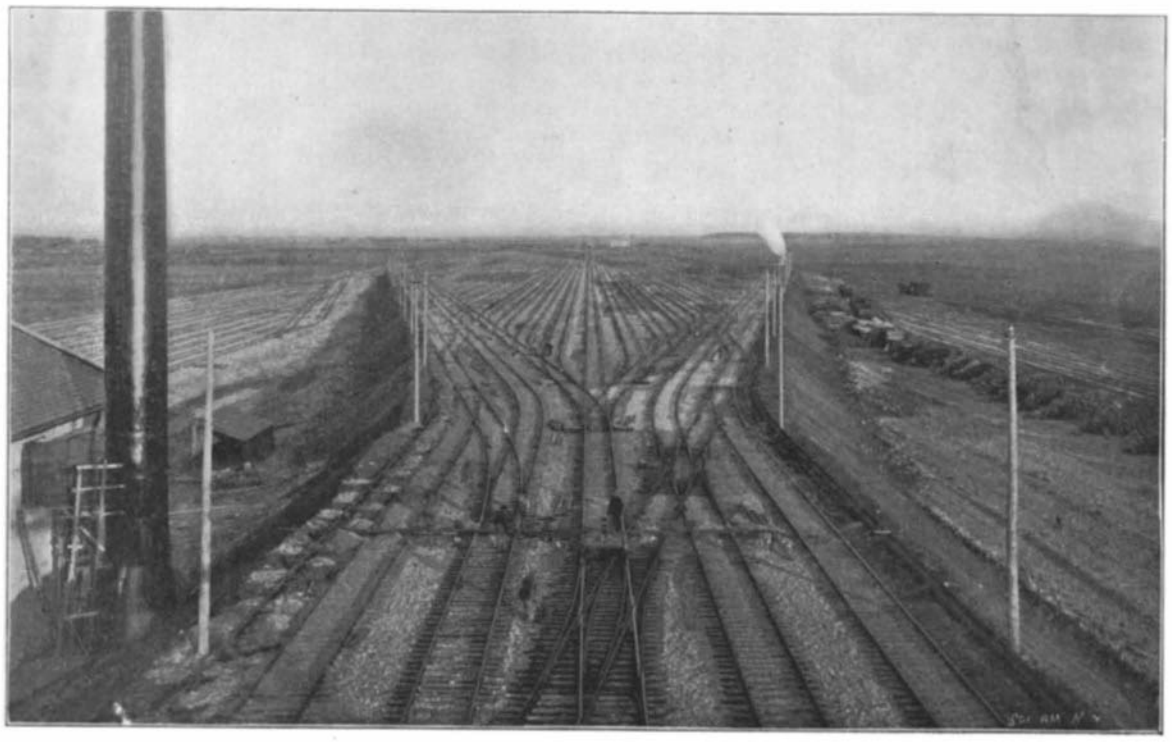
The greatest center of freight traffic in the world is found at Chicago, the meeting place of the eastern and western trunk lines. Here, every day of the year, there are handled about 10,000 cars of freight. Of this number over sixty per cent are cars loaded with through freight or cars which have entered the city by one railroad and will have to leave it by some other road. To transfer these 6,000 cars will mean, in the case of many of them, that they will have to be hauled over 15 miles from the incoming yard of one road to the outgoing yard of another, and that there will be a delay of a whole day in making the transfer. The other 4,000 cars are loaded with freight for Chicago. Under the system which has hitherto been followed in the transfer of this traffic, the trunk lines enter a terminal yard of the company, in which the freight trains are broken up, the cars sorted according to their destination, and outgoing trains made up. The inbound cars destined for an outgoing journey by other roads are taken by switch engines to the yards of these roads, or else they are distributed by means of belt lines which have been built especially to connect the terminal yards of the various railroads. Over half of the cars are transferred by the various roads themselves with their own engines, the remaining half being transferred by the belt lines.

It can be understood that this work of transfer involves much delay and labor, and it may often happen that a through car, reaching the yard shortly after the transfer train has left, will be delayed several hours before it can start out for the other road, or if the freight is specially important, a special trip has to be made for it. There are twenty trunk lines entering Chicago, and altogether the various belt lines and connecting lines have to operate a total of twenty-seven different yards. The distance between the yards varies from a tenth of a mile up to 16 miles, and it is estimated that the total number of cars interchanged daily averages over 7,000, while to haul them calls for the work of 264 engine round-trips. With these figures before him, the reader can readily understand that this system of independent operation of the yards causes endless complications and delays, involving in the aggregate a considerable expense to the railroads. The system which we illustrate in the accompanying engravings has been designed by A. W. Swanitz, C. E., for the Chicago Union Transfer Railway Company, for the purpose of overcoming the difficulties inherent in the present system of transfer and centralizing the work in one great clearing yard. This yard is located at a distance from the busy city lines, and the breaking up of trains and classification of them for their outgoing journeys will no longer be done separately by the various companies, but centrally.

The yard is located west of the city limits on a line with 67th Street. It extends east and west and connects with the Chicago and West Indiana Railroad on the east and with the Chicago Terminal Transfer Railroad and the Chicago Junction Railway on the west. It occupies a rectangular tract of ground 670 feet in width and 13,000 feet in length. The general arrangement of the yard is as follows: Ex-



PLAN SHOWING GENERAL LAYOUT OF CHICAGO CLEARING YARD. MAXIMUM CAPACITY OF YARD, 8,000 CARS PER DAY.



CHICAGO CLEARING YARD—LOOKING EAST FROM SIGNAL TOWER AT CENTER OF GRAVITY MOUND.

tending along the whole length of the north and south boundaries there are three thoroughfare tracks with double-track "Y" connections at each end to the belt lines. Bisecting the yard on an east and west line is a central through track known as "track No. 25." In the plan showing the general arrangement it will be seen that there are two sets of classification tracks, known as the "classification yards." The tracks in these yards are 2,400 feet long, and they extend the full width between the thoroughfare tracks. Midway between the two classification yards is an artificially-constructed gravity mound and on each side of it and parallel with it on the level plain are sets of receiving tracks which are from 1,600 to 3,200 feet in length. The gravity mound has an elevation at its summit of 21½ feet above the general level of the yard. For a short distance each side of the summit there is a grade of 1½ per cent. and then for a distance of 1,800 feet a grade of 0.9 per cent, which finishes in a grade of 0.5 per cent for a distance of 300 feet further, the foot of the gravity mound tracks being several hundred feet beyond the apex of the classification yards.

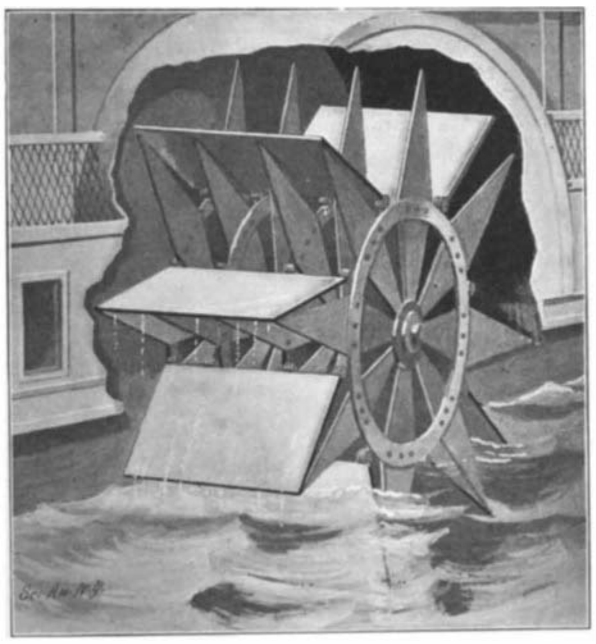
Running diagonally across the classification yards there are double ladders, and east and west of the classification tracks there are parallel overflow tracks which extend parallel with the classification ladders at the outer end of the classification yards. Parallel with the double ladder, at the inner ends of the classification tracks, are two tracks, the one next to the ladder being a "poling" and the outer one a "drilling" track. The double ladders, which connect by switches with each track in the classification yard, converge at a three-throw switch into the central track No. 25, already mentioned, which extends through the center of the whole yard. Consequently there extend over the summit of the gravity mound five parallel tracks with leader tracks and crossovers.

The object of the gravity mound is to allow the transfer of the cars to the various classification tracks to be accomplished by gravity and save a great amount of engine mileage which would be necessary if the cars had to be pushed onto the various tracks by switching engines. The method of operation is as follows: A train coming in at either end of the yard will be run into one of the receiving tracks, where the engine will be uncoupled and will take back a made-up train from one of the classification tracks, taking it out by means of the outer ladders of the classification tracks. One of the clearing yard switching engines will then couple onto the train, back up and push it over one of the drilling tracks, which we have mentioned above, as lying alongside the classification ladder. The drilling tracks and the whole V-point of the classification yard are on the grade of the gravity mound. As the train is pushed up to the summit, the couplers are disconnected at the proper places in the train, and as the cars go over onto the down-grade on the other side of the summit, they separate from the train and run down on the central track No. 25 to the three-throw switch at the apex of the classification ladder. Here they are switched to either side of the double ladder and finally into the desired track of the classification yard. Switching can be carried on simultaneously in both directions, that is, into both classification yards. The object of the "polling" track between each classification ladder and the drilling track is to allow an engine to assist the cars when a heavy wind is blowing against the grade or when there is snow upon the tracks.

The brakemen who ride on the cars down the gravity tracks are brought back by a light engine and car, which run to and fro either on the center track or on one or both of the tracks at the side of the classification tracks. The motive power of the yard will consist at first of six engines, four of them consolidations weighing 185,000 pounds and two of them six-wheeled switching engines weighing 120,000 pounds each. It is expected that from 5,000 to 8,000 cars can be switched and handled at this yard daily. For our illustrations and particulars we are indebted to A. W. Swanitz, chief engineer of the company.

A SELF-FEATHERING PADDLE-WHEEL.

The ordinary type of paddle-wheel encounters considerable resistance as it is submerged, and lifts no small quantity of water as it rises to the surface. As a result of these defects in construction, the engine must perform considerably more work than is actually required in propelling the ship. Mr. David W. Horton, of Petersburg, Ind., has designed a paddle-wheel which feathers itself both on entering and leaving the water,



THE HORTON PADDLE-WHEEL.

so that much of the power now unnecessarily expended is used in propelling the ship.

To the paddle-wheel shaft a series of parallel, radial, lozenge-shaped arms are secured. For the purpose of securing rigidity, a stay-ring is bolted to each circular series of arms at the widest part. Between the radial arms the paddle-blades are hinged to the stay-rings, in such a manner that they can be supported against the inclined face of either of the extending portions of the arms.

The paddle-wheels, as they successively pass the center of the wheel while it is rotating in either direction, will incline forwardly, and will thus be presented at or near a right angle to the surface of the water. The blade approaching the water will be submerged edgewise with a minimum of resistance. When fully immersed, the pressure of the paddle-blade and the immobility of the water when subjected to sudden impact, will rock the blade back until it impinges upon the arms immediately behind. The successive rearward movement of the blades will cause them to engage the water throughout their areas, when submerged, so that they will exert a maximum pressure. Each paddle-blade, by reason of its rearward inclination, will leave the water edgewise. Thus the paddle-blades are feathered while entering and leaving the water, and thus the tendency of ordinary wheels to lift a mass of water is prevented.

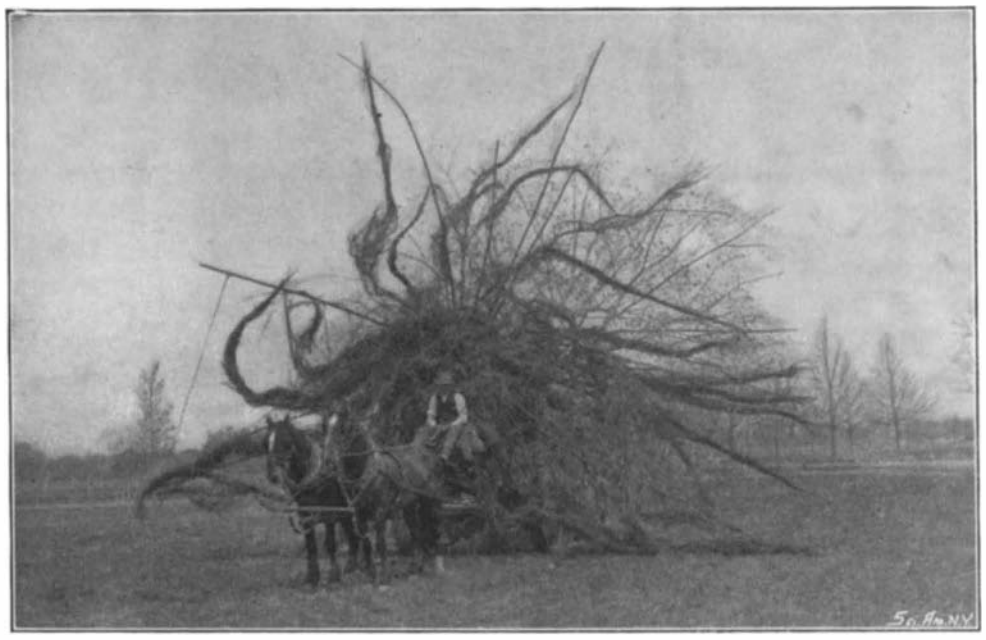
SCIENTIFIC METHODS OF MOVING TREES.

BY DAY ALLEN WILLEY.

The transferring of trees is at present so scientifically conducted that it is not necessary to wait ten or fifteen years for shade trees to grow for one's grounds or to ornament the landscape with large specimens of trees. In fact, parks and the surroundings of country seats can be made to order these days, the grounds about the residence being beautified and shaded while the home is being constructed. At a number of villages on Long Island can be seen fine specimens of forest growth ranging from twenty-five to fifty years old, moved various distances and replanted, yet are growing vigorously and to all appearances are in perfect health. They include such specimens as silver maple, Norway maple, beech, birch, linden, fir, hemlock and cherry.

Apparently it would seem impossible to transplant a tree fifty feet in height, with a trunk varying from one to two and one-half or three feet in diameter at the base, for even a novice realizes the extent of the roots which spread through a wide area of ground in all directions, yet the operation is being performed with complete success. What is known as a tree mover, the invention of Mr. Henry Hicks, of Westbury, N. Y., has been adapted for the purpose. In operating with this apparatus, the tree, if of 14 to 26 inches diameter of trunk, is dug by starting a circular trench with a diameter of 30 to 40 feet. An undercut is made beneath the roots with a light prospecting pick, and the soil picked out and caved down with a spading fork or picking rod, the points of which are rounded to avoid cutting off the roots. The lose dirt is shoveled out of the bottom of the trench and the roots are uncovered, tied in bundles with lath yarn and bent up, out of the way of the diggers. If the roots are to be out of the ground even for one day in dry weather, the bundles are wrapped in clay mud, damp moss and straw or burlap. When the digging has progressed within from 4 to 8 feet of the center, the tree is slightly tipped over to loosen the central ball, which cleaves from the subsoil near the extremities of the downward roots. On sand or hardpan subsoil this is at a depth of 2 to 5 feet. In deep soil it may be necessary to cut some downward roots. A ball of earth is left in the center from 5 to 12 feet in diameter, or as heavy as can be drawn by four to eight horses. This ball is not essential with deciduous trees, but it is easier to leave it than to remove and replace the soil. With fine-rooted trees like the red maple, it is difficult to pick out the soil, while with coarse-rooted trees, like the beech, in gravelly soil the ball drops to pieces.

In loading for removal, the cradle of the mover, which is pivoted above or back of the axle, is swung over to the tree, the trunk first being wrapped with cushions and slats. It is thus clamped to the cradle by chains and screws without injuring the bark. By means of a screw 9 feet long operated by a ratchet lever or hand-brake wheel, the cradle lifts the tree from the hole and swings it over in a horizontal position. Pulling in the same direction by tackle fastened in the top of the tree aids the work of the screw. After the tree is loaded, the roots on the other side of the axle are tied up to the perches. The front wheels are on pivots, therefore



ROOTS WITH 35-FOOT SPREAD BEING TRANSPLANTED AFTER BEING TIED TO BRANCHES.

LOWERING THE TREE INTO HOLE AFTER POLE AND SEAT ARE REMOVED.