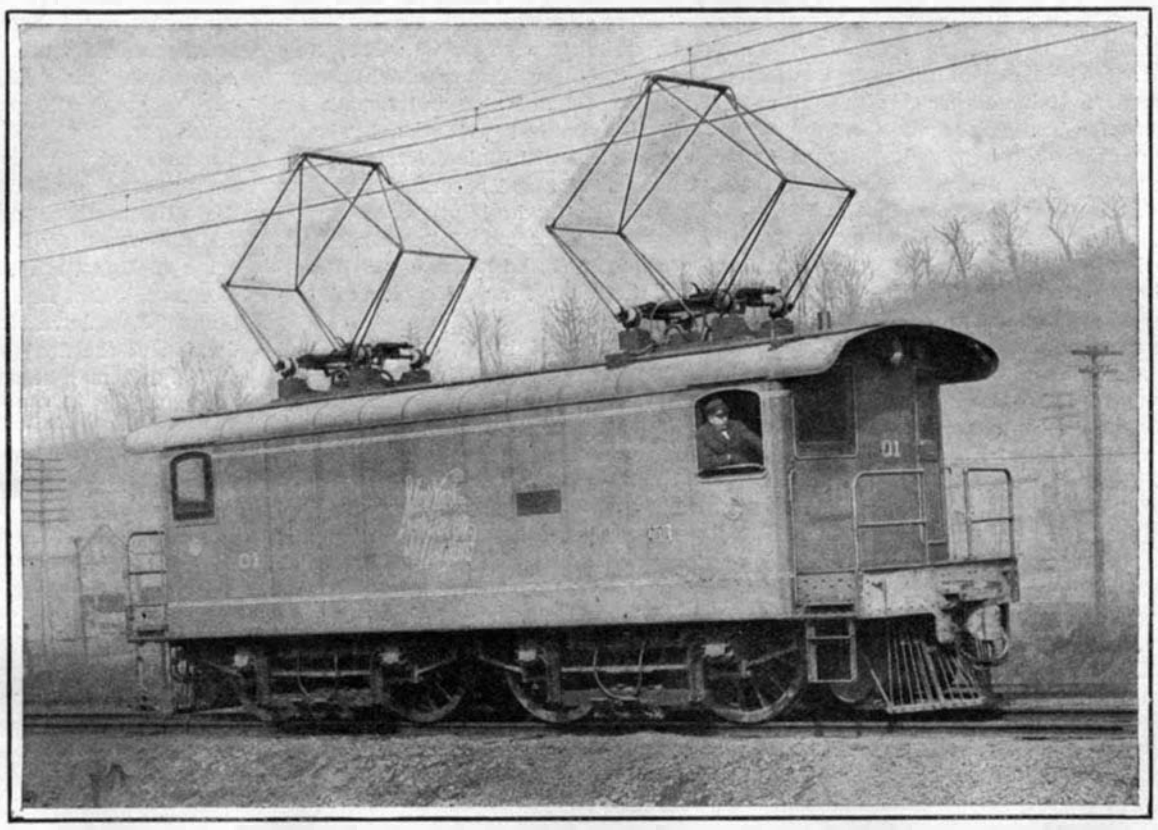
has a length of about 1,500 feet, and can handle from 300 to 600 cords daily. The horse-power required averages from two to three in every hundred feet when the conveyer is traveling at this rate per minute. In one installation of this sort the pulp wood is loaded upon the conveyor from railroad cars, carried to the storage yard, and dumped. At the storage yard the conveyer is depressed to the surface of the ground, and this section is used to supply the mill from the storage yard.

The accompanying photograph shows one of the largest storage yards, which is served by two conveyers, owing to the large quantity of material which is handled. One of these is composed of jointed rods, but like the other referred to it is endless, passing around wheels at each terminal.

Practically all of the conveying machinery used in connection with sawmills, pulp factories, and other woodworking establishments is operated by steam power for convenience, the wheels upon which the endless chains or belts move being belted to shafting or to the flywheel of a special engine. To operate the largest size rarely more than 50 horse-power is needed, and the steam can be furnished from the boiler plant operating the other equipment.



AN ELECTRIC LOCOMOTIVE OF THE NEW YORK, NEW HAVEN AND HARTFORD RAILROAD.

THE ELECTRIC LOCOMOTIVES OF NEW YORK, NEW HAVEN AND HARTFORD RAILROAD.

Great interest attaches to the new electric locomotives now building for the New York, New Haven, and Hartford Railroad, because of the unusual conditions they are required to meet. An overhead alternating-current trolley system is to be installed on the line from Stamford to Woodlawn. At the latter station the road joins the Harlem branch of the New York Central Railroad, which is to be equipped with a third-rail direct-current system. The locomotives must thus be adapted to operate with both direct and alternating current. The alternating-current line will be fed from a single power station at Riverside, three miles from Stamford and nineteen miles from Woodlawn. Three turbine-driven generators will be used, which are so wound that they will supply either single-phase or three-phase current, and each has a rating of 3,750 kilowatts single-phase, or 5,500 kilowatts three-phase. Current will be supplied to the trolley system under a tension of 11,000 volts; hence no transforming stations will be necessary along the line. Each locomotive, however, will be provided with a pair of transformers to step-down the current to a working pressure. The purpose of having two transformers is to distribute the weight in the locomotive, and also to provide against total disablement of the locomotive in case of injury to one of the transformers. Current will be collected by means of a pair of pantograph-type, bow trolleys. Eight collecting shoes are also provided for the third-rail system, four of the shoes being designed to run under the power rail and the others on the top of the rail, thus allowing for conditions on the New York Central portion of the road. A pair of each type of shoes is mounted at each end of the locomotive.

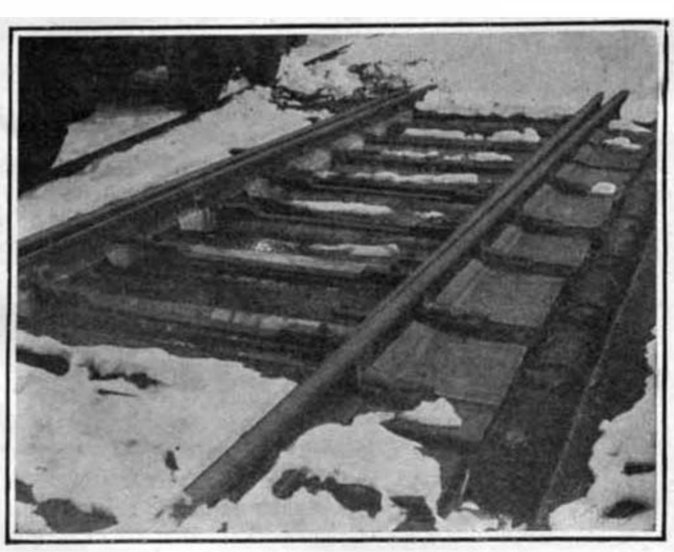
The motors, of which there are four, each have a nominal rating of 250 horse-power, and a continuous capacity of over 200 horse-power, comprising a total of more than 800 horse-power to each locomotive. They are adapted to operate with a voltage of about 235 on alternating current, and from 275 to 300 on direct current. The motors are of the compensating gearless type, and contain some very novel and interesting mechanical features. They are suspended from frames, which fit over the trucks and rest on the journal boxes. Depending from each frame are four bolts provided at their lower ends with coil springs, on which the motor is supported. The armature is not directly connected to the axle of the truck, but is mounted on a quill which passes over the axle, with an all-round clearance of ⅝ inch. On this quill the bearings of the fields are mounted. The quill is formed with a wide flange at each end, and projecting from the face of each flange are a series of pins adapted respectively to engage a series of pockets in the hub of the wheel. Around each pin is a coil spring with its coils progressively eccentric, and these bearing against the sides of the pockets serve to transmit the motive power to the wheels. To prevent wear, steel bushings are fitted over the pins and into the pockets, and between these the eccentric springs operate. This construction provides for a certain amount of vertical and lateral movement, while the motor is centered axially by the compression of the springs between the end walls of the pockets and the flange of the quill. Strong coil springs are fitted into the ends of the pins, and bear against the end walls of the pockets to take up the end play of the motor. In order to prevent the motors from pressing against the wheels when thrown by centrifugal force at curves, they are adapted to bear against rails on the truck frames. This construction has proved an excellent one. The entire locomotive is spring-supported with the exception of the driving wheels, axles, and journal boxes.

A novel feature of the new locomotive is the system of ventilating the motors. In this system the channel beams used in the framework of the car are utilized to provide conduits through which air is pumped by means of a fan in the cab to the motors and transformers. As this air is taken from within the cab, it is fairly dry and clean. The air current, aside from carrying off the heat generated by resistances, also serves to keep the motor free from dust. The locomotives measure 36 feet 4 inches over all, and have a weight of about 85 tons. Tests of one of these locomotives have proved very favorable. A 250-ton train can be handled on a through service with a speed of 60 miles per hour, while heavier trains will be hauled by two or more locomotives coupled together and operated in multiple. In local service a 200-ton train can be operated at an average speed of 26 miles per hour with stops about two miles apart, and making a maximum speed of about 45 miles an hour. The frame, trucks and cab of the locomotive were constructed by the Baldwin Locomotive Company, and the electrical equipment is being installed by the Westinghouse Electric and Manufacturing Company.

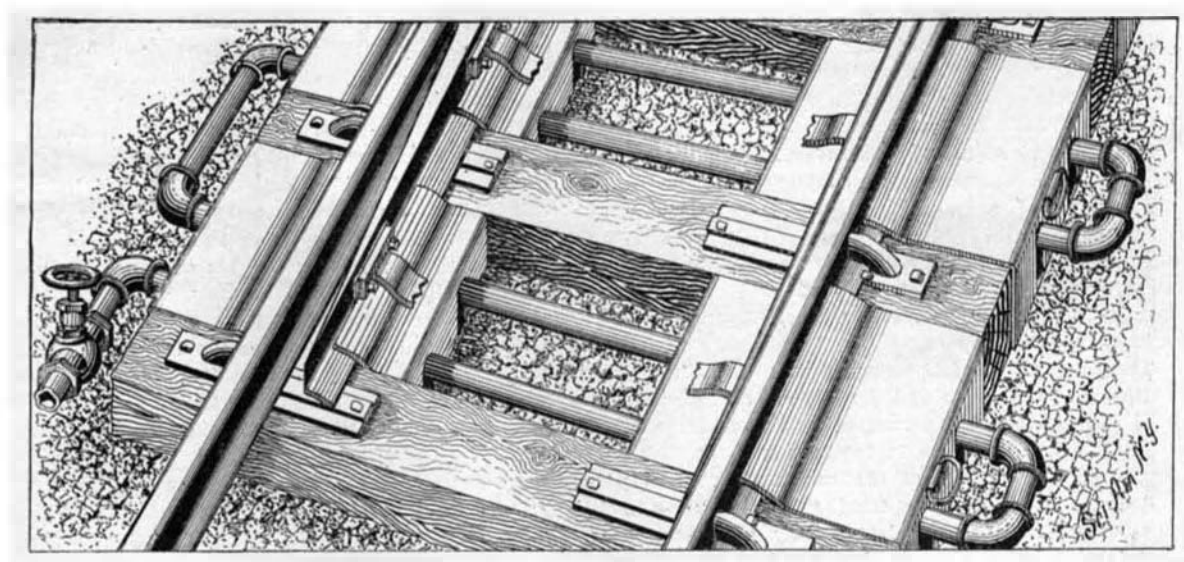
A novel use of compressed air is made by some railway companies in the Southern States of America, says the Railway News. When the loads of cotton for export are being taken to the coast, there is always some danger of such highly inflammable material becoming damaged through sparks from the locomotives. To prevent this, the locomotive boilers are filled with compressed air. A train load of several thousand bales of cotton can be hauled by these locomotives at a rate of twelve miles an hour, although no fire whatever is used in working them.

A NEW METHOD OF HEATING SWITCHES.

The greatest difficulty that railroads have to contend with in winter time is the blocking of switches with snow and ice. While it is a comparatively easy matter to clear the main line of a heavy fall of snow, in the yards even a moderate fall of snow is apt to demoralize the schedule. If the storm is a dry one, the difficulty is confined to shoveling away the snow at the switches. This in itself is no small task in a busy yard, crowded with a maze of converging and crossing lines; but when the snow is wet and then freezes, the difficulty is increased many fold, and serves sometimes to completely tie up and demoralize the system. To overcome these serious conditions, various suggestions have been put forth. Attempts at heating the switches electrically have proved very expensive and quite dangerous, owing to the possibility of short circuits in the network of rails. Steam-heated switches have also met with but little success, due to the danger of condensation, and subsequent freezing, which would entirely block the steam pipes. A new system has recently been developed by Mr. Frank L. Young, of Boston, Mass., which is calculated to overcome the above-mentioned objections. In place of steam, heated oil of a special quality is circulated through pipes placed between the ties. The advantage



THE OIL HEATED SWITCH AFTER A SNOWSTORM.



METHOD OF LAYING THE PIPES FOR THE OIL-HEATED SWITCH.