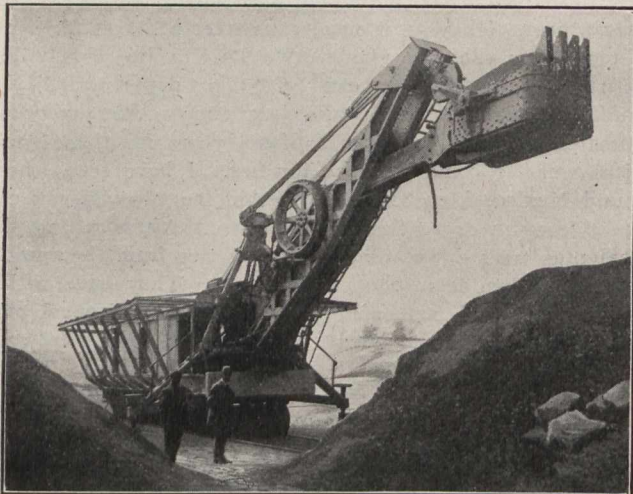


fastening the rails to the ties and, as I understand it, there is very little more expense than the ordinary track spike. One of our master mechanics has invented a machine that sits on the gasoline car with bits to bore those holes, so that the question of labor in putting them in has been reduced to a minimum. I do not know whether many roads are adopting them or not, but I do not believe it will be very long before you will see this form of fastenings in general use.

TWO GIANT ELECTRICALLY DRIVEN POWER SHOVELS.

The largest electrically operated power shovels ever constructed, having buckets of four cubic yards capacity, and equipped with Westinghouse motors and automatic control, have recently been placed in the service of the Dolse and Shepard Company of Chicago, for mining rock in its limestone quarries.

The hoist movement of these two 110-ton machines is actuated by a 200-horsepower, 220-volt, series-wound, direct current Westinghouse type M.T. mill motor running at 415 revolutions per minute; the thrust motor, controlling the movement of the dipper handle, is an 80 horsepower machine of similar type; while the swing boom is operated by an 80-horsepower motor. Each motor is controlled independently by Westinghouse type "A" automatic magnetic-switch controllers which secure the greatest nicety of operation of the heavy bucket. This form of control protects the motors from any heavy overloads which may result from the bucket striking solid rock or other obstruction, by opening switches to



introduce resistance into the motor circuit. The control panels and resistances are mounted in the rear of the cab, while the controller handles are conveniently placed under the hand of the operators.

The hoist and swing-boom motors are mounted within the car, as shown in one of the accompanying illustrations. The thrust motor is placed out on the boom, communicating its motion to the bucket staff through reducing gearing connected to a pinion engaging a rack on the staff. The power circuit to the shovel is completed through a feed cable, carried on a retractile reel on the shovel cab, and through the rails on which the shovel advances. The shovel may also be fitted with a standard trolley for driving power and for propulsion on ordinary electrified track. The machine may then attain a speed of five miles an hour.

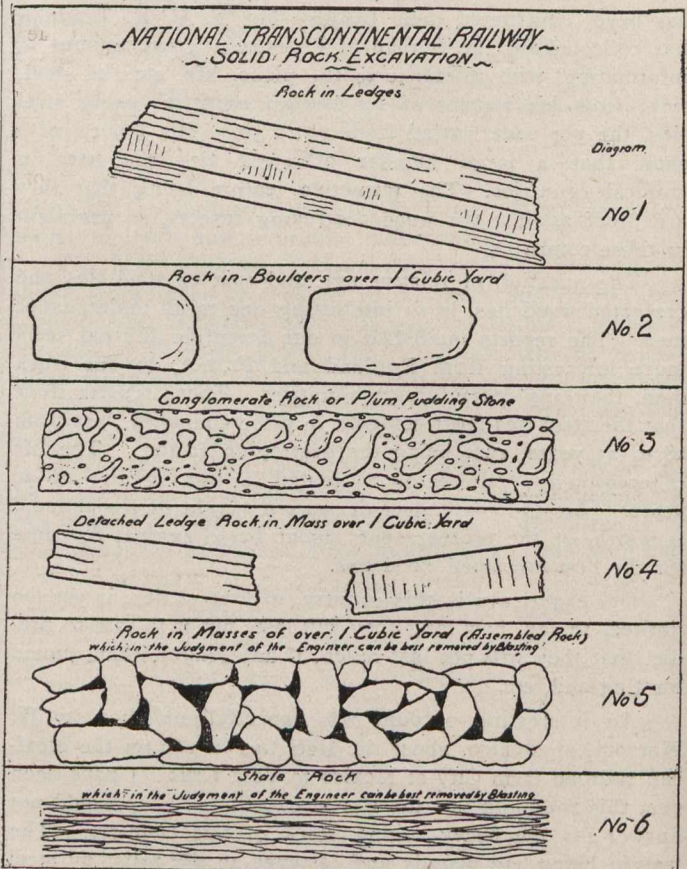
Compared with the steam shovel, the electric-driven excavating apparatus has been found to present marked advantages of simplicity, economy and ease of operation. The hauling of water and coal is avoided; fewer operators are required to handle the machine; and a considerable saving of time is noted. For example, the cost of operating a certain electric shovel with 75-horsepower hoist, 30-horsepower thrust and 30-horsepower swing-boom is \$.0164 per cubic yard of gravel, clay and sand, while similar work performed by steam shovels would cost from three to four cents per cubic yard.

TRANSCONTINENTAL CLASSIFICATION.

Classification of material excavated in country where solid rock, loose rock, hard pan and earth are met with is at best a difficult task and on every railway line small or great there has been adjustments, etc.

The resignation of Mr. Hugh Lumsden, Chief Engineer of the National Transcontinental Railway brings to mind the Hodgins charges and the difficulties that arise on such large work.

In September, 1907 Mr. Lumsden felt the pressure of the work and realized that the building of a road by a commission, Government appointed and Government supervised was much different from work for a railway company. He said:—"Personally, I feel that matters are so different under a government commission, whose powers are limited by the act, from what they had previously been under a corporation, who could act on their own initiative and take the responsibility of making such modifications in contracts as now suggested by me in just such difficulties as are now being experienced in district 'F,' that unless some relief can be given, the strain and worry connected with my present position is more than I can stand, especially as the salary is not in proportion to the responsibility involved."



The Specifications.

The specifications on this work, provided that grading should be commonly classified under three heads: Solid rock, loose rock, and common excavation, each of which was described as follows:

34. Solid rock excavation will include all rock found in ledges or masses of more than one cubic yard, which, in the judgment of the engineer, may be best removed by blasting.

35. All large stones and boulders measuring more than one cubic foot and less than one cubic yard, and all loose rock whether in situ or otherwise, that may be removed by hand, pick or bar, all cement gravel, indurated clay and other materials that cannot, in the judgment of the engineer, be ploughed with a 10-inch grading plough, behind a team of six good horses properly handled, and without the necessity of blasting, although blasting may be occasionally resorted to, shall be classified as loose rock.

36. Common excavation will include all earth, free gravel or other material of any character whatsoever not classified as solid or loose rock.