

increased in strength and made of cast steel. Cut wideners were added to the casing to enable the banks to be cut away and the strength of the casing greatly increased, especially at the cutting edges. Fig. 4 shows a plow constructed for the C.P.R. in 1911, to which cut wideners were applied,

operated on the C.P.R., and to a great extent his opinion is no doubt correct. On the other hand, the heaviest service a plow is subjected to is when cutting its way through snow slides, and unfortunately these are met with on every road that operates to the Pacific Coast. The snow

Manager, Western Lines, C.P.R., was engaged for a considerable time in operating rotary plows, and decided that a plow was required that practically could not break down and that would have sufficient power and strength to cut its way through any snow bank. His instructions were that he wanted a plow with knives of 2 in. armor plate and the rest in proportion. Authority was given the following spring for two plows to these specifications, and arrangements were made with the Montreal Locomotive Works for their construction. J. Player, Consulting Engineer of the American Locomotive Co., was engaged to prepare the design, in collaboration with the writer, and it was decided to modify the construction of the regular rotary plows considerably. The writer had for some years believed that better results could be ob-

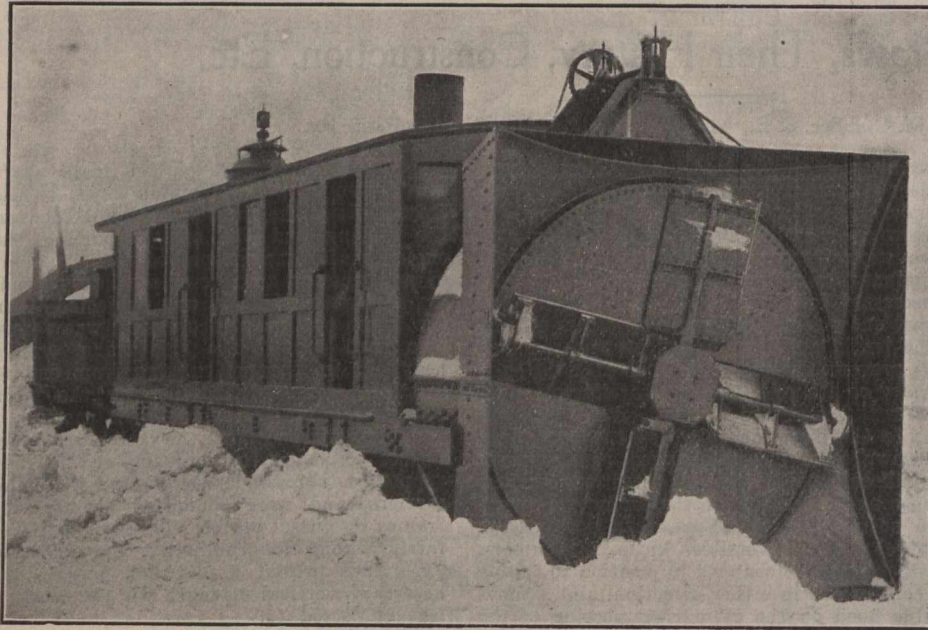


Fig. 1.—Early Leslie Type of Single Cutter Rotary Snow Plow.

which in this view are photographed in their working position. When not required they can be folded back against the sides of the casing, the rods which hold them in position being then removed.

These photographs illustrate the develop-

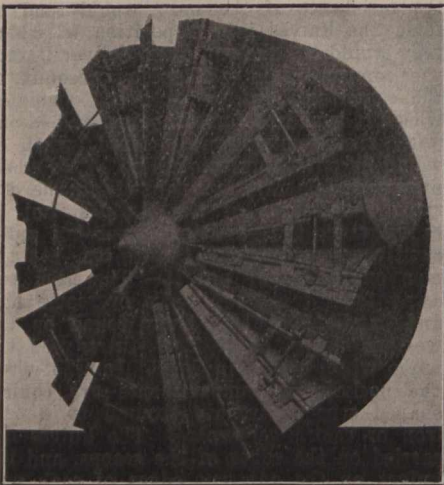


Fig. 3.—Leslie Type of Scoop Wheel for Snow Plow.

ment that has taken place in the rotary snow plow, which has without any question proved the only successful plow of this type and the means by which trains have been operated during severe winter weather. It is difficult to imagine how United States and Canadian railways could have operated without it with the amount of traffic they are now called upon to handle. There have been many attempts to develop other styles of steam driven plows, but none have been found as powerful and efficient as the rotary, and none are today in actual use. The experience on the C.P.R. showed, however, in the opinion of its officers that good as the rotary was, it was not good enough. It is only fair to Mr. Leslie to say that he does not agree that the rotary was properly

in a slide is not only packed exceedingly hard, but it is liable to contain trees and rocks which are carried with it down the mountain side. No plow can, of course, handle such obstructions, and when they are discovered they are either pulled out or blasted away. There is, however, a very strong pressure on every railway to open up the line in the shortest possible time, and to effect this the usual method of operating a rotary was to put two heavy engines behind it, run the plow engine as fast as possible and drive it into the cut at 8 or 10 miles an hour. As the plow slowed down it was drawn back, speeded

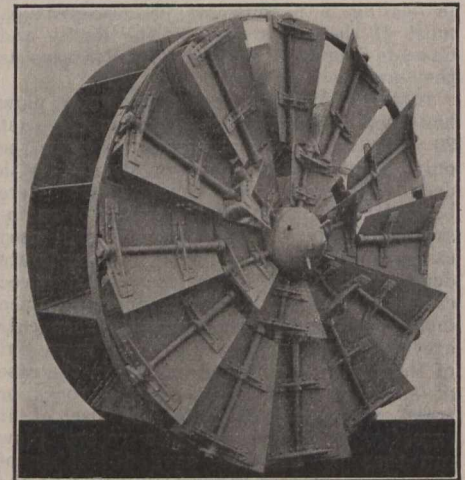


Fig. 2.—Square Fan Type of Early C. P. R. Snow Plow.

tained by driving the plow wheel direct, in marine engine style, than through the bevel gears previously used, and that the frame of the plow should resemble a bridge girder, to thoroughly support the casing or hood in place of the channel iron frame, which required bracing to prevent its bending. After some preliminary designs had been



Fig. 4.—1911 Type of C.P.R. Snow Plow with Cut Wideners.

up again and the operation repeated. If trees or rocks were met with the knives were frequently torn off or damaged, and their repair was an extremely difficult and tedious job. In addition, two points that have been referred to, the formation of ice in the casing and the weakness of the plow frame, were a constant source of trouble, apart from the time that was taken to clean out a cut of any length. During the winter of 1908-09 George Bury, then General

prepared it was decided to adopt these suggestions, and as the work progressed a number of novel features of construction developed. One of the most important questions was that of obtaining a wheel of greatly increased strength. The use of a knife blade 2 ins. thick with a corresponding construction behind it would have led to a weight that was impracticable, but the wheel as actually built is immensely strong and radically different from those previ-