ously employed. The cone shaped scoops were formed from plates of 3/8 in. steel pressed into shape, and the hinges for the knife blades were riveted to their edges. To obtain the desired strength these plates would have to be increased to 1¼ in. or 1½ in., which would make them most difficult to form and necessitate the hinge castings being fitted to them individually as it could not be expected they would be absolutely uniform in shape. It was, therefore, decided to make the entire wheel out of cast steel, casting the hinges solid with the body of the wheel. As no machinery facilities or annealing furnaces were available for handling a casting of this size in one piece, the centre was made in octagon form, 80 ins. across the flats, with 8 segments bolted to it. Fig. 5 is a front view of the centre, which shows the cast steel hinges before machining. Fig. 6 shows one of the segments which are bolted to the faces of the centre. The hinges are 6 ins. in diameter at the largest part and the hinge pin 2½ ins. in diameter. The bottom holes in line with the hinge holes are for the 2¼ in. bolts which secured the segments to the centre. There are three of these bolts in each segment, one in line with each hinge hole and one central between the hinges. There are also 5 bolts, 2 ins. in diameter at the rear edge of the segments, and they are also bolted together through the flanges at their rear edges. It was necessary to make the fastenings between the segments and the centre of ample strength, not only to stand the shocks at the edge of the blade but the effect of centrifugal force, which at 400 revolutions a minute, the estimated maximum speed, was equal to about 275 times the weight on a diameter of 11 ft. The face of the segment bolts to the centre, each segment containing one pair of hinges and the halves of the two scoop shaped compartments. Fig. 7 is a view of the wheel assembled before the knives are attached. This view shows the band, 1¼ in. thick by 10 ins. wide, which further secures the segments in place. This band is made in sections with L-shaped lugs on each end, which fit in grooves cut in the segments (see fig. 6), and is also securely bolted to them. It is increased in thickness to compensate for the holes for the hinge pins and bolts. This view also shows the bolts attaching the segments to the centre and the stops for the knife blades. Fig. 8 is a view of one of the blades from the inside, and shows their massive construction. There are three hinge pins, 1⅜, 1⅝ and 2¼ ins. in diameter respectively. The hinges on the wheel and on the knives are sufficiently strong to shear these pins, and it was calculated that to shear the outer pin, which is the one exposed to the greatest strain, would require 400 tons at the edge of the blade. The knives are ⅝ in. thick at the edge and heavily ribbed, while the stop extends from end to end and forms a strong backbone.

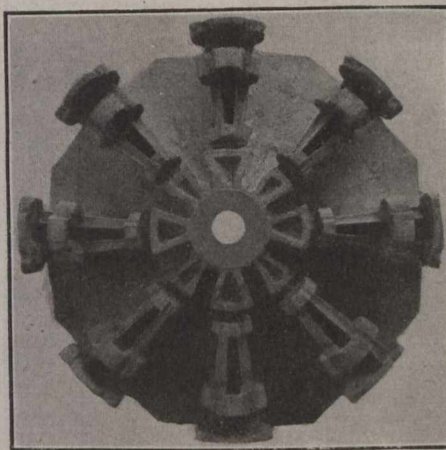

Fig. 5.—Centre Casting of New C.P.R. Snow Plow.

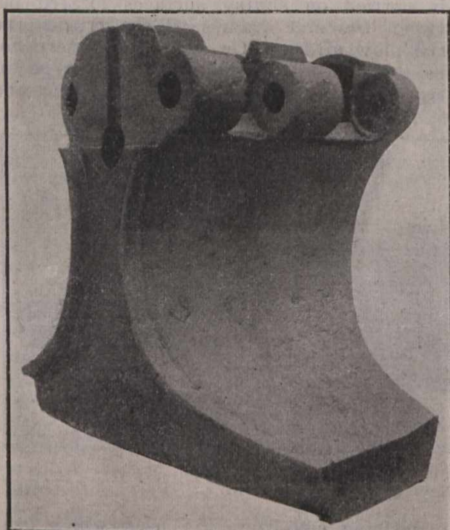

Fig. 6.—Cutter Head Segment of New C.P.R. Snow Plow.

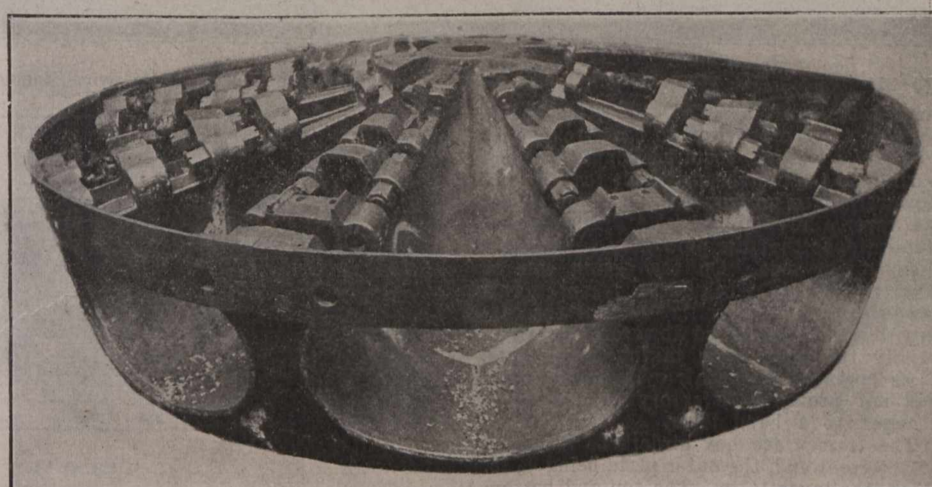

Fig. 7.—Assembled Cutter Head of New C.P.R. Snow Plow, Without Cutters.

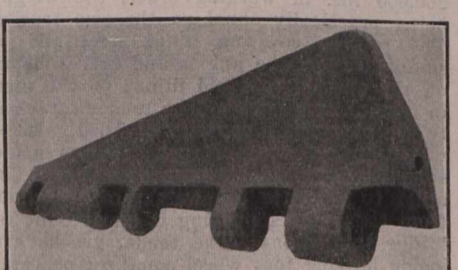

Fig. 8.—Cutter Blade of New C.P.R. Snow Plow.

Fig. 9 is the nose piece which completes the centre of the wheel. The completed wheel without the nose pieces, when being balanced in the shops, weighed 24,000 lbs., and on account of the high speed at which it was required to run it was necessary to balance it most accurately. This view also shows the links connecting each pair of knives to move the rear knife into the proper position. The machined surface near the link was to permit of the attachment of clips to hold the knives in their proper position, but these were not required when the proper length of link was obtained.

Fig. 10 is a view of the plow partly assembled, but before the wheel was applied, and shows the general construction of the casing. This was made of ¾ in. plate in two tapered courses, the front one being tapered 1 in 1½, the back one 1 in 4. In place of making the front of the casing in a vertical plane, the taper course was cut away to bring its cross section to the shape required. By adopting this plan all flat surfaces which might lead to the formation of ice were avoided. The front casing is reinforced by a second thickness of ¾ in. plate along its lower front edge, and heavily braced with tee irons. The back of the casing is constructed of steel castings, having flanges for attachment to the gusset plates, which are securely riveted to the frame. This view also shows the taper wheel fit of the main shaft, which is 11⅛ in. diameter and 12 ft. 2 ins. long over all. The front bearing is 11⅛ ins. diameter by 28 ins. long. Behind this is a marine type thrust bearing having 10 collars and a rear bearing 10 ins. diameter by 16½ ins. long. The thrust bearing was introduced on account of the conviction that the arrangements for taking the thrust were inadequate on the older plows, and in their case the thrust was actually taken by the sheet of ice which formed between the plow wheel and the casing. This has been justified by the results as the plow runs very freely on heavy cuts. On the rear end of the main shaft is a crank disc connected to the crank pin of the engine by a drag link coupling. This was used in case of any variation between the alignment of the main shaft and the engine crank shaft and to prevent any bending strains being transmitted from one to the other. On one plow there is actually a difference of ¼ in. which is easily taken care of in this way. The engine is of strong but light construction, the cylinders 20 ins. diameter, 24 in.

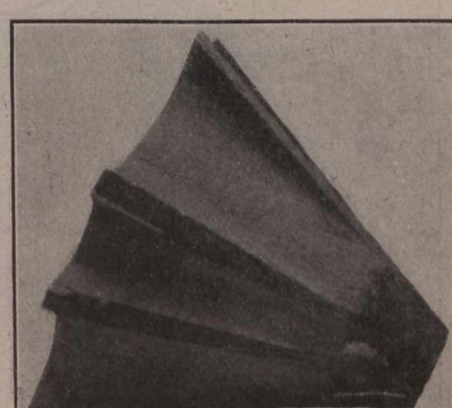

Fig. 9.—Cutter Head Nose Piece of New C.P.R. Snow Plow.