is shown in fig. 52, illustrating various types of pilot ploughe. For double track operation, a single cutting plate extending the full width of the trackway is used.

As stated previously, flangers are applied to snow ploughs of various types. Sometimes flangers are attached to a special car. The smallest flanger car raising the flanger is contained within the car. The majority of the large cars are equipped with two flangers in order that the car may be operated in either direction. On some roads the flangers are hung from the underframe of the car between the trucks. On other roads they are placed at the ends of the cars outside the trucks. Figs. 53, 54 and 55





Fig. 54. Flanger Car, Canadian Pacific Railway.



Fig. 55. Flanger Car, Canadian Pacific Railway.

is practically a 4-wheel truck to which flangers have been applied. A platform is built over the truck and carries the operating mechanism as well as a load of heavy material to hold the flanger down to its work. The large flanger cars are ordinarily of the caboose type, and are usually equipped with two 4-wheeled trucks. The mechanism for lowering and

show some different types of flanger cars. Some of the various styles of flangers used under such cars or other equipment are shown in fig. 56.

Ice Cutters. — The formation of ice around and over tracks in yards is a cause of great delay. Removal by hand is slow and retards switching operations. To remove such ice quickly, the C.P.R. has developed and is using a type of ice cutter shown in fig. 57. This cutter is applied to the plough of a Jordan spreader car. The cutter consists of 29 2 in. square cutting tools of hardened steel, ground to a point at the bottom end. These knives are carried in a flanged channel which is fastened to the plough at the front of the spreader. This method of attachment permits the entire cutter to be raised and lowered by the existing spreader mechanism. Fig. 57 shows the cutter in working position. Figs. 58 and 59 shows the cutter entering a snow and ice covered track and leaving it in clear condition.

Sweepers. — For removing ordinary light snows in yards, a few roads have used the well known street railway type of sweeper. A sweeper of this type is shown in figs. 60 and 61. The revolving brooms at each end of the sweeper are operated by means of a single cylinder reversible steam engine located in the body of the car. This engine takes steam from the locomotive pushing the sweeper. The broom shaft is driven by means of a chain drive. The writer has been advised that these cars are very efficient in removing light snow, and particularly in cleaning up terminals and terminal yards.

Operation of Equipment. — All snow fighting equipment should be in good condition before the start of the snow season. This is best accomplished by means of a definite summer repair programme. Snow fighting conditions vary greatly. Some roads, in order to determine the probable weather conditions, keep in close touch with the government observatories, which advise the localities or areas in which storms exist or are probable.

Operation of equipment usually starts with the beginning of a storm. In clearing snow under ordinary conditions, pilot, push and wing plows are generally run at a good speed, in order that the snow may be thrown well clear of the track. If a good speed is maintained, the ploughs will frequently go through a cut without stalling, whereas, if the speed is slow the plough may catch or stall half way through the cut or drift, with the result that it may be stuck or buried and have to be shoveled out. Particular care should be used upon

Particular care should be used upon approaching a cut, particularly one with a side drift at the entrance, as with a double track plough sufficient side pressure may develop to cause derailment. Such an approach is generally squared off before pushing the plough into it. If the snow is too deep for the plough to handle, it is leveled off by shoveling until reduced to a reasonable depth. The man in charge of the snow plough must be one with considerable initiative, as weather and snow conditions vary greatly, and situations frequently arise which call for good judgment and quick decision.

Rotary snow ploughs are handled in an entirely different manner from the push and wing ploughs. Instead of dedepnding upon speed to get through the drifts, the rotary plough approaches the drift slowly and the cutting wheel is fed into the drift instead of bucking it. A snow bank or slide is generally approachat a speed of about 3 or 4 miles an hour with the rotary wheel revolving about 150 revolutions a minute. When coming close to the obstruction the speed of the wheel is increased, and the pusher engines keep moving just fast enough to keep the plough up against the drift. If the pusher engine crowds the rotary too much the pilot signals the locomotive