

heating surface exposed to the steam. This can be easily done by allowing the water of condensation to collect in steam jackets to different predetermined levels. In cars already equipped this can be accomplished by connecting the stand pipe or controller in the pipe carrying off the condensation from the steam jackets, and by connecting the top of the steam jacket or jackets to the top of the controller, so that the steam pressure in each will be the same. If the water is allowed to accumulate in the stand pipe to any of certain overflow levels, it will assume approximately the same levels in the steam jackets or steam coils, proportionately varying the surface exposed to the steam. In the case of new cars the arrangement is the best, on account of its simplicity and its wide and positive range of control. Should any failure of the controller occur, and it fail to adequately hold the condensation, the conditions would be no worse than formerly, if the car was too hot and required regulation the angle valve would have to be used in the old way.

Freezing of the drip has always been a bugbear with the hot water systems, but as it is possible to shut off the heat from the steam jacket by allowing the condensation to collect, which it does very rapidly, this system has been arranged so that the heat can be shut entirely off in the car without shutting off the steam from the drip, which means practically the entire prevention of frozen drips.

The "Controller," as the valve operating the water levels has been called, has usually four adjustments marked, "Full On," " $\frac{3}{4}$," " $\frac{1}{2}$," and " $\frac{1}{4}$." When it is desired to shut the heater off entirely it is done by the angle valve in the old way, but this does not shut off steam from the drip. The efficiency of the regulation has been most satisfactory. It has made it possible on a mild night in the winter, that even a lower berth at the heater end can be kept comfortable without overheating, no matter what steam pressure supplied, and also no worry of a frozen drip or water pipes in the morning.

While very considerable improvement has been made in the control of the heat, several other improvements have been made in the hot water systems worthy of consideration.

In one heating system a so-called "Accelerator" fitting has been used, presumably to accelerate the circulation. This device was evidently designed on a misconception of the cause of circulation, the argument used is equivalent to a man lifting himself by his boot straps. The fitting consists of a casting into which the riser pipe is screwed, and a jet or nozzle forming practically a contracted continuation of the