it can be placed anywhere in the steam line where it will do the most good and be most convenient.

Another important advantage of separate firing is that the amount of superheat can be nicely regulated by the intensity of the fire, by that means giving a range of from no superheat to the maximum capacity of the superheater without in any way affecting the production of steam in the boiler. By the use of this apparatus we have added a certain amount of heat and it might be supposed that this, less the ordinary losses, is all we can get out of it. By the addition of this heat we have changed the properties of the steam and so have greatly increased its efficiency. The specific heat of superheated steam is less than half that of water, being about .48, and with the expenditure of 1 B.T.U. we raise the temperature of 1 lb. of steam about two degrees F. If we superheat steam at 150 lbs. gauge pressure 200 degrees, we expend 96 B.T.U.'s in doing it. The total heat necessary to evaporate 1 lb. of water at 150 lbs. pressure is 1225.5 B.T.U.'s, so that in securing this amount of superheat we have only added 7.8 per cent. of the heat necessary to obtain 1 lb. of dry saturated steam at 150 lbs. pressure. But by adding this superheat we have increased its volume which, following the laws of a perfect gas is proportionate to its absolute temperature. The volume of 1 lb. of saturated steam at 150 lbs., pressure is 2.726, and its absolute temperature is 365.6+461=826.6 degrees. The absolute temperature of 1 lb. of steam at 150 lbs. pressure superheated 200 degrees is 365.6+200+461=1026.6 degrees, and its volume is $\frac{2.726 \times 1026.6}{826.6}$=3,386, an increase of .66 cubic feet, or 24.2 per cent. You will see by this that by adding 7.8 per cent. to the heat already in 1 cubic foot of steam at 150 lbs. pressure, we have obtained 1.24 cubic feet—now if we assume that we have a cylinder consuming 1 cubic foot of steam per stroke, we can fill it with superheated steam one and one-quarter times at an expense of only 7.8 per cent. more heat. We must bear in mind that heat directly represents energy. By superheating saturated steam of 150 lbs. pressure 200 degrees, we have added 96 heat units and the total heat per pound is 1225.5+96=1321.6 B.T.U.'s, which is the heat contained in 1 lb. of saturated steam at a pressure exceeding 1,000 lbs. per square inch. In other words, by adding 200 degrees of superheat to steam at 150 lbs. pressure we can obtain the same amount of energy per pound as we would if it were possible to use steam at a pressure of 1,000 lbs.

It is well-known that cylinder condensation is one of the large losses in steam engine practice. Steam entering the