This invention relates to a process for treating malleable cast iron to increase its strength and to leave it in such condition that it may thereafter be galvanized, for example, by the hot dripping process, without such galvanizing causing any appreciable change in the structure of the material, and particularly without such galvanizing causing deterioration in the quality of the metal.

As generally understood, ordinary malleable cast iron is granular in structure, being composed mainly of grains of ferrite and small particles of carbon or graphitic carbon. One step in the present method or process is designed to cause a combination of the carbon and the ferrite in order to form pearlite or iron carbide.

Other objects will appear from time to time in the specification and claims.

The malleable cast iron parts which are to be treated are first cleaned by any suitable method and are thereafter heated. This heating will usually be done in furnaces, but may, of course, be done by any other means. The iron is raised to a temperature in the neighborhood of 1475° F. This temperature is given as approximating the best temperature, but a variation either above or below this temperature is possible. After the material has reached the critical or carbon combining temperature a part of the carbon is combined with ferrite. The length of time that the material being treated must be held at this temperature varies with the size of the parts being treated and with the physical properties desired. After the heating has been carried on a sufficient time, the parts are then quenched, that is to say, cooled, in air, oil, water or other medium. In ordinary practice, no particular effort is made to cool the metal slowly and where it is quenched in oil or a liquid, it is usually cooled rapidly. Where it is desired to give the metal a tough and wear resisting outer coat, the heating operation will be carried out in the presence of a carburizing agent.

When the material being treated has been first heated and quenched, it is thereafter reheated to a temperature not exceeding the critical or carbon combining temperature. The result of this second heating is to cause the martensite and troostite retained after the first heating to break down into pearlite or sorbite. This change will normally be effected at a temperature range of 900° F. to 1200° F. After the first heating, then, the metal may be heated a second time to approximately 1200° F. and it is subsequently cooled or quenched. It may thereafter be galvanized by hot dipping and since the normal temperatures of such hot galvanizing are well below 1200° F., such subsequent galvanizing does not materially change the structure of the material and therefore hot galvanizing malleable cast iron which has been treated by the method above set out does not appreciably affect the strength of the metal and does not embrittle it.

I claim:

1. The process of heat treating malleable cast iron which includes heating the iron to approximately 1475° F., quenching and reheating to approximately 1200° F.

2. The process of treating malleable cast iron which includes the following steps: heating the metal to a temperature higher than the carbon combining temperature, quenching it and reheating it to a temperature below the carbon combining temperature.

3. The process of treating malleable cast iron containing ferrite and graphitic carbon, which includes the following steps: heating it to a point above the carbon combining temperature and quenching it, reheating it to a temperature sufficient to cause the martensite and troostite to break down to form sorbite or pearlite, and cooling it.

4. The process of treating malleable cast iron which includes heating the iron to approximately 1475° F., quenching and reheating to approximately 1200° F.
cast iron containing ferrite and graphitic carbon, which includes the following steps; heating it to a point above the carbon combining temperature and quenching it to cause the formation of martensite and troostite, re-heating it to a temperature sufficient to cause the martensite and troostite to break down to form sorbite or pearlite, and cooling it.

Signed at Indianapolis, county of Marion and State of Indiana, this 27th day of October, 1927.

CARL F. LAUENSTEIN.