June 23, 1931. E. A. LAUGHLIN 1,811,203

METHOD FOR TREATING CAR WHEELS

Filed Aug. 26, 1926 2 Sheets-Sheet 1

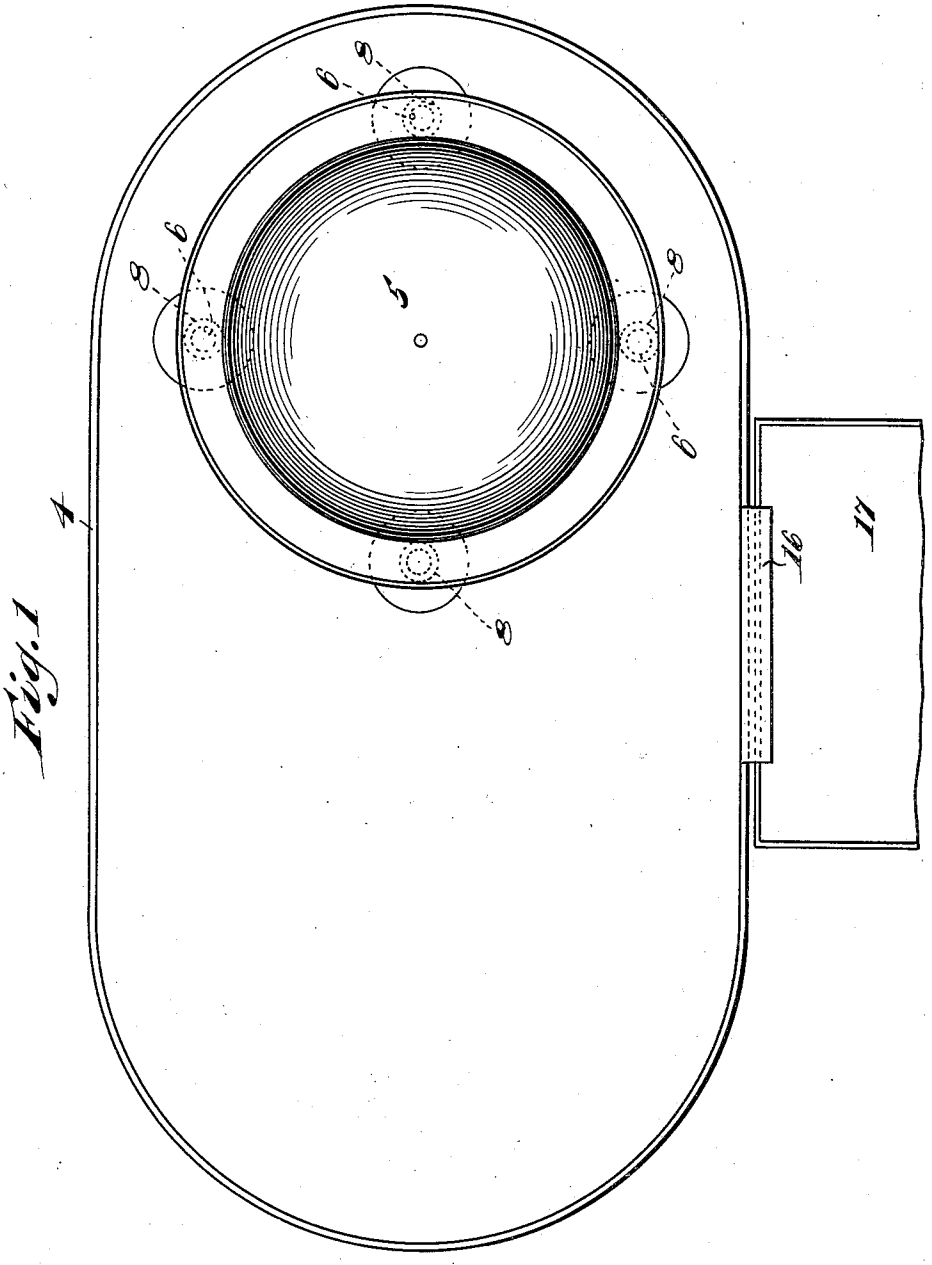


Fig. 1

Witnesses:
C. E. Wessels
B. Y. Richards

Inventor:
Elmyr A. Laughlin,
By Joshua R. H. Potts
his Attorney

June 23, 1931. E. A. LAUGHLIN 1,811,203

METHOD FOR TREATING CAR WHEELS

Filed Aug. 26, 1926 2 Sheets-Sheet 2

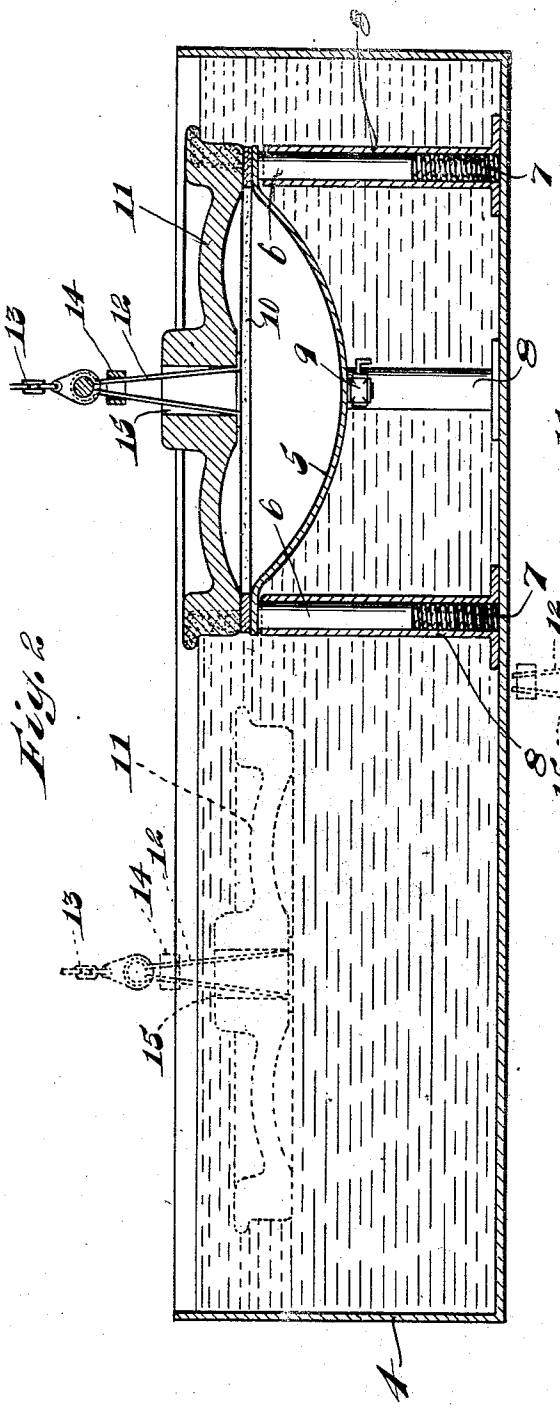


Fig. 2.

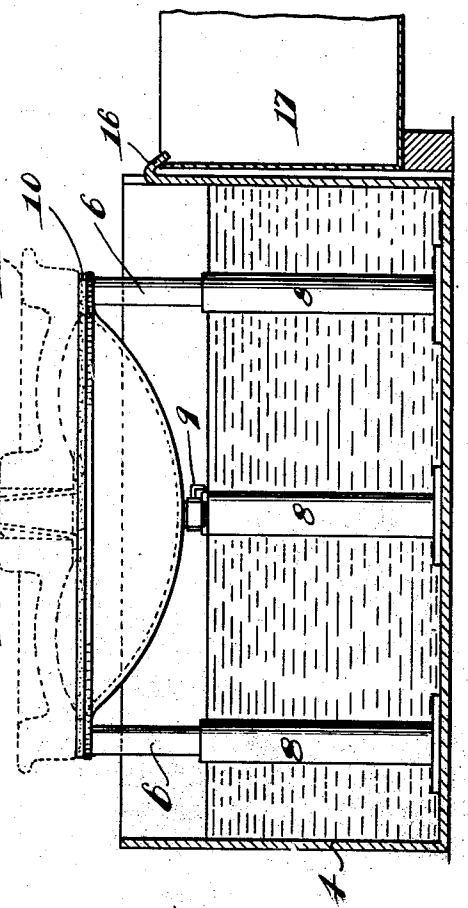


Fig. 3.

Witnesses:
C. E. Wessels.
B. G. Richards

Inventor:
Elmer A. Laughlin,
By Joshua R. H. Potts
his Attorney.

Patented June 23, 1931 1,811,203

UNITED STATES PATENT OFFICE

ELMYR A. LAUGHLIN, OF OREGON, ILLINOIS, ASSIGNOR OF ONE-HALF TO HIMSELF AND ONE-HALF TO JOSHUA R. H. POTTS, OF CHICAGO, ILLINOIS; BESSIE D. LAUGHLIN ADMINISTRATRIX OF SAID ELMYR A. LAUGHLIN, DECEASED

METHOD FOR TREATING CAR WHEELS

Application filed August 26, 1926. Serial No. 131,585.

My invention relates to improvements in methods and apparatus for treating car wheels and has for its object the provision of an improved method and apparatus for this purpose by means of which steel car wheels may be manufactured having tread surfaces especially adapted to withstand the normal wear thereon and interior or body portions especially adapted to withstand the shocks and jars to which they are subjected in use.

The present application is an improvement on the invention set forth in my prior Patent No. 1,527,418 dated February 24, 1925.

Other objects will appear hereinafter.

The invention consists in the method and apparatus hereinafter described and claimed.

Fig. 1 is a top plan view of the preferred form of apparatus for carrying on the improved process;

Fig. 2 is a vertical longitudinal section of the same; and,

Fig. 3 is a transverse section of the same.

The preferred form of apparatus for carrying on the invention comprises a suitable tank or vessel 4 adapted and arranged to contain the quenching fluid and having a wheel rest 5 in the form of a shallow bowl yieldably mounted in one end thereof. The wheel rest 5 is mounted on four depending stems 6 resting on springs 7 in hollow posts 8 in said tank and whereby said bowl will be depressed by the weight of the wheel until the rim or edge of the bowl rests upon the tops of the posts 8 as indicated in Fig. 2. The bowl 5 is provided at its bottom with a stopcock 9 by means of which the same may be drained in case any of the quenching fluid accidentally becomes deposited therein. An asbestos washer 10 is arranged on the rim of the bowl 5 in position to support the rim of a car wheel 11 as shown. A suitable lifting arrangement comprises two spring jaws 12 supported on a crane chain 13 and provided with a ring 14 arranged to pass through the central bore 15 of the wheel hub and engage the same for the purpose of lifting the wheel. Obviously, by driving the ring 14 downwardly on the jaws 12 the wheel will be released and vice versa. The apparatus for lifting and moving the wheel constitutes no part of the present invention, any suitable or desired apparatus being adequate for the purpose.

In carrying on the process the wheels to be treated are first rapidly heated to a temperature well above the upper critical range thereof. I prefer to employ a wheel which is composed of steel having a carbon content of from .35 to .45 with the usual silicon and manganese content allowable in the plain carbon steels. After the wheel is properly formed, I then heat it rapidly to above the upper critical range, or around 1600° to 1700° F. With said steel I prefer to use water as the quenching fluid, at a temperature of from 70 to 80° F., and to this end the tank 4 is previously filled with such water. A heated wheel is engaged by the lifting mechanism and first immersed in the water in the tank 4 as indicated by the dotted lines in Fig. 2. Obviously such immersion subjects the entire exterior surfaces of the wheel to the action of the quenching fluid uniformly and simultaneously and this quenching is preferably continued for a period of time of from 10 to 20 seconds or such time as will so reduce the temperature of the body that when the internal heat is permitted to diffuse substantially uniformly the exterior surfaces of the wheel will be reheated to a temperature of from 1200° to 1500° F. Usually a quenching of from 20 to 30 seconds will be long enough to accomplish this purpose. The wheel is then withdrawn from the quenching fluid and the interior heat allowed to diffuse, thus reheating the cooled or quenched surfaces and until the entire mass is brought to a proper toughening temperature of from 1200 to 1500° F.

During this reheating the wheel is moved in position and rested on or adjusted over the bowl 5 with the rim of the wheel on the gasket or washer 10. When the temperature of the wheel has diffused as stated above, the wheel is further lowered or released so that its entire weight falls upon the rim of the bowl 5, depressing said bowl until the

thread surfaces of the wheel are immersed in the quenching fluid and the rim of the bowl rests upon the tops of the posts 8, as indicated in Fig. 2. The tank 4 is provided with a suitable overflow 16 and a receiving vessel 17 so that the wheel will not be completely immersed in the quenching fluid but only the thread surfaces thereof, as indicated in full lines in Fig. 2, any excess of quenching fluid flowing out in the vessels 17 over the overflow 16. In this way the second quenching is confined solely to the thread surfaces of the wheel, asbestos washer 10 constituting a sufficient seal to prevent the entry of material water in the bowl 5. It is also to be noted that the intense heat of the wheel rim itself will vaporize any water tending to leak through and thus form a steam seal. Obviously, therefore, the second quenching will be confined solely to the tread portion of the wheel. This second quenching is continued preferably for a period of time usually from 5 to 10 minutes or until the body has been sufficiently cooled so that when the interior heat is again diffused throughout the whole body the temperature of the whole body will have been reduced to a proper drawing temperature usually to around 500° F. The wheel is then permitted to cool slowly and will be found to have a tread or wear surface especially adapted to withstand the usual and normal contact with the rails and interior or body composition or structure especially adapted to withstand the shocks and strains to which it is normally subjected in use.

This process is also applicable to steel wheels made from higher carbon steel or with alloy steel, but if the higher carbon is employed, the temperatures must be reduced as the carbon content increases, and an oil or less drastic quenching compound employed.

When a carbon steel of from .35 to .45 carbon content is employed it will be found that a wheel is produced which will have a hub and a web of from 130,000 to 135,000 lbs. psi. and an undeterminable fatigue life, being unaffected by millions of cycles of stress. It will thus be seen that by employing such material and subjecting it to such a process the cross sectional area of the wheel can be proportionately reduced and thus the wheels made considerably lighter and yet considerably stronger. The cost of the process will be found to be very economical so that, by the use thereof, a very considerable saving can be made in the amount of material and the time consumed. In this way steel wheels weighing about 500 lbs. can be made stronger and more durable than those of ordinary treatments weighing 800 lbs. or more.

It will also be found that the tread surfaces of such a wheel will test around 444 Brinell hard and thus will be approximately twice as hard as the usual railroad rail head. As is well known, two metals of different degrees of hardness and subjected to interfriction between them will wear longer than two metals of substantially the same hardness. The tread surfaces of the wheels thus produced being substantially twice as hard as the heads of the rails will cooperate therewith in resisting abrasive wear on both and it will be found that the wearing qualities of both are greatly improved by employing this process in treating the wheels.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. The method of treating car wheels which consists in first heating the same to a temperature above the upper critical range thereof; then substantially uniformly and simultaneously quenching the entire exterior surfaces of the wheels for a period of time varying from ten to thirty seconds; then discontinuing the quenching a sufficient length of time to permit said surfaces to reheat by conduction from the interior of the wheel and until the entire wheel reaches a temperature of from 1200° to 1500° F.; and then quenching the tread surfaces only of said wheel, substantially as described.

2. The method of treating car wheels which consists in first heating the same to a temperatuere of from 1600° to 1700° F.; then substantially uniformly and simultaneously quenching the entire exterior surfaces of the wheel for a period of from 20 to 30 seconds; then discontinuing the quenching a sufficient length of time to permit said surfaces to reheat by conduction from the interior of the wheel and until the entire wheel reaches a temperature of from 1200° to 1500° F.; then quenching the tread surfaces only of the wheel for a period of time of from 5 to 10 minutes; then discontinuing said second quenching and permitting the tread surfaces of the wheel to reheat by conduction from the interior to a temperature of from 400° to 700° F.; and then permitting the wheel to cool slowly, substantially as described.

In testimony whereof I have signed my name to this specification.

ELMYR A. LAUGHLIN.