

Thermit Welding and its Application at Transcona Shops, National Transcontinental Railway.

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The technological aspect and importance of thermit reaction can hardly be over-estimated, being a branch of aluminothermics, a science only in its infancy, and which has been taken up so rapidly by the steel industries of Canada and

stand great changes in temperature.

Thermit may be well termed a new kind of fire, a fire that is different from all other varieties of fire. In its combustion thermit is not air consumed, nor is there any gas evolved, as in the case

of thermit, that a heat density is produced unattainable otherwise. Thermit would therefore be of no practical use were it not for these peculiarities in its behavior.

The thermit process of welding as ap-



Fig. 1.—Cast iron boring bar of vertical boring mill.

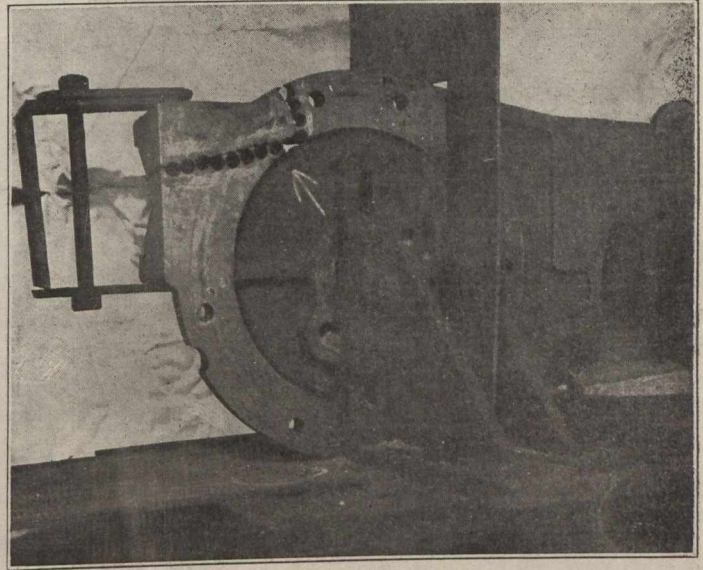


Fig. 2.—Quadrant of vertical boring mill.

the United States that a knowledge of it is nowadays indispensable. Already thermit reaction serves for the preparation of a number of pure metals and alloys of considerable value in the iron and steel and allied industries. Among

of wood, coal, gas, or any other kind of flammable combustion. Its heat density is also high and violent, and of such a peculiar nature that its application for welding purposes has been determined for industrial use with success. Then

plied to railway locomotive and machine repair, particularly in the welding of frames, and other heavy sections, maintains its advantage in the factors of time, portability in manipulation, simplicity of apparatus required, and its convenience in the smaller outlying points of modern facilities. At the Transcona shops ordinary locomotive frame fractures are thermit welded in from about 4½ to 6 hours, from start to pour, and mould boxes to accommodate all required shapes are built up from adjustable scrap boiler plate specially designed to suit the job, and which form part of the welding outfit. The thermit process is one of the oldest of autogenous welding in the railway shop, although there have even here, been recent improvements and changes affecting details, which have brought about further improvements and economy. Special railway thermit can now be obtained, already mixed with proper proportions, thus relieving the individual

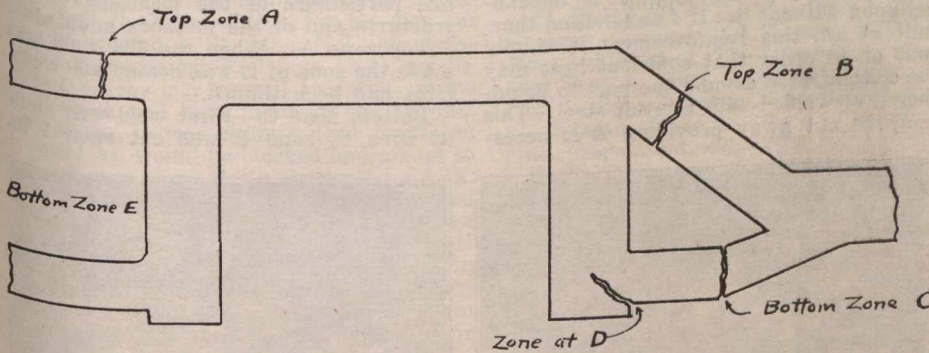


Fig. 3.—Welding of locomotive 427.

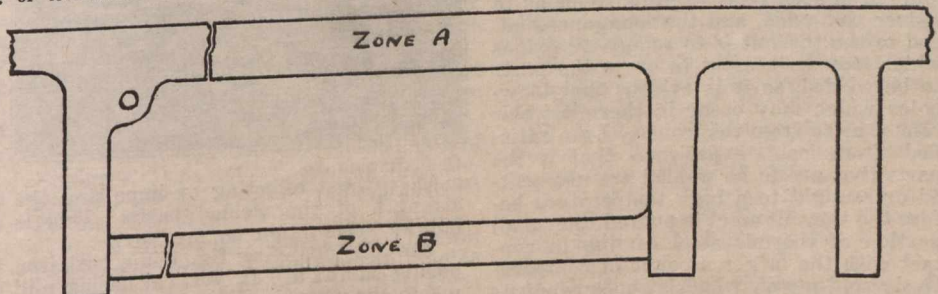


Fig. 4.—Welding of locomotives 405 and 634.

the alloys I may mention chromium (98 to 99% pure), which is used extensively in the manufacture of high speed tool steel and armor plate. Other alloys I may mention are chromium-manganese, manganese-titanium, ferro-titanium, ferro-vanadium, and ferro-boron.

In foundry work thermit, containing a small quantity of titanium-oxide, is used to prevent blowholes, and to give clean, dense castings. The fluidity of the metal is increased, producing a finer grain and decreasing the sulphur contents, the slag rising to the top can be removed very easily. It has also been discovered that, from the reaction of chromium under thermit, minute rubies are found in the slag, but being so small, they are of no commercial value. The slag itself, being free from metallic impurities, is mixed with certain clay, burned and manufactured into chemical apparatus, which can

again, that the actual amount of heat obtainable from a given weight of thermit is much less than that from the same weight of anthracite has been demonstrated, but the reaction between quantities of iron oxide and aluminum is so instantaneous, caused by the combustion

in charge entirely from what previously was one of the most important features in securing good results.

Too much emphasis cannot be placed on the value of using good moulding material. It should always be remembered that on account of the high tem-