

1

2,901,346

MILD STEEL

Roy Alfred Ulfketel Huddle, East Ilsley, near Newbury, 5
Thomas Felix Pearson, Blackhill, and Michael de Lippa,
Consett, England, assignors to Consett Iron Company
Limited, Durham, England, and United Kingdom
Atomic Energy Authority, London, England; both are
British companies

No Drawing. Application May 3, 1957
Serial No. 656,749

Claims priority, application Great Britain May 4, 1956

1 Claim. (Cl. 75—124)

The present invention relates to an improved mild steel.

The object of the invention is to provide a mild steel which has a greater resistance than hitherto known mild 20
steels to oxidation in the presence of oxidising gases and

2

intentionally, are accepted as residuals and do not exert any undue harmful influence on the mechanical properties of the mild steel. The residuals also comprise sulphur and phosphorus which are inevitably present in small quantities, are considered undesirable and are usually limited to 0.06% by weight each, maximum.

Table 1 demonstrates how the addition of beryllium within the range specified above improves the resistance to oxidation of mild steels when subjected to the action of carbon dioxide at high temperature. In this table the figures for percentage composition are by weight and the discrepancy between 100% and the total of the individual percentages of the elements indicated represents the percentage of iron and residuals present in the mild steel. The 10
oxidation index in Table 1 represents the gain in weight in mgs. per unit area of the mild steel after being maintained at 450° C. for 750 hours in a carbon dioxide atmosphere. Two oxidation indices are given, one relating to tests carried out in an atmosphere of dry CO₂ and the other relating to tests carried out in an atmosphere of wet CO₂ (i.e. CO₂ and steam). 15

Table 1

Percentage composition of the mild steel								Oxidation Index	
C	Mn	Si	Al	Cu	Ni	Cr	Be	Dry CO ₂	Wet CO ₂
0.13	1.2	0.11	0.1 to 0.5	0.25 to 0.50	Nil	0.10	Nil	9.00	6.40
0.13	1.2	0.11	0.1 to 0.5	0.25 to 0.50	Nil	0.10	0.020	5.15	4.05
0.13	1.2	0.11	0.1 to 0.5	0.25 to 0.50	Nil	0.20	Nil	8.70	3.40
0.13	1.2	0.11	0.1 to 0.5	0.25 to 0.50	Nil	0.20	0.014	7.20	2.80
0.15	1.2	0.11	0.1 to 0.5	0.25 to 0.50	0.50	0.50	Nil	9.60	3.50
0.15	1.2	0.11	0.1 to 0.5	0.25 to 0.50	0.50	0.50	0.020	6.15	3.40
0.14	1.2	0.11	0.1 to 0.5	0.00 to 0.25	0.50	1.00	Nil	8.30	3.90
0.14	1.2	0.11	0.1 to 0.5	0.00 to 0.25	0.50	1.00	0.014	7.50	3.60
0.13	0.5	0.08	0.5 to 1.5	0.25 to 0.50	0.50	0.10	Nil	8.30	3.80
0.13	0.5	0.08	0.5 to 1.5	0.25 to 0.50	0.50	0.10	0.020	7.10	3.80
0.13	0.5	0.08	0.5 to 1.5	0.25 to 0.50	0.50	0.10	0.070	3.40	3.00
0.13	0.5	0.08	0.5 to 1.5	0.25 to 0.50	0.50	0.20	Nil	8.30	4.00
0.13	0.5	0.08	0.5 to 1.5	0.25 to 0.50	0.50	0.20	0.080	2.10	3.40
0.15	0.5	0.08	0.5 to 1.5	0.25 to 0.50	1.00	0.50	Nil	5.20	2.90
0.15	0.5	0.08	0.5 to 1.5	0.25 to 0.50	1.00	0.50	0.020	4.10	2.30

vapours, such as carbon dioxide and water vapour, particularly at high temperatures (for example, temperatures in the region of 500° C.).

According to the invention an amount of beryllium in the proportion of from 0.01% to 0.08% (preferably 0.02% to 0.08%) by weight is included in a mild steel which contains from 0.1 to 0.18% by weight of carbon, from 0.4 to 1.4% by weight of manganese, from 0.05 to 0.3% by weight of silicon, from 0 to 0.6% by weight of copper, from 0 to 0.6% by weight of molybdenum, 50
from 0 to 1 by weight of nickel, from 0 to 1% by weight of chromium and from 0 to 1.5% by weight of aluminum, the remaining constituents of the mild steel being iron and residuals.

The residuals are small quantities of elements such as 55
vanadium and cobalt which are inseparable completely from the melt during manufacture, which, as long as they do not exceed say 0.1% by weight each and are not added

An addition of beryllium to mild steels within the range specified above does not adversely affect the mechanical properties of the mild steel.

What we claim is:

A mild steel containing from 0.13 to 0.15% by weight 45
of carbon, from 0.5 to 1.2% by weight of manganese, from 0.08 to 0.11% by weight of silicon, from 0.014 to 0.08% by weight of beryllium, from 0.0 to 0.50% by weight of copper, from 0.0 to 1.0% by weight of nickel, from 0.10 to 1.00% by weight of chromium and from 0.1 to 1.5% by weight of aluminum, the remaining constituents of the mild steel being iron and residuals. 50

References Cited in the file of this patent

UNITED STATES PATENTS

2,382,466 Crafts Aug. 14, 1945