

INDEX

- | A | B |
|--|---|
| Accelerated cooling, 233, 235, 236 | Basic vs. acid steel, 10 |
| Acetylene-oxy welding, 253 | Bessemer, 110 |
| Acid electric furnace, 160, 183 | open-hearth, 7, 113 |
| open-hearth, 7, 16, 113 | bottom, 125 |
| bottom, 124 | costs of steel, 18 |
| cost of steel, 19 | flexibility, 14 |
| flexibility, 14 | melting, 146 |
| melting, 129, 166 | quality of steel, 10, 115 |
| quality of steel, 10, 115 | raw material, 28, 161 |
| raw material, 28, 159, 161 | typical heats, 149 |
| typical heats, 137 | Bauxite in acid open-hearth slags, |
| vs. basic steel, 10 | 137 |
| Air in Bessemer converter, 11, 66, 72, | <i>Belaview</i> on microstructure, 229 |
| 74, 84, 93 | Bending castings, 252 |
| cooling, 224, 233, 235, 244 | test, 240 |
| furnace for melting recarburizers, | <i>Bessemer</i> , Sir Henry, 66 |
| 81, 103 | Bessemer, basic process, 110 |
| Alternating stress test, 244 | converter to supply electric fur- |
| Alloy steels, Bessemer, 108 | nace, 193 |
| crucible, 55, 59, 65 | -electric process, 78, 195 |
| open-hearth, 166 | process, 7, 66 |
| remelting in electric furnace, 171, | advantages of, for foundries, 69 |
| 187, 190 | basic, 110 |
| Alpha iron, 225 | blowing, 84, 92 |
| Alumina in acid open-hearth slags, 137 | converters, 71 |
| Aluminum, 107, 196 | cost of installation, 30, 69 |
| Analysis, control of, in crucibles, 54 | of steel, 20, 69 |
| Annealing, control of temperature in, | flexibility, 13, 69 |
| 249 | fuel, 28, 97 |
| effect on microstructure, 232 | quality of steel, 10, 69, 70 |
| on stresses, 220 | raw material, 28, 97 |
| furnaces, 248 | suitability for small work, 15, |
| general rules for, 235 | 16, 69 |
| Anthracite—as fuel for crucible melt- | tonnage, 26, 70, 96 |
| ing, 40, 50 | Beta iron, 225 |
| Applications of electric furnace in | Blast, in Bessemer process, 11, 66, 72, |
| foundry, 187 | 74, 84, 93 |
| Arc-electric welding, 253 | Blister bar, 34 |
| furnaces, 173 | Blow holes, as starting place for cracks, |
| Ash in coke, 98 | 246 |
| Ashes, removing, from producers, 46, | from blowing cores, 203 |
| 126 | in badly made open-hearth steel, |
| Austenite, 224 | 136 |

- Blow-holes in Bessemer steel, 16, 66, 87, 106
 in crucible steel, 9, 16, 39
 in electric steel, 9
 influence of venting on, 202
 of composition on, 106
 of high manganese on, 87, 106
 of sink heads on, 204
 of size and intricacy on, 16
 of special deoxidizers on, 106, 136, 196
 of wet moulds on, 202
 welding up, 253
- Blowing, bottom-blown Bessemer, 84
 cores, 203
 side-blown Bessemer, 92
- Boil, in side-blown Bessemer, 93, 94
- Boiler plate scrap, 6, 9, 24, 28, 36, 52, 63, 97
- Boiling, of open-hearth bath, 114, 127, 129, 135
- Boil-over, of open-hearth bath, 134
- Bottom-blown Bessemer vessel, 66, 71
 blowing, Bessemer process, 84
 making, acid open-hearth, 124
 basic open-hearth, 125
 electric furnace, 172, 181
 vs. lip pouring, 57, 215
- Bottoms, for Bessemer converters, 71
- Boynon, on heat treatment, 247
- Breaking off sink heads, 218
- Break-outs, in open-hearth, 127
- Brittleness, influence of carbon content, 223
 on cracking, 219
 produced by free ferrite, 239
- Building up impurities in steel, 53, 99, 161, 258
- C
- Calcium-silicon alloy, 107, 197
- Campbell on acid open-hearth slags, 131
 tilting open-hearth furnace, 121
- Capital needed to build a shop, 29
- Carbon, absorption from charcoal in crucibles, 6, 34, 55
 from graphite in crucibles, 54
 elimination of, in Bessemer converter, 7, 66, 84, 92
- Carbon elimination in open-hearth, 7, 113, 134, 145
 gains and losses of, in steel making, 196
 in acid electric furnace, 184
 in cementite, 223
 in directly produced iron, 33
 in electric furnace, 184, 185, 187, 188
 in eutectoid steel, 223
 in recarburizers, 103, 166
 -iron diagram, 225
 loss of, in clay pots, 54
 ladles to promote uniformity of, in crucible steel making, 56
 low, difficulty of making in crucibles, 39, 42
 of pouring sound steel, 106
 reaction with FeO in side-blown Bessemer, 94
- Carbonic oxide, combustion of, in Bessemer, 66, 85, 90, 94
 formation of, in open-hearth, 114
- Carr, on cost of installation of open-hearth, 19, 20
 open-hearth furnace, 16, 157
- Cementation of charcoal iron, 33
 furnace, 34
- Cementite, 223
- Chambers, regenerative, 43, 113
- Charcoal, as raw material, 6, 28, 34, 52, 54
 iron, see "iron charcoal"
 use of, on sink heads, 209
- Charges—typical. Acid open-hearth, 137
 basic open-hearth, 149
 crucible, 58
 cupola, Bessemer, 100
- Charging the cupola, 83
 machine, 122
 the open-hearth furnace, 122, 132, 147
- Checkers, 43, 113
- Chemical laboratories, 255
- Chills, 208
- Choice of a process, considerations governing, 6

- Chrome, gains and losses of, in steel making, 109, 168, 196
 ore, in basic open-hearth, 125
 for patching, 126
 steel, Bessemer, 108
 crucible, 55, 51, 65
 heat treatment, 247
 open-hearth, 168
- Clay, 202
 brick, 40, 44
 -lined pots, 49, 54
 pots, 41, 49, 54
- Cleaning castings, 217
- Coal, anthracite, for crucible melting, 40, 50
 as fuel 28, 50, 113
 as recarburizer, 102, 143, 166
 powdered, as fuel, 113
- Coke as deoxidizer in electric furnace, 170, 183
 in open-hearth, 137
 as fuel in Bessemer process, 97
 in crucible process, 41, 51
 as recarburizer, 102, 166
 breeze, in regenerative crucible furnace, 45
 -oven gas as fuel, 113
 to heat up electric furnace, 181
 use of in remelting scrap in open-hearth, 29, 165
- Competition, 30
- Composition, effect on soundness, 87, 106, 107
- Cone, on heat treatment, 237
- Continuous melting in open-hearth, 158, 163
- Contraction of steel in cooling, 204
- Control of analysis, in crucibles, 54
 of temperature, in Bessemer, 84, 87, 88
 in crucible furnace, 48, 50, 56
 in heat treatment, 249
 in open-hearth, 132
- Converter, Bessemer, 7, 66, 68, 71, 74
 bottom-blown, 68, 71
 side-blown, 68, 74
- Cooling, accelerated, 233, 235, 236
 air, 233, 235, 244
 Bessemer blows, 87, 95
- Cooling castings, 217
 curves, 224
 oil, 235
 water, 232, 235
- Copper, in Bessemer steel, 97, 99
 in pig iron, 97
- Cores, 203
- Cornwall pig iron, 97
- Cort, 35
- Costs of installation, 30
 of steel, Bessemer and electric, 194
 various processes, 17, 26
- Coupons, test, 256
- Cracks, from rough usage, 219
 hot, 204
- Critical points, 224
- Crucibles 41, 49, 54
 furnaces, 40
 for melting recarburizers, 81, 103,
 packing, 58
 process, 6, 33
 advantages for foundries, 39
 control of analysis in, 54
 cost of installation, 30
 of steel, 24
 flexibility of, 13, 39
 fuel, 28, 40, 42, 43, 50
 melting, 50
 quality of steel, 9, 35
 raw material, 28, 52
 suitability for small work, 14, 39
 tonnage, 26
 use of ladles to promote uniformity, 56
- Cupola, charges, for Bessemer work, 99
 charging the, 83
 for recarburizers, 81, 103
 for pre-melting electric furnace metal, 185, 188
 open-hearth metal, 159, 165
 handling the, 83
 placing in Bessemer shops, 80, 81
 metal, as recarburizer, 80, 102, 167
- D
- Dead melting, 36, 55
- Dendritic freezing, 227

- Deoxidation in acid open-hearth, 135
 in basic open-hearth, 148, 149
 in Bessemer, 86, 106, 109
 influence of temperature, 85
 French method of, in acid open-hearth, 136
- Deoxidizers, special, 107, 136, 196
- Diffusion of carbon, in annealing, 231
 in side-blown Bessemer, 94
- Digging out castings, 217
- Dolomite in basic Bessemer, 110
 open-hearth, 125
- Door frames, water-cooled, 117
- Doors, in open-hearth furnace, 118
- Drop bottom converter, 76
 test, 238, 241, 242
- Dry door frames, 17
 sand, 202
- Drying out crucible furnace, 47
 ladles, 41, 82, 108
 open-hearth, 123
- E
- Elastic limit, 240
- Electric furnace, applications of, in
 foundry work, 187
 for melting recarburizers, 81,
 103
 ferromanganese, 109
Girod, 176
Gronwall, 176
Heroult, 175
 induction, 178
Keller, 176
Kjellin, 178
Nathusius, 176
 resistance, 178
Röchling-Rodenhauser, 178
Stassano, 174
 with open-hearth, 158, 188
 with Bessemer, 189, 193
 process 7, 170
 acid, 160, 183
 cost of installation, 30
 of steel, 22, 23, 194
 flexibility, 13, 172
 fuel, 28
 melting, 182
- Electric furnace, process, quality of
 steel, 9, 170
 raw material, 28, 186
 setting the bottom, 181
 suitability for small work,
 14, 172
 tonnage, 26
 steel, heat treatment, 234
 welding, 253
- Elongation, 240
- Endurance test, 244
- Eutectoid, 223
- Expansion of open-hearth roof, 124
- F
- Facing, 202
- Ferrite, 223
 free, effect on toughness, 239
- Ferro-alloys, addition to crucibles,
 36, 51, 54
- Ferrochrome, 55, 61, 65, 108, 168
- Ferromanganese as source of phos-
 phorus, 99
 in Bessemer work, 102
 in crucibles, 36, 52, 54
 in electric furnace, 182
 in open-hearth, 136, 149
 melting, 102, 109
- Ferromolybdenum, 169
- Ferrosilicon, in Bessemer work, 88, 91
 95, 102
 in crucibles, 36, 52, 54
 in electric furnace, 182
 in open-hearth, 136, 149
 melting with scrap for Bessemer,
 29, 101
- Ferrotitanium, 197
- Ferrotungsten, 169
- Final flame, 94
- Flame, Bessemer, 84, 93
- Flexibility, relative, of processes, 12
- Fluid pressure, 204
- Fluidity of slag, decreased by loam, 128
 effect on elimination, 91
 influence of MnO, 72, 91
 promoted by limestone, 128
- Fluorspar, in basic open-hearth, 148
 in electric furnace, 182

- Forgings, improvement of, by heat
 treatment, 246
- Foundry, departments of, 6
 function of, 1
 jobbing, 2
 specialty, 3
 tonnage, 1
 use of electric furnace in, 187
- Fracture of steel, 222
- Fremont* testing machine, 238
- Freeze-up, of open-hearth bath, 136
- Freezing, dendritic 227
- French method of deoxidizing, open-
 hearth, 136
- Frequency, of alternating current, 177,
 180
- Fuel, Bessemer, 28, 97
 crucible, 28, 40, 41, 42, 43
 different processes, 28
 open-hearth, 28, 113
- Furnace, annealing, 248
Carr, open-hearth, 16, 157
 cementation, 34
 crucible, coal, 40
 coke, 41
Krupp, 48
 oil 42,
Siemens regenerative, 43
 advantages of, 48
 starting up, 47
 electric, applications of, in
 foundry, 187
 for melting ferromanganese, 103,
 109
 recarburizers, 81, 103
Girod, 176
Gronwall, 176
Heroult, 175
 induction, 178
Keller, 176
Kjellin, 178
Nathusius, 176
 resistance, 178
Röchling-Rodenhauser, 178
Stassano, 174
 with Bessemer, 189, 193
 with open hearth, 158, 188
 open-hearth, 116
 electric, 189
- Furnace, open-hearth, starting, 123
 tilting, 121
- G
- Gains and losses of metalloids in steel
 making, 196
- Gamma iron, 225
- Gas, coke-oven, for open hearth,
 113
 natural, for annealing furnaces,
 248
 for crucible furnaces, 28, 43
 for open-hearth furnaces, 28,
 113
 producer, for annealing furnaces,
 248
 for crucible furnaces, 28, 43
 for open-hearth furnaces, 28,
 113
 firing the open hearth with, 132
 producers for regenerative fur-
 naces, 45
 starting up, 47
- Gating, 209
- German Bessemer practice, 92
- Girod* electric furnace, 176
- Graphite pots, 49
- Green sand, 202
- Greene's* process, 185
- H
- Hadfield*, use of ferro-alloys in Besse-
 mer, 88
- Hard coal, see "anthracite"
 steel, see "high carbon steel"
 tap, 128
- Hardening of welds, 254
 power of steel, 225
- Head, of open-hearth furnace, 120
- Heads, sink, 204
- Heat losses, in Bessemer gases, 90
 treatment, 220
 effect on endurance tests, 243
 of alloy steels, 247
 value of, 238
- Heating up Bessemer converter, 73,
 77
 castings to straighten, 252

- Hering*, electric furnace, 180
Heroult, electric furnace, 175
 Heterogeneity, 227
 of crucible steel, 56
Hibbard, on slag inclusions, 197
 High carbon steel, bending, 252
 heat treatment, 247
 in Bessemer, 108
 in open-hearth, 166
 Hot blast for Bessemer vessel, 77
 cracks, 204
Howe, on microstructure, 229
 on piping and segregation, 208
 on shock test, 238, 246
Huntsman, 34
 Hyper-eutectoid steel, 223
 Hypo-eutectoid steel, 223
- I
- Impact test, 238
 Increase of impurities, in open-hearth, 161
 in Bessemer, 97
 in crucible, 52
 in steel in general, 258
 Induction electric furnace, 178
 Ingotism, 230
 Intermittent operation, influence on
 choice of process, 31
 International Association for Testing
 Materials, 226
 Intricacy of castings, influence on
 choice of process, 14
 Iron, alpha, 225
 beta, 225
 charcoal, 28, 33, 52
 gamma, 225
 pig, 7, 28, 33, 66, 84, 87, 97, 102,
 111, 113, 129, 146, 161, 166,
 187, 193
 as recarburizer, 102, 149, 166
 puddled, 6, 9, 28, 36, 52, 161
 quality of, 36
 Walloon, 33
 wrought, see "iron charcoal,"
 "iron puddled"
 carbon diagram, 225
- Iron ore in open-hearth, 113, 114, 130,
 135, 146, 148
 in electric furnace, 170, 182
- J
- Jameson* on increase of impurities, 98,
 258
 Jobbing foundry, 2
- K
- Killing, 36, 55
 Knocking off sink heads, 218
Krupp crucible furnace, 48
Kjellin electric furnace, 178
- L
- Labor, availability of, influence on
 choice of process, 31
 for Bessemer, 21, 22, 73
 for crucible, 24, 25, 41, 42, 47
 for electric furnace, 22, 23
 for open-hearth, 18, 121
 Laboratories, necessity of, 255
 Ladles, 198
 use of, to promote uniformity of
 crucible steel, 56
 Lag, 224
Lash process, 29, 165
 Lay-out of Bessemer shop, 78
 of crucible shop, 41, 46
 of open-hearth, 122
 Lebanon iron, 97
Le-Chatelier on heat treatment, 239
Légenisel, *Walrand* process, 88
 Lime, in basic open-hearth, 146
 in crucibles, 58
 in electric furnace, 170, 182
 Limestone in acid open-hearth, 138
 in basic open-hearth, 146
 Lining, of Bessemer converters, 71, 76
 of ladles, 198
 Lip, vs. bottom pouring, 57, 215
 Loam, in acid open-hearth slag, 137,
 138
 Loss of heat, in Bessemer gases, 90
 Losses and gains of metalloids in steel
 making, 196

- Low carbon steel, heat treatment, 239,
 241
 in crucibles, 39, 42
 soundness of, 106
- M
- Magnesite in basic open-hearth, 125
 Magnetism, loss of, in heating, 226
 Magnets, for handling raw material,
 82, 123
 Manganese, effect of high, in bottom-
 blown Bessemer, 90
 in side-blown Bessemer, 95
 on heat treatment, 107, 240
 on soundness, 87, 106
 gains and losses of, in steel mak-
 ing, 196
 in Bessemer, 66, 68, 86, 89, 196
 oxide in acid open-hearth slag, 131,
 138
 in Bessemer slag, 72, 91
 in crucible slag, 54, 65
 retention of, in basic open-hearth,
 146, 149
 steel, Bessemer, 109
 crucible, 65
 electric, 171
 heat treatment, 247
 open-hearth, 169
 sulphide, as nucleus for formation
 of ferrite, 228
 use of, to counteract influence of
 sulphur, 68
 absorption of sulphur, 91
 Market, influence on choice of pro-
 cess, 8
 Martensite, 224
Martin, 113
 Mayari pig iron, 109
 Melting, in acid open-hearth, 129
 in basic open hearth, 146
 in crucibles, 50
 in electric furnace, 182
 recarburizers, 11, 81, 103, 167, 169
 Metallography, 222
 Methods of steel making, 6
 Microscope, 222
 Microstructure, 222, 227, 232
- Milwaukee type crucible furnace, 43
 Mixer, 67
 Molybdenum, gains and losses of, in
 steel making, 196
 steel, Bessemer, 108
 crucible, 55, 59
 open-hearth, 169
 Mother metal, 226
 austenite, 227
 Moulding, 201
Mushet, 67
- N
- Nailing moulds, 210
 Natural gas for annealing furnaces, 248
 for crucible furnaces, 28, 43
 for open-hearth, 28, 113
 Necks, 205
 Net-work structure, 223, 227, 239
 Nickel, gain and losses of, in steel
 making, 196
 steel, acid open-hearth, 143, 168
 basic open-hearth, 156, 168
 Bessemer, 109
 crucible, 35, 60, 62, 65
 heat treatment, 247
 Nozzles, 199
 Nozzle vs. lip pouring, 215
 Nucleus action of slag or sulphide, 228
- O
- Oil as fuel, 28, 40, 42, 77, 113, 134, 158,
 248
 -fired annealing furnace, 248
 crucible furnace, 42
 open-hearth furnace, 113, 158
 melting in Bessemer converter, 77
 quenching, 235, 237
 Open-hearth furnaces, 116
 break-outs, 127
 bottom making, 124, 125
 repairs, 126
 tapping, 128
 electric process, 189
 process, 7, 113
 continuous, 121, 158, 163, 192
 cost of installation, 30
 of steel, 18, 19

- Open-hearth process, flexibility, 14, 115
 fuel, 28, 113
 melting, 129, 146
 quality of steel, 8, 10, 114
 raw material, 28, 161
 suitability for heavy work, 16, 115
 tonnage, 26
 typical heats, 140, 151
- Ore, iron, in acid open-hearth, 113, 114, 130, 135
 in basic open-hearth, 113, 114, 146, 148
 in electric furnace, 170, 182, 184
- Oxidation, in Bessemer, 11, 85, 94
 in crucible, 9, 36
 in electric furnace, 38, 170, 182
 in open-hearth, 10, 114, 133, 136, 148
- Oxy-acetylene welding, 253
- P
- Pearlite, 223
- Phosphorus, gains and losses of, in steel making, 196
 in acid open-hearth, 7, 10, 114, 161
 in basic open-hearth, 7, 10, 114, 147, 150, 161
 Bessemer, 110
 in Bessemer, 7, 97, 194
 electric, 195
 in crucible, 6, 36, 52
 in electric furnace, 7, 9, 170, 180, 182, 186
 increase of, in remelting scrap, 52, 99, 161, 258
 in puddling furnace, 37
- Physical properties, effect of heat treatment on, 240, 241, 243
- Pig iron, see "iron"
 and scrap process, 129
- Pinch effect, 180
- Piping, 204
- Pits, Bessemer, 82
 cooling castings in, 217, 221
 open-hearth, 122
- Plate scrap, 6, 9, 24, 28, 36, 52, 63, 97
- Ports, of open-hearth furnace, 117
- Pots, 29, 41, 54
 packing, 58
- Pouring, 15, 56, 96, 214
- Powdered coal as fuel, 113
- Pressure in fluids, 204
- Price of castings, influence on choice of process, 17
- Processes of steel making, 6
- Producer gas, firing open-hearth with, 132
 in annealing furnaces, 248
 in crucible furnaces, 28, 43
 in open-hearth furnaces, 28, 113
- Producers, gas, for crucible furnaces, 45
 starting up, 47
- Production, see "tonnage"
- Protection of iron from oxidation, by metalloids, 38, 85, 114, 131
- Puddled iron, see "iron"
- Puddling furnace, 10, 37
- Pyrometers, 249
- Q
- Quality of Bessemer steel, 8, 10, 70
 of crucible steel, 8, 9, 35
 of electric steel, 8, 9, 38, 170
 of open-hearth steel, 8, 10, 115
 of steel by different processes, 8
- Quenching castings, 232, 237, 240, 242
- R
- Rate of cooling, influence of, on physical properties, 236, 239, 242
- Raw material, Bessemer, 28, 97
 crucible, 28, 36, 52
 different processes, 28
 electric, 28, 186
 handling, 82, 123
 open-hearth, 28, 161
- Recalescence, 224
- Recarburizer, melting, 11, 81, 103, 167
 acid open-hearth, 11, 136
 basic open-hearth, 11, 115, 149, 166
 Bessemer, 11, 85, 95, 102

- Red shortness, 68, 204
- Reduction of area, 240
- Regenerative furnaces, crucible, 43
 open-hearth, 113
- Reheating, 236
- Repairs to open-hearth furnace, 126
- Rephosphorizing, in basic open-hearth, 149, 158
 in electric furnace, 180, 182
- Resistance electric furnace, 178
- Reversing valves, 45, 120
- Risers, see "sink heads"
- Röchling-Rodenhauser electric furnace, 178
- Roof, electric furnace, 173
 open-hearth furnace, construction of, 117
 expansion of, 124
- Runners, 209
- S
- S. A. M. metal, 197
- Sand, mixing, 201
- Sawing off sink heads, 218
- Scrap, boiler plate, 6, 9, 24, 28, 36, 52, 63, 97
 melting without pig in open-hearth, 29, 165
 remelting, 52, 97, 109, 130, 162, 168, 171, 180, 185, 187
 with ferrosilicon, for Bessemer, 29, 101
 use of, to cool Bessemer steel, 87, 95
 to deoxidize open-hearth steel, 139
- Segregation, 197
- Shanking, from ladle or vessel, 15, 216
- Shanks, 198, 215
- Shock test, 238, 242
- Shrinkage of steel, 204
 cavities, 204
 influence of chills on, 208
 of sink heads on, 205
 welding up, 253
 stresses, 220
- Side-blown Bessemer vessel, 68, 74
 blowing, 92
- Siemens, 113
 crucible furnace, 43
- Silica brick, 45, 123
- Silico-spiegel, 108
- Silicon, absorption of, in acid electric furnace, 183
 calcium alloy, 107, 197
 gains and losses of, in steel making, 196
 in acid open-hearth, 113, 130
 in basic open-hearth, 113, 146
 in bottom-blown Bessemer, 66, 84, 89
 in crucible steel, 36, 55
 in side-blown Bessemer, 92
- Sink heads, 204
 removing, 218
- Size of castings, influence on choice of a process, 14
- Skimming crucible steel, 51
- Skin drying, 203
- Slag, as nucleus for formation of ferrite, 228
 hampers division of heats, 13
 in acid open-hearth, 7, 10, 114, 147
 electric furnace, 183
 in basic Bessemer, 110
 open-hearth, 7, 10, 113, 147
 in Bessemer, 66, 85, 91, 94
 electric, 195
 in crucible, 35, 51, 57, 58, 65
 in electric furnace, 9, 170, 182
 in puddling furnace, 37
 influence of fluidity on elimination of, 91, 197
 use of, in making bottom, acid open-hearth, 125
 basic open-hearth, 126
 electric furnace, 181
- Sleeve brick for stopper rods, 199
- Slopping, of Bessemer vessel, 91, 95
- Snelus on Walrand-Légenisel process, 88
- Snot bar, 128
- Soft steel, see "low carbon steel"
- Solidification of steel, 226
- Sorbite, 224
- Special steels, see "alloy steels"

Specialty foundry, 3
 Specifications for cast steel, 17
 for coke, 98
 for gas coal, 161
 for raw material, 53, 97, 161, 186
 Spiegel, 67, 102
 Sprue, see "runner"
 Starting, gas producers, 47
 open-hearth furnace, 123
 Siemens crucible furnace, 47
Stassano electric furnace, 174
 Steam in Bessemer blast, 87
 Steel making, methods of, 6
Stock converter, 77
 Stoppers, 199
Stoughton converter, 76
 on heat treatment, 237
 on piping and segregation, 208
 Straightening castings, 252
 Stress test casting, 220
 Stresses, relief of, 220
 Structure, 222
 Sulphide of iron, 68
 of manganese, as nucleus for formation of ferrite, 228
 formation of, 68
 Sulphur, absorption of, from fuel, 36, 50, 52, 91, 97, 114, 159, 161
 counteracted by manganese, 91
 effect on cracking, 68, 204
 gains and losses of, in steel making, 196
 in acid open-hearth, 7, 10, 114, 159, 161
 in basic Bessemer, 111
 open-hearth, 7, 10, 114, 148
 in Bessemer, 7, 68, 97
 electric, 195
 in crucible steel, 36, 50, 52
 in electric steel, 7, 9, 170, 180, 182, 183, 185, 186, 189, 194
 increase of, in remelting scrap, 52, 99, 161, 258
 influence of, counteracted by manganese, 68
 in puddling furnace, 37
 Swedish iron, 34

T

Tap hole of open-hearth furnace, 119, 125, 126
 Tapping the open-hearth furnace, 128
 Temper, 34
 Temperature, control of, in Bessemer, 84, 87, 88
 in crucible furnace, 48, 50, 56
 in heat treatment, 249
 in open-hearth furnace, 132
 estimating, in open-hearth furnace, 134
 for annealing, 231, 235
 for hot straightening, 252
 for reheating, 236
 influence of, on deoxidation, 86
 Tensile strength, 240
 Test, bending, 240
 casting for open-hearth, 134
 coupons, 256
 drop, 238, 241, 242
 endurance, 244
 impact, 238
 stress, 220
 Tilting open-hearth furnace, 121
 Titanium, 197
 Tonnage, crucible process, 26
 Bessemer, 26, 96
 different processes, 26
 foundry, 1
 Transformation, 225, 227
 Troostite, 225
Tropenas converter, 74
 use of ferrosilicon, 88
 Tungsten gains and losses of, in steel making, 196
 in Bessemer, 108
 in crucible, 55, 59
 in open-hearth, 169
 Turnings, 132, 134, 147
 Tuyères, 71, 74, 76

U

Uniformity, promoting, in crucible steel, 56

V

Valves, reversing, 45, 120
 Vanadium, gains and losses of, in steel making, 196
 Variability of product, influence on choice of process, 12
 Venting, 202

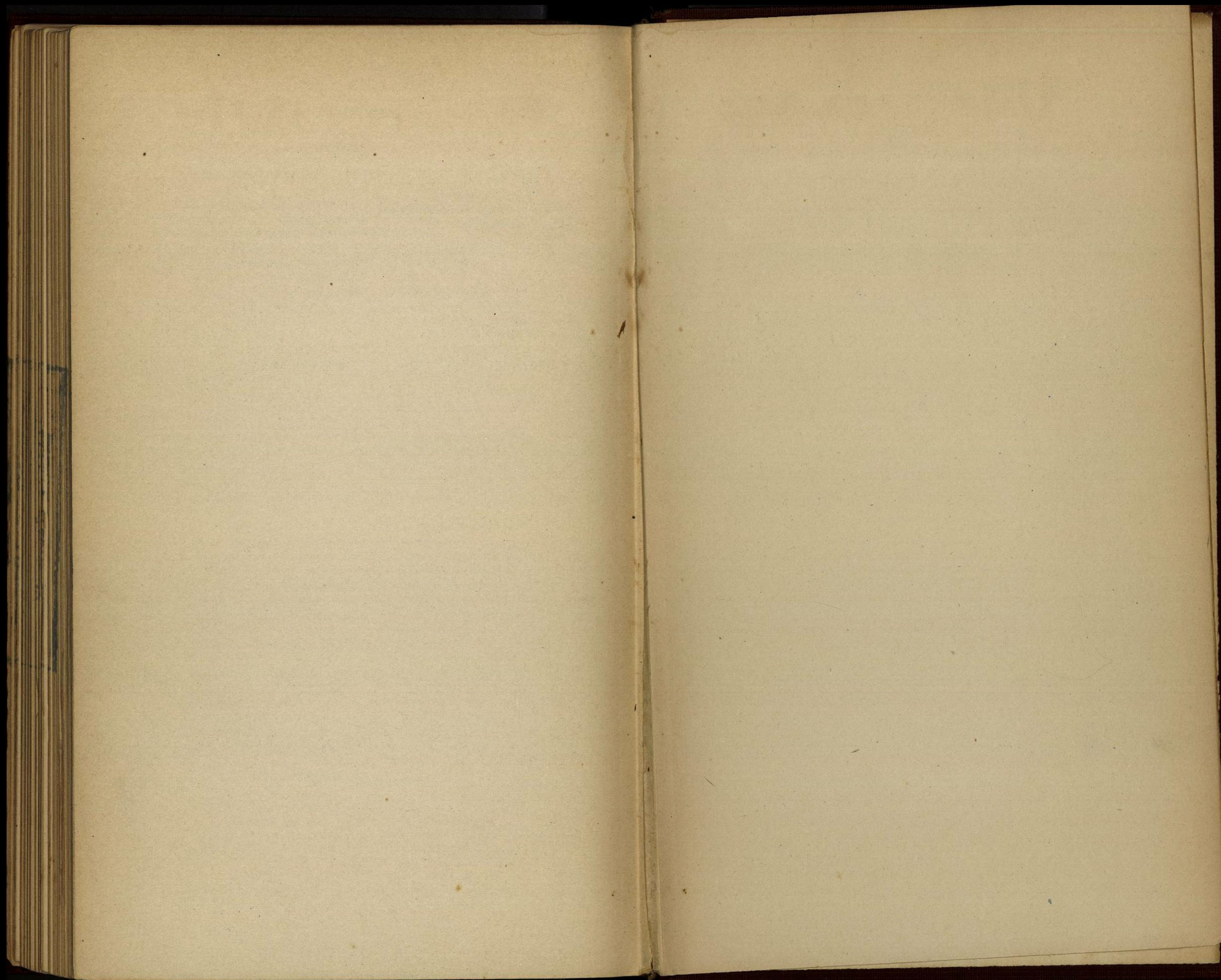
W

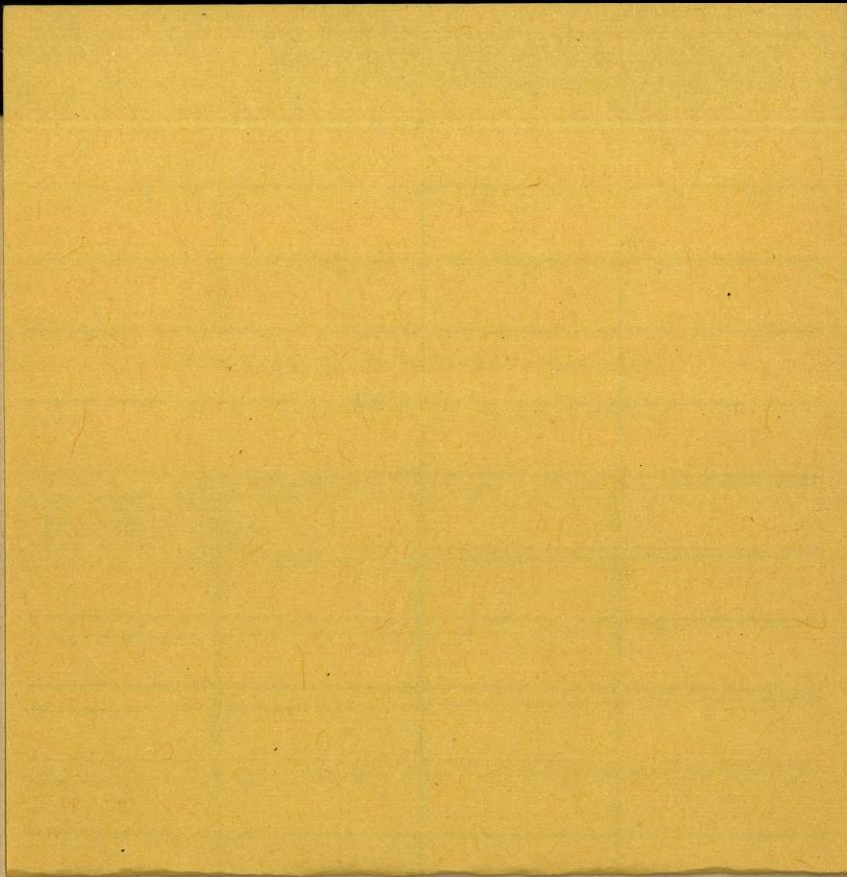
Walker open-hearth electric furnace, 189
 Wälloon iron, 33
Walrand-Légenisel process, 88
 Warming up Bessemer blow, 88, 95
 Wash, 197

Washed metal, 6, 34, 52, 87, 161
 Wasters, 2
 Water cooling, of open-hearth furnace, 117
 quenching, 232, 235, 237, 240, 242
 Welding, 203, 253
Wellman tilting open-hearth furnace, 121
 Widmanstätten structure, 230, 234
 Wiping slag off crucibles, 51
 Wrought iron, see "iron"

Y

Yard, Bessemer shop, 82
 open-hearth shop, 123





TN730
H23

127340

AUTOR

HALL

127340

