

UNITED STATES PATENT OFFICE.

HUGH RODMAN, OF PITTSBURG, PENNSYLVANIA.

ART OF CASE-HARDENING OR CEMENTING.

949,444.

Specification of Letters Patent. Patented Feb. 15, 1910.

No Drawing.

Application filed May 15, 1909. Serial No. 496,269.

To all whom it may concern:

Be it known that I, HUGH RODMAN, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have made a new and useful Invention in the Art of Case-Hardening or Cementing, of which the following is a specification.

This invention relates to the art of case-hardening or cementing and more particularly to materials for use in same art.

Certain vegetable and mineral matters used alone or in admixture with various energizing substances are excellent cementing materials so far as regards their ability to surrender carbon to heated iron, but are practically useless in service because of excessive shrinkage under heat treatment. As examples of such materials, I may mention saw-dust and various low forms of coal, such as peat and lignite. All of these materials, either alone or in combination with an energizing substance, such as lime or soda-ash, as described by me in a co-pending application for patent Serial No. 496,271, filed on or about May 15, 1909, have active cementing properties, but when heated change so greatly in volume and supporting power as to render them wholly impracticable as dry packing material. By energizing substance, I mean such material, not necessarily carbonaceous material, as will when added to an inactive carbonaceous substance, render such carbonaceous substance active, as a carbonizing agent. I have found that by mixing with these shrinkable materials certain proportions of a setting or coking material I can obtain cementing material practically free from shrinkage. For instance, peat with ten per cent. of slaked lime has cementing properties but will shrink in use about seventy-five per cent. By mixing peat, slaked lime and bituminous coking coal in proportions 50, 10 and 50 by weight, I can produce cementing material which is satisfactory in all respects. Again, saw-dust with seventy-five per cent. of soda-ash has active cementing properties but shrinks so under heat treatment as to render its use impracticable, but by mixing therewith seventy-five parts by weight of coking coal I have produced cementing material having active cementing properties and good supporting qualities. I have found that by

adding heavy hydrocarbons such as asphaltum or materials containing heavy hydrocarbons, such as crude petroleum, to various cementing materials, unfit in themselves because of their shrinking or settling qualities, I have obtained cementing material satisfactory both in carbonizing efficiency and in supporting power. The cementing material thus obtained does not remain granular nor pulverulent during use as a case-hardening or cementing material as does charcoal and bone dust, but instead there is a more or less marked adhesion of particles throughout the mass caused by the fritting together of the coking and shrinkable constituents and it is this adhesion (which is controllable by varying the ratio of coking to shrinkable material) which explains the good supporting qualities of the mixture. I am not certain that the individual particles of shrinkable material do not shrink as much when mixed with coking material as they do alone, but the mixed mass as a whole retains substantially its original volume and has sufficient supporting power to render it practicable as a cementing material. Moreover, the coking constituent of the material I find does not coke to such an extent as to be objectionable.

The mixtures given are by way of example only, as various coking and shrinkable materials may be combined and used either with or without energizing substances and the ratio of coking to shrinkable material may be varied to produce cementing material of definite rigidity and strength when heated, depending upon the character of the work and the methods to be followed in the use of the cementing material.

In using the cementing material, when it is desired to empty the contents of the heated pots directly into the quenching bath, the mixture will be proportioned so that just sufficient strength and rigidity will be obtained to support the metal parts to be treated, and when the metal parts to be treated are allowed to cool slowly in the carbonizing pots, a mixture which will produce material of greater rigidity may be used.

Having thus described my invention, what I claim is:

1. A cementing compound containing coking material and shrinkable carbonaceous matter.

2. A cementing compound containing coking coal, peat and lime.

3. A cementing compound containing coking coal, peat and soda ash.

5 4. A cementing compound containing coking coal, peat, lime and soda ash.

In testimony whereof, I have hereunto

subscribed my name this 12th day of May, 1909.

HUGH RODMAN.

Witnesses:

C. W. MCGHEE,
GEO. C. WALKER.