

ALIEN PROPERTY CUSTODIAN

PROCESS OF PREPARING CEMENT POW- DERS AND ACID-PROOF MORTARS

Karl Dietz, Kronberg im Taunus, Germany; vest-
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The present invention relates to cement pow-
ders, acid-proof mortars and a process of pre-
paring them, as well as to containers lined with
acid-proof bricks and acid-proof mortars.

In recent times there have been used in the art
for acid-proof linings of receptacles nearly ex-
clusively acid- and water-proof, liquid-tight
water-glass cements which are self-hardening
even with exclusion of air. These cements are
obtained by mixing cement powders with alkali
silicate; the latter is either added as aqueous so-
lution or, in case it is admixed to the cement
powder in pulverulent form, becomes active when
the whole is made up with water. The self-
hardening of the cements is principally due to the
presence of such substances as react with the alk-
ali of the water-glass and thereby precipitate
the silicic acid of the water-glass. Alkali-reac-
tive substances of this kind are described, for in-
stance, in my U. S. Patents 1,867,444 and 1,881,-
180. Other self-hardening acid-proof cements
are also known.

Now, it has recently been ascertained that it is
very important for the inner lining of pressure
apparatus or such apparatus as have an outer
metal jacket and are heated externally that the
inner lining consisting of acid-proof bricks cem-
ented by acid-proof mortars is from the very
beginning under a special pressure in such a way
that the bricks are firmly and constantly pressed
against the said outer jacket even if the latter is
exposed to an intensive expansion owing to high
pressure or high temperature.

It will easily be recognized that for preparing
such linings there are of particular value such
mortars as have a certain regulatable capability
of swelling. With the aforesaid ordinary self-
hardening water-glass cements which contain
such substances as react with alkali, however, a

swelling effect of the hardened mortar masses was
hardly to be obtained since, owing to the precipi-
tation of the silicic acid proper as binding agent,
in most cases, an intense shrinkage occurred on
hardening.

Now, I have found that it is possible to exactly
regulate the capability of swelling of the above
cements by adding thereto small quantities of
slags which are obtained in producing and proc-
essing metals and metal alloys. There have
proved to be especially suitable the slags ob-
tained in the production of iron, that is to say,
blast furnace slag, Thomas slag, acid and basic
slags or foundry slag whose composition may be
characterized by a content of about 30-55 per
cent of SiO_2 , 15-45 per cent of CaO and 1-25 per
cent of $\text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3$. The slags are added to the
cement powders in a finely ground state and in a
quantity of about 5-20 per cent thereof. The
acid-proof mortars are capable of swelling not
only in contact with water but also in contact
with aqueous liquids such as acids or brines.

The following example serves to illustrate the
invention but it is not intended to limit it thereto;
the parts are by weight:

A cement powder is prepared by mixing 61
parts of powdered quartz, 4 parts of ground sili-
ceous sinter, 6.5 parts of clay, 2.5 parts of K_2SiF_6 ,
5 parts of Na_2SiF_6 , 1 part of CaSiF_6 and 20 parts
of powdered blast furnace slag with about 34
per cent of SiO_2 , 41 per cent of CaO and 18.6 per
cent of $\text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3$. A mortar is prepared by
mixing the cement powder with sodium silicate
solution, the proportion of Na_2O to SiO_2 to H_2O
being 1:2.65:4.66. The hardened mortar mass,
when stored in acids, shows a swelling of 1%.

KARL DIETZ.