Specification left on 27th May 1968. (Application accepted on 27th November 1968.)
Index at acceptance—103[XLV(I)].

IMPROVEMENTS IN OR RELATING TO INHIBITIVE PRIMERS.

PROVISIONAL SPECIFICATION.

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH, RAJA MBAN, NEW DELHI-1, INDIA, AN INDIAN
REGISTRATION BODY INCORPORATED UNDER THE REGISTERATION OF SOCIETIES ACT (ACT XXI OF 1860).

THIS IS AN INVENTION BY KUMMATTHIYIDAL SANTHIANAM RAJAGOPALAN, SCIENTIST AND SUBBIAH
NADAR GURUVIYAH, SCIENTIST, BOTH OF THE CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE,
KARAKUNDI-3, INDIA, BOTH INDIAN CITIZENS.

The following specification describes the nature of this invention.

This invention relates to improvements in or relating to Corrosion Inhibitive Primers.

Hitherto it has been proposed to use as corrosion inhibitive primers oleoresinous varnishes containing lead compound such as litharge, red lead, calcium plumbate and chromates such as zinc chromate, barium potassium chromate, strontium chromate. Also paints containing more than 90% zinc powder in vehicles such as polystyrene are also known.

This procedure of incorporating lead compounds, zinc and strontium chromates as inhibitive pigments and metallic zinc in varnishes to produce inhibitive primers suffers from the drawback that the pigments are produced from imported lead, zinc and strontium salts.

The object of this invention is to use readily available ingredient material as pigment in oleoresinous varnishes and thus reduce the need to import the raw materials for the manufacture of inhibitive pigments.

The invention consists of the use of iron powder (85% as metallic iron) as pigment in oleoresinous varnishes and to obtain a paint which when applied to structural steel gives it protection against corrosion.

Examples of varnishes prepared in the laboratory and tested for corrosion protection are given below:

<table>
<thead>
<tr>
<th>Paint</th>
<th>Iron powder</th>
<th>Vehicle</th>
<th>Solvent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example 1</td>
<td>20</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Example 2</td>
<td>20</td>
<td>15</td>
<td>10</td>
</tr>
</tbody>
</table>

Protection against corrosion given by the primers cited above is shown in Table 2.

<table>
<thead>
<tr>
<th>Condition of polished steel specimens coated with one coat of primer after immersion for 15 days in</th>
<th>1% sodium chloride solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Iron oxide primer in linseed oil media</td>
<td>a large number of pin points of rust</td>
</tr>
<tr>
<td>2. Red lead in linseed oil</td>
<td>steel surface unaffected and remains bright</td>
</tr>
<tr>
<td>3. Primer described in Example 1</td>
<td></td>
</tr>
<tr>
<td>4. Primer described in Example 2</td>
<td></td>
</tr>
</tbody>
</table>

It is seen from the above table that a non-inhibitive primer like iron oxide in linseed oil does not give full protection against corrosion. Like the inhibitive red lead primer, iron powder, primers corresponding to Examples 1 & 2 also seen to give good protection against corrosion.

The main advantage of the invention is an indigenously available material can be used as an inhibitive pigment in place of pigments made from imported material.

R. BHASKAR PAI,
Patents Officer,
COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH.

Dated this 26th day of July 1967.

COMPLETE SPECIFICATION.

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH, RAJA MBAN, NEW DELHI-1, INDIA AN INDIAN
REGISTRATION BODY INCORPORATED UNDER THE REGISTERATION OF SOCIETIES ACT (ACT XXI OF 1860).

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NADAR GURUVIYAH, SCIENTIST, BOTH OF THE CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE,
KARAKUNDI-3, INDIA, BOTH INDIAN CITIZENS.

The following specification particularly describes and ascertains the nature of this invention and the manner in which it is to be performed.

Annotated title of the invention:
This invention relates to improvement in or relating to Corrosion Inhibitive Primers for Protective Schemes for Structural Steel.

Prior Knowledge:
Hitherto it has been proposed to use as corrosion inhibitive primers oleoresinous varnishes containing lead compounds such as litharge, red lead and calcium

Price: TWO RUPEES.
plumbate and chromates such as zinc chromate, barium chromate, zinc chromate and strontium chromate. Also, paints containing more than 90% of zinc powder in vehicles such as polyurethanes are known.

Drawbacks connected with hitherto known processes/devices:

- Incorporation of lead compounds, zinc and strontium chromates as inhibitive pigments and metallic zinc in varnishes to produce inhibitive primers suffers from the drawback that the pigments are produced from imported lead, zinc and strontium salts.

Object of the invention:

The object of the invention is to prepare an inhibitive primer based on the use of iron powder as pigment in oleoresinous varnishes available in this country.

Main finding:

Inhibitive primers are produced by grinding together the requisite amounts of iron powder and oleoresinous varnishes, in a triple roller mill, and thinning with turpentine.

New result:

The quantum of import of inhibitive pigments based on zinc and lead will be brought down since inhibitive primer can be made from indigenously produced electrolytic iron.

Statement of Invention:

According to the present invention, the process for the preparation of inhibitive primers consists in grinding together oleoresinous varnish and iron powder in the proportion of 55-70% of iron powder and 45-30% of oleoresinous varnish.

The iron powder is electrolytic iron of 93% purity. The oleoresinous varnishes are e.g., double boiled oil, long oil linseed alkyd, linseed stand oil, or modified phenolic stand oil.

A dried e.g., based on lead, cobalt or manganese soap is incorporated in the inhibitive primer.

A suitable solvent, e.g., turpentine is incorporated in the inhibitive primer.

The inhibitive primers give protection to steel from corrosion of the same order as of other inhibitive primers e.g., zinc chromate primer.

Thus, the process consists in producing inhibitive primers by grinding together known amounts of electrolytic iron powder (93% metallic iron), oleoresinous varnish, e.g., double boiled oil, long oil linseed alkyd, linseed stand oil and modified phenolic stand oil, a suitable drier e.g., lead, cobalt, manganese salts and a suitable solvent e.g., turpentine. The composition and properties of such inhibitive primers are given in Tables I A & IB. The performance in corrosion protection tests in comparison with zinc chromate, 'red-lead' primers to specification is given in Table II.

### TABLE I A

**Composition and Properties of Inhibitive Primers using Electrolytic Iron Powder.*

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Composition of paint (Percentage by wt.)</th>
<th>Thinner</th>
<th>Consistency</th>
<th>Drying time</th>
<th>Colour</th>
<th>Adhesion</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Long oil linseed alkyd</td>
<td>Iron Powder: 59</td>
<td>Vehicle: 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Linseed stand oil</td>
<td>Iron Powder: 59</td>
<td>Vehicle: 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Drier is added only to the extent of less than 0.1% so it is not given in a separate column.

### TABLE I B

**Composition of Iron Powder.

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metallic</td>
<td>83%</td>
</tr>
<tr>
<td>Total Iron</td>
<td>94%</td>
</tr>
<tr>
<td>Carbon</td>
<td>0.4%</td>
</tr>
<tr>
<td>Sulfur</td>
<td>0.01%</td>
</tr>
<tr>
<td>Fe</td>
<td>94.9%</td>
</tr>
<tr>
<td>Si</td>
<td>0.001%</td>
</tr>
</tbody>
</table>

### TABLE II

**Performance in Corrosion Protection Tests in Composition with Well-known Primers.

<table>
<thead>
<tr>
<th>Primer</th>
<th>Immersion in</th>
<th>Per cent. water absorption in 15 days</th>
<th>Field exposure in marine atmosphere for 4 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Primer based on iron powder</td>
<td>distilled water for 15 days</td>
<td>1% NaCl solution for 15 days</td>
<td>A.R.E. Salt drop test.</td>
</tr>
<tr>
<td>2. Zinc-chromate primer to I.S. Specification</td>
<td>Small blisters steel surface bright.</td>
<td>No blisters, steel surface bright except at edges</td>
<td>5-10</td>
</tr>
<tr>
<td>3. Red-lead primer to I.S. Specification</td>
<td>Small blisters steel surface bright.</td>
<td>No blisters, steel surface bright.</td>
<td>20-30</td>
</tr>
<tr>
<td>4. Red-oxide primer to I.S. Specification</td>
<td>Small blisters steel surface bright.</td>
<td>Big blisters large Nos. of rust spots.</td>
<td>10-15</td>
</tr>
</tbody>
</table>

**Example 1**

Electrolytic iron powder is ground, passed through 200 mesh sieve and -200 powder is ground with double boiled linseed oil of I.S. specification No. 79. Primer in a triple roller mill and sufficient turpentine is added to get brushable consistency.

**Example 2**

Electrolytic iron powder is ground to pass 200 mesh sieve and -200 powder is ground with linseed stand oil of I.S. 79 (1956) to which drier has been added in a triple roller mill and sufficient turpentine is added to get brushable consistency.
Advantages of the invention:

1. Raw materials for the manufacture of this pigment are indigenously available.
2. This pigment is cheaper than inhibitive pigments based on zinc or lead which are scarce.

We claim:

1. A process for the preparation of Inhibitive Primers which consists in grinding together oleoresinous varnish and iron powder in the proportion of 33-70% of iron powder and 45-30% of oleoresinous varnish.
2. A process as claimed in Claim 1 wherein the iron powder is electrolytic iron of 93% purity.
3. A process as claimed in Claim 1 wherein the oleoresinous varnishes are double boiled oil, long oil linseed alkyd, linseed stand oil, or modified phenolic stand oil.
4. A process as claimed in any of the preceding claims wherein a drier based on lead, cobalt or manganese soap is incorporated in the inhibitive primer.
5. A process as claimed in any of the preceding claims wherein turpentine is incorporated in the inhibitive primer.
6. Inhibitive primers which give protection to steel from corrosion of the same order as of other inhibitive primers, e.g., zinc chromate primer whenever produced according to a process claimed in any of the preceding claims.

R. BHASKAR PAI,
Patents Officer,
COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH,

Dated this 28th day of May 1968.