Oct. 25, 1966

E. G. D'ASTO

3,281,308

COATED CHIMNEY

Filed Sept. 28, 1961

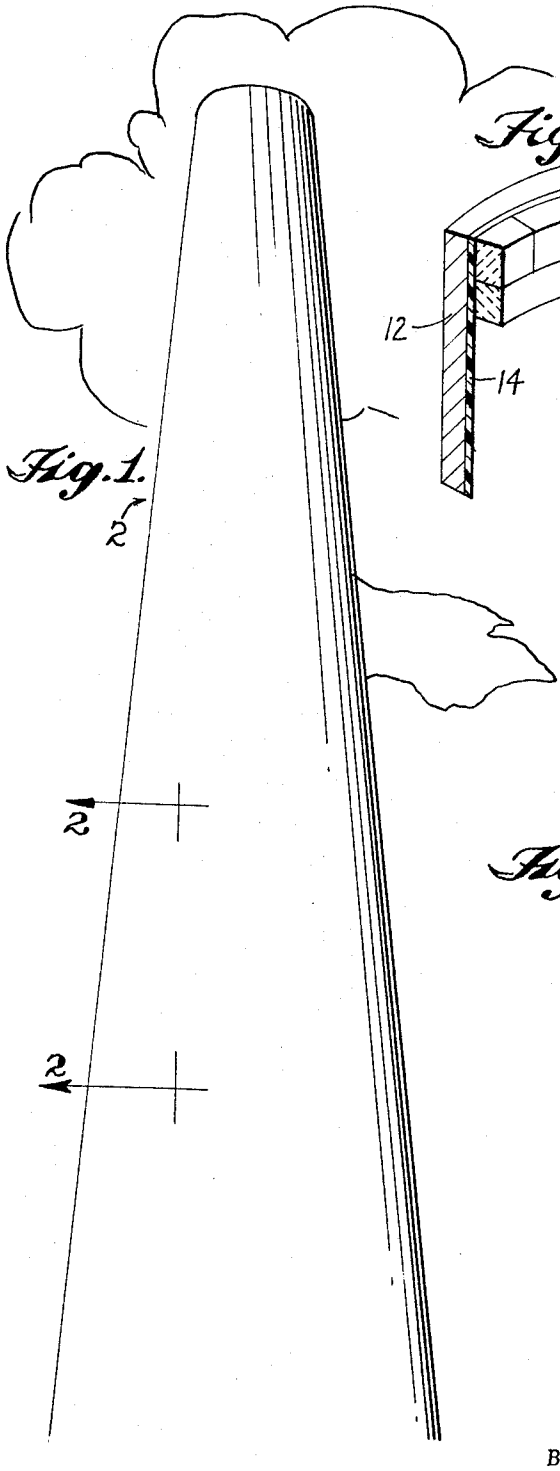


Fig. 1.

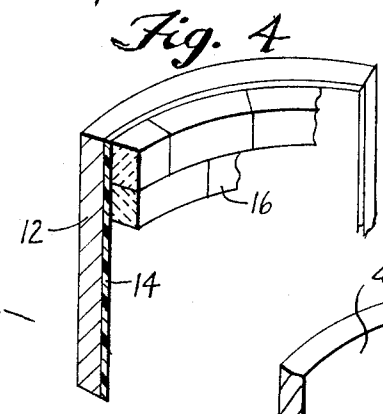


Fig. 4

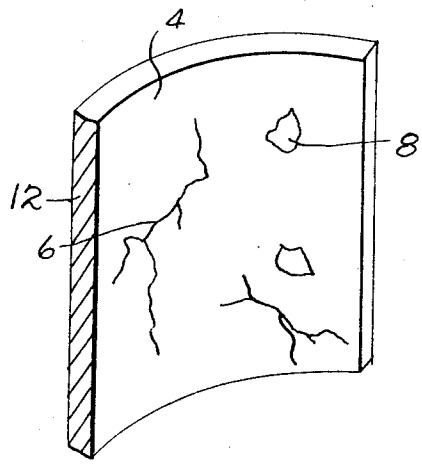


Fig. 2.

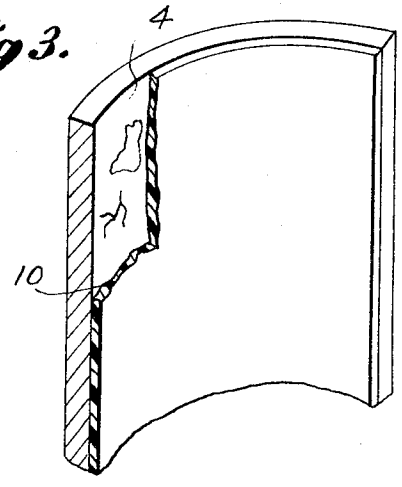


Fig 3.

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United States Patent Office

3,281,308

Patented Oct. 25, 1966

3,281,308
COATED CHIMNEY

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Filed Sept. 28, 1961, Ser. No. 141,359
5 Claims. (Cl. 161—162)

This invention relates to the protection of chimneys.

The flues of many industrial chimneys are subjected to a severe corrosive environment under a relatively high temperature.

It is an object of the present invention to protect the interior surface of the wall of a chimney, including the flues, from such corrosive environment.

Another object is to provide a fire resistant coating for the interior surfaces of the wall of a chimney which has an inside layer of fire brick.

A further object is to provide a permanently plastic coating for chimneys which will permit the chimney to be ready for service immediately upon completion of the application of the coating or upon application of fire brick thereto if the latter is necessary due to conditions in the chimney during service.

Still further objects and the entire scope of applicability of the present invention will become apparent from the detailed description given hereinafter; it should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

It has now been found that these objects can be attained by the use of a mastic coating composition comprising an asphalt base, mineral fillers and a polyolefin as set forth below.

The invention will be best understood in connection with the attached drawings wherein:

FIGURE 1 is a perspective view of a chimney;

FIGURE 2 is a sectional view along the line **2—2** of FIGURE 1;

FIGURE 3 is a sectional view similar to FIGURE 2 but partially broken away and employing the coating of the present invention; and

FIGURE 4 is a view similar to FIGURE 3 but employing fire brick inside the mastic coating of the chimney.

Referring more specifically to the drawings there is shown in chimney **2**. As can be seen in FIGURE 2 the interior surface **4** of the chimney shows the effects of the corrosive gases at **6** and **8**. The attack of the corrosive gases is eliminated in FIGURE 3 by coating the inner surface of wall **4** of the chimney with mastic **10** of the present invention. In FIGURE 4 the corrosive effects of the gases are eliminated by coating the inner surface of the wall **12** with mastic **14** and then covering the mastic with a layer of fire brick **16**.

In chimneys wherein there is high velocity gas flow or high amounts of solids such as fly ash the mastic after being applied to the inside surface of the outer wall of the chimney should be covered or protected with a layer of fire brick.

While reference is made to coating the inner surface of a wall of the chimney the invention is also applicable to coating the inner surface of a wall of a chimney flue when flues are provided to conduct the corrosive gases to the atmosphere. The term "inner surface of a wall of the chimney" as used in the claims therefore is intended to include such inner surfaces of walls of chimney flues.

The invention is applicable to equally protect steel and masonry chimneys. Examples of masonry which can be employed are brick, concrete, haydite, cements and slag.

The mastic employed according to the present invention comprises asphalt, chloroparaffin wax, finely divided silica, antimony oxide, asbestos, volcanic ash, hydrocarbon polymer oil and mica. The preferred formulation is:

	Pounds	Gallons	Percent
Asphalt Flux 32	2,370	300	51.33
Chlorowax #70	516		11.05
Cab-O-Sil	50		1.08
Antimony oxide	185		4.00
Coralux—B-Fines	255		5.50
Asbestos	750		16.18
Polybutene 32	352.5	47	7.63
Check Mica #160	150		3.23
	4,628.5		100.00

Asphalt Flux 32 is an unblown asphalt without solvent. It has a viscosity at 210° F. of 40–60 sec. Furol, a melting point of 50 to 55° F., a flash point of 450° F. and a weight of 7.9 lbs./gal.

Chlorowax 70 is a resinous chlorinated paraffin containing 70% chlorine by weight.

Cab-O-Sil is a colloidal silica.

Coralux B-Fines is finely divided expanded perlite (volcanic ash).

Polybutene 32 is a synthetic polybutene oil having a viscosity at 310° F. SSV of 3,050, a molecular weight of 1,185 and a weight per gallon of 7.5 lbs.

Check Mica #160 is mica which will pass through a 60 mesh sieve.

The asbestos also was finely ground to pass through a similar sieve.

The process for making the formulation is to charge the asphalt to the mixer at approximately 250° F., then the chlorowax is added. This is mixed for five minutes followed by the Cab-O-Sil and a further ten minutes of mixing. Then the balance of the ingredients are added and mixing continued for a further hour. This composition has a specific gravity of 8.0 pounds/gallon.

The formulation is then ready to apply to the chimney. Viscosity can be adjusted as desired by the addition of more asbestos or asphalt. The mastic can have a weight between 7.8 and 8.2 pounds/gallon.

The mastic is applied to the interior of the outside wall of the chimney, e.g. with a stiff pointed trowel. While atmospheric temperature can be employed, preferably the mastic is warmed to 90 to 100° F. since the application can be accomplished in a smoother and faster manner. The chimney surface is preferably prepared by mechanical cleaning prior to application of the mastic.

No solvent is employed in the mastic itself. This provides maximum assurance against fire hazard and also eliminates shrinkage and attendant problems. The mastic resists temperatures from —50° F. up to 400° F. in continuous service. It remains permanently tacky and plastic but does not sag or drip at temperatures up to 440° F., and at the same times has excellent adhesion to steel and masonry surfaces. The composition does not melt and in fact will char before melting. Preferably it is applied to vertical surfaces up to a thickness of 5/16 inch (20 gallons/100 sq. ft.). On horizontal surfaces there is no maximum thickness. For best results the minimum thickness of the coating is ¼ inch (16 gallons/100 sq. ft.).

In tests the mastic did not break down even after one month immersion in 65% sulfuric acid at 125° F.

The mastic can be employed to seal the edges of cellular thermal insulation blocks in chimneys as wells as the chimney wall itself.

It can be employed between chimney insulation, such as Foamglas for example, and on hot uninsulated pipe flanges and in other areas, in areas in general were similar

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high temperature corrosive conditions are encountered. Thus, it can be employed to protect boiler and furnace casings, breechings, masonry structures around forges, etc.

The formulation can vary to some extent, thus the asphalt can be 50–55%, the chlorinated resinous paraffin 10–12%, the finely divided silica 0.5–1.5%, the antimony oxide 3–5%, the expanded perlite 5–6%, the asbestos 15–20%, the polybutene oil 7–8% and the mica 3–4%.

What is claimed is:

1. In the combination of a chimney having a wall having an inner surface and a coating for the inner surface of the chimney the improvement comprising employing as said coating a corrosive gas resistant composition which is a non-shrinkable mastic comprising 50–55% unblown asphalt, 10–12% chlorinated resinous paraffin, 0.5–1.5% finely divided silica, 3–5% antimony oxide, 5–6% expanded perlite, 15–20% asbestos, 7–8% polybutene oil and 3–4% mica, the total adding up to 100%.

2. A combination according to claim **1** wherein the chlorinated paraffin has 70% chlorine.

3. A combination according to claim **1** wherein the mastic is covered by a layer of firebrick.

4. In the combination of a chimney having a wall having an inner surface and a coating for the inner surface of the chimney the improvement comprising employing as said coating a corrosive gas resistant composition which is a non-shrinkable mastic comprising 51.33% unblown asphalt, 11.05% chlorinated resinous paraffin, 1.08% colloidal silica, 4.00% antimony oxide, 5.50% expanded perlite, 16.18% asbestos, 7.63% polybutene oil and 3.23% mica.

5. A combination according to claim **4** wherein the asphalt has a viscosity at 210% F. of 40–60 sec. Furol, a melting point of 50–55° F., a flash point of 450° F. and a weight of 7.9 lbs./gal., the chlorinated resinous paraffin contains 70% chlorine by weight, the polybutene oil has a viscosity at 310° F. SSV of 3050, a molecular weight of 1185 and a weight of 7.5 lbs./gal.

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