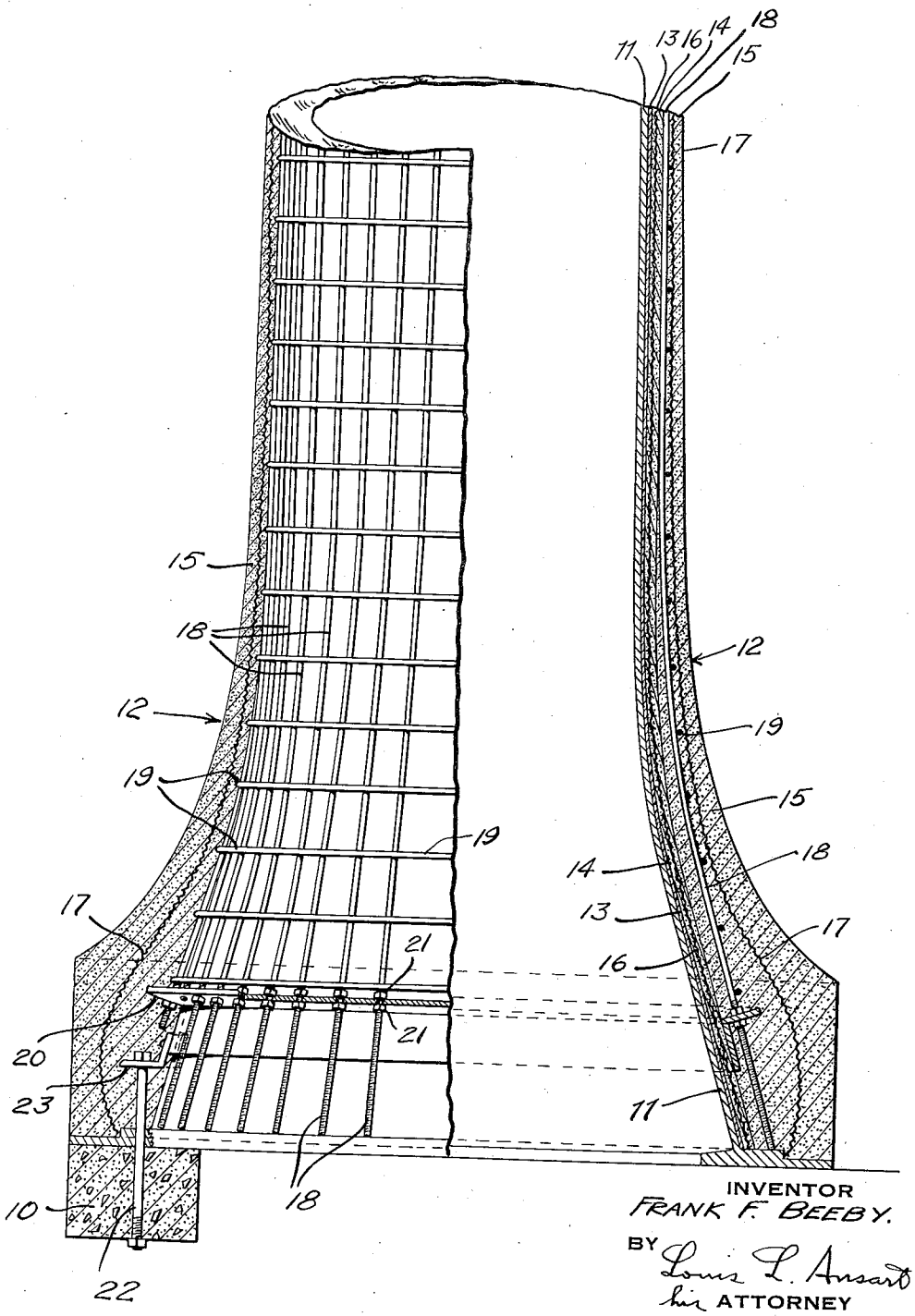
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CHIMNEY

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CHIMNEY

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The present invention relates to improvements in construction and repair of chimneys or stacks, and more particularly to improvements in the repair of chimneys, which repair involves the construction, around a chimney, such as a steel stack already in place, of an outer chimney of cementitious material such as "Gunite."

It should be understood that, in forming "Gunite" by means of a "Cement Gun," a mixture of suitable cement and granular material, of relatively fine grain such as sand, to form an aggregate, is blown through a hose and a suitable nozzle, where it is hydrated, against a suitable backing. The "Gunite" thus formed is dense and strong.

Heretofore, it has been proposed to repair a chimney such as steel chimney or stack, by surrounding the chimney to be repaired with a layer or coating of compressible material, such as asbestos, which is heat resistant and heat insulating, and by forming against said compressible material an outer reenforced chimney of suitable material such as "Gunite." In this way there is built about an already existing chimney a second complete chimney independent of the original chimney so that the original chimney may be completely destroyed without in any way affecting the outer chimney which remains and serves the same general purpose as the original chimney. The layer of compressible insulating material serves to space the outer chimney from the inner chimney or stack and serves not only as a cushion to permit expansion of the inner stack or chimney without cracking the outer chimney or shell, but as heat insulation to protect the outer chimney from heat which might cause cracking of the "Gunite," particularly during the setting thereof.

The gases passing through the steel stack produce an acid action on the steel even where the stack is lined with brick and this action may be intensified when the steel is encased in an outer chimney of "Gunite," with the result that the steel plates will go to pieces quite rapidly. When the steel plates break down, the asbestos layer may also be broken and its heat insulating effect lost to a cerdtain extent. Furthermore under some conditions the insulation of the asbestos layer as usually formed might not be sufficient. Consequently the conclusion was reached that it would be wise to construct the outer stack to increase its protection from heat and also to provide for protection against acid penetration and action.

An important object of the present invention is to provide improvements in chimney construction of the character wherein a separate chimney of suitable material, such as "Gunite" is built around another chimney to strengthen the same and assist in giving effective service, and in the event of destruction of the original inner chimney the outer chimney may function by itself.

According to one manner of carrying out the present invention, a compressible layer or coating of heat-resistant and heat-insulating material, such as asbestos is applied, as heretofore, to the outside of the chimney to be repaired, but, instead of constructing the outer reenforced chimney of "Gunite" or the like as heretofore, there is applied a relatively thin layer of heat resistant and heat-insulating material made of a relatively fine aggregate having the requisite heat resisting and heat insulating qualities, and cementitious material adapted to meet the above-mentioned requirements as to heat resistance and insulation, and then the rest of the outer chimney is constructed of "Gunite" in the same general manner as heretofore, thus providing a unitary outer chimney.

One kind of cement that meets the aforesaid requirements for the inner layer of the outer chimney is "Lumnite" cement which is a calcium alumnate cement as distinguished from Portland cement in which the principal constituents are calcium silicates. "Lumnite" is of particular value in that its effectiveness as a binder is not destroyed by high service temperatures. The aggregate for use with "Lumnite" or other suitable cement, may be of any suitable material, such as sand, but preferably is of material, highly resistant to heat and acid action, such as ground trap rock or "Haydite," which possesses such qualities to a marked extent. The mixture of "Lumnite" cement and granular aggregate may be applied by suitable apparatus, such as a "Cement Gun," and as soon as a layer of sufficient thickness has been formed the usual "Gunite" may be applied to the outside thereof until the necessary thickness is attained. The outer chimney will then have at its inner surface material which is resistant to acid and heat and also is heat insulating, thereby serving to protect the "Gunite" of the outer chimney. Obviously the outer chimney constructed in this manner will be much superior to those constructed heretofore.

Other objects, features and advantages will appear upon consideration of the following detailed description and of the drawing in which the figure is a fragmentary elevation of a chimney embodying the invention, parts being broken away to show the interior structure.

In the drawing there is a fragmentary showing of a suitable foundation or supporting structure 10 to which the enlarged base of a steel chimney or stack 11 is secured. When a steel chimney or stack such as chimney 11 becomes weak or leaks or becomes defective for other reasons, it may be repaired by building therearound a suitable outer chimney 12. According to prior practice the chimney or stack 11 to be repaired may be covered with a compressible layer or coating 13 of suitable material, such as asbestos, which is heat-resistant and heat insulating and outside of such compressible layer there may be constructed an independent outer chimney.

Heretofore such an outer chimney has been of reenforced "Gunite" and the only protection thereof has been furnished by said compressible layer or coating 13 which has also acted to prevent cracking of the outer chimney due to expansion of the stack or chimney 11. The protective layer 13 of the usual thickness may not give sufficient protection for the outer chimney 12 when the inner chimney 11 is very hot and in any event the acid in the gases passing through the inner stack may gain access to the inner surface of the outer stack and if this stack be of Portland cement "Gunite" only, the acid might cause considerable damage at the inner surface thereof.

Therefore in carrying out the present invention, the outer chimney may be made principally of Portland cement "Gunite" as heretofore but at its inner side is provided with a protective layer 14 of material which is not only heat-insulating and heat resistant but is resistant to acid action. Preferably the material of said layer 14 is applied in the same manner as "Gunite" and is formed from a suitable mixture of cement, such as "Lumnite" which is heat and acid resistant as well as heat insulating, and granular material, such as ground trap rock or "Haydite".

In constructing the outer chimney 12, the inner original chimney 11 is covered with the compressible coating 13 of asbestos, and in connection with the placing of suitable reenforcing material, the protective layer 14 may be placed by a "Cement Gun" and when the layer 14 has reached the requisite thickness, it may be used as a backing and "Gunite" placed thereagainst until the wall of the outer chimney 12 has been brought to the required thickness. Obviously the layer 14 will be integral with the "Gunite" layer 15 at the outer side thereof.

The reenforcement of the outer chimney may be effected in any suitable manner and as illustrated includes wire mesh 16 for the protective layer 14, wire mesh 17 for the "Gunite" 15 and heavy reenforcing material for the outer chimney comprising rods 18 extending longitudinally of the chimney and rods 19 extending circumferentially of the chimney. In order to anchor the outer chimney 12 to the base or foundation 10, the rods 18 may pass through openings in an outwardly extending flange of a horizontally positioned flange ring 20 and be secured thereto by nuts 21 on these rods above and below said outwardly extending flange, and the rods 18 may be held with their lower ends resting on the outwardly extending base of the inner chimney 11 by bolts 22 passing through the foundation 10, the base of the chimney 11 and clips or brackets 23 attached to the downwardly extending flange of the ring 19. The bolts 22 may be positioned in the same manner as the usual anchor bolts for the inner chimney 11 but are of greater length to cooperate with clips 23.

It should be understood that various features may be changed and that certain features may be used without others, without departing from the true spirit and scope of the invention.

What I claim is:

1. A double chimney comprising an inner chimney, a layer of compressible heat resistant and heat insulating matter covering the outside surface of the inner chimney, and an outer chimney engaging the outer surface of said layer of compressible material, said outer chimney comprising an inner dense heat-resisting and heat-insulating layer of fine granular material resistant to heat and acids and heat-resistant cementitious material, and a thick dense body of sand and cement at the outside of such inner layer and integral therewith.

2. A double chimney comprising an inner chimney, a layer of compressible heat resistant and heat insulating matter covering the outside surface of the inner chimney, and an outer chimney engaging the outer surface of said layer of compressible material, said outer chimney comprising an inner dense heat-resisting and heat-insulating layer at the inner surface thereof consisting of fine granular material resistant to heat and acids and heat-resisting cementitious material, and a body of "Gunite" at the outer side of such inner layer and integral therewith.

3. A double chimney comprising an inner chimney, a layer of compressible heat resistant and heat insulating matter covering the outside surface of the inner chimney, and an outer chimney engaging the outer surface of said layer of compressible material, said outer chimney comprising an inner dense heat-resisting and heat-insulating layer of fine granular material resistant to heat and acids and "Lumnite" cement, and a dense body of Portland cement "Gunite" at the outer side of said inner layer and integral therewith.

4. The method of constructing a second chimney about a chimney already in place, comprising covering the outer surface of the first chimney, already in place, with a compressible layer of heat-resisting and heat-insulating material, blowing into place against the outer face of said layer of compressible material a mixture, hydrated just before application, of heat-insulating and heat-and-acid-resisting cementitious material and granular material thus forming an inner layer of the outer chimney, and placing a relatively thick layer of "Gunite" at the outer side of said inner layer and integral therewith.

5. The method of constructing a second chimney about a chimney already in place, comprising covering the outer surface of the first chimney, already in place, with a compressible layer of heat-resisting and heat-insulating material, blowing into place against the outer face of said layer of compressible material a mixture, hydrated just before application, of heat-insulating and heat-and-acid-resisting cementitious material and granular material having to a certain degree the same resistant qualities, thus forming an inner layer of the outer chimney, and blowing against the outer surface of said inner layer a mixture of sand and cement hydrated immediately before application thus forming an integral outer chimney.

6. The method of constructing a second chimney about a chimney already in place, comprising covering the outer surface of the first chimney, already in place, with a compressible layer of heat resisting and heat-insulating material,

blowing into place against the outer face of said layer of compressible material a mixture, hydrated just before application, of heat-insulating and heat and acid resisting "Lumnite" cement and granular material which has the same general resistant qualities, thus forming an inner layer of the outer chimney, and applying a relatively thick third layer of "Gunite" at the outer side of said inner layer so as to be integral therewith.

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