Feb. 15, 1944. C. E. MORRIS 2,342,058

PREFABRICATED STACK SECTIONS

Filed April 30, 1943

Fig. 1.

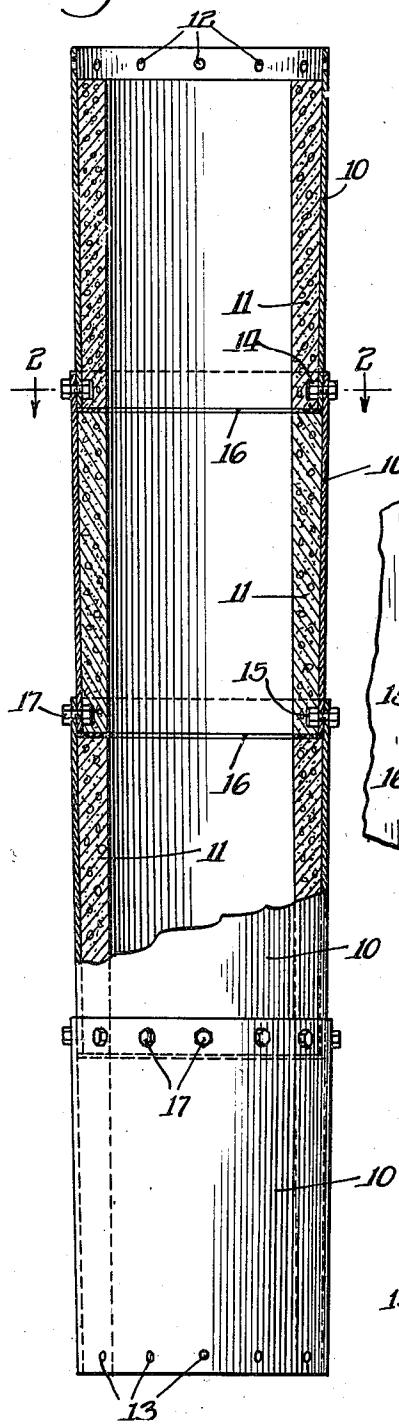


Fig. 2.

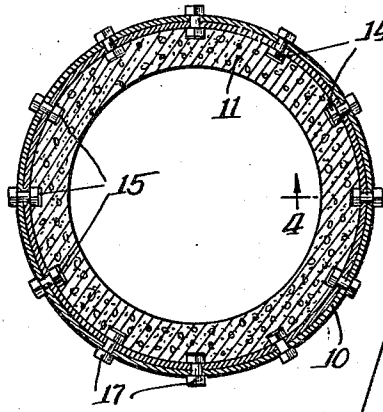


Fig. 3.

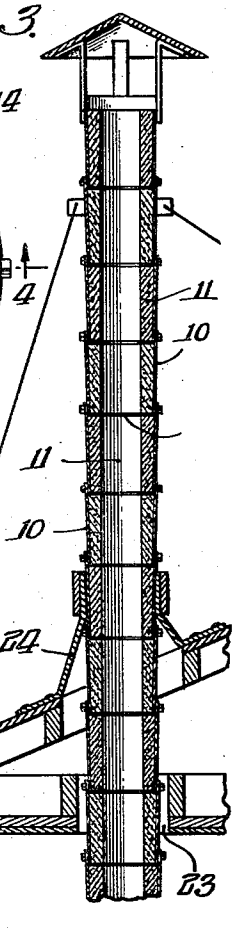


Fig. 4.

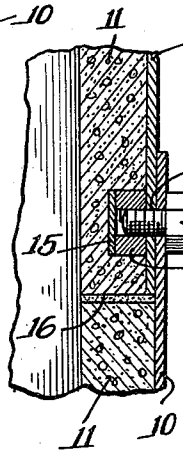
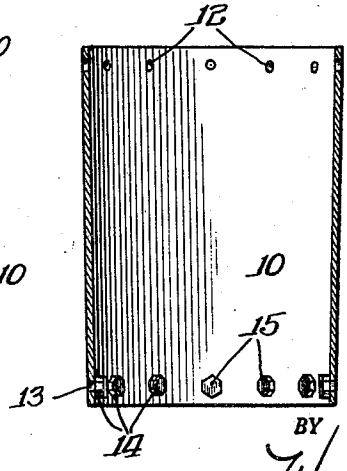


Fig. 5.



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PREFABRICATED STACK SECTIONS

Charles E. Morris, Dallas, Tex.

Application April 30, 1943, Serial No. 485,207

10 Claims. (Cl. 72—92)

The present invention relates to prefabricated, heat-insulated, high-temperature, stack or chimney sections designed to be superimposed on one another in registered relation to form the complete stack, each such section having an outer, tubular, metallic jacket identical in all respects with the complementary jackets and all of which are slightly tapered longitudinally so that the larger end of each one will receive the smaller end of the next jacket, such jackets preliminarily serving as molds or forms for their linings of self-hardening, heat-resisting compositions, the liner terminating short of one end of its jacket but being flush with the opposite end of the jacket or shell.

An object of the invention is to provide prefabricated stack-sections which require no special skill in their erection, and this aim is reached inasmuch as the sections are merely superposed upon one another and bolted together in such manner that there will be no internal temperature influences capable of causing expansion of the metallic fastenings with possible fracture thereby of the refractory, insulating material of the liners, and further due to the effectiveness of the insulating liners, combined with a heat-resisting cement to seal the joints between the sections, a chimney is provided which will afford permanent resistance to the intense heat of the products of combustion, especially in the burning of coal.

Another aim of the invention is to supply a sectional stack-construction wherein, if any section of the lining becomes accidentally injured, damaged, or broken, the remaining sections above are independently supported by their metal jackets in such manner that their maintenance in proper operative position does not depend upon the condition of any lower lining section.

With the foregoing and other objects in mind, the invention has particular reference to certain features of accomplishment which become manifest as this description proceeds, taken in connection with the accompanying drawing, forming a part of this specification and throughout the views of which like parts have been supplied with the same reference numerals.

In this drawing:

Figure 1 is an incomplete elevation and a partial, central, vertical section of a number of the series of superimposed chimney sections or parts;

Figure 2 is an enlarged, horizontal cross-section on line 2—2 of Figure 1;

Figure 3 is a fragmentary view showing a chimney constructed according to this invention and as extending through an incompletely-illustrated building-roof;

Figure 4 is a fractional, vertical section on an enlarged scale on line 4—4 of Figure 2; and

Figure 5 is a vertical, central section through one of the metallic jackets before its lining is applied thereto.

Continuing with a more detailed description of the structure presented in the drawing, reference is made primarily to Figure 1 wherein each numeral 10 denotes a tubular metal shell or jacket, which, while it may be of any suitable cross-section or shape, is, in the present case, cylindrical and slightly tapered lengthwise, its lower smaller end being of such size as to conform to and to be snugly received in the larger end of the next jacket below, as shown.

Within each such jacket or casing 10 there is a liner 11 of a cementitious composition of a self-hardening nature and composed of materials known to possess a high resistance to intense heat.

In applying this composition to the interior surfaces of the jackets, the latter serve as the molds or forms and when such stack-sections are completed, their liners constitute a part thereof and afford the means by which the sections are supported in superimposed relation in the completed stack.

It will be noted from the drawing that the larger, upper end of each such jacket or casing shell 10 is provided with a circular, transverse row of spaced-apart apertures 12, 12 and that a similar or like row of holes 13, 13 (Figure 4) extends around the smaller end of the jacket, each such hole 13 being in register with the screw-threaded aperture of a nut 14 welded to the inner face of the jacket, the inner surface of each such nut having welded thereto a cover-plate 15 closing the corresponding end of the aperture of the nut.

Each such nut-equipped jacket has its liner-mixture spun therein and forced outwardly against its inner surface by centrifugal-force, the jacket acting as a mold, and when such liner-mixture has hardened, the nuts 14 are firmly embedded in its outer portion adjacent to its lower smaller end, it being understood that the principal function of the plates or discs 15 is to prevent the entrance of the liner-material, while it is in plastic condition, from finding entrance into the interior of the nuts.

As has been clearly illustrated, each such insulating-lining 11 is flush with the lower end of its metal-shell 10, but at the upper portion of

such casing, such inner coating terminates short of the corresponding end of the jacket in a flat annular surface at a right-angle to the axis of the jacket and at the proper distance below the row of apertures 12.

The nuts 14 are correlated with the apertures 12 in the jacket so that when one stack-section is disposed upon another with the lining of the upper section resting on the lining of the lower section with a suitable joint cement 16 between the two, the apertures 12 will be alignable with those of the holes 13 and nuts 14 and will jointly receive stud-bolts 17 which extend through the contiguous walls of the telescoping jackets, thereby firmly securing the sections together.

In this connection, it should be noted that inasmuch as the bolts 17 do not penetrate through the walls of the insulating-linings and the associated nuts are well embedded in the linings, they are not exposed to sufficient heat of the products of combustion rising in the stack to cause excessive expansion and possible damage to the linings.

It is to be observed that by thus constructing the sections, the weight of the assembly is borne by the superimposed insulating-liners as an adequate support instead of by the bolts and because of this steel of a thinner gauge than would otherwise be necessary can be availed of in the construction of the jackets.

In lining the jackets or casings 10 with the composition, it is preferred that the latter be centrifugally applied by one of the several suitable spinning processes, although it is obvious that an internal form can be used to confine the inner-wall surface of the insulating liner.

In any case, however, it is important that the ends of the liners be perpendicular to the axis of the jacket so that the sections themselves, when assembled, will be perpendicular to the ground to assure against difficulty in alining the holes 12 with the nuts for the reception of the bolts 17.

In Figure 3 is shown one authorized method of extending the chimney or flue through and fastening the same to the roof 21 of a building 22.

Usually a clearance 23 is provided between the flue and the wood framework for an air-space and a sheet-metal flashing 24 is placed about the flue or stack to rest upon the roof as a weather seal.

Manifestly, the construction as shown and described is capable of reasonable modification and such changes as may be construed to fall within the scope and meaning of the appended claims is to be considered within the spirit and intent of the invention and such modifications may be made without departure from the heart and substance of the invention and without the loss or sacrifice of its substantial benefits and advantages.

For example, the sheet-metal jackets 10 may be made of sufficient gauge or thickness to support their linings so that the latter do not carry the weight of the stack and this is easily accomplished because of the tapered fit of each lining in its jacket and by reason of the tapered fit of each jacket in the next lower one, thereby avoiding undue strain on the bolts.

I claim:

1. A plurality of like stack-sections adapted when assembled in superimposed registered relation to form a stack, incorporating the novel characteristics that (*a*) each such section includes a longitudinally-tapered metal-jacket adapted at its larger end to telescopically receive the smaller end of a like section and at its smaller end to fit telescopically in the larger end of a like section, (*b*) each said jacket has a heat-resisting, heat-insulating liner having an outer surface conforming to and in contact with the inner tapered surface of the jacket, (*c*) one end of each said liner is substantially flush with the corresponding end of the jacket, and (*d*) the other end of each said liner terminates short of the corresponding end of the jacket.

2. A plurality of like round stack-sections adapted when assembled in superimposed registered relation to form a stack, incorporating the novel characteristics that (*a*) each such section includes an encasing longitudinally-tapered metal-jacket adapted at its larger end to telescopically receive the smaller end of a like section and at its smaller end to fit telescopically in the larger end of a like section, (*b*) each said jacket has a heat-resisting, heat-insulating liner having an outer surface conforming to and in contact with the inner tapered surface of the jacket, (*c*) one end of each said liner is substantially flush with the corresponding end of the jacket, (*d*) the other end of each said liner terminates short of the corresponding end of the jacket, (*e*) each said jacket has a first transverse circular row of apertures outwardly beyond said non-flush end of the liner, (*f*) each said jacket has a like second transverse circular row of apertures near the flush end of said liner, (*g*) each said jacket has internally screw-threaded members secured to its inner surface, each with its screw-threaded passage in register with one of the apertures of said second row, (*h*) said members are entirely embedded in said liner, whereby by means of bolts occupying registered jacket apertures of said first and second rows and the threaded passages of said members, the one end of each said section may be secured to the opposite end of a like section.

3. The novel characteristics in stack-sections set forth in claim 2, in which each of said members is a nut, the threaded passage through which is closed by a plate over its inner end.

4. The novel characteristics in stack-sections set forth in claim 2, in which the flush ends of said linings are adapted to bear on the other ends of the linings of other sections with cement sealing such joints.

5. A high temperature flue pipe including a plurality of superimposed sections, each section comprising a metallic jacket tapered to conformably receive and be received at its ends by adjacent jackets, a liner of heat resisting material on the walls of said jacket, one end being flush with and the other terminating short of the end of said jacket to form a supporting shoulder for superimposed sections and means borne jointly by juxtapositioned jackets to secure the ends thereof together.

6. In a prefabricated, high temperature chimney, a chimney section comprising a tapered, metallic jacket having an annular row of apertures in each end thereof, an insulating liner of self-hardening, heat resisting material on the interior walls of said jacket, one end of which is flush with the smallest end of said jacket, the opposite end terminating short of the largest end of said jacket to define an annular shoulder.

7. In a sectional, prefabricated flue pipe, a flue section comprising a metalllic jacket tapered to receive and be received at its ends by identical jackets, a liner of self-hardening, heat resisting material on the interior walls of said jacket, one end of which is flush with the smallest end of

said jacket, the other being terminated short of the largest end of said jacket to define a shoulder against which bears the smallest end of the next adjacent flue section and means jointly provided in said jacket ends for securing the same in assembled relationship.

8. In a prefabricated, high temperature flue pipe, a flue pipe section comprising a jacket smaller at one end than at the other and having on its inner walls a liner of self-hardening heat resisting material, said liner being flush with the smallest end of said jacket and terminating short of the largest end thereof to define an annular shoulder and means in each end of said section to effect securement thereof to identical and contiguously aligned sections.

9. A prefabricated high temperature flue pipe comprising a plurality of vertically aligned, telescopically related sections, each comprising a tapered shell containing a liner of heat resisting material, one end of which is flush with the smallest end of the shell, the other end terminating short of the largest end of the shell to define an abutment for the smallest end of the shell of the next higher section and means for securing the sections in superimposed relationship.

10. In an insulating liner for metallic tubular bodies, a preformed series of cementitious sections having exterior surfaces conforming to the interior surfaces of said metallic bodies and provided with end portions conforming in shape to that of the end portions of juxtapositioned sections to be disposed in end to end relationship in a metallic tubular body and means for establishing a seal intermediate the ends of said sections against the escape of gases.

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