

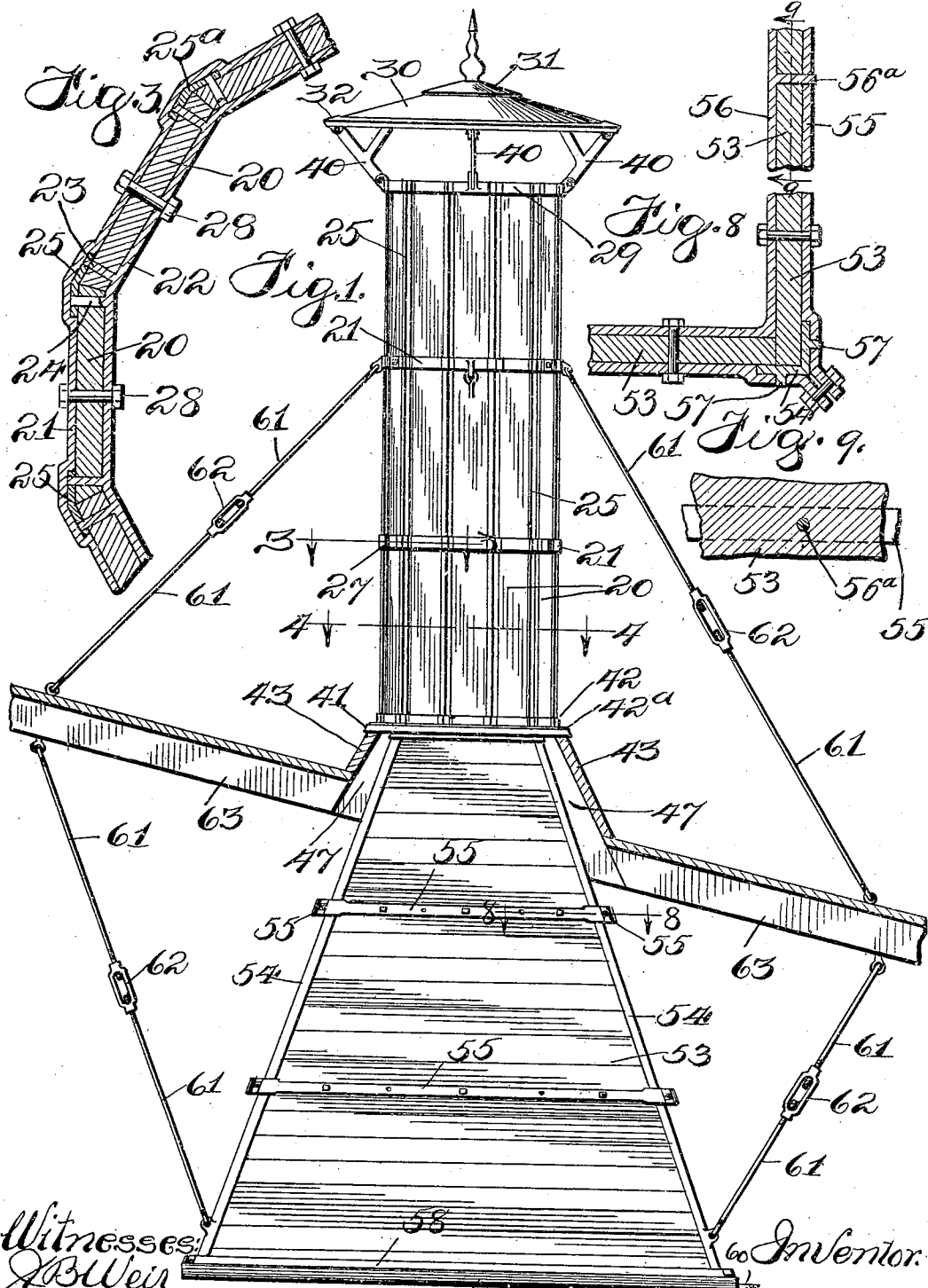
P. DICKINSON, DEC'D.
O. F. DICKINSON, EXECUTRIX.
SMOKE STACK.

945,709.

APPLICATION FILED SEPT. 29, 1906

Patented Jan. 4, 1910.

3 SHEETS—SHEET 1.



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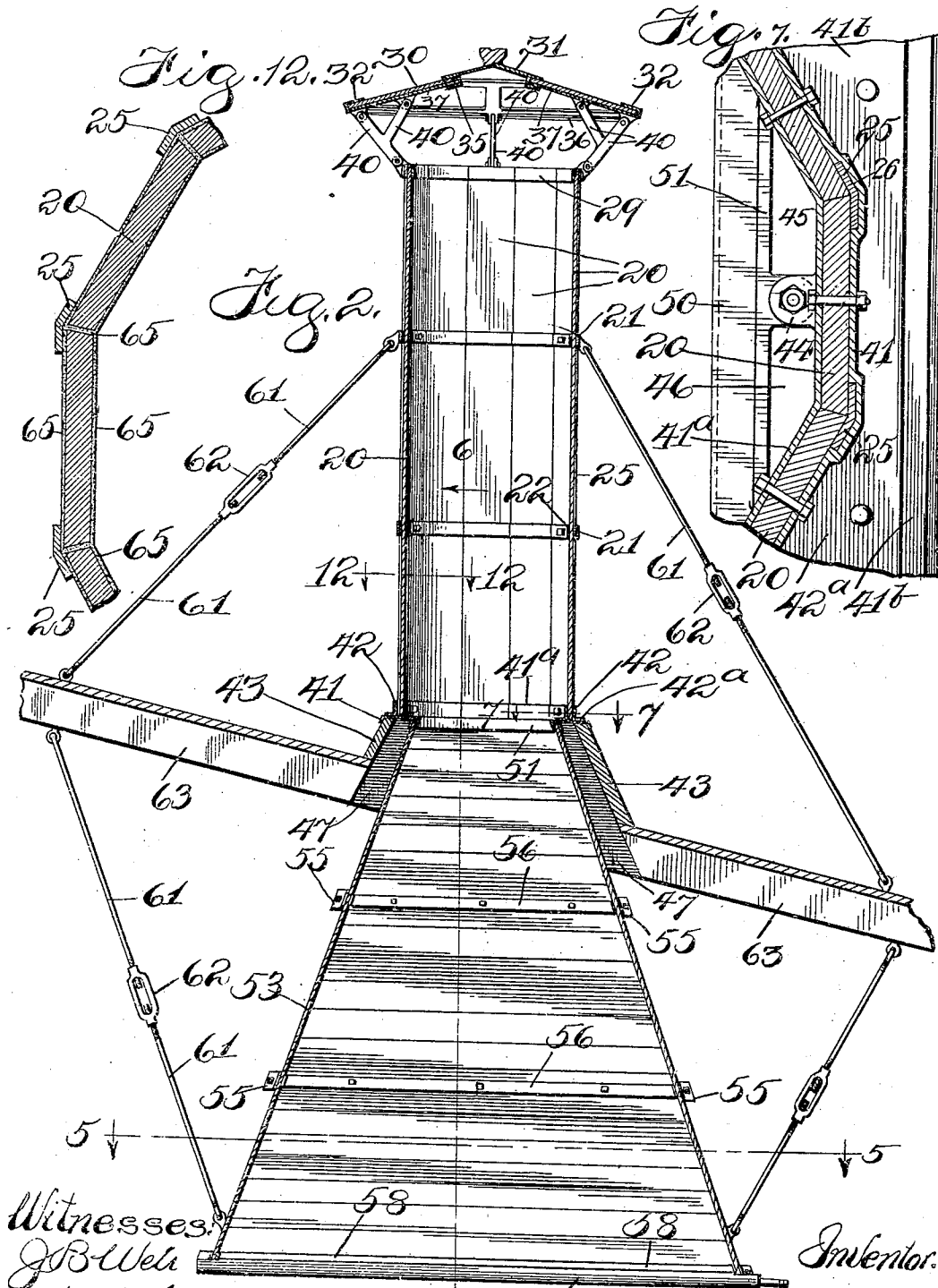
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3 SHEETS—SHEET 2.



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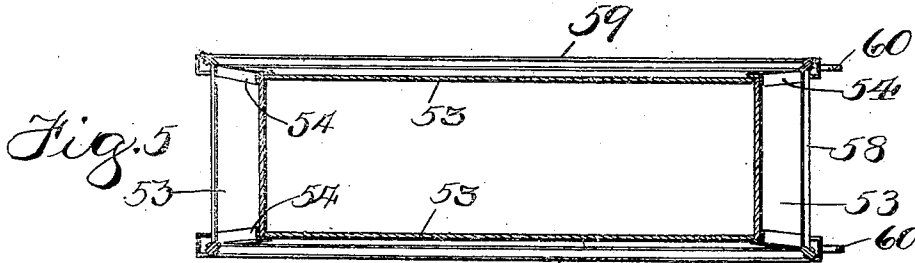


Fig. 4.

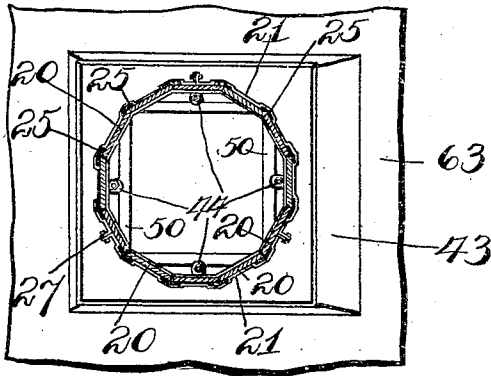
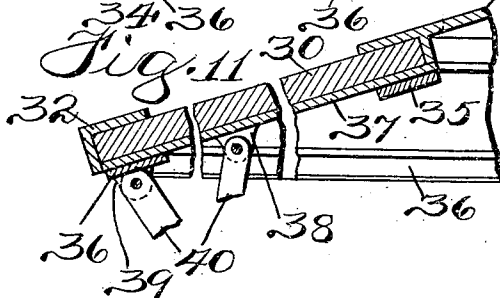
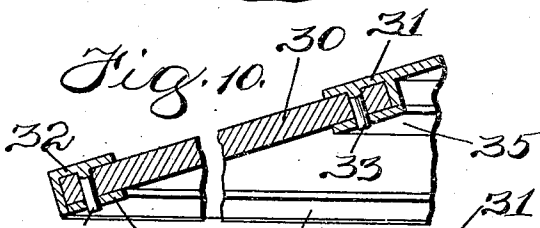
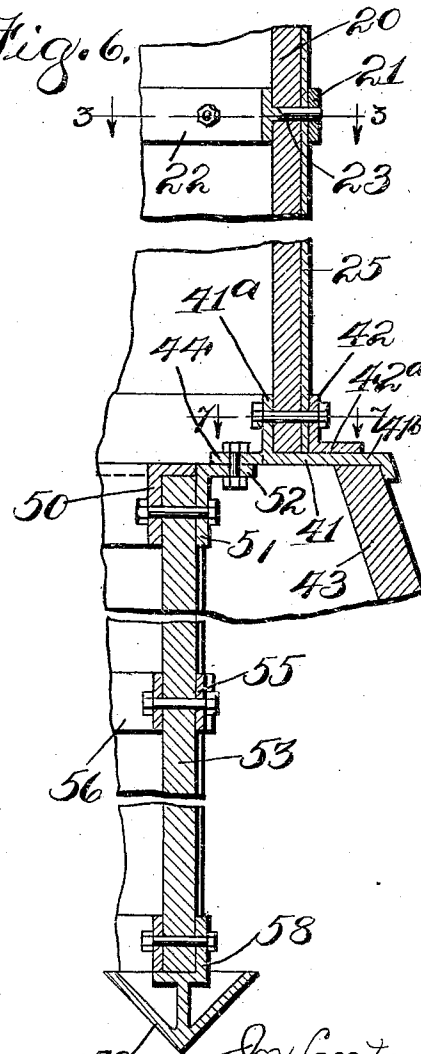


Fig. 6.



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UNITED STATES PATENT OFFICE.

CLAIRE FILKINS DICKINSON, OF WINNETKA, ILLINOIS, EXECUTRIX OF PAUL DICKINSON, DECEASED.

SMOKE-STACK.

945,709.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed September 29, 1906. Serial No. 336,776.

To all whom it may concern:

Be it known that PAUL DICKINSON, deceased, late a citizen of the United States, residing at Winnetka, in the county of Cook and State of Illinois, did in his lifetime invent certain new and useful Improvements in Smoke-Stacks, of which the following is a full, clear, and exact specification.

This invention relates to smoke-stacks or chimneys commonly used on round houses for conducting away the smoke that issues from the locomotive stacks, although it is equally applicable as a smoke stack or chimney for other forms of buildings, especially where the weight of the same is carried by the roof of the building; and the primary object is to provide an improved smoke-stack constructed of materials as light in weight as possible, and possessing at the same time sufficient strength and durability to withstand the destructive agencies encountered in the use of devices of this character.

The prime requisites of a perfect smoke-stack as used in locomotive round houses and running sheds are that it shall be light in weight in order to be of sufficient length to furnish an effective draft and yet be supported by the roofs of the buildings without endangering them or adding unnecessary expense in their construction; it must not be liable to attack by acid fumes in the locomotive smoke which is found very destructive to most metals and especially iron and steel; it must be fireproof to prevent its destruction from sparks and heat from the locomotive stack; it should be constructed as far as possible of materials that are poor conductors of heat in order that the heated gases may pass readily through the stack and produce a more effective draft and in order that the condensation of steam on the inner walls may be prevented as such condensation is found to produce an acid drip very harmful to the materials in the stack and equally harmful and disfiguring to locomotives when such drip is permitted to reach them; and it should be constructed of materials cheap and durable and be easy to keep in repair. Certain vegetable fibrous materials, prepared and used in various ways but more particularly as hereinafter shown and described, possess all of these desirable features; and a further object of this improvement is to provide a form of smoke

stack in which these materials may be utilized to the greatest possible advantage.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in the construction, combination and arrangement of the several parts, hereinafter more fully described and claimed, and shown in the accompanying drawings, illustrating an exemplification of this invention, and in which:—

Figure 1 is a view in elevation showing smoke-stack mounted on roof and roof-box both of which latter are shown in section. Fig. 2 is a vertical sectional view of Fig. 1 showing roof-box and roof in section as in Fig. 1. Fig. 3 is a broken sectional view on line 3—3 of Fig. 1. Fig. 4 is a sectional view on line 4—4 of Fig. 1. Fig. 5 is a horizontal sectional view of the hood on line 5—5 of Fig. 2. Fig. 6 is an enlarged broken sectional detail on line 6—6 of Fig. 2. Fig. 7 is an enlarged sectional detail on line 7—7 of Fig. 2. Fig. 8 is an enlarged broken sectional view on line 8—8 of Fig. 1. Fig. 9 is a broken sectional view on line 9—9 of Fig. 8. Figs. 10 and 11 are enlarged broken sectional views showing details in the construction of the top. Fig. 12 is an enlarged detail sectional view on line 12—12 of Fig. 2 showing the manner of applying a material to hermetically seal or close all joints and exposed surfaces and more particularly the exposed surfaces of the wood or other fibrous materials employed for the purposes hereinafter described.

The common form of smoke stacks or chimneys is followed in that it is preferred to construct the same in three sections—viz: a top or cowl, a body section and a flared bottom section or receiving hood. A chimney or smoke stack embodying these features has been previously shown and described in each of the United States Letters Patent No. 445,714 and No. 457,910 granted to Paul Dickinson respectively February 3, 1891 and August 18, 1891.

The body section is constructed of a series of strips of wood bound together by external and internal bands 21 and 22 preferably of common cast or gray iron forming a cylindrical shaped figure preferably of uniform diameter. It is preferred that internal bands 22 be cast integrally and provided with the

outwardly extending pins or lugs 23 which enter corresponding holes or recesses 24 in the wood strips 20. External bands 21 are preferably in two or more sections for convenience in assembling and erecting and are provided with recesses 26 which receive the longitudinal strips 25 also preferably of cast iron. Holes are also provided in strips 25 to receive lugs 23. Sections of external bands 21 are united by clamping members 27 (Fig. 4) and the entire structure is held firmly together by bolts 28 (Fig. 3). At the top of the middle section a suitable collar preferably cast in one piece and of gray iron is provided on which the cowl or top is carried.

Any common form of top may be used but it is preferred to employ wood as far as possible and support the same by a cast metal frame work as in the main body section already referred to and in the receiving hood presently to be described. The wood section 30 may be composed of strips preferably tapered and held together by cast center plate 31 and external cast ring 32 both of which may be provided with depending lugs 33, 34 entering corresponding holes in 30 and in lower ring plates 35 and 36. Radial strips 37 are supported in ring plates 35, 36. The top should be bound together by bolts similar to 28 already referred to passing them through 31, 35 and 32, 36. Depending lugs 38, 39 on plate 36 and strip 37 receive the bifurcated standards or supports 40 which are carried by top collar 29. The collar 41 at the bottom of body section is preferably cast integrally and contains an inner flange 41^a corresponding to inner bands 22. It is also provided with lugs similar to band 22. An outer collar 42 similar to 21 coöperates with 41 and is provided with a horizontal portion 42^a adapted to break the joint between collar 41 and the body section. Collar 41 is also provided with horizontally extending flanges 41^b adapted to support the entire smoke stack on the roof-box 43, which is built to conform to the pitch of the roof 63 as illustrated in Figs. 1 and 2. Flared bottom section or receiving hood is preferably constructed with a square collar at the top comprising the internal angular band 50 and external band 51 provided with lugs 52 adapted to bolt to lugs 44 on collar 41. This construction leaves 4 pairs of openings 45, 46 (Fig. 7) communicating from the interior of the body section to the openings 47 between the flared bottom section and the roof-box, thus furnishing means for ventilating the interior of the building. The bottom section preferably has the wooden strips 53 disposed horizontally. Two opposite sides of this section are approximately vertical and parallel with each other. The other two sides diverge down-

wardly. Angular external corner strips 54 are bolted between top collar plates 50, 51. As a further means of support one or more pairs of horizontal external and internal bands 55, 56 may be employed. External bands 55 are preferably in four parts united at the four corners as shown passing around corner angles 54 and containing recesses or holes for receiving lugs 57. Internal bands 56 may be cast integrally and are provided with lugs or pins 56^a passing through wood 53 and into external members 55. As illustrated in Fig. 8 and elsewhere sufficient bolts through bands 55, 56 should be employed to give the structure the requisite strength and firmness. Bottom collar 58 may be provided with drip troughs 59 to conduct any condensation from the metal parts through discharge duct 60. A series of anchor rods 61 provided with turnbuckles 62 are used to further hold the structure in position on the roof-box. These rods are preferably attached to the external bands 21 on body section, and to corner strips 54, and secured to the roof 63 as illustrated in Figs. 1 and 2.

As already pointed out, wood is employed in the construction wherever possible and in the supporting framework described it is preferred to use cast gray iron throughout.

Many attempts have been made heretofore to build smoke-stacks of wood or fibrous combustible materials and to render the same fireproof by coating the exposed surfaces with various fireproofing materials such as sand, crushed or pulverized stone, soil or clay mixed with various ingredients for causing the same to adhere. Such construction is the cause of much annoyance wherever attempted in modern smoke-stacks and chimneys. The early settlers of this and other countries succeeded measurably well in plastering a wooden framework with mud or mortar which hardens under the action of the heat. Such construction is not entirely practical in smoke-stacks to be carried on roofs on account of the excessive weight of a sufficient quantity of such material to be effective, and a thin coating of such material is found to scale off and leave portions of the combustible surface unprotected thus affording a lodging place for sparks and resulting as is frequently the case in expensive fires. The well known tendency of wood to warp and shrink and to open up at cracks or joinings especially under excessive temperatures renders its use under such conditions when protected only by surface treatment very unsatisfactory. Even the early settler's chimney was found hazardous for the reason that the wood retained its combustible qualities and ignited whenever exposed to excessive heat, sparks or flame.

The wood used in the construction of this

smoke-stack is previously treated to render it throughout its entire cellular structure fireproof or more strictly speaking non-flaming and unable within itself to support combustion. This treatment of the wood or other fibrous material consists in first thoroughly impregnating the interior cellular structure with a fireproofing solution generally consisting of the sulfates of magnesia, ammonia, or zinc, or ammonium or sodium phosphates, in various proportions well known to those skilled in the art of fireproofing combustible materials. After being impregnated the wood is thoroughly kiln or air dried with the result that the interior cellular structure is left filled with minute crystals of salts which when heated give off their constituent gases as ammonia or carbonic acid gas or when excessively heated sulfuric acid gas all of which are very effective in checking combustion.

It has been found that a treatment of albumen, or saponifiable oils in conjunction with ammonia gas, or carbonic acid gas or other gas having an acid reaction causes the fatty acids to separate in the impregnated wood and to have a tendency to seal the cellular substance and to render the deliquescent salts less solvent when acted upon by water and certain gases. It is not found, however, that wood or fibrous materials treated in this manner are perfectly adapted for use in smoke-stacks or chimneys without a further treatment to hermetically seal the surface of the wood in order to prevent the escape of the fireproofing salts under the action of the heat and acid fumes and steam from locomotive stacks and from the destructive effects of the elements such devices being of necessity unusually exposed. To this end is provided a preparation for coating the entire surface of the wood and use the same particularly freely between all joints after the manner illustrated in Fig. 12 the coating being designated by 65. The basis of the most satisfactory preparation is elaterite known also as elastic bitumen or mineral caoutchouc which is partly a carbon-hydrogen and partly an oxygenated material insoluble in acids, alkalis or water and is capable of withstanding great heat. These qualities combined with its great adhesive qualities make it admirably adapted for this purpose. It unites with the fibrous surface permanently and hermetically closing the pores and retaining the fireproofing salts therein. The action of excessive heat has the effect of driving the preparation into the intercellular structure and if the heat be continued until the surface of the material be charred the elaterite on cooling forms with the charred surface an absolutely fireproof strata or covering and continues to seal the fireproofing salts on the interior. For use in the joinings elaterite gum is pre-

ferred, but as it is soluble in some of the paraffin oils and particularly in ether it may be prepared and applied to exposed surfaces as a paint, the applications being continued until the covering and sealing process is complete.

In order that the invention might be fully understood, the details of an embodiment thereof have been thus specifically described, but

What is claimed is:—

1. A smokestack or chimney formed of fibrous vegetable material, said material containing fireproofing substance in its interior cellular structure and having a surface coating of elaterite for resisting fire and the solvent action of water and acids, and adapted to hermetically seal the said fireproofing substance therein.

2. A smokestack or chimney formed of fibrous vegetable material containing fireproofing substance on the interior of its cellular structure and having the surface of said fibrous vegetable material covered with a water, fire and acid resisting substance.

3. A smokestack or chimney formed of wood containing fireproofing salts in its interior cellular structure and having the surface of said wood covered with elaterite for hermetically sealing the said fireproofing salts therein and for resisting the action of the steam, heat and acid fumes from a locomotive stack.

4. In a smokestack or chimney, the combination of wood strips containing fireproofing salts in the interior cellular structure thereof, a coating of elaterite for hermetically sealing said fireproofing salts therein and capable of resisting water, acids and fire, and a metallic frame for retaining said wood strips in position.

5. A smoke stack or chimney comprising walls of a fibrous vegetable substance impregnated in the interior cellular structure thereof with fire proofing salts and a coating adapted to seal said fire proofing salts therein, said coating being adapted to resist the action of fire, water and acid.

6. A smoke stack or chimney comprising wood walls having their cellular structure impregnated with fire proofing salts and a covering material adapted to hermetically seal the surface of the wood walls to prevent deliquescence of the fire proofing salts, said covering material being capable of resisting fire and the solvent action of water and acids.

7. In a smokestack or chimney, the combination of a main body member embodying a series of vertically disposed fireproofed wood strips bound together by a series of cooperating internal and external bands, a cowl or cover on the top thereof, a supporting collar at the base thereof, and a flared bottom section, said bottom section embodying a series of horizontally disposed fire-

proofed wood strips bound together by a series of cooperating external and internal bands and corner angles.

8. In a smokestack or chimney embodying
5 a main body section and a flared bottom section, the combination of a series of wood strips a series of cooperating external and internal bands adapted to bind the structure together, and a plurality of pins secured to
10 said bands and extending into the wood strips.

9. In a smokestack or chimney, the combination of a series of wood strips forming a closed passage, a series of integral internal
15 bands, a cooperating series of external bands, pins secured to said bands and entering into the wood strips and means for contracting said external bands.

10. In a smokestack or chimney, the combination of a series of wood strips forming a laterally closed passage, a series of integral internal rings or bands provided with out-

wardly extending pins or lugs, a cooperating series of external bands, means for contracting said external bands and recesses or holes
25 in said external bands for receiving said pins or lugs.

11. In a smokestack or chimney, the combination of a series of wood strips forming a laterally closed passage, a series of internal
30 rings or supporting bands, a cooperating series of external bands, means for contracting said external bands and integral means on said internal bands adapted to enter recesses in said wood strips.
35

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 25th day of September A. D. 1906.

CLAIRE FILKINS DICKINSON,
Executrix of Paul Dickinson, deceased.

Witnesses:

LILLIAN SCHMIT,
WILLIAM A. BITHER.