April 3, 1928. 1,664,473

S. A. WILLIAMS

SMOKE JACK

Filed Feb. 3, 1925 2 Sheets-Sheet 1

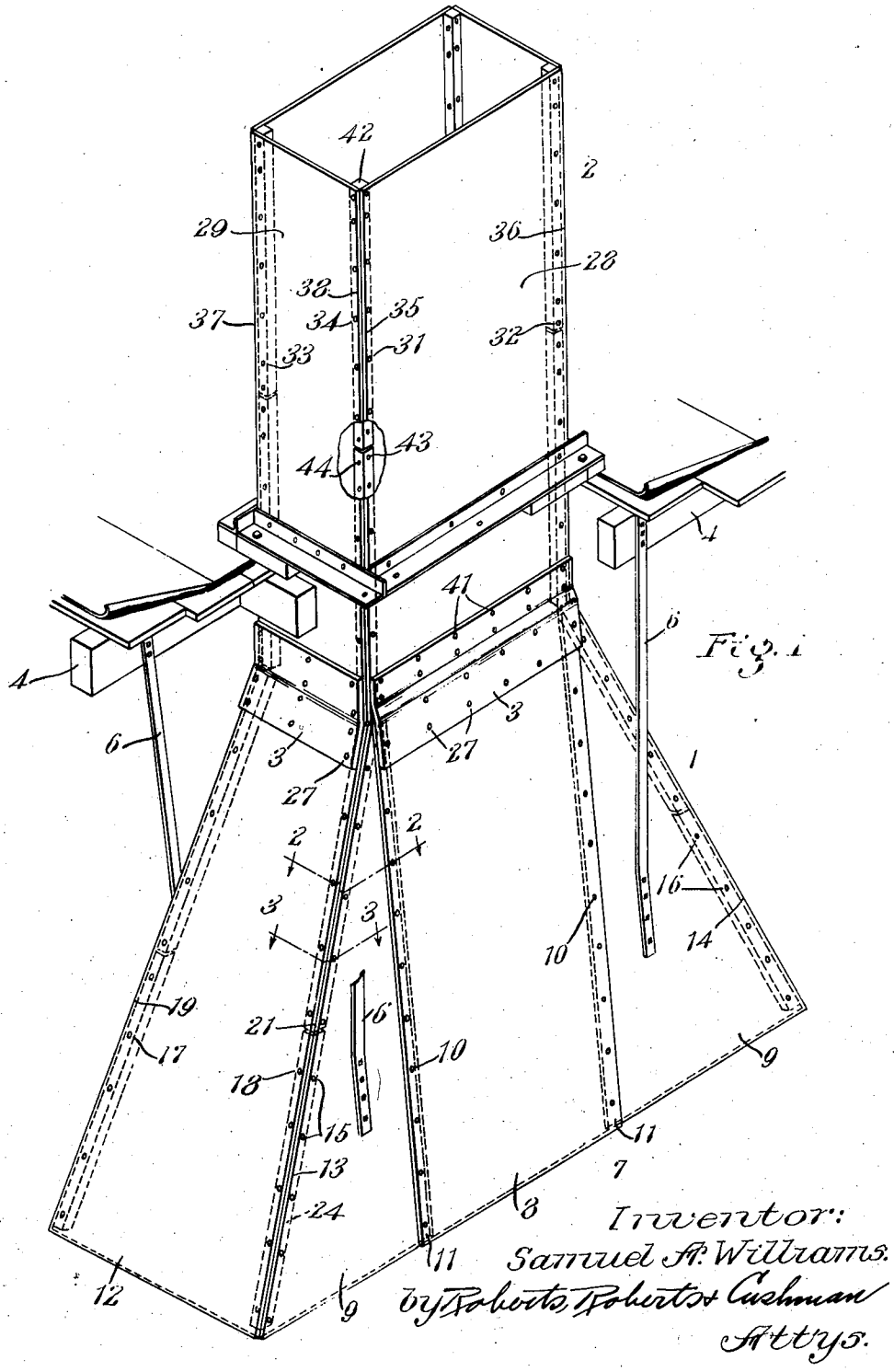


Fig. 1

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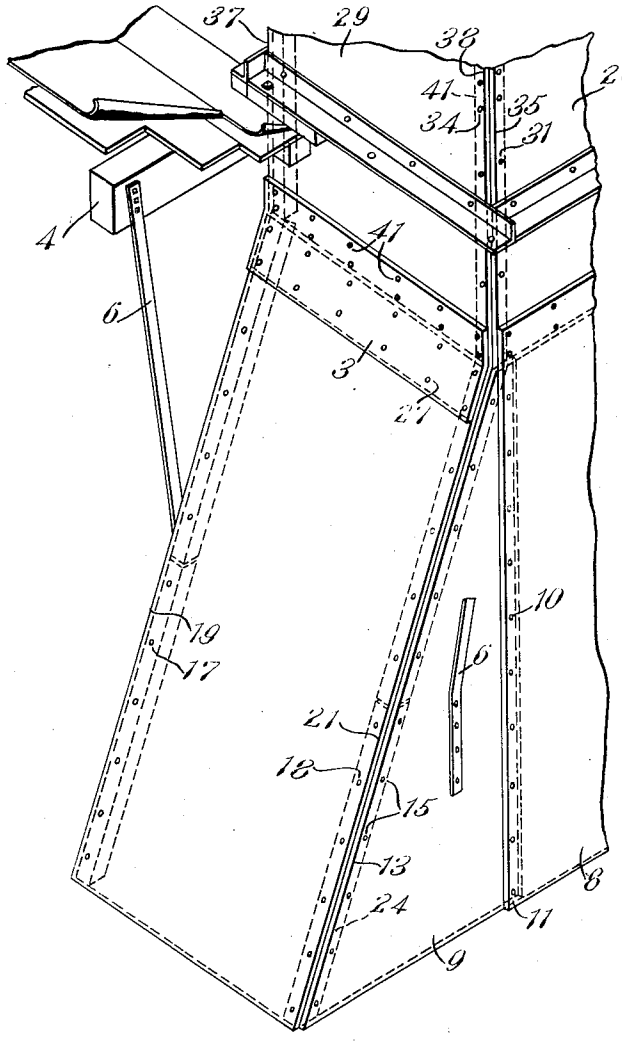


Fig. 5.

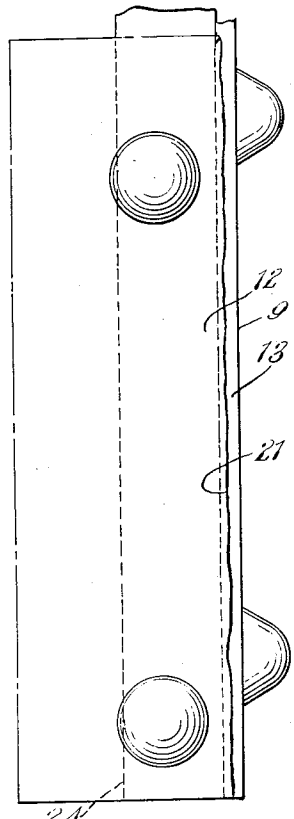


Fig. 4.

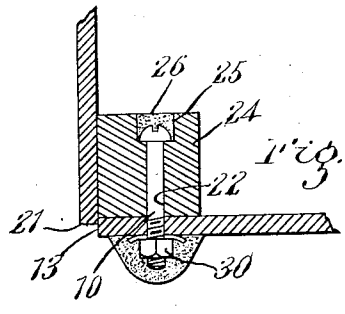


Fig. 3.

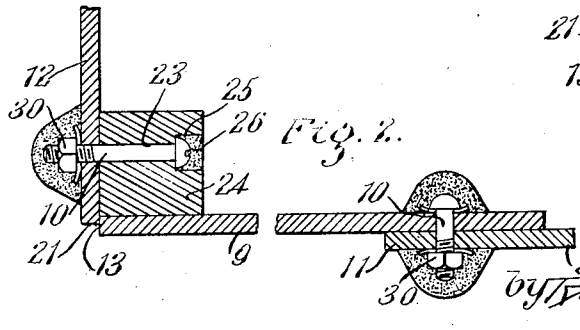


Fig. 2.

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UNITED STATES PATENT OFFICE.

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SMOKE JACK.

Application filed February 3, 1925. Serial No. 6,596.

The present invention relates to smoke jacks or similar smoke conducting funnels, and more especially to certain improvements in the construction thereof.

Smoke jacks or funnels, such as those employed in round houses for locomotives, are subjected to severe conditions of mechanical strain due both to their weight and to the currents of air and smoke passing through them, and they are also seriously affected by the chemically active character of the gases and the varying physical condition of the atmosphere with which they are continuously in contact. Hence it is necessary to employ a material for these constructions which is relatively resistant to such conditions, in order that they may serve their purpose for a reasonably long period of time after they are once set up.

For these reasons, an inert material is preferable if not absolutely essential, and the ordinary building materials such as iron and wood are to be avoided. Hence, a chemically more resistant substance, such as asbestos is usually used. For example, the asbestos fibre may be admixed with Portland cement and water to a suitable consistency, the mixture being then molded into sheets under high pressure then bent into the desired conical or cylindrical shape required, and subsequently allowed to dry and harden in its thus acquired shape, as the cement sets. For a single jack sheets of several different shapes are usually required which are fitted together, (as by overlapping the edges and fastening them with bolts) to form the completed smoke jack. Such a construction is described in U. S. Patent 955,290 to W. R. Seigle.

However, molded shapes are difficult to make, require the construction of expensive molds, and do not conform to specified dimensions and contours sufficiently accurately to permit of their certain assembly without serious distortions or the necessity of reforming the various parts to a considerable extent. Consequently in practice, it is necessary to set up such smoke jacks at the place where they are manufactured so that the parts may be further shaped and fitted together, in order to insure the satisfactory assembly of them when the jack is fully installed. They are then taken down and the various sections packed and shipped. Even when such precautions have been taken, it is frequently discovered that the molded and fitted shapes are contorted or damaged by handling and in transit to such extent that still further adjustments must be made in order to construct a satisfactory jack. Obviously, under such conditions it is quite impracticable to replace a damaged section of the jack with a new section which can be used directly as a substitute, without considerable re-shaping and re-fitting, resulting in delay and the general impairment of the installation as a whole.

A further fault of such constructions is that, due to the flared shape of the bottom portion, they tend to warp out of shape under their own weight and the softening influence of moist air unless firmly braced with cross pieces, usually angle iron, which add to the weight and are subject to corrosion. Likewise, the metal fastenings connecting the several parts of the jack project from the surface of the sheets and either remain exposed or are covered with a wad of cement. In both cases they are sooner or later attacked by the atmosphere, for the cement coating is subject to cracking or flaking off which permits the gases to reach the metal fastenings, thus causing them to rust and bind so that they cannot be taken off if this should for any reason be necessary, or loosening and weakening them so that they will eventually fail to hold the section firmly together.

It is accordingly an object of the invention to provide a smoke jack construction wherein these difficulties in construction and assembly shall not appear or shall be substantially overcome, and which will be generally more resistant to the conditions to which it is subjected in transportation and use than those heretofore employed. It is also an object of the invention to provide a construction in which the parts may be made with those economies of material, storage space and labor incident to the standardization of parts, and which will permit the ready assembly or substitution of any of the several sections of the jack by corresponding sections taken from a common stock supply. It is a further object to provide allowance for slight irregularities of the several interfitting edges of the sheet occurring in the course of manufacture, as a result of unequal expansion and contraction, due to the setting of the cement, heat or

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the like, without disrupting or deforming adjacent sections and without causing it to bend or buckle itself.

The invention will be described with respect to its adaptation for smoke jacks, as illustrated by the accompanying drawings in which,

Fig. 1 is a perspective view of an assembled smoke jack;

Fig. 2 is a detailed section along line 2—2 of Fig. 1;

Fig. 3 is a detailed section along line 3—3 of Fig. 1;

Fig. 4 is an enlarged view of a corner of the jack;

Fig. 5 is a perspective view, partly broken away, of a modified form of smoke jack.

Referring to the drawings, wherein like numerals refer to like parts, the numeral 1 indicates the hood portion of the jack, having the general shape of a truncated pyramid surmounted by the rectangular stack 2, the two portions being connected at the throat by overlying plates 3 and suspended from the roof of the building 4, in which it is erected, by means of angle irons and hangers 6.

The walls or side members 7 of the hood portion 1 as shown, consists of a rectangular sheet 8 and two triangular sheets 9 fastened thereto as by bolts 10 along the overlapping edges 11, while the ends 12 are each made from a single sheet. The lateral margins 13, 14 of the sides 7 are provided with rows of holes 15, 16, respectively.

The ends 12 are provided with similar rows of holes 17, 18 near the margins 19 and 21 respectively. The sides and ends are retained in position by suitable engagement with the series of bolt holes 22 and 23 respectively, perpendicularly disposed thereto in the corner posts 24, and countersunk at their inner extremities 25 as more fully shown in Figs. 2 and 3, the bolt heads being covered by plugs of cement 26.

Similar rows of holes (not shown) are provided along the upper portion of the side and end walls, corresponding to holes 27 in the plates 3.

The stack portion of the jack consists of side and end members composed of panels 28 and 29, having rows of holes 31, 32, 33, and 34 along their vertical edges 35, 36, 37 and 38 respectively, and also holes (not shown) along their lower edges, to register with holes 41 in the plates 3. The panels 28 and 29 are retained in position by means of posts 42 fitting into the corners formed by their intersections, and provided with bolt holes 43 and 44, similar to corner posts 24 already described.

The flat asbestos sheets, from which all of the sections required by the present invention may be cut, are made by first preparing a mixture of asbestos fibres with a binder or bond, such as Portland cement and water, of relatively fluid consistency, flowing it into a suitable mold having a porous bottom and subjecting the charge to hydraulic pressure from above, thus expressing the water and reducing the pulpy mass to a substantially compact and consolidated sheet usually ½″ or less in thickness and (with or without repressing the sheet thus formed) subsequently permitting it to dry and the cement to set. Similar sheets from which the corner posts may be cut, are made in a like manner, but the amount of pulp used is sufficiently greater to form a sheet several inches thick. In this case, however, it is ordinarily essential to repress the sheet, which, after being formed is placed between steel plates and again subjected to compression, of the order of several thousand pounds per square inch, whereby the whole mass is consolidated to a very marked degree, but substantially uniformly in all directions.

The thick sheets so produced may be cut and shaped into posts of the thickness required and further shaped, drilled, countersunk and otherwise worked in a manner similar to the operations which may be carried out upon wood. It is further characterized by manifesting no noticeable tendency toward lamination and consequently is equally retentive of fastenings or the like which may traverse it in one direction as of those passing through it at right angles thereto, and both may be provided in the same post. It is also possessed of high tensile strength and appreciable resiliency and toughness, to resist both stresses and strains of a high order without fracture.

Preparatory to assembly, the sheets which have been made in this fashion are cut in any convenient way into the several sizes and shapes required, and then applied to corresponding templates or frames (not shown) and perforated along their lateral margins. One edge of each section serves as the base line from which all of the holes are positively spaced in accordance with the template.

For example, side wall 7 may be constructed by cutting triangular sheets 9 to size, fitting them into a suitable template, along the edges 13, and 14 and providing the rows of holes 15 and 16, respectively, at a fixed distance therefrom and a recond row along the opposite margins to correspond with holes similarly provided in the margins 11 of sheet 8. In this manner edges 13 and 14 will be perforated exactly in accordance with the template, any irregularities being compensated for by the sheet 8.

The side 7 may be composed of a single sheet or assembled before providing the marginal rows of holes, in which case the edge 13 may serve as a standard and irregularities of the sheet be permitted to extend

beyond the row of holes 16 and upon the opposite margin 14.

In like manner edge 19 of the end wall 12 may be fixed with respect to the stencil and perforated, any irregularities in the sheet projecting upon the edge 21 beyond the row of holes 18, which are positively spaced from edge 19.

The corner posts 24 are cut from the thick sheets or blocks of bonded asbestos above described so as to fit into the corners defined by the intersection of the side and end elements 7 and 12, respectively, and provided with bolt holes (as shown in Figs. 2 and 3) passing therethrough at right angles to the outer faces of the post, countersunk at their inner extremities, 25, and spaced to correspond to the holes provided in the margins of the front and side sections respectively which have already been described.

The same principle is followed with regard to the sections 28 and 29 of the stack, the edge 35 for example being provided with a row of holes 31 at a definite distance therefrom, leaving edge 36 spaced at a greater or less distance from the row of holes 32, depending upon the accuracy with which the sheet has been shaped. Likewise, end portion 29 may have edge 37 the standard and edge 38 variable, with respect to the marginal rows of holes.

The upper margins of sides 7, ends 12 and the lower margins of the sides 28 and ends 29 will likewise be punched, while in the stencil employed for punching the vertical margins, to correspond with similar holes 27 and 41 provided in the overlapping plates 3, respectively.

Arrived at this stage in actual manufacturing operations, the several sections are ready for shipment without further preparation, the subsequent steps in construction being carried out at the point where actual erection of the jack is to be made. It is to be noted that the several parts are in the form of flat sheets or square posts, which may be conveniently and securely packed together so that the parcel of them is neither bulky nor subject to damage while in transit.

In construction, the side section 7 may be set up with the corner post 24 against edge 13, the perforations 15 in the latter registering with the outer ends of bolt holes 22 in the post, bolts 10 being then passed therethrough with their heads received within the countersunk portions 25 thereof, and nuts 30 turned up upon the outer threaded ends of the bolts. This will bring edge 13 flush with the corner of the post 24. End section 12 is then placed with its marginal row of holes 18 adjacent to edge 21 coinciding with the second set of bolt holes in post 24, bolts 10 passed therethrough with their heads in the countersunk portion 25, and likewise fixed in position by nuts 30 on the outer ends.

The edge 21 may be of slightly irregular contour, and either project beyond or fall somewhat short of the corner of the post 24 as shown by Fig. 4. In either event, the joint is not only strong but essentially gas tight, without further trimming or fitting of the sections and without introducing inaccuracies in either the size or shape of any one of the sections or of the jack as a whole.

A like procedure is followed in the construction and assembly of the remaining sections of the hood portion of the jack,—one of each pair of adjacent edges lying flush with the corner post to which it is attached and the other overlapping it to such extent as the inaccuracies in its size and shape may require.

The stack portion 2 is assembled upon the same principle, edge 35 of side wall 28 lying flush with the edge of corner post 42 for example and edge 38 of end wall 29 overlapping the same to a greater or less extent, as may be necessary, but the rows of holes 31, 32, 33, 34, being disposed parallel to each other and spaced apart the standard distance required, as provided for by the template used in making them.

Cement, preferably impervious and resistant to chemical action of the gases and vapors to be encountered, such as asbestos and Portland cement is then filled into the countersunk portions 25 of the bolt holes, so as to cover the heads of the bolts and protect them from the smoke and gases ordinarily encountered by forming a plug 26 therein. A similar wad of cement is applied to cover the exterior end of the bolt 10 and nut 30. Such cement coverings will be firmly held in place and exhibit no tendency to crack or separate from the bolt heads, as in former constructions, and thus serve as a permanent and adequate protection thereof.

The stack and hood portions are then fastened, by plates 3 as already described and the completed jack suspended by any suitable means, such as the hangers 6, from the roof 4.

The modification shown in Fig. 5 (like numerals indicating like parts) is substantially identical with the stack already described, except that the end walls 12 are rectangular instead of tapered as shown by Fig. 1, and side wall 7 being in the same plane as side of stack 29. Obviously, in this case, if a sufficiently large sheet is used the walls 7, 12 and 29 might be formed from a single sheet. Likewise, in Fig. 1, side walls 28 and panel 8 might be fashioned from a single sheet of material.

Other modifications and adaptations of the invention will present themselves in the course of actual practice thereof for the construction of jacks, in order to conform to

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special requirements of their erection and the conditions of use to which they will be subsequently subjected. However, such modifications and adaptations of the invention are to be considered as comprehended in the present disclosure and included by the terms of the following claims.

I claim:

1. A smoke jack comprising walls of sheets of bonded asbestos angularly disposed and substantially meeting along their adjacent margins, corner members conforming to the angle thus defined, countersunk openings passing through the corner members, fastening means seated therein, and joined to the marginal portion of the wall, and cementitious material covering said fastening means.

2. A smoke jack comprising walls of sheets of bonded asbestos angularly disposed and substantially meeting along their adjacent margins, corner members conforming to the angle thus defined, countersunk openings passing through the corner members in a plurality of directions, fastening means seated therein and joined to the marginal portions of the walls, and cementitious material covering said fastening means.

3. A smoke jack comprising walls of sheets of bonded asbestos angularly disposed and substantially meeting or overlapping along adjacent margins, corner members conforming to the angle thus defined, countersunk openings passing through the corner members, a marginal edge of one wall standing flush with the edge of the corner member and the marginal portion of the adjacent wall being permitted to fall short of or overlap said first marginal edge, depending upon the irregularities in dimension or shape of said wall, openings in said walls at a predetermined distance from said flush marginal edge, openings at a predetermined distance from said first openings and in proximity to the second marginal portion, fastening means passing through said openings and through the countersunk openings in the corresponding corner members, and cementitious material covering and protecting said fastening means.

4. A method of constructing smoke jacks of bonded asbestos, which comprises providing perforations in a sheet of bonded asbestos at a fixed distance from a given margin thereof, providing a second row of perforations, spaced at a fixed distance from the first row, perforating a bonded asbestos support member to correspond to said first row of perforations, when the edge of said support member coincides with said given margin of the bonded asbestos sheet, perforating a face of a second bonded asbestos support member to correspond to said second row of perforations, providing a row of perforations in a second sheet of bonded asbestos at a fixed distance from a margin thereof and a second row of perforations at a fixed distance from the first, perforating said second asbestos support member through a face intersecting with the first and at a distance from said intersection not greater than that between the edge and marginal row of perforations in said second asbestos sheet, and corresponding thereto, and inserting fastening means through the corresponding perforations in said sheets and supporting members.

Signed by me at Nashua, N. H., this 31st day of January, 1925.

SAMUEL A. WILLIAMS.

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