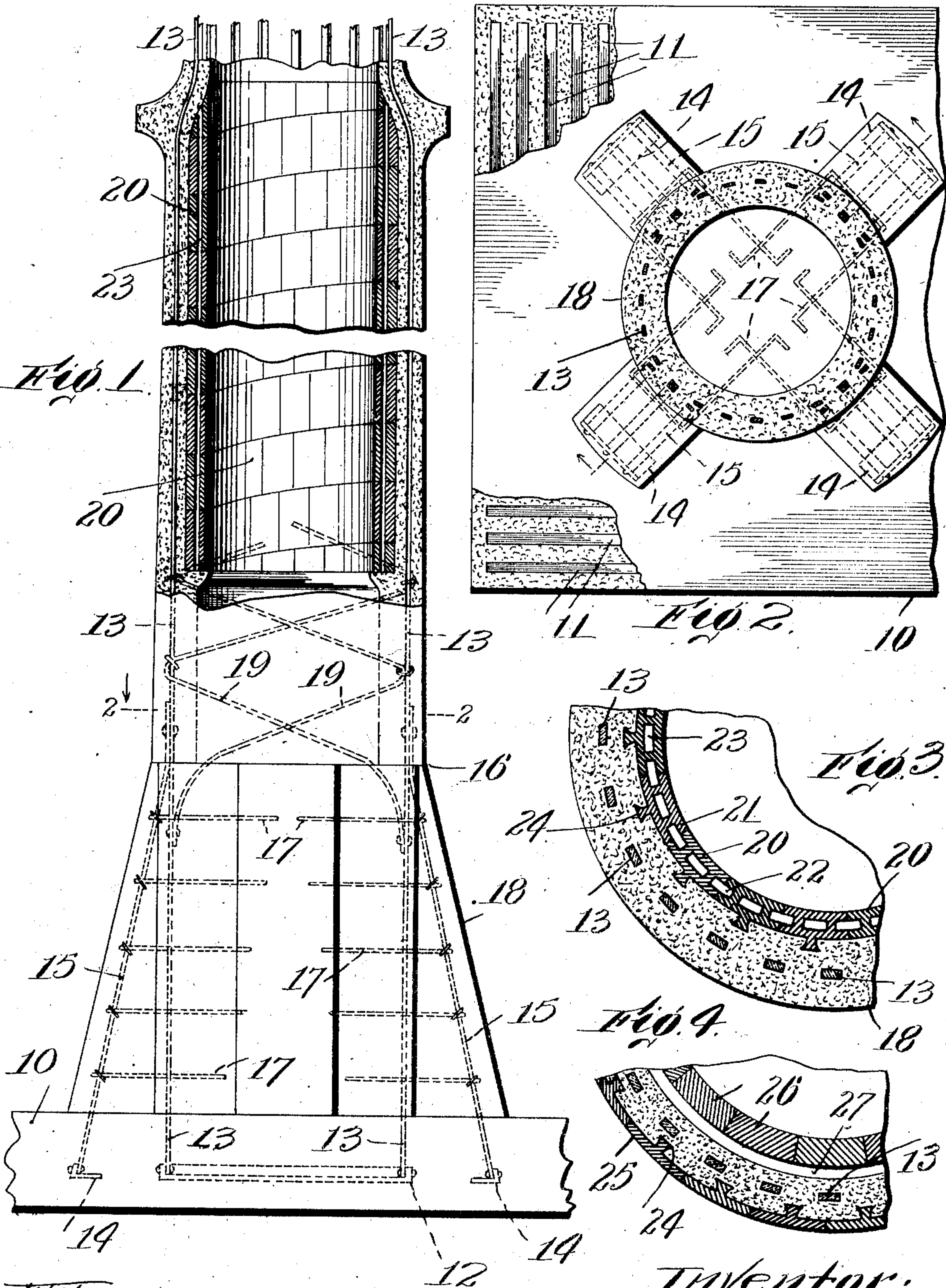


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O. T. BENSON.  
CHIMNEY OR STACK.  
APPLICATION FILED APR. 4, 1907.



Witnesses:

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# UNITED STATES PATENT OFFICE.

OSCAR T. BENSON, OF WORCESTER, MASSACHUSETTS.

## CHIMNEY OR STACK.

No. 883,164.

Specification of Letters Patent.

Patented March 31, 1908.

Application filed April 4, 1907. Serial No. 366,424.

Be it known that I, OSCAR T. BENSON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Chimney or Stack, of which the following is a specification.

This invention relates to a construction for chimneys or stacks.

The principal objects of the invention are to provide a reinforcing structure which can be set up in position and the parts thereof securely connected together before the concrete is applied. Also to provide an improved facing preferably for the inner surface of the chimney; and generally, to improve the construction of chimneys or stacks in which a metallic reinforcing frame is embedded in the concrete and a facing of tiles or bricks is employed.

Reference is to be had to the accompanying drawings in which,

Figure 1 is a side elevation partly in vertical central section showing a preferred form of the invention. Fig. 2 is a horizontal section of the same on the line 2—2 of Fig. 1. Fig. 3 is a fragmentary sectional view on an enlarged scale, and Fig. 4 is a similar view showing a modification.

The foundation is made with a base constructed of concrete or the like and having two series of metallic bars 11 embedded therein. Also embedded in this base is an angle-iron 12 preferably of circular form to which are secured the lower ends of a series of vertical reinforcing bars 13 which may be of angle-iron, channel-iron, T-iron, or of any desired form. Also located in the base of the foundation are a series of angle-irons 14, in the present instance four of these are shown extending toward the four corners of the foundation. From these angle-irons strengthening bars 15 extend upwardly on an incline being secured to the upright strengthening bars at a point near the ground line 16. Each angle-iron 14 is shown as connected with three of the bars 15 and the latter bars are provided with tie rods or hooks 17 extending inwardly to be embedded in the concrete of which the upper part 18 of the foundation is formed.

It is to be noted that the metal parts so far described are supported by the bars 12 and 14 and are set up to occupy the positions they are to occupy in the completed structure. The body of concrete 18 is applied to them to surround and embed them, a mold

being used if desired to form the exterior shape of the foundation.

Above the ground line the irons 13 are extended to the desired height being connected with each other by two sets of tie rods 19. The lower ends of these tie rods are secured to the uprights, preferably at a point near the top of the foundation 18 and they are wound around continuously to the top of the chimney or stack. One of these spiral or helical tie rods is wound inside the uprights and the other outside, both being secured to the uprights where they cross them.

It will be seen that the metal work of the chimney can be reared in advance of the application of the concrete thereto in a manner similar to that in which steel-frame buildings are made and that the molds can then be applied and concrete molded to its final form around its self-sustaining frame work. This is an improvement over those forms of construction in which the reinforcing rods are merely placed in position as the concrete is molded, for the reason that the frame-work is self-sustaining and does not depend on the concrete for support in any sense of the word.

As is usual with chimneys of this kind, the concrete wall extends up to a point at which the heat enters the chimney and above that an air space is provided for some distance in a lining which may be made of tiles, fire-bricks or the like. In the present instance, the lining is made by a series of tiles 20. Each tile has a pair of walls 21 at each end separated by an open space 22, two of these spaces on adjacent tiles coming together to form an air space. Each tile also is provided with a central air space 23. On the inside of the tiles they are provided with dove-tailed projections 24 for receiving the concrete and locking the tiles thereto in an effective manner. If desired, the tiles may be made without the air space in a manner similar to the tiles 25 shown in Fig. 4. In this case, when they are used on the inside of the chimney, boards are placed vertically along the spaces between the projections 24 and are withdrawn when the concrete has been molded to leave the necessary air spaces at this point. The chimney can be made in other ways, as for instance in Fig. 4, is shown a series of fire-bricks 26 which are spaced from the inner concrete wall to form a continuous air space 27. Tiles 25 similar to those above mentioned are shown on the outside of this chimney. Whatever the form



of tiles used, they are preferably laid helically as is indicated in Fig. 1. This adds to the strength of the chimney and increases its durability.

5 The parts so far described are illustrated as being applied to the lower part of the chimney, the upper part may be made in any desired way but preferably, the upright metal reinforcing rods 13 are continued in  
10 the same way and connected by the spiral tie rods 19.

By the construction of a chimney in this manner, the operation of setting up the metal-work is facilitated and as it supports  
15 itself, application of the concrete thereto is carried out in a most simple manner. Moreover, the chimney is stronger and in some instances may be made with some economy in concrete without sacrificing its strength.  
20 The air spaces in the inner wall of the chimney formed either in the tiles 20 or by removing the parts as indicated or by leaving a space between the fire-bricks and wall, are preferably provided with openings at some  
25 point in the inner surface of the wall to allow for contraction and expansion, but when tiles are used this is not necessary for the reason that tiles are sufficiently porous to prevent any trouble from the expansion and  
30 contraction of air in the air spaces. It is to be seen that a chimney constructed in accordance with this invention is very strong and durable.

While I have illustrated and described a  
35 particular form of the invention, I am aware that many modifications may be made therein without departing from the spirit of the same as expressed in the claims. Therefore, I do not wish to be limited to the particular form shown, but  
40 What I do claim is:—

1. In a chimney or stack, the combination  
45 of a circular strengthening angle-iron, upright strengthening rods secured thereto at their lower ends, inclined rods connected with the upright rods and having their lower ends secured at about the level of the circular strengthening iron, a solid body of concrete surrounding all of said irons and rods  
50 to constitute a foundation, a circular wall resting on said foundation and consisting of spiral or helical tie rods secured to said uprights, and a hollow cylindrical body of concrete surrounding the uprights and tie rods.
- 55 2. In a chimney or stack, the combination of a concrete foundation, an angle iron embedded in the base of said foundation, reinforcing bars having their lower ends secured to the upwardly projecting portion of said  
60 angle iron and extending upwardly therefrom through the entire length of the structure, a series of angle irons embedded in the base outside of the first named angle iron and in substantially the same plane, strengthening  
65 bars secured to, and extending at an angle

from, the last named angle irons upwardly and connecting with said reinforcing bars, said foundation having projections for receiving said strengthening bars, said foundation extending up to a point slightly above the top of said strengthening bars and projections, and a hollow cylindrical stack formed of concrete resting on the top of said foundation.

3. In a chimney or stack, the combination of a concrete foundation, an iron embedded in the base of said foundation, reinforcing bars having their lower ends secured to said iron and extending upwardly therefrom through the entire length of the structure, a series of irons embedded in the base outside  
75 said first named iron and in substantially the same plane, strengthening bars secured to, and extending at an angle from, the last named irons upwardly and connecting with said reinforcing bars, said foundation having  
80 projections for receiving said strengthening bars, said projections being integral with the main body of the foundation, each of said inclined strengthening bars being provided with a plurality of hooks extending inwardly  
85 into the main body of said foundation and located at different elevations along the same, and a hollow stack resting on the top of said foundation.

4. In a chimney or stack, the combination  
95 of a solid concrete foundation, series of metallic bars embedded near the bottom thereof, a circular angle iron embedded in the base of said foundation above said bars, vertical reinforcing bars having their lower ends secured to the upwardly projecting portion of  
100 said angle iron and extending upwardly therefrom through the entire length of the structure, a series of angle irons embedded in the base outside said circular angle iron and in substantially the same plane, strengthening  
105 bars secured to, and extending at an angle from, the last named angle irons upwardly and connecting with said reinforcing bars, said foundation having projections  
110 with slanting outer walls for receiving said strengthening bars, said projections being integral with the main body of the foundation, said foundation being solid up to a point slightly above the top of said strengthening bars and projections, and a hollow  
115 cylindrical stack formed of concrete resting on the top of said foundation and having tie rods embedded in the body thereof and secured to said reinforcing bars.

5. In a chimney or stack, the combination  
120 of a solid concrete foundation, a series of metallic bars embedded near the bottom thereof, a circular angle iron embedded in the base of said foundation above said bars, vertical reinforcing bars having their lower  
125 ends secured to the upwardly projecting portion of said angle iron and extending upwardly therefrom through the entire length of the structure, a series of four angle  
130



irons embedded in the base outside said circular angle iron and in substantially the same plane, strengthening bars secured to, and extending at an angle from, the last  
 5 named angle irons upwardly and connecting with said reinforcing bars, said foundation having four projections with slanting outer walls for receiving said strengthening bars, said projections being integral with the main  
 10 body of the foundation, each of said inclined strengthening bars being provided with a plurality of substantially horizontal hooks extending inwardly into the main body of said foundation and located at different  
 15 elevations along the same, said foundation being solid up to a point slightly above the top of said strengthening bars and projections, and a hollow cylindrical stack formed of concrete resting on the top of said founda-  
 20 tion and having tie rods embedded in the body thereof and secured to said reinforcing bars.

6. In a chimney or stack, the combination of a solid concrete foundation, a series of  
 25 metallic bars embedded near the bottom thereof, a circular angle iron embedded in the base of said foundation above said bars, vertical reinforcing bars having their lower ends secured to the upwardly projecting  
 30 portion of said angle iron and extending upwardly therefrom through the entire length of the structure, a series of four angle irons embedded in the base outside said circular angle iron and in substantially the same  
 35 plane, strengthening bars secured to, and extending at an angle from, the last named angle irons upwardly and connecting with said reinforcing bars, said foundation hav-  
 40 ing four projections with slanting outer walls for receiving said strengthening bars, said projections being integral with the main body of the foundation, said foundation being solid up to a point slightly above the

top of said strengthening bars and projec-  
 tions, and a hollow cylindrical stack formed 45  
 of concrete resting on the top of said founda-  
 tion and having tie rods embedded in the  
 body thereof and secured to said reinforcing  
 bars, said stack having an inner wall inside  
 said reinforcing bars and tie rods composed 50  
 of tiles having air spaces extending verti-  
 cally therethrough, and having projections  
 by which they are tied to said concrete wall,  
 said projections being embedded in the same.

7. In a chimney or stack, the combination 55  
 of a solid concrete foundation, a circular  
 angle iron embedded in the base of said  
 foundation, vertical reinforcing bars having  
 their lower ends secured to the upwardly  
 projecting portion of said angle iron and 60  
 extending upwardly therefrom, a series of  
 angle irons embedded in the base outside  
 said circular angle iron and in substantially  
 the same plane, strengthening bars secured  
 to, and extending at an angle from, the last 65  
 named angle irons upwardly and connecting  
 with said reinforcing bars, said foundation  
 having projections for receiving said strength-  
 ening bars, and a hollow cylindrical stack  
 formed of concrete resting on the top of said 70  
 foundation and having tie rods embedded  
 in the body thereof and secured to said  
 reinforcing bars, said stack having an inner  
 wall inside said reinforcing bars and tie rods  
 composed of tiles having air spaces extend- 75  
 ing vertically therethrough, and having pro-  
 jections by which they are tied to said con-  
 crete wall, said projections being embedded  
 in the same.

In testimony whereof I have hereunto set 80  
 my hand, in the presence of two subscribing  
 witnesses.

OSCAR T. BENSON.

Witnesses:

ALBERT E. FAY,

C. FORREST WESSON.