T. H. SKINNER.

FIREPROOF SHEATHING FOR STRUCTURAL STEEL.

APPLICATION FILED MAR. 20, 1909.

1,056,463. Patented Mar. 18, 1913.

Fig. 3.

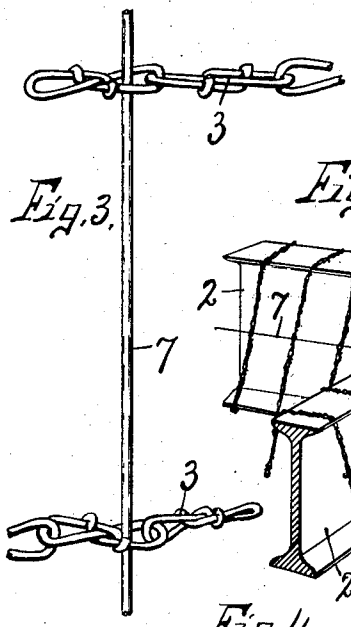


Fig. 1.

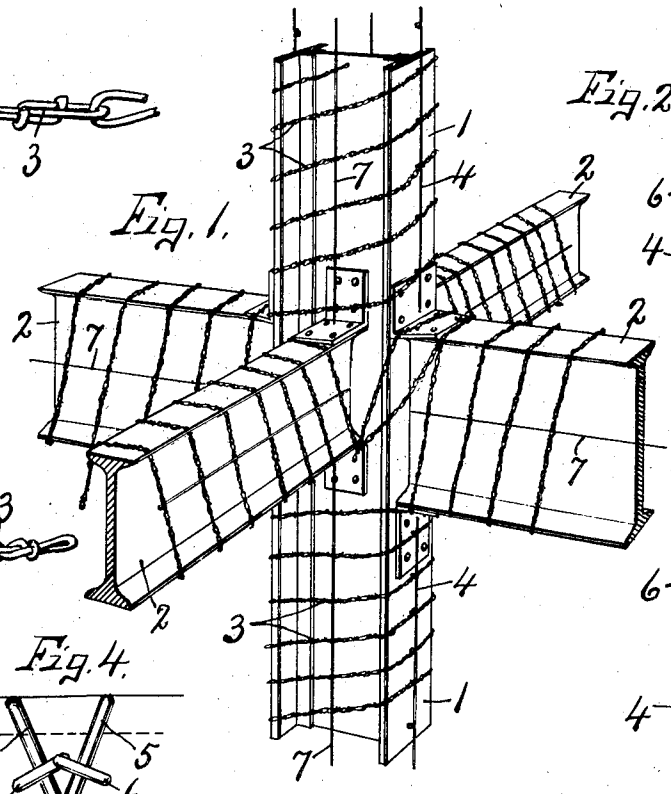


Fig. 2.

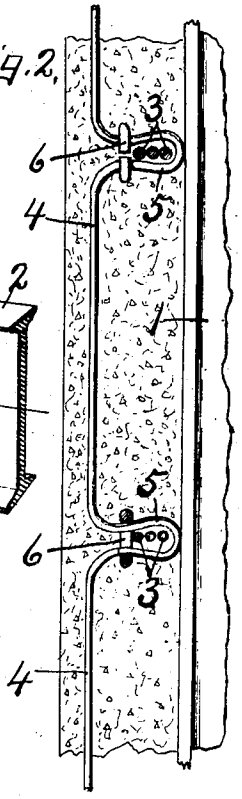
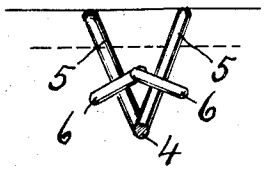


Fig. 4.



Witnesses

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FIREPROOF SHEATHING FOR STRUCTURAL STEEL.

1,056,463. Specification of Letters Patent. Patented Mar. 18, 1913.

Application filed March 20, 1909. Serial No. 484,697.

To all whom it may concern:

Be it known that I, THEODORE H. SKINNER, of Oneida, in the county of Madison, in the State of New York, have invented new and useful Improvements in Fireproof Sheathing for Structural Steel, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in fire proof sheathing for structural steel frames of buildings, in which chains are employed as the reinforcing elements, and is particularly useful in connection with steel beams and columns as distinguished from the floor reinforcement shown in my pending application #484,698, filed March 20, 1909.

In modern steel building structure it is customary to envelop the steel columns and beams in a concrete sheathing or casing as a protection against warping or other distortion by heat in case of fire.

My main object is to increase the permanency and efficiency of such sheathing by the use of chain reinforcements which may be conveniently and expeditiously wound around the steel columns and beams to more effectively maintain the integrity and rigidity of the sheathing. In other words, I have not only sought to materially reduce the cost of applying the reinforcement to structural frames of this character, but also to establish a closer unity between the frame and sheathing by the use of open link chains, which, by reason of their flexibility at all points, may be wound more tightly and with greater speed and accuracy than any continuous wire, which would necessarily require more or less fitting or bending to conform to the shape of the beam or column.

Another object is to provide a simple means for spacing the helices of the chain uniform distances apart and holding these parts of the chain in fixed relation during progressive building.

A still further object is to provide a simple means for tightening all parts of the chain after winding upon the beams or columns.

Other objects and uses will be brought out in the following description.

In the drawings—Figure 1 is a perspective view of the column and portions of a series of floor beams projecting therefrom showing the application of my improved reinforcement thereto. Fig. 2 is an enlarged elevation of a portion of one side of the column seen in Fig. 1, showing a portion of my reinforcement as embedded in the concrete sheathing. Fig. 3 is an enlarged elevation of portions of the reinforcing chains showing the retaining bar for holding them in their tightened position. Fig. 4 is an enlarged horizontal sectional view through the spacing rod shown in Fig. 2.

The building frame structure shown in Fig. 1 comprises a column —1— and beams —2— projecting laterally from, and secured to, the column. A chain, or chains, —3— is, or are, wound spirally and tightly around and upon the column —1— and beams —2— with the helices spaced some distance apart and regulated by suitable spacing members consisting of wire rods —4— having loops —5— spaced at regular intervals and normally left open to permit portions of the chain to be drawn therethrough during the process of winding, after which the open sides of the loops may be closed upon the inclosed portions of the chain and held in fixed relation to the rod by rings or tie pieces —6—, although in most instances these tie pieces may be dispensed with by reason of the fact that when the concrete is set the closed loops are held in firm engagement with the inclosed portions of the chains. These loops project some distance laterally from the main line of the spacing rod and rest against the adjacent portion of the structural frame, thereby forming convenient chairs for the reception of the chains and serving to hold the main line of the spacing rods a uniform distance from the face of the frame which is to be sheathed in the concrete, leaving ample intervening space between the main line of the rod and support, and also between the chains and said support for the reception of the concrete. In other words, these rests or chairs not only firmly hold the rods and chain against relative movement, but also hold such chain and main line of the rod some distance from the face of the member to which the concrete is to be applied, allowing the concrete to be worked within and around all parts of the chain as well as the spacing rod, and at the same time the winding of the chains around the column or beam

serves to firmly hold the spacing rod in position. Some of the loops are deflected laterally in one direction, while the others are deflected in the opposite direction, as clearly shown in Fig. 4, for the purpose of bracing the spacing rod against lateral rocking movement and causing all parts of the spacing rod to stand a uniform distance from the face of the column or other support to which it is applied. In practice alternate loops are deflected in one direction and intermediate loops are deflected in opposite direction which accomplishes the desired result of bracing the main wire against lateral deflection. These spacing rods are particularly useful in connection with upright columns or walls where the chains would be most liable to sag by their own weight, and as previously stated, serve not only to hold the helices of said chains in their adjusted positions, but also enable the workmen to readily wind the chain around the column and into the loops with the assurance that the helices will be spaced a uniform distance apart.

Although I have shown in Figs. 1 and 2 the reinforcing unit comprising the chains —3— and spacing rods —4— as applied to one of the upright faces of the column —6—, it is clearly evident, upon reference to Fig. 2, that the same reinforcing unit may be used in connection with any wall to which it is desired to apply a concrete facing, and in some instances, instead of allowing the loops —5— to rest against the upright wall, the order of arrangement may be reversed bringing the main line wires or loops next to the wall.

During the process of winding, or after the chain has been wound in the manner described on the column and beams, portions thereof are twisted by hand, or by a suitable tool, to further tighten the same, and a wire retaining rod —7— is passed transversely through alined links of the twisted portions to hold them against untwisting, and thereby keeping all portions of the chains absolutely tight, the retaining wire being drawn through the twisted portions of the chain as fast as they are tightened, one helice after another, and at the same time when the concrete is filled in and around the links of the chain these retaining wires serve as additional reinforcement.

These chains are wound around the column and beams in the manner described prior to the installation of the forms and it is clearly evident that when the forms are placed in position and the concrete filled in in the usual manner, such concrete will be firmly worked through and around the links, thereby practically enveloping the entire system of chains, together with the beams and column, the spacing members causing an even distribution of the reinforcement throughout the entire area of the concrete, while the retaining wires or rods —7— serve to hold all parts of the chain in substantially the same plane and tightly across the spaces between the flanges of the beam, so that when the concrete is set the reinforcement is evenly distributed and each link becomes an individual anchorage for the concrete, by reason of the fact that the concrete is worked through and fills the links and envelops the entire chain, thereby establishing a reinforced unitary sheathing and making it practically a unitary part of the column and beams, leaving the entire reinforcement concealed within the concrete.

What I claim is:—

1. A reinforcement for concrete sheathing for the frames of buildings comprising a chain wound spirally around said frame, portions of the helices of said chain being twisted to tighten the same, and retaining means passed through the links of the twisted portions of the helices for holding them in their twisted tightened conditions.

2. In reinforced concrete building structures including a column having at least one flat side, a chain wound spirally around the column with its helices spaced some distance apart, and a rod running vertically along the flat side of the column in a line intersecting the adjacent portions of the helices of the chain and provided with loops embracing such helices at their intersections with the rod.

3. In reinforced concrete building structures including a column having channels in two of its opposite sides and the remaining sides substantially flat, a chain wound spirally around the column with its helices spaced some distance apart, rods running vertically through certain of the links of the helices at the open sides of the channels, and additional rods running vertically along the flat sides of the beam and provided with loops embracing adjacent portions of the helices.

In witness whereof I have hereunto set my hand this 10th day of March 1909.

THEODORE HOBART SKINNER.

Witnesses:
ETHELBERT DOTY PITT,
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