Feb. 13, 1923. 1,444,806

J. SOTY

FLOOR CONSTRUCTION FOR REENFORCED CONCRETE

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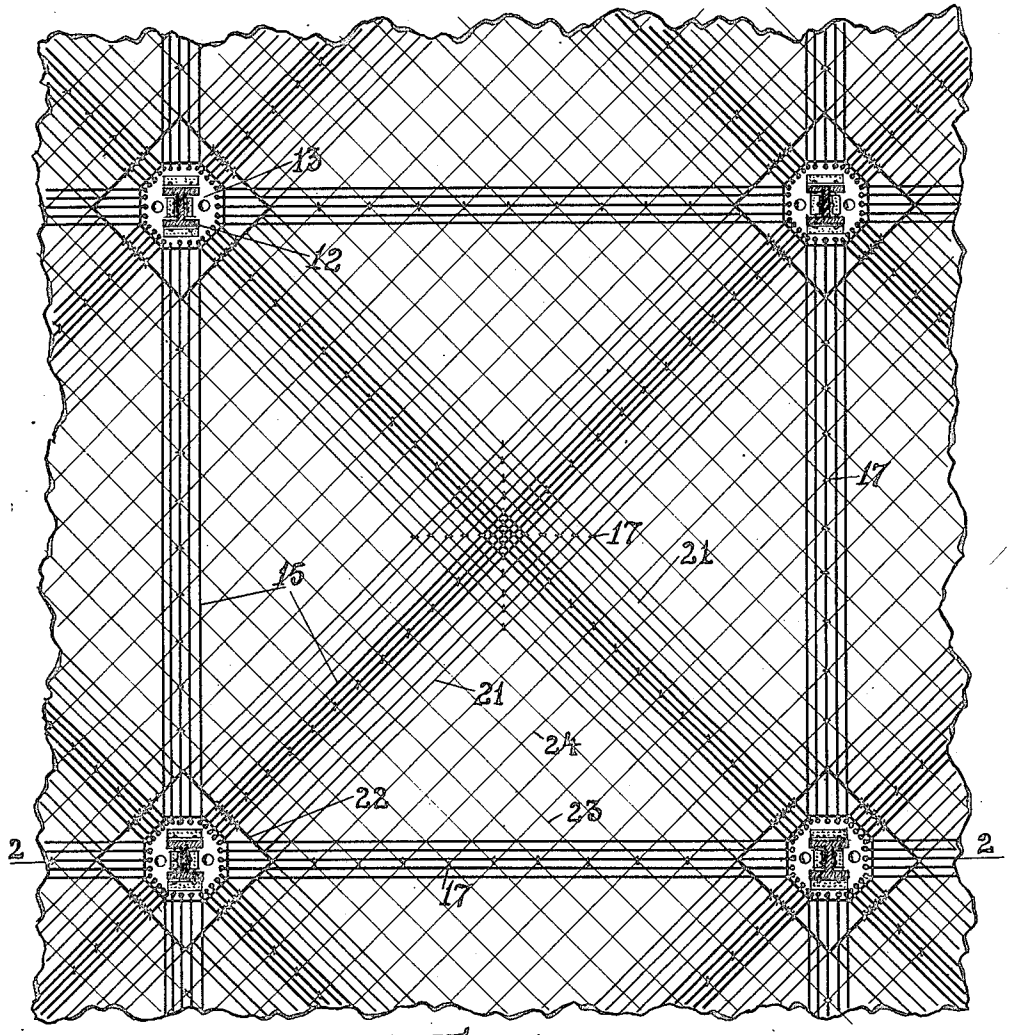


Fig. 1

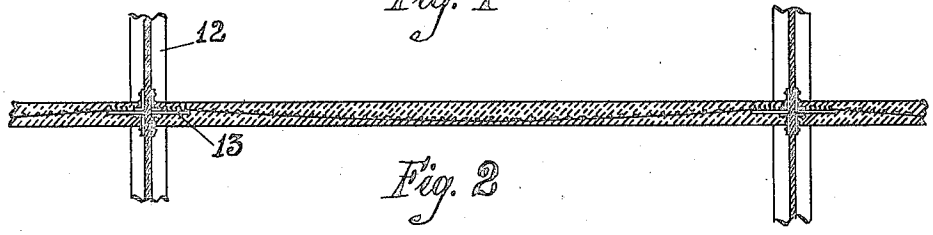


Fig. 2

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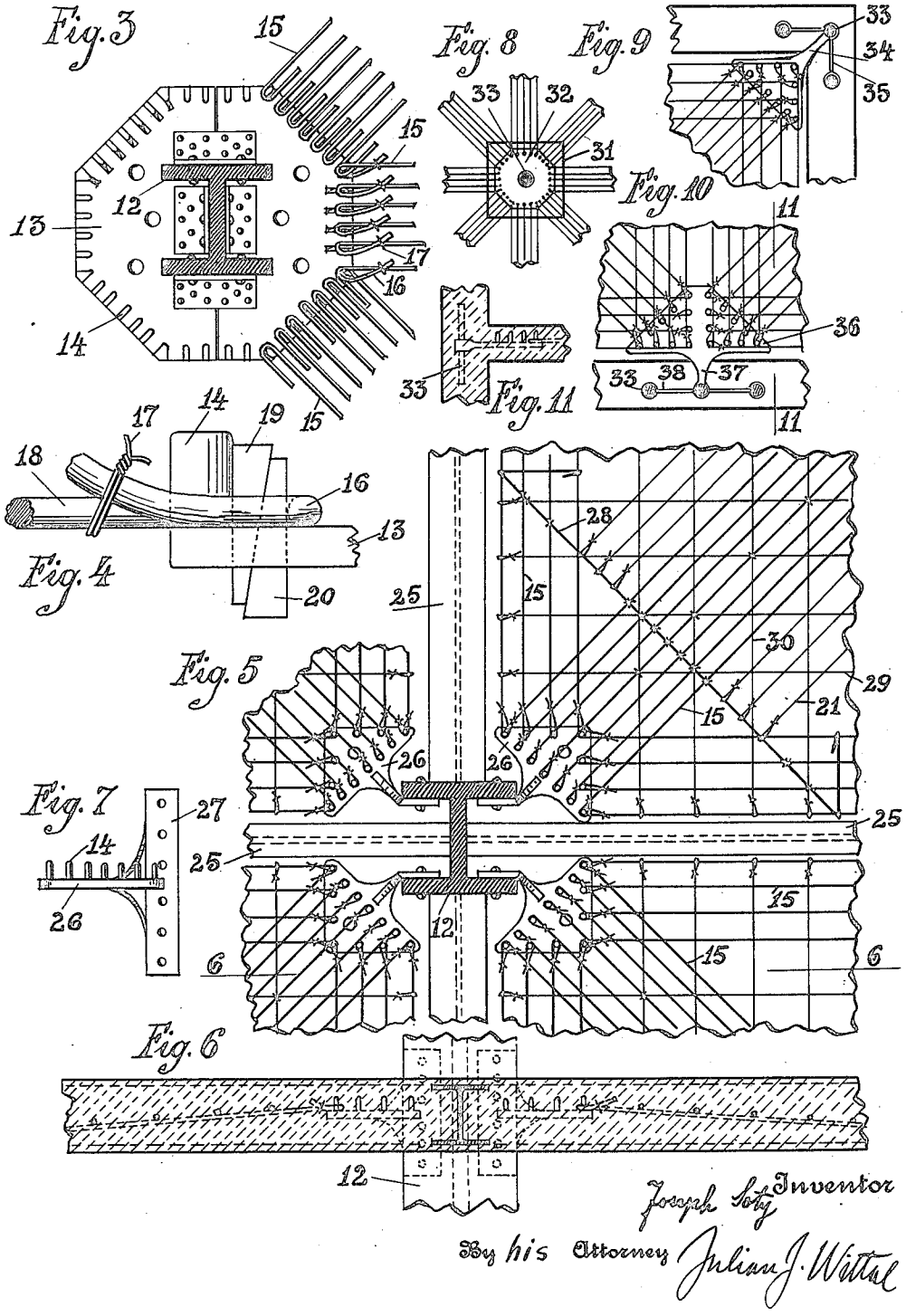
By his Attorney Julius J. Wittal

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Patented Feb. 13, 1923. 1,444,806

UNITED STATES PATENT OFFICE.

JOSEPH SOTY, OF NEW YORK, N. Y.

FLOOR CONSTRUCTION FOR REENFORCED CONCRETE.

Application filed March 10, 1922. Serial No. 542,665.

To all whom it may concern:

Be it known that I, JOSEPH SOTY, a citizen of the United States, and resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Floor Constructions for Reenforced Concrete, of which the following is a specification.

This invention relates to reenforced floor constructions and has for its main object to provide such a construction and system of building and reinforcing concrete floors which will do away with the horizontal beams used at present to carry part of the load on the floor construction.

Another object of this invention is to provide such a system which will make the top and lower surfaces of the floor construction perfectly horizontal and parallel to each other and thereby make the necessary forms and frames for the concrete more economical, simpler and cheaper.

Another object again is to make such a floor construction which will be easier to build, lighter in weight and cheaper in cost than those used at present for similar purposes.

Still further objects of this invention will be apparent while the description of my invention proceeds.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the same for effecting the various results mentioned hereinbefore, reference is to be had to the following description and accompanying drawings.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which:—

Fig. 1 is a plan view of a floor construction made according to my invention,

Fig. 2 is a vertical sectional view of said floor construction, the section being taken on the line 2—2 of Fig. 1,

Fig. 3 is a more detailed plan view of a connecting plate applied to the columns of the building to which my reenforced concrete floor construction is to be built,

Fig. 4 is a detail view of the method by which I connect the reinforcing bands to said plate,

Fig. 5 is diagrammatic plan view of a portion of a floor constructed according to my invention in the case where horizontal steel beams are desired to be used, though temporarily only,

Fig. 6 is a vertical cross sectional view of the floor construction used with temporary iron beams, the section being taken on the line 6—6 of Fig. 5,

Fig. 7 is a detail view of one of the connecting plates employed in the above mentioned second modification of my invention,

Fig. 8 is a diagrammatic plan view of my invention employed in connection with built stone or brick columns,

Fig. 9 is a diagrammatic plan view of a portion of the floor constructed according to my invention and joined at the corners of the building to built brick or stone walls.

Fig. 10 is a similar view to Fig. 9 showing said connection at the sides of a wall, and

Fig. 11 is a vertical cross sectional view of such a construction, the section being taken on the line 11—11 of Fig. 10.

Referring more closely to the drawings, 12 indicates the column of the building, in this case it being made of structural steel. At the center line of the floor to be constructed, I apply connecting plate 13 and fasten it to the column 12. This plate is shown on an enlarged scale in Figs. 3 and 4 and is preferably made of cast iron. In this case it is shown as of octagonal shape and around its sides on its upper surface it has lugs 14 into which are connected the single rods of reenforcing bands 15. Said rods are preferably formed into an end loop 16 thrown over the lugs 14 and secured by wire clasps 17. In order to take up the possible bend and looseness of the rods 18, keys 19 and 20 are employed into the loop 16 and the rods can be pulled tight by driving said keys against each other.

In order to construct the concrete floor, I first employ reenforcing bands 15 in two directions, connecting the columns in their lines, and in the diagonals of the squares formed by their lines. These bands will be connected to the plates 13 in the manner explained hereinbefore. In the diagonal directions I further employ additional rods at the two sides of the original bands, distributing them at a larger distance from each other than the rods of the original bands are placed. Said additional diagonal band rods are shown in Fig. 1 marked 21 and they are bound into a rectangular or square stiffening and reinforcing rod shape 22 placed around

each column. Further additional reinforcing rods 23 and 24 may be employed at still larger distances from each other in the two diagonal directions at the two sides of the central diagonal bands and filling the whole field of the floor.

After this reinforcing skeleton is placed and properly fastened and also secured to each other, the concrete may be poured and the floor is ready.

In case a temporary steel beam construction is needed, horizontally connecting, reinforcing and stiffening the columns of the building while the erection work is going on, the construction shown on Figs. 5 to 7 may be employed. In this modification 12 again represents the structural steel columns of a building. Between said columns a system of horizontal stiffening beams 25—25 are applied, which are useful only while the erection is going on and which may be lighter and lower than the beams usually employed if they have to carry the load of the floor. Specially shaped cast iron quarter plates 26 are in this case employed in the four corners formed by the reinforcing beams 25 and fastened to the columns in the center line of the floor by their extensions 27. These quarter plates are similarly constructed to the plates 13 described above and the load carrying and reinforcing bands are secured to them in the same way as they have been secured to the plates 13 in the construction detailed hereinbefore. Load bands 15 and additional rods 21 are employed in a similar manner as mentioned above, only the stiffening rectangular shapes 22 are replaced here by single sides 28. The field reinforcements for the floor run in this case in the directions of the columns and not in their diagonals and are represented by the rods 29 and 30.

My system of reenforced concrete floor construction may also be applied to buildings with stone or brick columns and walls. Figs. 8 to 11 show some details of such constructions. In Fig. 8 the numeral 31 represents the outlines of a brick or stone column, 32 indicates the octagonal connecting plate built into the column in the center line of the floor. The construction of these connecting plates and the method of securing the rods to them is entirely similar to those described above. A center rod 33 is built into the column and through a suitable hole in the center of the connecting plate to further secure said plate in the column, and will be described presently.

At the corners of the building the reinforcing rods are connected to quarter plates shown on Fig. 9 and said quarter plates are secured into the corners of the walls by extensions 34 and 35 which may be further secured into the walls by the vertical rods 33, in this case three of them being shown.

Figs. 10 and 11 show the construction used when my reinforcing bands and rods are to be connected to the plain sides of a building having stone or brick walls. Here again a specially formed connecting plate 36 is used, similar to those used hereinbefore and connected to the wall by extensions 37 and 38 through which pass the vertical rods 33. Said rods are built into the wall or column of the building and serve to further secure the connecting plates or their extensions to the column or to the wall of the building.

As will be seen, my floor construction does not need any horizontal beams to carry the load and transfer it to the columns or walls of the building. All the loads on the floor will be directly transferred by this system of reinforcement to the columns or the walls.

Another advantage of my system against other floor constructions as used at present is that the upper and lower surfaces of the floor are absolutely parallel to each other and horizontal so that the building of the forms for the concrete is greatly facilitated as the boards need not be cut to any special shapes.

As the horizontal load beams are eliminated, the costs of erection are greatly reduced, at the same time the floor will be much lighter than heretofore and the columns also can be built cheaper and lighter than with the present systems.

The reinforcing rods everywhere in the floor form such a reinforcing triangle that any load at any point of the floor will always be distributed on all the four columns limiting the field in question. All the rods of the reinforcing system are stressed for tension only.

The columns of the building may be distributed in any suitable system, form and number.

This system of reenforced concrete floor can be used with stone or brick buildings as wall as with concrete buildings. My floor construction at the same time is absolutely fire and water proof.

In case temporary horizontal beams are used while the erection work is being done, said beams do not carry any load afterwards, can be of light and low dimensions and can afterwards be totally buried into the concrete.

Having thus described my invention, what I claim as new and want to protect by Letters Patent, is:—

1. A reenforced concrete floor construction, comprising H shaped steel columnar substructures; polygonal center plates secured to said columns, having radially placed lugs at their circumferences and an opening in the line of each lug, said lugs and openings, respectively, being adapted, to receive end loops of reinforcing rods and regulating wedges thereto; primary groups

of reinforcing rods connecting said center plates both in the line of said columns and in their diagonals; a stiffening and load distributing frame placed horizontally around each column, substantially in the plane of said center plates; secondary groups of reinforcing rods placed parallel to said primary groups of reinforcing rods and secured to said stiffening and load distributing frames; additional field reinforcing rods distrbuted in the area of the floor between the columns, placed parallel to the two directions of either of the primary systems of reinforcing groups, and concrete material to cover said plates and said reinforcing rods.

2. A reenforced concrete floor construction, comprising H shaped steel columnar substructures, horizontal I beams connecting said columns in the plane of said floor construction; quarter connecting plates having extensions to be secured to said columns in the corners formed by said I beams and lugs and openings, being adapted, respectively, to receive end loops of reinforcing rods and regulating wedges thereto; primary groups of reinforcing rods connecting said quarter plates both in the line of said columns and in their diagonals; stiffening and load distributing shapes placed diagonally in said four corners; secondary groups of reinforcing rods placed parallel to said primary groups of reinforcing rods and secured to said stiffening and load distributing shapes; additional field reinforcing rods distributed in the area of the floor between the columns and placed parallel to the two directions of either of the primary systems of reinforcing groups, and concrete material to cover said plates and said reinforcing rods.

3. In a reenforced concrete floor construction for buildings of stone or brick, quarter plates secured to the corners of said buildings and half plates secured to the walls of said buildings in the necessary locations, said plates having extensions built into said walls and an anchoring rod passing through said extensions in said walls; lugs and holes in said plates being adapted to receive the end loops of reinforcing rods and regulating wedges thereto; stiffening and load distributing shapes placed in front of said plates; primary groups of reinforcing rods connecting said plates parallel to the line of the walls and diagonally thereto; secondary reinforcing rods parallel to the two directions of one system of said primary groups and connected to said stiffening and load distributing shapes; additional field reinforcing rods distributed in the area of the floor placed parallel to the two directions of either of the primary systems of reinforcing rods, and concrete material to cover said plates and said reinforcing rods.

Signed at New York, in the county of New York and State of New York, this 6th of March, A. D. 1922.

JOSEPH SOTY.