No. 683,441. Patented Oct. 1, 1901.

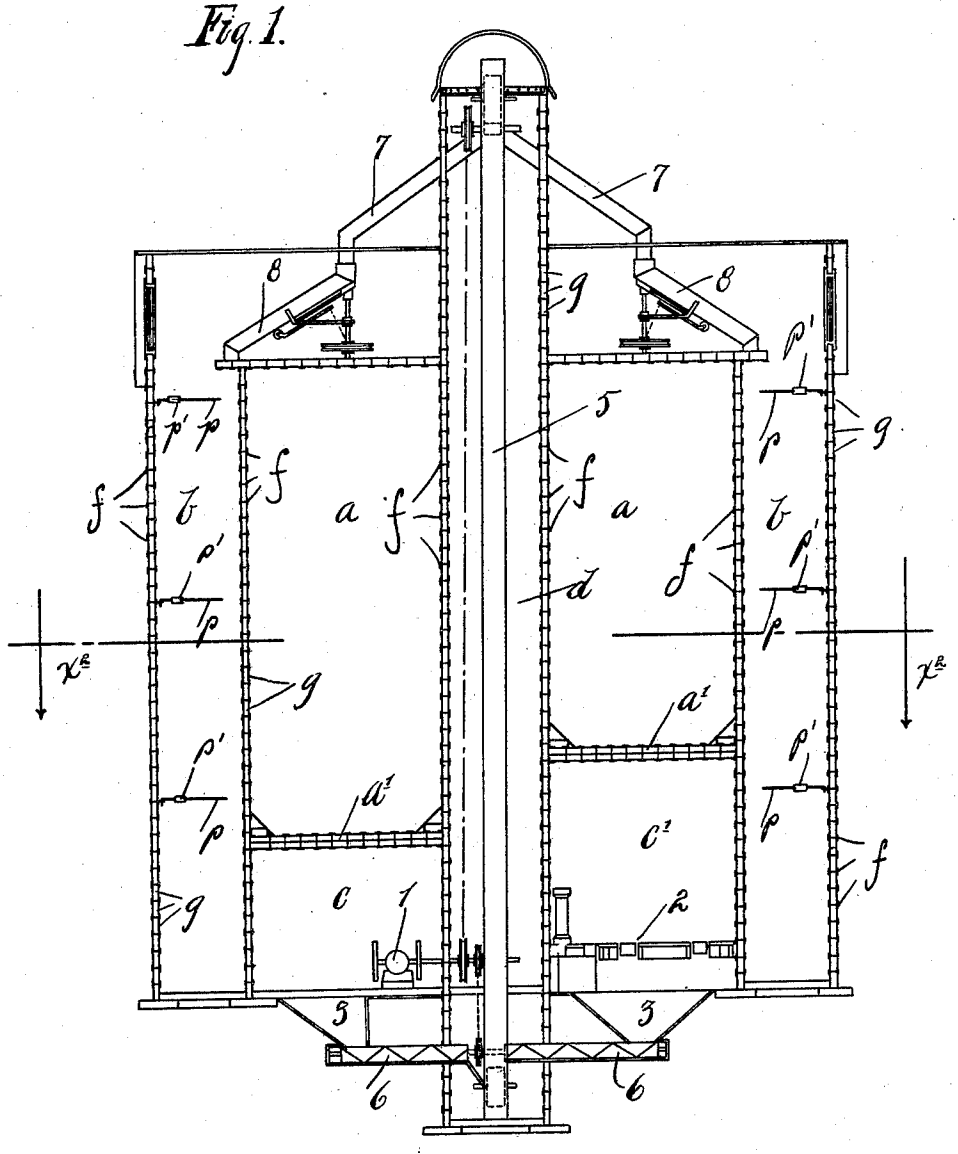
F. W. COOLEY.

FIREPROOF GRAIN ELEVATOR.

(Application filed Feb. 16, 1901.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



Witnesses.
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Harry Kilgore.

Inventor.
Fred W. Cooley.
By his Attorneys.
Williamson Merchant

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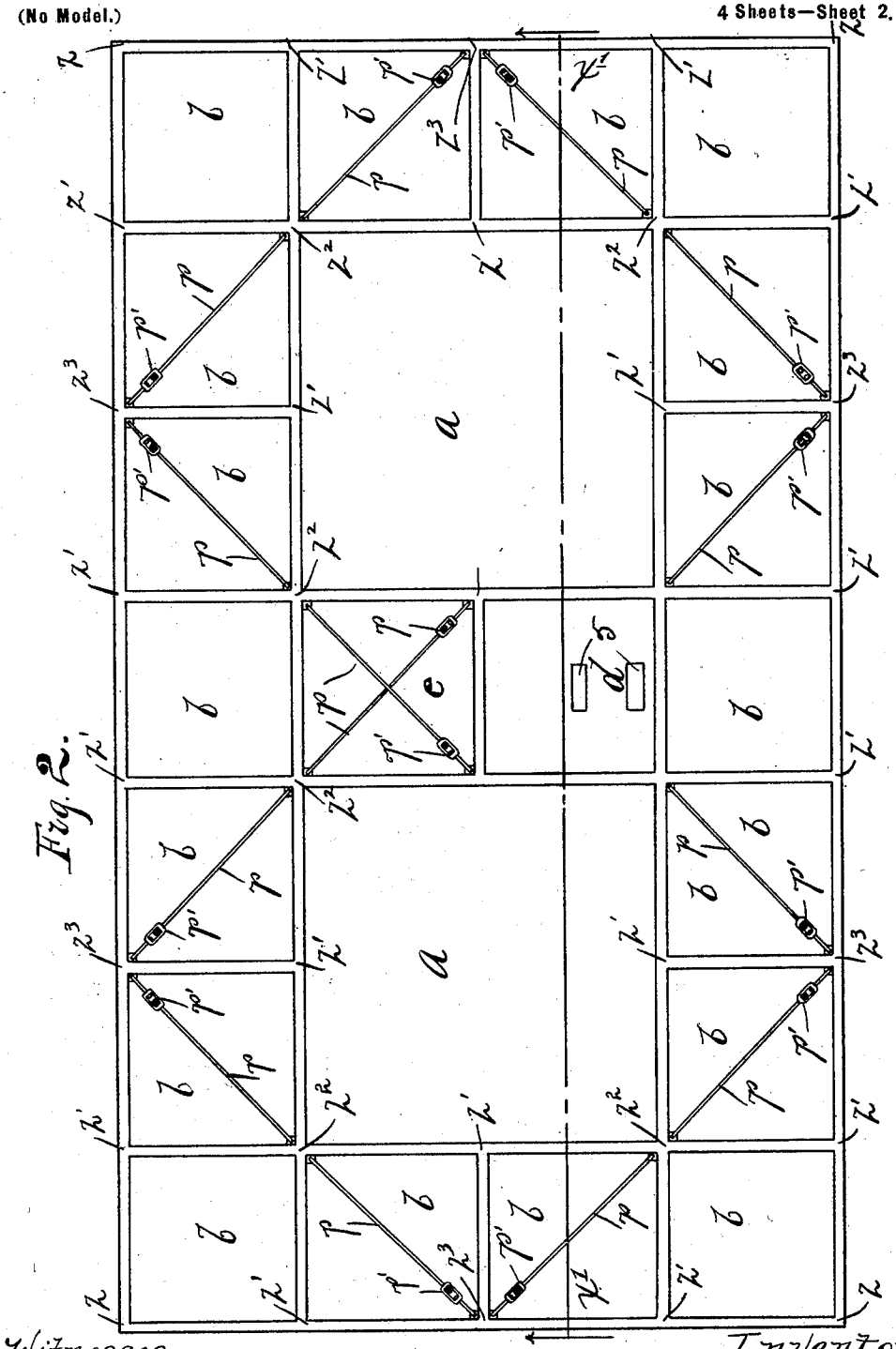


Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

Fig. 3.

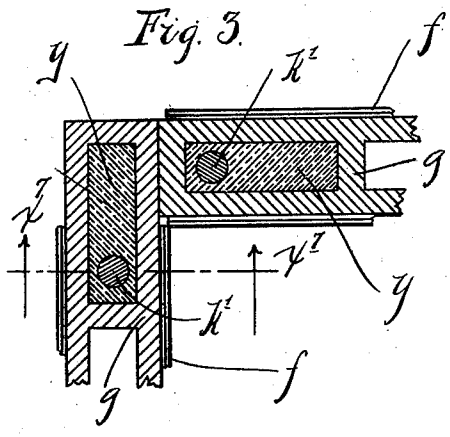


Fig. 5.

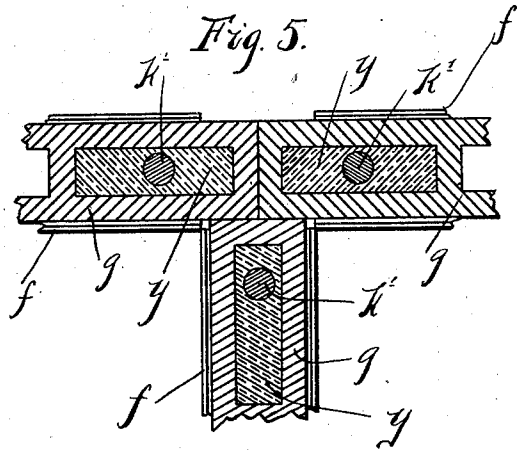


Fig. 4.

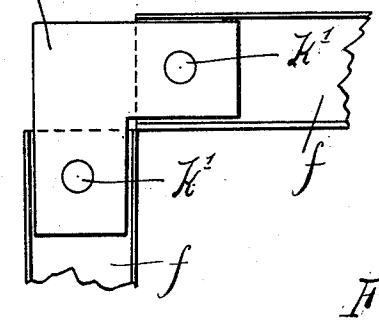


Fig. 6.

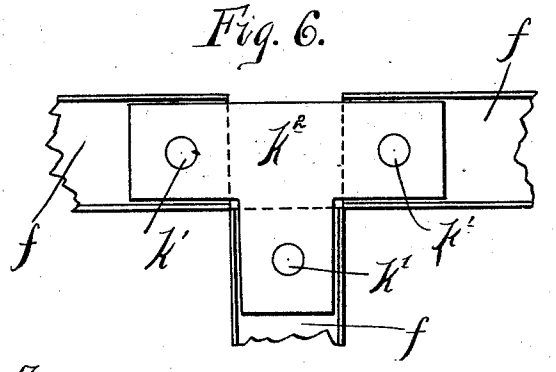
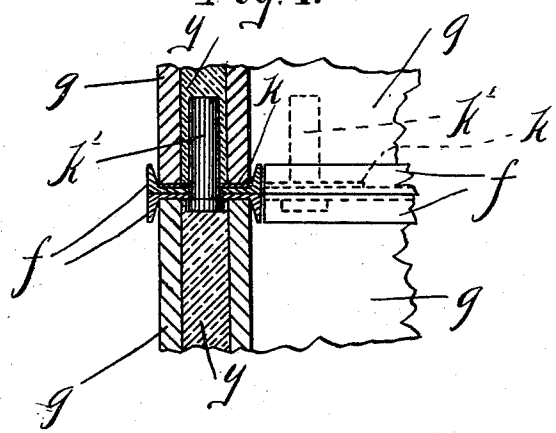


Fig. 7.



Witnesses.

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(Application filed Feb. 16, 1901.)

(No Model.) 4 Sheets—Sheet 4.

Fig. 8.

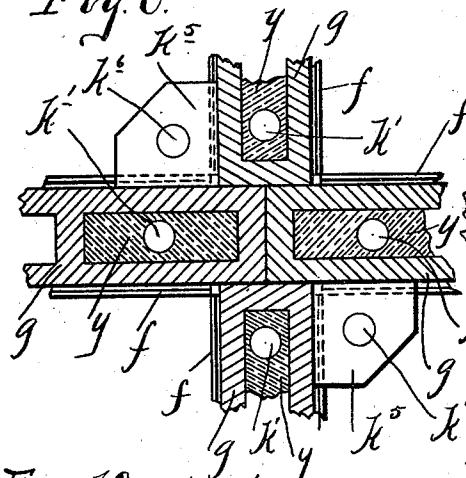


Fig. 9.

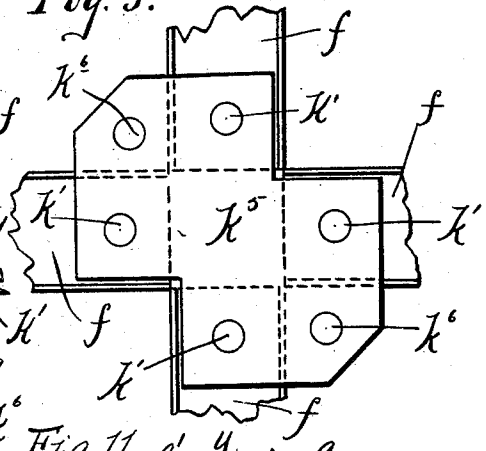


Fig. 12.

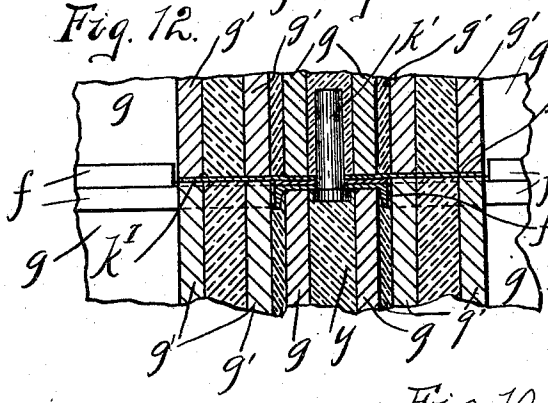


Fig. 11.

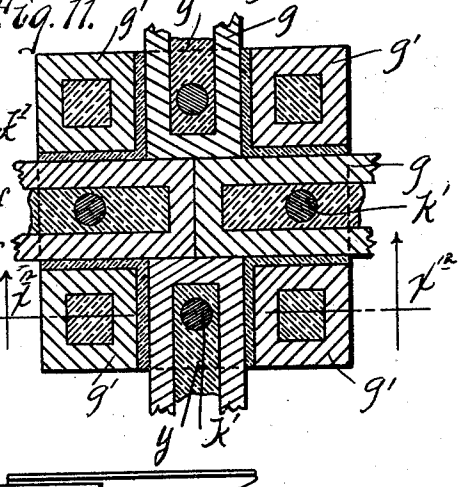
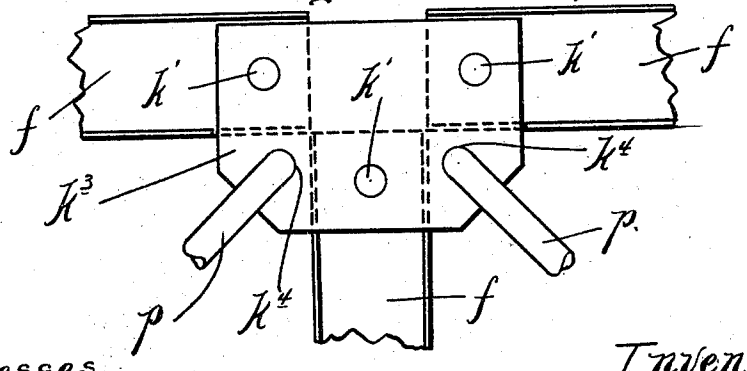


Fig. 10.



Witnesses.

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By his Attorneys.

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UNITED STATES PATENT OFFICE.

FRED W. COOLEY, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR OF TWO-THIRDS TO GEORGE T. HONSTAIN, OF SAME PLACE.

FIREPROOF GRAIN-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 683,441, dated October 1, 1901.

Application filed February 16, 1901. Serial No. 47,541. (No model.)

To all whom it may concern:

Be it known that I, FRED W. COOLEY, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Fireproof Grain-Elevators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the construction of elevators or grain-storage buildings and bins.

The first object of my invention is to provide a fireproof structure; second, to provide a structure which will be strong and durable; third, to provide a construction which may be rapidly built up either in warm or cold weather with good results; fourth, to provide an arrangement of central and surrounding bins wherein the surrounding bins truss the central bins, and, fifth, to accomplish the above results at a minimum of cost.

To the above ends the invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a diagrammatic section taken approximately on the line $x' x'$ of Fig. 2, showing an elevator constructed in accordance with my invention. Fig. 2 is a diagrammatic horizontal section on the line $x^2 x^2$ of Fig. 1, but on a relatively larger scale. Figs. 3 and 4 are details, respectively in section and plan, illustrating the construction of one of the bin-corners marked z in Fig. 2. Figs. 5 and 6 are detail views, respectively in horizontal section and plan, illustrating the construction of one of the intermediate bin-joints marked z' in Fig. 2. Fig. 7 is a detail in vertical section on the line $x^7 x^7$ of Fig. 3. Figs. 8 and 9 are details, respectively in section and plan, illustrating the construction of the bin-joints marked z^2 in Fig. 2. Fig. 10 is a plan view of one of the bin-joints marked z^3 on Fig. 2. Fig. 11 illustrates a modified construction of the joint marked z^2 and illustrated in Figs. 8 and 9, and Fig. 12 is a vertical section on the line $x^{12} x^{12}$ of Fig. 11.

The grain-elevator or building itself is made up of one or more (as shown, two) large inside bins a and a plurality of surrounding bins b. In the construction shown, which illustrates a country elevator, the outside bins b (see Fig. 1) extend from the top to the bottom of the building, while the larger inside bins a are provided with raised bottoms or floors a', below which in the one case an engine-room c and in the other case a driveway or weighing-room c' is located. In the construction illustrated an elevator-shaft d and a small interior grain-bin e separate the two large bins a. The elevator-shaft d, which is best illustrated in Fig. 1, extends from below the ground-line to a point above thereof of the building, so that the upper end thereof projects as a tower.

In the diagram view, Fig. 1, the numeral 1 indicates an engine, the numeral 2 a platform-scale, the numeral 3 hoppers, the numerals 5 and 6 conveyers, and the numerals 7 and 8 grain-distributing spouts, all of the ordinary construction and constituting no part of my invention.

The grain-bins of themselves and regardless of their relative arrangement involve novel features of construction provided in accordance with my noted objects 1, 2, 3, and 5. These bins, which are preferably rectangular, are built up of horizontally-extended series of I-beams and interposed blocks of tiling or other fireproof material, which are held against lateral displacement by the embracing-flanges of the said I-beams. These I-beams are rigidly connected at the corners of the bins by suitable tie-plates.

In the drawings in Figs. 3 to 12, inclusive, the character f indicates the I-beams, which in accordance with one feature of my invention are made up each of a pair of channel-beams placed back to back. These channel-beams may be riveted together or they may be connected simply as hereinafter noted. The character g indicates the tile-blocks, which are of ordinary hollow construction and which may be of any suitable dimensions, usually from one to two feet in height. In the construction of the bins a row of tile-blocks

are laid, an I-beam is laid on top of the said row, with its depending flanges embracing the upper edges of said tile-blocks, and another row of tile-blocks is then laid, with their lower ends on the I-beam and between the upturned flanges thereof. This action is of course continued from bottom to top of the bin. To form the corner-joints z, (see Figs. 3 and 4,) the I-beams are shown as cut straight across at their adjoining ends, and an L-shaped joint-plate k is interlapped between the upturned flanges of said beams and is secured thereto by strong pins k', passed through the overlapped parts, as best shown in Fig. 7. The pins k' project into the adjacent cavity of the corner tile-blocks, which overlie and underlie the same, and these cavities are preferably filled with cement, (indicated at y.) Thus the pins k' are secured in working position, and the tile-blocks are reinforced or strengthened at the corners of the bin.

The construction illustrated in Figs. 5 and 6 is substantially the same as that illustrated in Figs. 3 and 4, except that in this intermediate joint a T-shaped joint-iron k^2 is substituted for the joint-iron k. The pins k' are employed in the same manner, and cement y is in the same way and for the same purpose filled into the adjoining cavities of the tile-blocks g. The joint illustrated in Fig. 10 is the same as that shown in Fig. 6, except that a nearly rectangular joint-plate k^3 is used instead of the T-shaped joint-plate k^2, and certain of the upturned flanges of the abutting I-beams are cut away to permit the said plate k^3 to lie flat against the bodies of the connected beams. The inwardly-projecting corners of the joint-plates k^3 are perforated at k^4 to afford means for the attachment of truss-rods, to be hereinafter noted.

The construction illustrated in Figs. 8 and 9, which shows the joints z^2, is very similar to that shown in Fig. 10; but this joint connects four abutting I-beams, and the joint-plate k^5 therein employed is provided with oppositely-located perforations k^6, formed in parts of the said plate, which plate is countersunk into the upper flanges of the connected I-beams.

The construction illustrated in Figs. 11 and 12 is intended to be used at the junction of four bin-walls and where a very strong construction is required—such, for instance, as would be required to support a tower or the base of a bin. This construction is very similar to that illustrated in Figs. 8 and 9, but differs in the following respects: An approximately square joint-plate k^7 is employed and the upper flanges of the four abutting I-beams are cut off, so as to allow the plate to lie flat against the bodies or webs of the beams. The anchor-pins k' are employed as before, and cement is filled in around the same in the cavities of the abutting tile-blocks g. The four corners of the plate k^7 are thus left projecting into the bins, and upon the same or between the successive plates k^7 corner-tiles g' are secured by cement.

From the construction so far described it is evident that the metal I-beams and joint-plates of the outside bins b form a trusswork to the large inner bins a. To still further strengthen the entire structure against lateral or bulging strains, a plurality of truss-rods p are applied, as illustrated in Fig. 2. These truss-rods p are therein shown as extending diagonally of the bins b, which are subject to bulging strains from the inner bins a. The ends of the same are connected in the perforations k^4 and k^6 of the joint-plates k^3 and k^5, respectively, and to permit of their adjustments they are shown as provided with ordinary turnbuckles p'. In this manner the outer bins b are securely bound together and are caused to form a very rigid trusswork surrounding the large inner bins.

Directing attention again to Fig. 2, it will be noted that the intermediate portions of the relatively large interior bins a are prevented from bulging outward by the dividing-walls of the relatively small surrounding bins, which extend at right angles outward therefrom, and that such walls act as abutments to reinforce the intermediate wall portions of the said large bins a. The truss-rods p rigidly connect these intermediate walls, which serve as abutments, and thus still further strengthen the walls of the said large interior bins a.

The I-beams interposed between the layers of tile-blocks very securely hold the same against lateral movements and give the walls great strength. It is also evident that the construction may be very rapidly built up and that the same when built of iron and tiling is absolutely fireproof.

It will of course be understood that the invention is capable of many modifications other than those above specified.

It will be understood that the term "tile" or "tile-blocks" is herein used in a generic sense to include all fireproof or substantially fireproof blocks or sections.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. A building of the character described, comprising a relatively large interior bin, and a series of relatively small surrounding bins, certain of the walls of which surrounding bins, serve as abutments to reinforce the intermediate portions of the walls of the large interior bin.

2. A building of the character described, comprising a relatively large rectangular interior bin, and a series of rectangular relatively small surrounding bins, certain of the walls of which surrounding bins, serve as abutments for the intermediate portions of the walls of said large interior bin, substantially as described.

3. In a building of the character described, comprising a relatively large interior bin and a series of rectangular relatively small sur-

rounding bins, certain of the walls of which surrounding bins serve as abutments for the intermediate portions of the walls of the said large interior bin, and tie-rods rigidly connecting the walls which act as abutments, substantially as described.

4. A building of the character described, comprising a relatively large rectangular interior bin, and a series of relatively small rectangular surrounding bins, the walls of which bins are made up of layers of tile-blocks and interposed horizontally-extended iron girders or beams, rigidly connected at the corners of the bins, and certain walls of which surrounding bins serve as abutments for the intermediate portions of the walls of said large interior bin, substantially as described.

5. A building of the character described, comprising a relatively large interior bin and a series of relatively small surrounding bins, the walls of which bins are made up of layers of tile-blocks and interposed, horizontally-extended metal girders or beams rigidly connected at the corners of the bins, certain of the walls of which outer bins serve as abutments for the intermediate wall portions of said large interior bin, and truss-rods connecting the abutment-acting walls, which truss-rods are connected to the metal beams of said walls, substantially as described.

6. A fireproof wall made up of successive layers of tile-blocks and interposed metal I-beams formed by channel-beams laid back to back, and anchor-pins passed through said channel-beams and secured in the tile-blocks by cement, substantially as described.

7. A bin made up of successive layers of tile-blocks and interposed metal beams or girders connected at the corners of the bins by overlapping metal parts and anchor-pins passed through said overlapping parts, which pins are embedded in cement filled into the cavities of the corner tile-blocks.

8. A bin made up of successive layers of tile-blocks and interposed horizontally-extended metal beams or girders formed by channel-beams laid back to back and rigidly connected at the corners of the bins by overlapping parts, and anchor-pins passed through said overlapping parts and through the webs of said channel-beams, and cement filling the corner cavities of the corner tile-blocks and embedding said anchor-pins, substantially as described.

9. In a grain-bin, the combination with successive rows of tile-blocks, of I-beams interposed between the layers of tile, and overlapping the same with their flanges, and joint-plates overlapping the abutting ends of said I-beams and secured thereto substantially as described.

10. In a grain-bin, the combination with successive layers of tile, of horizontally-extended I-beams interposed between said layers of tile and overlapping the same with their flanges, joint-plates overlapping the abutting ends of said I-beams, and anchor-pins passed through said joint-plates and the overlapped portions of said beams, substantially as described.

11. The combination, with successive layers of hollow tile-blocks, of I-beams extended horizontally and interposed between said layers of tile with their flanges overlapping the edges of the same, joint-plates overlapping the abutting ends of said I-beams, anchor-pins passed through said joint-plates and the overlapped ends of said beams and projecting into cavities of adjacent tile-blocks, and cement filled into the cavities of said tile-blocks around said anchor-pins, substantially as described.

12. In a grain-bin, the combination with successive layers of tile-blocks, of I-beams interposed between said layers of tile and overlapping the edges of the same with their flanges, joint-plates overlapping the abutting ends of said beams, and truss-rods connecting diagonally opposite joint-plates to reinforce the bin, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRED W. COOLEY.

Witnesses:
MABEL M. MCGRARY,
F. D. MERCHANT.