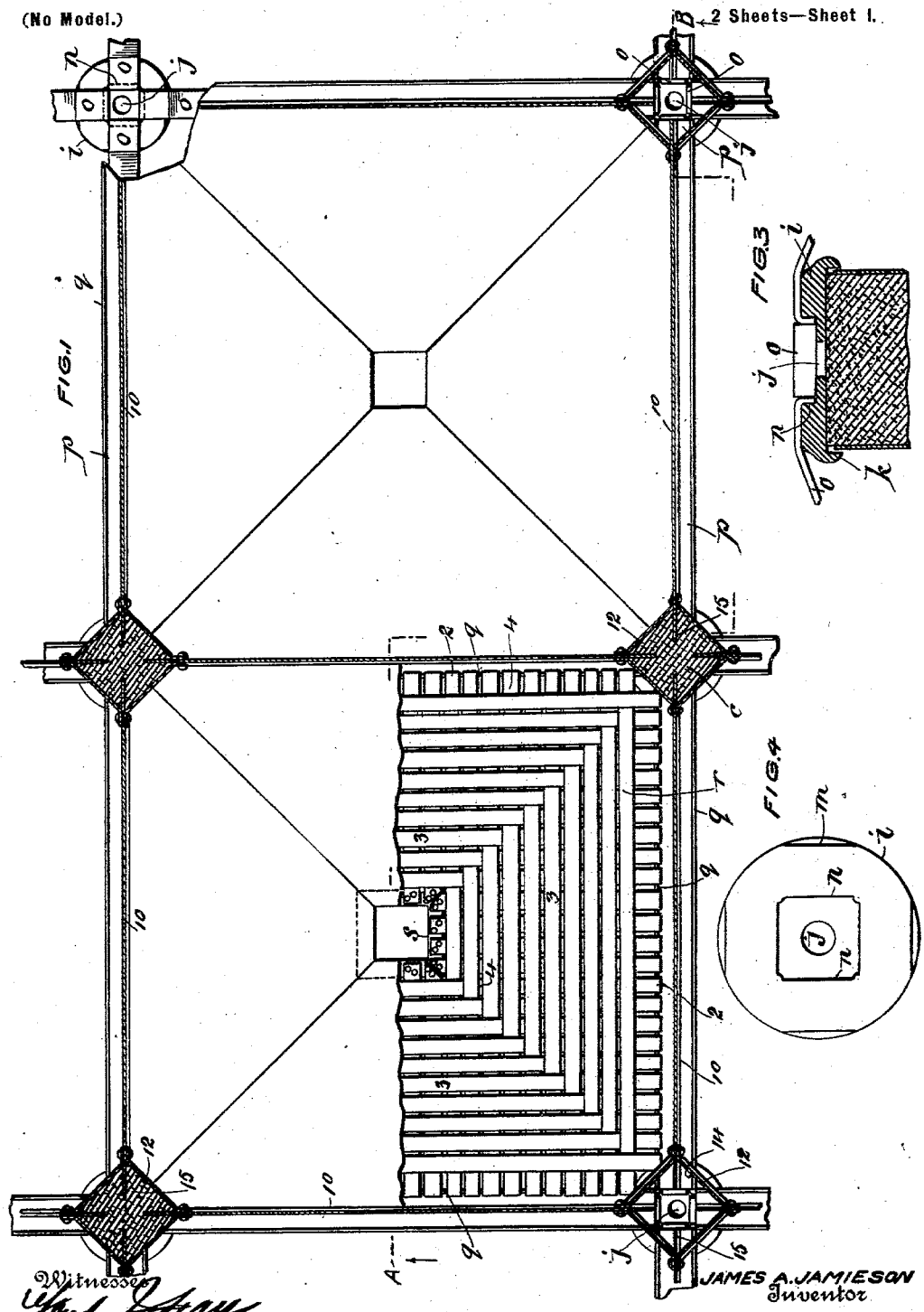
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J. A. JAMIESON.

ELEVATOR BIN.

(Application filed Aug. 27, 1900.)

(No Model.) 2 Sheets—Sheet 1.



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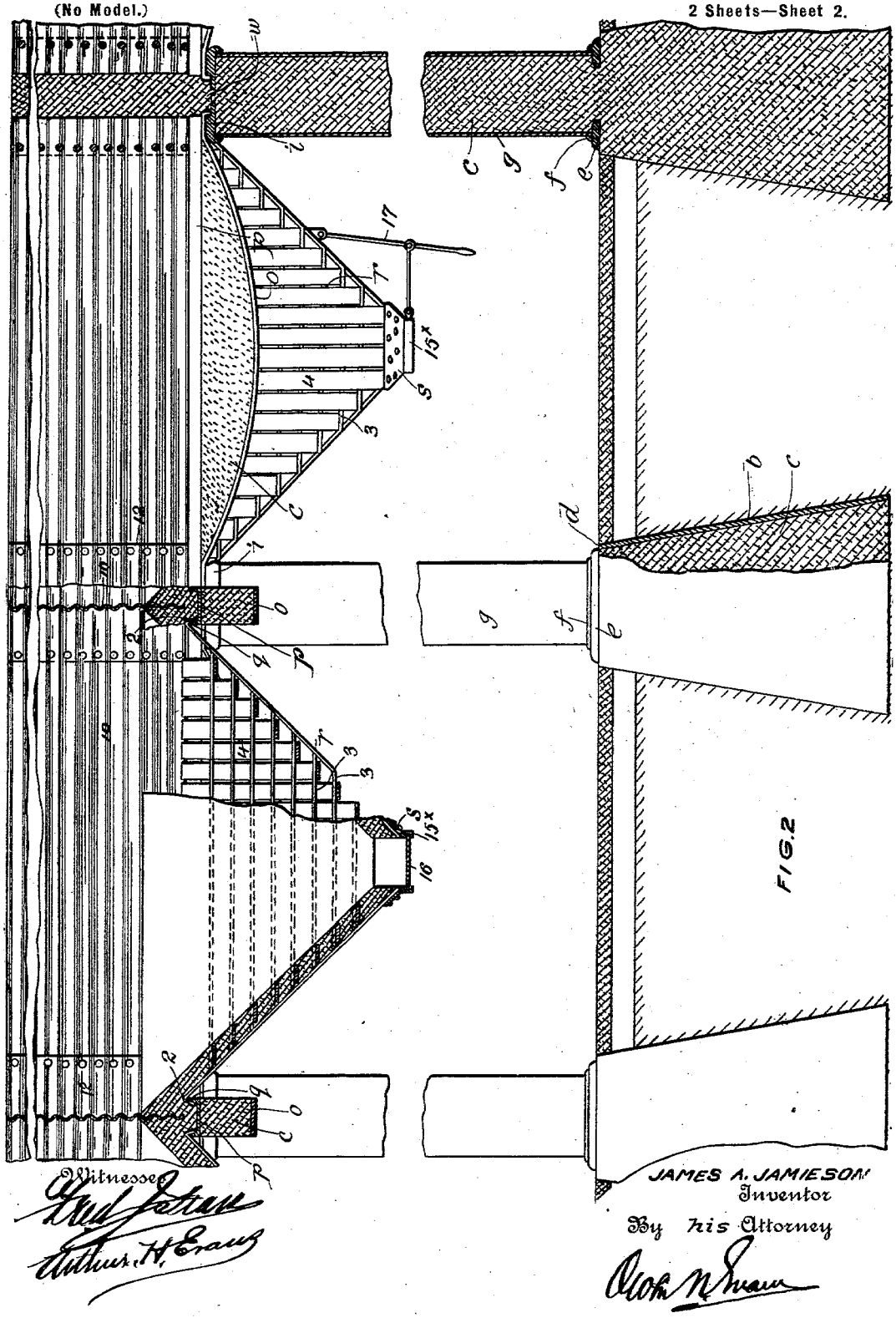


FIG. 2

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UNITED STATES PATENT OFFICE.

JAMES ALEXANDER JAMIESON, OF MONTREAL, CANADA.

ELEVATOR-BIN.

SPECIFICATION forming part of Letters Patent No. 704,805, dated July 15, 1902.

Application filed August 27, 1900. Serial No. 28,254. (No model.)

To all whom it may concern:

Be it known that I, JAMES ALEXANDER JAMIESON, of the city of Montreal, in the district of Montreal and Province of Quebec, Canada, have invented certain new and useful Improvements in Elevator-Bins; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention, although hereinafter described as applied to the construction of a bin for an elevator, is equally applicable in its various features wherever columns, walls, wall-joints, or hopper-bottoms are required.

Heretofore in the construction of elevator-bins a large number of stringers and vertical timbers have of necessity been used with the attendant unequal shrinkage and compression or collapse, the shrinkage being naturally greater transversely than longitudinally of a timber and the compression or collapse of a timber subjected to end load being almost *nil*, while when subjected to side load it is, comparatively speaking, considerable.

The prime object of my invention is to provide a structure that will obviate these defects and at the same time be fireproof, easily constructed, and have all strains to which it may be subjected evenly distributed therethrough and finally concentrated in supporting-columns.

The invention may be said, briefly, to consist in providing a series of columns, a bin, and a hopper-like bottom for said bin, all of novel construction. The columns each consists of a metallic tube vertically arranged, filled with concrete, and supported upon a suitable base, preferably consisting of a series of pedestals, each made up of a hollow conical metallic section filled with concrete and sunk in the ground.

My improved bin-bottom, which in the present embodiment is suspended from the top of columns constructed on the above principle, consists of a series of metallic strips bent and arranged relatively to one another to form a hopper of truncated pyramidal form, the ends of these strips being secured at their ends to composite girders of metal and concrete, which constitute a medium through which the pyramidal hopper is hung from the columns, the interior surface of this hopper being lined with concrete. My improved bin extends above this hopper-bottom and consists of a series of corrugated plates constituting the walls thereof and embedded at their ends in composite corner-columns superimposed upon the first-mentioned columns, while said walls rest upon the tops of said composite girders. This construction when the bin is full causes all stresses, whether tension, compression, or torsion, due to the weight of itself and its contents, to be uniformly distributed throughout the supporting-columns, each column's quota being concentrated thereto.

For full comprehension, however, of my invention in its entirety reference must be had to the accompanying drawings, forming a part of this specification, in which like symbols indicate the same parts, and wherein—

Figure 1 is a plan view of two adjoining bins, one of which is partly in section and a portion of the lining thereof partly broken away. Fig. 2 is a vertical sectional view taken on line A B, Fig. 1. Fig. 3 is an enlarged transverse vertical sectional view of the top of one of my improved supporting-columns, illustrating particularly one of the capping-plates; and Fig. 4 is a plan view thereof.

Each of my improved pedestals consists of a hollow metallic truncated conical casing *b*, filled with concrete *c* and having ends open. These pedestals are sunk to a depth to have their open tops *d* on a level with the surface of the flooring, and an annular foot-casting *e*, formed with an annular vertical flange *f*, rests upon each of these pedestals. These foot-castings support the columns, each of which consists of a vertically-arranged tubular metallic casing *g*, of a diameter to have its lower end closely fit inside of the vertical flange *f*, while it is also filled with concrete *c* and has a top casting *i* resting thereon. The function of these top castings is to provide means wherefrom the truss-plates of a series of composite girders can be hung, as will be presently shown, and each of said castings is formed with a central opening *j* and a depending peripheral flange *k* to closely fit over the top of the casing *g*. The top thereof is made of octagonal contour by shearing off four diametrically opposite portions of its upper peripheral line, as at *m*, and has a squared cen-

tral recess n disposed with its sides parallel to the four sheared-off sides m. The object of the central opening j is to allow a portion of the cement w for securing the casting to the top of the concrete column to project therethrough and form a binder.

The composite girders extend between the tops of each adjacent pair of columns and are supported at their ends by these top castings, as follows: A downwardly-bellying truss-plate o has its end portions taking over and resting upon the sides m of the portions of the top surfaces of the top castings which intervene said sides m and the adjacent sides of the squared recesses, while the ends proper thereof are bent over said adjacent sides of and depressed into said recesses. A brace in the form of a channel-iron p, disposed with its flanges projecting upwardly and corresponding in width to said truss-plate, rests upon the portions thereof that lie upon the top castings and are of a length to extend from the edge of the squared opening in the top casting from which one end of the truss-plate is hanging to the adjacent edges of the squared opening in the top casting from which the other end of the truss-plate is hung, the space between each truss-plate and the channel-iron resting thereupon being, like the columns and pedestals, filled with concrete c, thus constituting composite girders consisting of a concave truss-plate hung from its supports, a flat brace or tread resting upon the ends of said truss-plate, and a concrete filler between said truss-plate and brace. The hopper-shaped bin-bottoms are suspended from these composite girders, and each consists of four series of metallic truss-strips r, the strips of each series being riveted at their lower ends to one side of a rectangular open casting s, while their upper ends are bent and hooked over the adjacent flange q of the channel-iron adjacent thereto. The remainder of each side is made up of a series of metallic truss-strips arranged side by side and having their ends 2 bent to form hooks to take over the before-mentioned adjacent flanges q of the inclosing channel-irons. Each of these last-mentioned strips is bent to form a horizontally-extending portion 3 and diagonally-extending portions 4. The diagonally-extending portions of the strips of two of the oppositely-disposed series are lapped over the diagonally-extending portions of the other two series, thus providing diagonal supporting-sections and longitudinal trussing portions to brace said diagonal supporting portion, the whole being hung from the composite girders by their hooked end 2. The space between the flanges q of each channel-iron is also filled with cement. The walls of the bins, to a series of which these hoppers act as bottoms, are made up of a number of plates 10, of steel or other strong sheet material, longitudinally corrugated and horizontally arranged and secured together by angle-plates 12. These corrugated plates are supported upon the composite girders and rest upon the concrete filling of the channel-irons thereof, while the spaces 14, inclosed by the corner-plates, are located directly above the columns. These spaces 14 and the interior of the pyramidal sides of the hopper, like the tubular casings g of the columns, are respectively filled and lined with concrete c, the ends 15 of the wall-plates being embedded in the concrete filling of the corners, and the walls and corner-pillars thus constructed are continued until the required height of bin is attained.

The casting S is formed on the edges of its open under side with guideways $15^{\times}$ for a slide valve or door 16, operated by a lever 17, to control the flow of the substance from the bin. The stresses due to the load of a full bin or a series of full bins will in structures according to my invention be exerted downwardly upon the top of the corrugations in the wall-plates and laterally throughout the area of said walls and from said walls in tension to the composite corner portions and in vertical load mainly by the said composite corner portions and partially by the composite girders, which latter in turn will transmit it to the composite columns.

Stress in torsion is obviated in each of the composite girders by the concrete filling and the distribution of its proportion of the load carried by the hoppers contiguous thereto throughout its length.

In my improved columns the casing g serves solely as a stay for the concrete before it hardens and to prevent the perimeter thereof when dried and hardened cracking off or crumbling.

It is obvious that a series of bins constructed according to the foregoing will not be subjected to the unequal strain due to the unequal shrinkage and compression or collapse attendant upon the use of timbers in the construction of bins for elevators or the like. It is further obvious that my improved columns, girders, and walls can be independently or collectively used in the construction of buildings other than elevator-bins and that my improved hopper-bottom can be supplied to other uses than described and in connection with other supports than shown and the casings of the pedestals removed before they are sunk in the ground, all without departing from the spirit of my invention.

What I claim is as follows:

1. A composite hopper of inverted pyramidal form the sides whereof consist of a series of metallic stays conforming to the contour of the bottom of said hopper and arranged parallel to one another; a second series of metallic stays also conforming to the contour of the bottom of said hopper and arranged parallel to one another and at right angles to said first-mentioned series of metallic stays, and a lining supported upon said two series of stays.

2. A composite hopper of inverted pyramidal form the sides whereof consist of a series

of metallic stays conforming to the contour of the bottom of said hopper and arranged parallel to one another; a second series of metallic stays also conforming to the contour of the bottom of said hopper and arranged parallel to one another and at right angles to said first-mentioned series of metallic stays, and a concrete lining supported upon said two series of stays.

3. A composite hopper of inverted pyramidal form each side whereof consists of a series of metallic strips conforming to the contour of the bottom of said hopper and arranged parallel to one another and extending horizontally from side to side of said hopper, a second series of metallic strips also conforming to the contour of the bottom of said hopper and extending from bottom to top of the hopper and outside of said first-mentioned series of strips, means for connecting together the sides thus formed, and a concrete lining for said hopper, substantially as and for the purpose set forth.

4. A composite hopper of inverted pyramidal form and consisting of four supporting-girders arranged in the form of a square; an open pyramidal casting; means for suspending said casting from said girders; a series of metallic strips conforming to the contour of the bottom of said hopper and each extending from one of said girders to the opposite girder, means for securing the ends of said strips to said girders, a second series of metallic strips also conforming to the contour of the bottom of said hopper and overlapping said first-mentioned series and extending from one of the other girders to that opposite thereto, means for connecting said last-mentioned series of strips to said last-mentioned girders, and a concrete lining for said hopper, substantially as described and for the purpose set forth.

5. A hopper-bottom of inverted pyramidal form for a bin, consisting of four supporting-girders arranged in the form of a square and having flanges on their top sides; an open pyramidal casting; means for suspending said casting from said girders; a series of metallic strips conforming to the contour of the bottom of said hopper and each extending from one of said girders to the opposite girder; the ends of said strips being bent to hook over the flanges of said girders; a second series of metallic strips also conforming to the contour of the bottom of said hopper and overlapping said first-mentioned series and extending from one of the other girders to that opposite thereto; the ends of said last-mentioned series of strips being bent to hook over the flanges of said last-mentioned girders, a concrete lining for said hopper and means for retaining said hooked ends of the strips against displacement upon the flanges of said girders, substantially as described and for the purpose set forth.

6. A hopper-bottom for a bin, consisting of four supporting-girders arranged in the form of a square and having flanges on their top sides; an open pyramidal casting; means for suspending said casting from said girders consisting of a series of metallic strips having their lower ends riveted to said casting and their upper ends bent to form hooks to take over the adjacent portion of the flange upon said girders; a series of metallic strips conforming to the contour of the bottom of said hopper and each extending from one of said girders to the opposite girder; the ends of said strips being bent to hook over the flanges of said girders; a second series of metallic strips also conforming to the contour of the bottom of said hopper and overlapping said first-mentioned series and extending from one of the other girders to that opposite thereto; the ends of said last-mentioned series of strips being bent to hook over the said last-mentioned girders, a concrete lining for said hopper and means for retaining said hooked ends of the strips against displacement upon the flanges of said girders, substantially as described and for the purpose set forth.

7. The combination with a series of girders disposed to inclose a series of hoppers, a vertical flange located at each edge of the top of each girder, each hopper consisting of an open pyramidal casting; means for suspending said casting from said girders; a series of metallic strips conforming to the contour of the bottom of said hopper and each extending from one of the inclosing girders to the opposite inclosing girder; the ends of said strips being bent to hook over the flanges of said girders; a second series of metallic strips also conforming to the contour of the bottom of said hopper and overlapping said first-mentioned series and extending from one of the other inclosing girders to that opposite thereto; the ends of said last-mentioned series of strips being bent to hook over the flanges of said last-mentioned girders, a concrete lining for said hopper, a concrete packing for retaining said hooked ends of the strips against displacement upon the flanges of said girders and a series of bins supported with their walls upon said girders, substantially as described and for the purpose set forth.

8. A series of contiguous bins consisting of a series of supporting-girders disposed to form a series of squares, a series of bin-bottoms each located within and secured at its edges to the edges of one of said squares, a series of sheet-metal walls supported upon said girders, each of said walls being of less length than its supporting-girder, and the vertical edges thereof being a short distance from one another, a series of vertically-extending corner-plates, means for connecting the side edges of said corner-plates to said sheet-metal walls a short distance from the said vertical edges thereof, and a filling for the spaces inclosed by said corner-plates, substantially as described and for the purpose set forth.

9. The combination with a series of bins for

grain-elevators or the like, of supporting-columns, located beneath said bins, the corners of the bins being located over said columns, said columns consisting of a tubular metallic casing, and a concrete filler, said concrete filler extending continuously in columnar form upwardly through the corners to the top of said bins, a metallic casing for said upwardly-extending concrete portion, and means for securing said last-mentioned casing to the walls of the bins, substantially as described and for the purpose set forth.

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

JAMES ALEXANDER JAMIESON.

Witnesses:
WILLIAM P. MCFEAT,
FRED. J. SEARS.