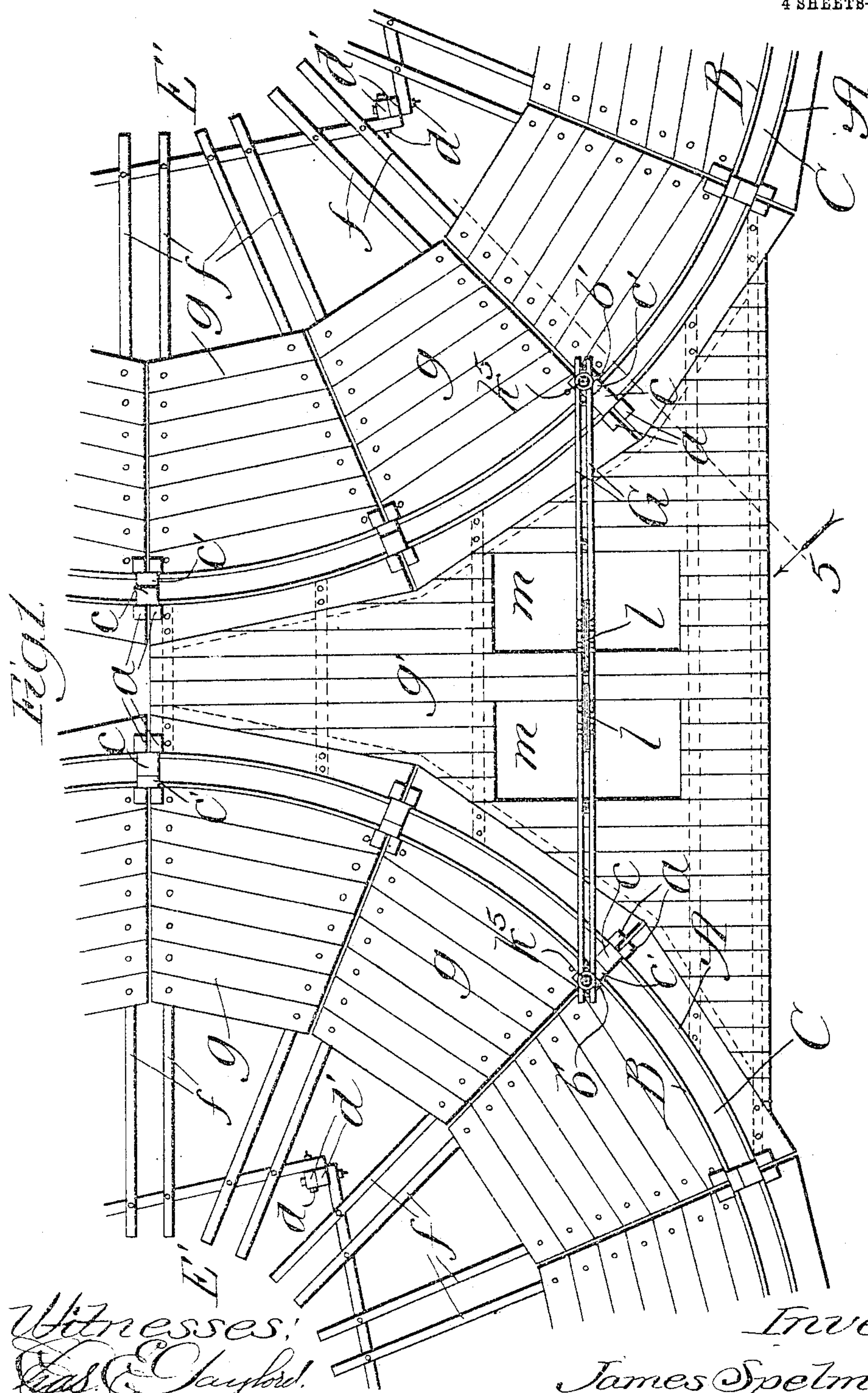


No. 787,058.

PATENTED APR. 11, 1905.

J. SPELMAN.  
HOISTING APPARATUS.  
APPLICATION FILED AUG. 8, 1904

4 SHEETS—SHEET 1.



Witnesses:  
E. C. Clayford.  
John Enders.

Inventor,  
James Spelman,  
By *Dymally, Dymally & Lee,*  
*Attorneys*

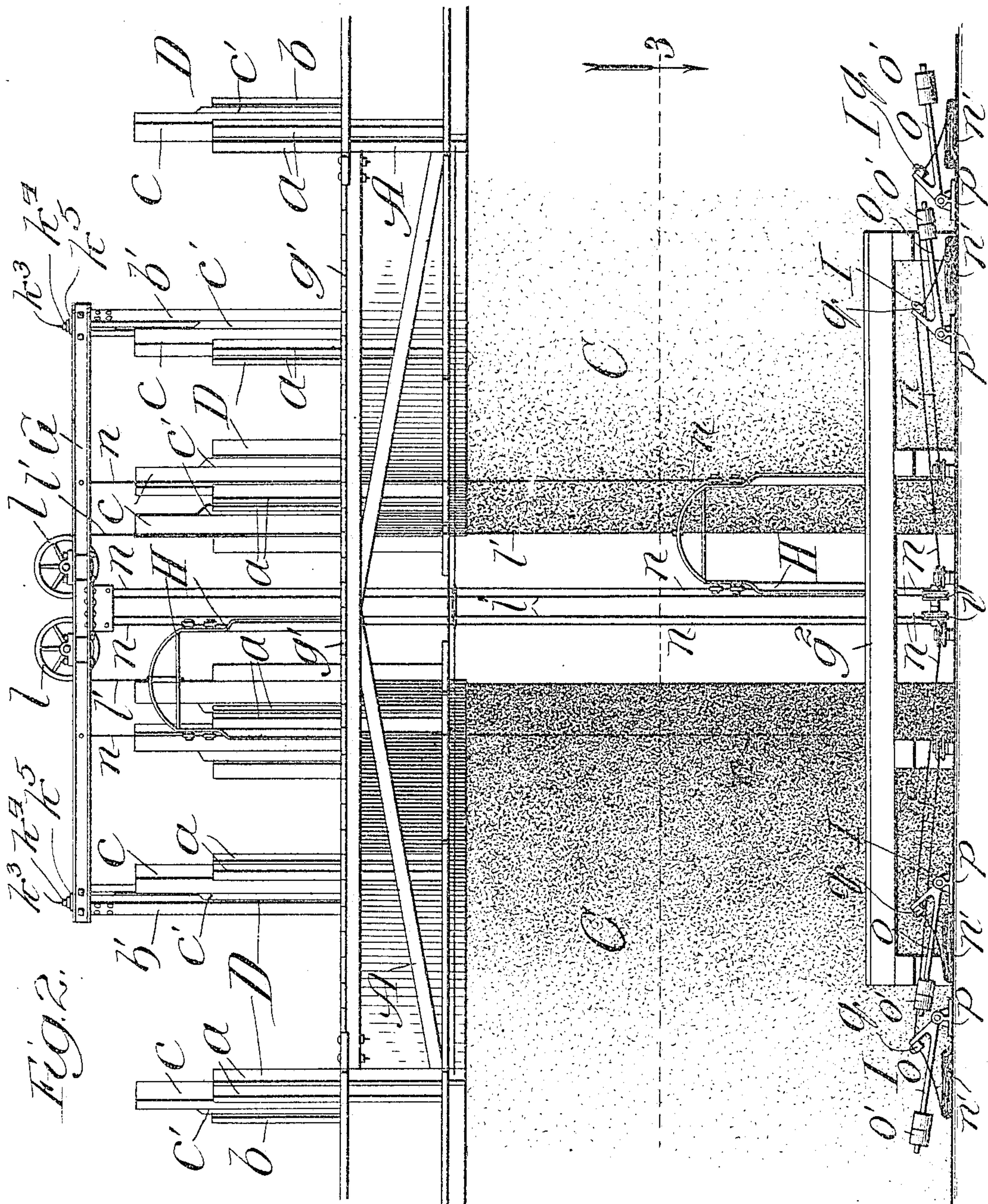


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4 SHEETS—SHEET 2.



Witnesses:  
E. C. Gaylord.  
John Enders.

Inventor:  
James Spelman,  
By *Dymforth, Dymforth & Co.*  
Attys.

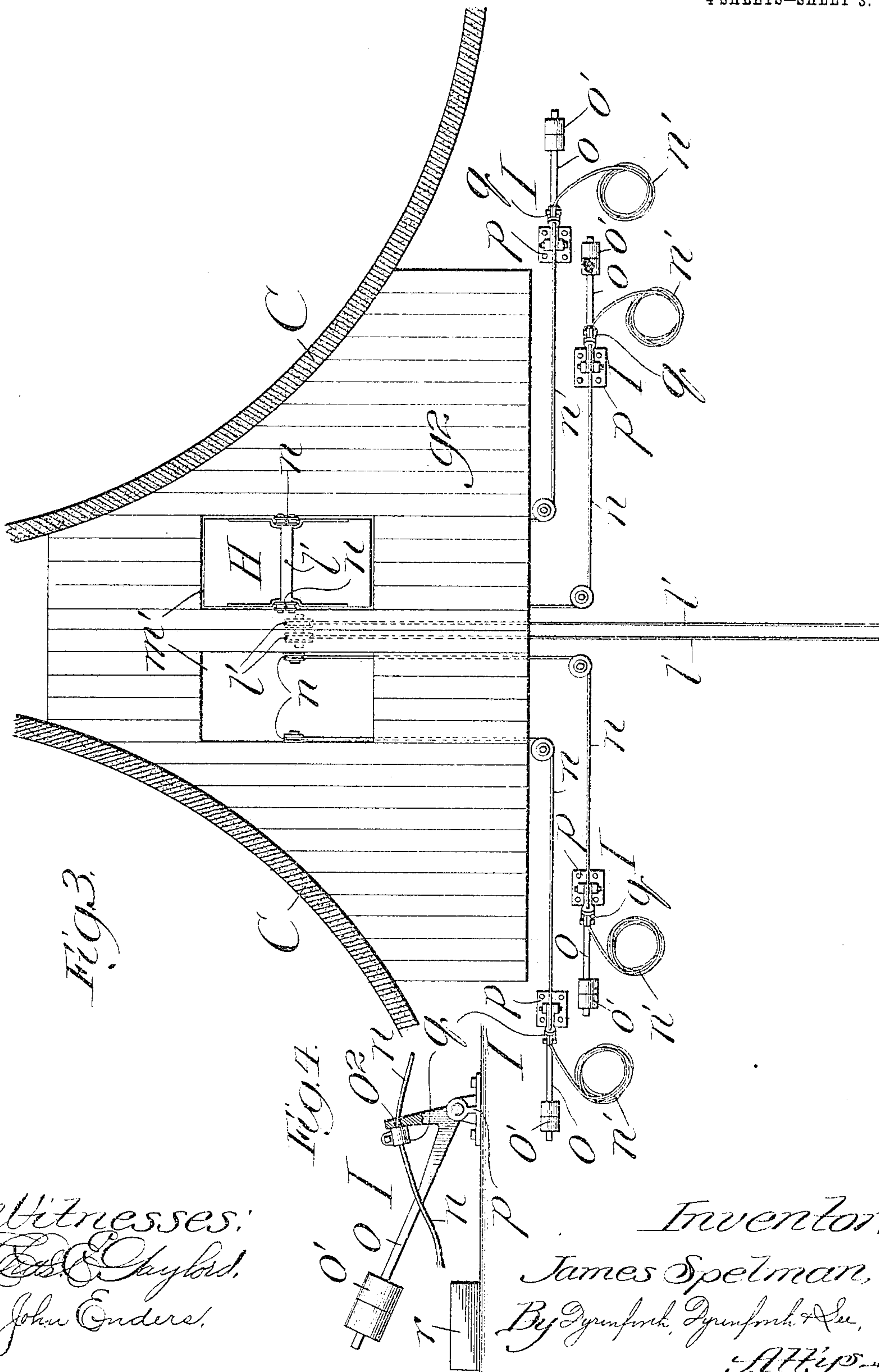


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4 SHEETS—SHEET 3.

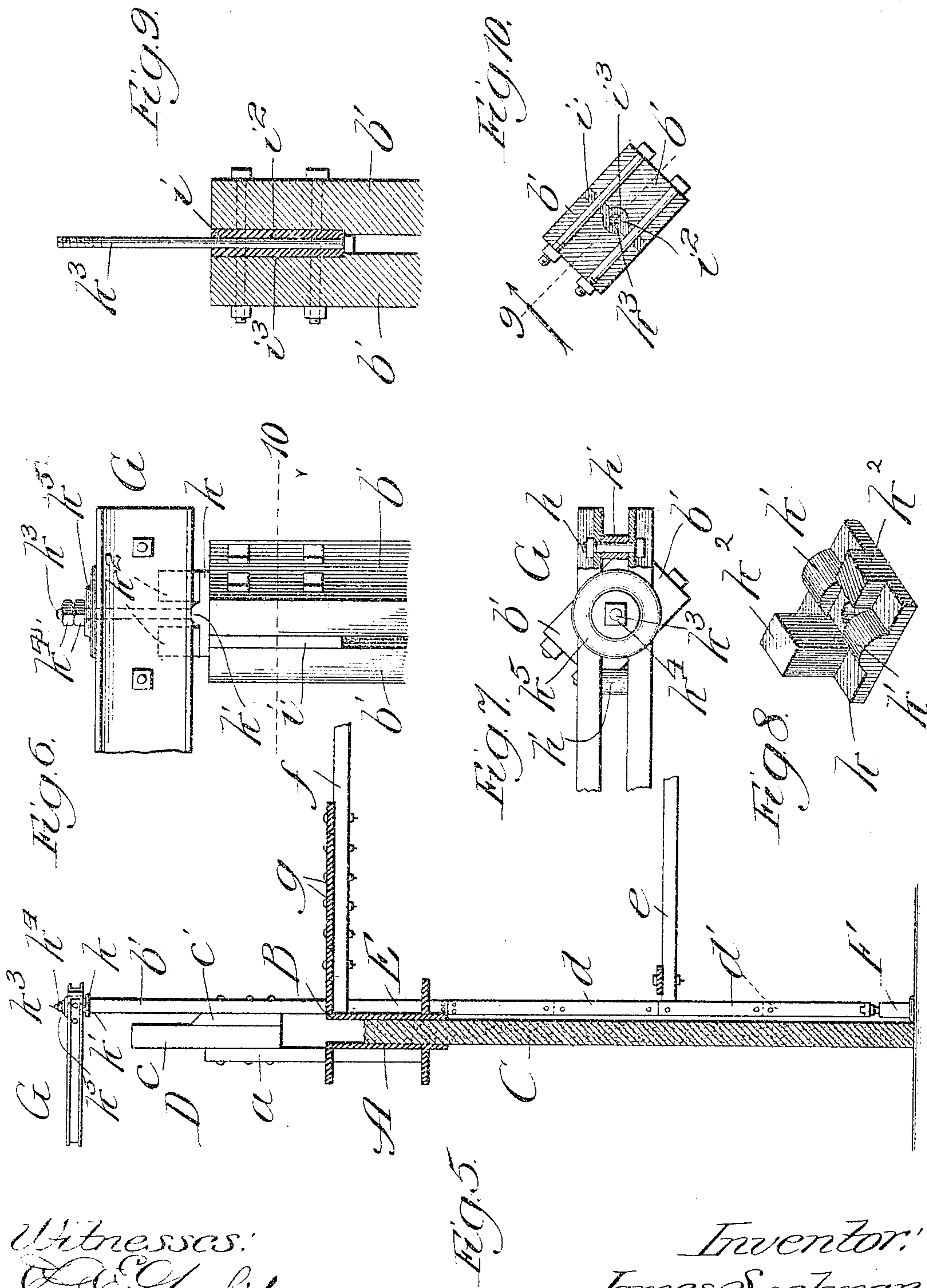


Witnesses:  
Edw. Chayford,  
John Enders.

R. *Inventor,*  
James Spelman,  
By *Gyrenforth, Gyrenforth & Son,*  
*Attys.*

J. SPELMAN.  
HOISTING APPARATUS.  
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4 SHEETS—SHEET 4.



Witnesses:  
Edw. Gaylord,  
John Enders

Inventor:  
James Spelman,  
By Dymfryth, Dymfryth & Lee,  
Attys.



# UNITED STATES PATENT OFFICE.

JAMES SPELMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO J. S. METCALF COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 787,058, dated April 11, 1905.

Application filed August 8, 1904. Serial No. 219,929.

*To all whom it may concern:*

Be it known that I, JAMES SPELMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have  
5 invented a new and useful Improvement in Hoisting Apparatus, of which the following is a specification.

This invention relates to an improvement in the elevator type of hoisting apparatus employed at structures undergoing erection for  
10 elevating to the points of use thereon the building material to be laid.

The particular purpose for which the present improvement is devised is that of use in erecting the walls of metal-reinforced concrete structures—such as grain-bins, chimneys, tanks, and the like—by filling the concrete into a mold supported on scaffolding and raising  
15 the mold as the wall structure progresses to enable the filling operation to be continued in it without interruption until the work of erection is completed. This may be done with means for the purpose forming the subject of my application for Letters Patent, Serial No.  
20 219,930, filed concurrently herewith on the 8th day of August, 1904.

Obviously as the height of the wall undergoing erection increases the elevation to which the hoisting apparatus is required to carry the  
25 building material to be used increases accordingly; and the primary object of this improvement is to enable the guide-course of the hoist to be lengthened as required with facility from the base of the structure undergoing erection.

The hoisting apparatus is illustrated in the accompanying drawings with sufficient of the mechanism of the scaffolding and mold thereon  
30 to be raised in the manner and for the purpose hereinbefore mentioned to enable the present improvement to be readily comprehended from the following detailed description thereof in the form in which it is used.

In the drawings, Figure 1 is a broken plan view of two grain-bins side by side of the  
35 molded metal-reinforced concrete construction referred to undergoing erection and equipped with the improved hoisting apparatus. Fig. 2 is a broken view of the same in elevation; Fig. 3, a section taken at line 3 on

Fig. 2 and viewed in the direction of the arrow; Fig. 4, an enlarged view in elevation, partly sectional, of the hoist-guide-cable holding and releasing device; Fig. 5, a section taken at the line 5 on Fig. 1, viewed in the direction of the arrow and enlarged; Fig. 6, an  
40 enlarged view in elevation of the overhead beam from which the hoist is suspended, showing the manner of supporting it adjustably; Fig. 7, a broken plan section of the same; Fig. 8, a perspective view of an end bearing for the overhead beam; Fig. 9, a section taken at the line 9 on Fig. 10 and viewed in the direction of the arrow, and Fig. 10 a section taken at the line 10 on Fig. 6 and viewed in the direction of the arrow.  
45

A and B are respectively the outer and inner sections of a circular mold for forming the wall C of a cylindrical structure of concrete having vertical and circumferential metal bars (not shown) embedded in it in the  
50 ordinary or any desired manner. These mold-sections are rigidly tied together at suitable intervals by frames D, each comprising a pair of vertical timbers *a* on the outer mold-section, a pair of similar timbers *b* on the inner  
55 mold-section, and bolted between said timbers spacing-timbers *c*, with supplemental filling-strips *c'*, if required, for determining the width of space between the mold-sections for the thickness of wall C desired. Inside the  
60 mold is provided scaffolding, comprising an outer circumferential section E and an inner central section E', each section having legs *d*, formed, preferably, as represented, by strips *d'* *d''*, bolted flatwise together and standing on  
65 jack-screws F. The legs of the outer scaffolding-section are joined to the frames D at their timbers *b*. That timber of one frame on each of the two structures represented in the drawings as undergoing erection is shown to extend  
70 to a greater length than the other timbers, *b*, for a purpose hereinafter explained, and is denoted as *b'*. The legs of the central scaffolding also stand on jack-screws F. The two scaffolding-sections are connected at vertical  
75 intervals by bars *e* and from near the upper ends of the molds by floor-beams *f*, on which the working floor *g* is laid.  
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85  
90  
95



Concrete is filled into the mold of each structure represented as undergoing erection to produce the wall C, and as the filling proceeds the jack-screws are operated at intervals or otherwise, as desired, to raise the scaffolding and the molds thereon to permit the filling to be performed continuously or without interruption for disintegrating and removing the molds after using them for producing sections of the walls undergoing construction and replacing them on the molded wall-sections after the latter have set, thereby saving the expense of erection incurred by delays incidental to such mold adjustments.

Materials used in the erection are hoisted for delivery to the workmen on the platform  $g$  to a platform  $g'$ , provided on a level there-with between the two structures undergoing erection, from a platform  $g^2$ , provided between the two structures at their bases. The means employed for so hoisting the materials are elevators in the form of cars or platforms suspended on cables from overhead sheaves and guided between taut cables, the suspension-cables being paid out from and taken up upon rotary drums driven by suitable power, all in a usual or any suitable manner to lower and raise the elevators.

It will be realized that as the molds by raising them as and for the purpose described attain higher and higher elevations with the progress of the work of erection the elevators must ascend farther and farther to reach the working platform  $g'$  and that corresponding lengthening of the guides for the elevators must be provided for. This provision constitutes the primary purpose of the improvement herein and is accomplished by the following described construction relative to two similar structures undergoing erection, as shown.

A metal beam G is supported at its ends on coincident frames D of the molds of the two structures. This beam, as shown, is formed of two parallel channel-bars bolted together near their ends through their webs, as represented at  $h$  in Fig. 7, with sleeves  $h'$  about the bolts spacing the bars apart. The higher timbers  $b'$ , upon the upper extremities of which the beam ends are supported and which are in pairs with the members spread apart, as shown in Figs. 9 and 10, have their opposing faces coincidently grooved for some distance downward from their upper ends to form a longitudinal cylindrical recess  $i^3$ , Fig. 10. A metal block  $i$ , formed with a central longitudinal enlargement  $i'$ , containing a bolt-opening  $i^2$  lengthwise through it, is inserted between the members of the pair of frame-timbers  $b'$  with the enlargement  $i'$  fitting the recess  $i^3$  and is securely bolted in place through the said members. A plate  $k$  seats upon the upper end of the pair of timbers  $b'$  and has on its upper surface near opposite edges rounded bearing-bosses  $k'$ , and rising from that surface

near the edges thereof at right angles to those adjacent to which the bosses are provided are vertical guide-posts  $k^2$ . The beam G rests upon the rounded bearing-bosses  $k'$  and is fastened in place by a bolt  $k^3$  passing through the opening  $i^2$ , below which the bolt-head affords a stop, through an opening in line with the bolt in the plate  $k$  and between the channel-bars of the beam, above which the bolt is secured by a nut  $k^4$ , bearing against a washer  $k^5$ , interposed between the nut and bars.

Between the members of the beam G at opposite sides of its transverse center are journaled sheaves  $l$ , from each of which is suspended an elevator H on a hoisting-cable  $l'$ , connected with any usual or suitable form of hoisting-engine. (Not shown.) These elevators work through openings  $m$  and  $m'$ , provided, respectively, in the platforms  $g'$  and  $g^2$ . Each elevator is guided between guide-cables  $n$ , fastened at their upper ends to the beam G and each passing at the platform  $g^2$  over suitable guide-pulleys, as shown, or otherwise to an adjustable holder I for maintaining the guide-cable yieldingly in its required taut condition and beyond which the cable is shown to be laid in a coil  $n'$  under the lower platform. The holder I in the preferred form thereof illustrated comprises a bell-crank lever  $o$ , fulcrumed at its angle on a suitable bearing  $p$ , with a weight  $o'$  on its longer arm and an eye  $o^2$  in its shorter arm, through which the guide-cable passes, and carries a stop  $q$ , clamped upon it, to prevent the cable from being drawn back through the eye.

According to the arrangement represented the hoisting-engine raises one elevator to the platform  $d'$  while it lowers the other to the platform  $g^2$  to be loaded with the material to be carried up. When between trips of an elevator the upper platform has been raised by raising the molds, the guide-cables  $n$  will have been correspondingly raised by turning accordingly the bell-cranks of the holders I on their fulcrums until by continued raising of the molds the limit of so turning the bell-cranks has been reached. Then the clamp-stops  $q$  are loosened to permit the cables  $n$  to pay out to the desired extent, and the bell-cranks are turned back to their initial positions represented and the clamps are refastened on the guide-cables to hold them subject to the tightening effect of the weighted bell-crank arms. In practice in adjusting a guide-cable the bell-crank arm  $o$  is let down to rest the weight  $o'$  upon a block  $r$ , and after the adjustment is made the prop-block is withdrawn to permit the arm to lower and take up any slack there may be in the cable.

The growth in height of the two structures represented is not liable to be uniform, so that if the hoist-carrying beam G were rigidly fixed on its end supports inequality in the



extent of raising the two molds would strain the hoist mechanism and might more seriously injure it. By supporting the beam at its ends in the manner shown and described it is rendered sufficiently yielding to compensate for any degree of inequality in the elevation of the two molds that is liable to occur.

It is usual to erect simultaneously a plurality of the structures like those represented, either in line or in clusters, and for that reason the improved hoisting mechanism is illustrated in the drawings and hereinbefore described in detail in connection with two such structures undergoing erection. However, it is similarly applicable in the erection of a single structure, the only material difference being in the manner of supporting the hoist-carrying beam, which may then be rigidly fastened in position. The details of construction of the hoist-regulating mechanism may, moreover, be otherwise variously modified without departure from the invention, which is not, therefore, intended to be limited to such details.

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination with a mold, for use in erecting a wall substantially as described and provided with means for raising it, hoisting apparatus carried by the mold, comprising an elevator suspended to be raised and lowered, vertical guides for the elevator, and yielding holding means for the guides, in which they are confined to retain them in taut condition, substantially as and for the purpose set forth.

2. In combination with a mold, for use in erecting a wall substantially as described and provided with means for raising it, hoisting apparatus carried by the mold, comprising an elevator suspended to be raised and lowered, vertical guides for the elevator, and yielding holding means for the guides, in which they are adjustably confined to retain them in taut condition, substantially as and for the purpose set forth.

3. In combination with a mold, for use in erecting a wall substantially as described and provided with means for raising it, hoisting apparatus comprising a beam carried by the mold, an elevator suspended on the beam to be raised and lowered, vertical guides suspended on said beam, and holding means for the guides in which they are adjustably confined toward their free ends to retain them in taut condition, substantially as and for the purpose set forth.

4. In combination with a mold, for use in erecting a wall substantially as described and provided with means for raising it, hoisting apparatus comprising a beam carried by the mold, an elevator suspended on the beam to be raised and lowered, vertical guides suspended

on said beam, and yielding holding means for the guides, in which they are adjustably confined toward their free ends to retain them in taut condition, substantially as and for the purpose set forth.

5. In combination with a mold, for use in erecting a wall substantially as described and provided with means for raising it, hoisting apparatus comprising a beam carried by the mold, an elevator suspended on the beam to be raised and lowered, guide-cables suspended on said beam, and holders for said cables consisting of bell-crank levers fulcrumed on bearings and having their longer arms weighted and with the shorter arms of which said cables are connected toward their free ends, substantially as and for the purpose set forth.

6. In combination with a mold, for use in erecting a wall substantially as described and provided with means for raising it, hoisting apparatus comprising a beam carried by the mold, an elevator suspended on the beam to be raised and lowered, guide-cables suspended on said beam, and holders for said cables consisting of bell-crank levers fulcrumed on bearings and having their longer arms weighted and eyes in their shorter arm through which said cables pass, and clamping-stops on said cables adjacent to said shorter arms, substantially as and for the purpose set forth.

7. In combination with a pair of molds for use in erecting walls of structures close together substantially as described, and provided with means for raising the molds, hoisting apparatus comprising a beam yieldingly supported at its opposite ends on said molds, elevators suspended on the beam to be raised and lowered, guide-cables suspended on said beam, and yielding holding means for said cables, on which they are adjustably confined toward their free ends to retain them in taut condition, substantially as and for the purpose set forth.

8. In combination with a pair of molds, for use in erecting walls of structures close together substantially as described and provided with means for raising the molds, hoisting apparatus comprising a beam, rounded bearings on said molds for the opposite ends of said beam and with which said ends are yieldingly connected, elevators suspended on the beam to be raised and lowered, guide-cables suspended on said beam, and yielding holding means for said cables on which they are adjustably confined toward their free ends to retain them in taut condition, substantially as and for the purpose set forth.

JAMES SPELMAN.

In presence of—

L. HEISLAR,

WALTER N. WINBERG.