

No. 890,641.

PATENTED JUNE 16, 1908.

P. C. HAINS, SR.
CONCRETE MIXING APPARATUS.

APPLICATION FILED MAR. 31, 1908.

2 SHEETS—SHEET 1.

Fig. 1.

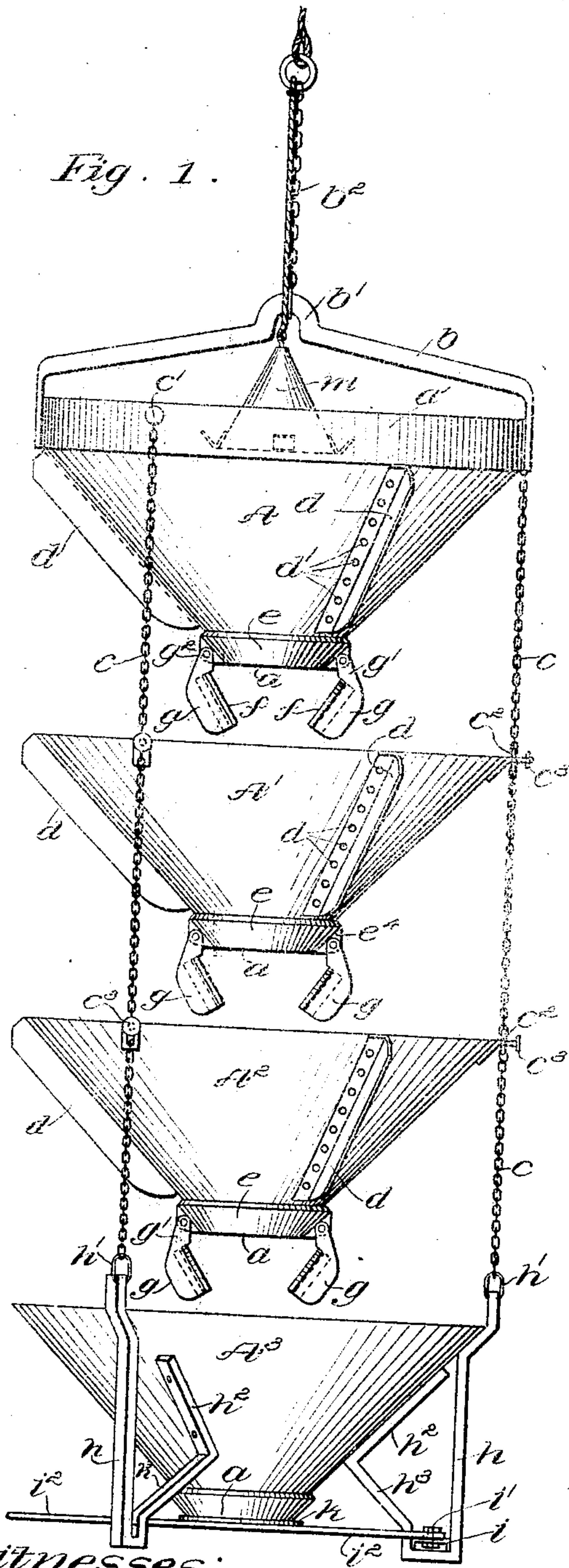


Fig. 4.

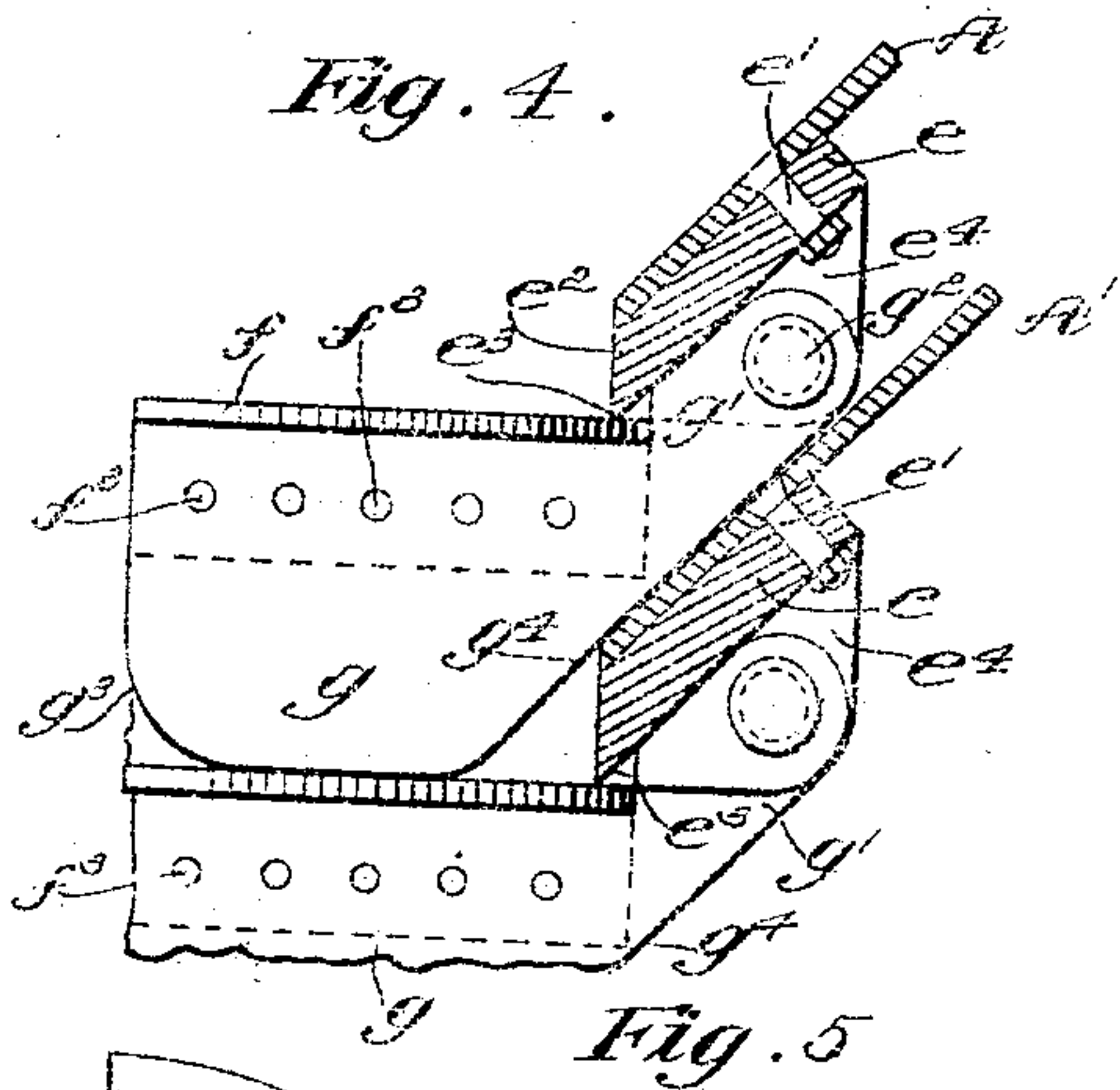
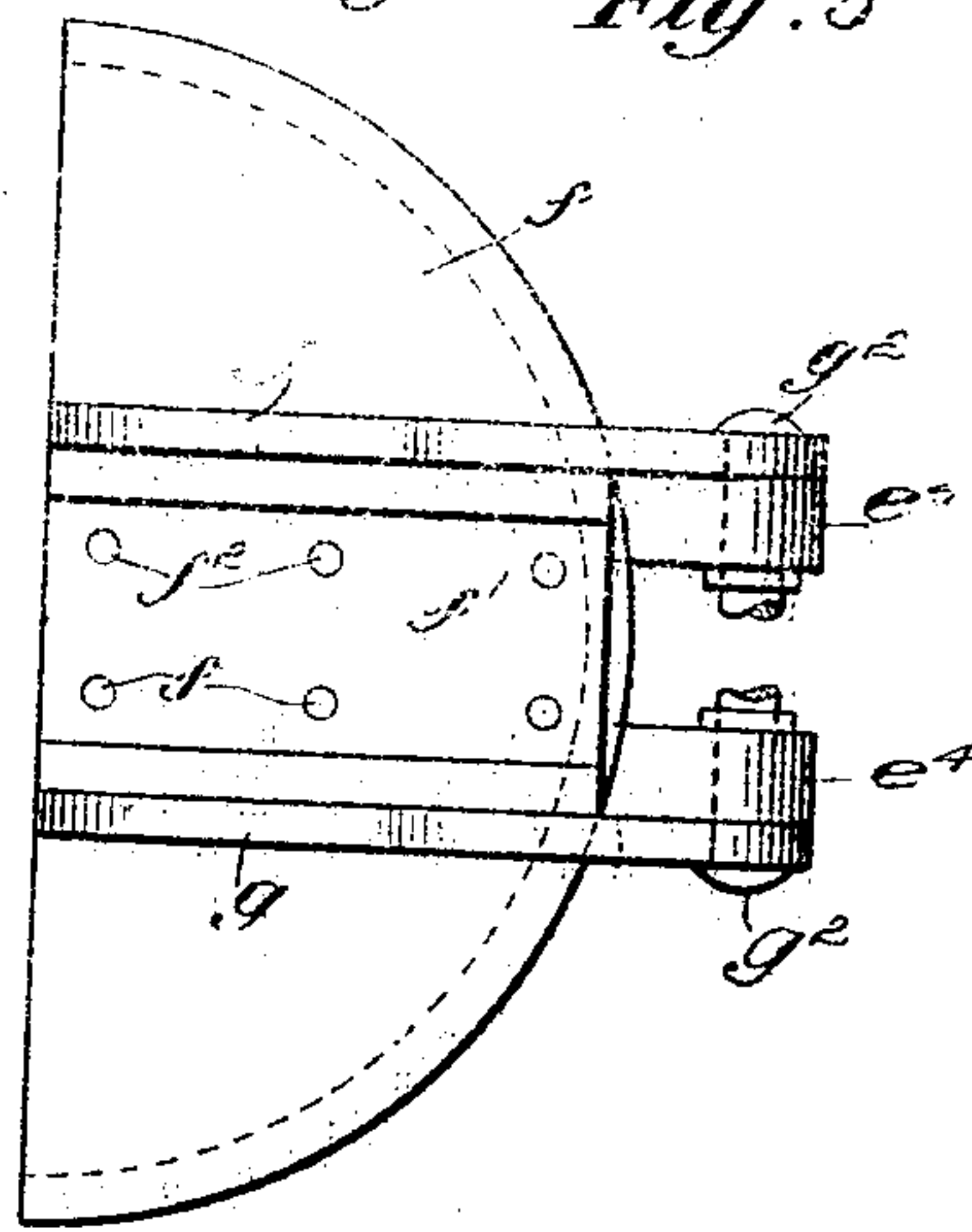


Fig. 5.



Witnesses:
Wm. G. Ogden
Edward H. Palmer.

Inventor:
Peter C. Hains, Sr.
by Robt. P. Hains, Atty.

No. 890,641.

PATENTED JUNE 16, 1908.

P. C. HAINS, SR.
CONCRETE MIXING APPARATUS.
APPLICATION FILED MAR. 31, 1908.

2 SHEETS—SHEET 2.

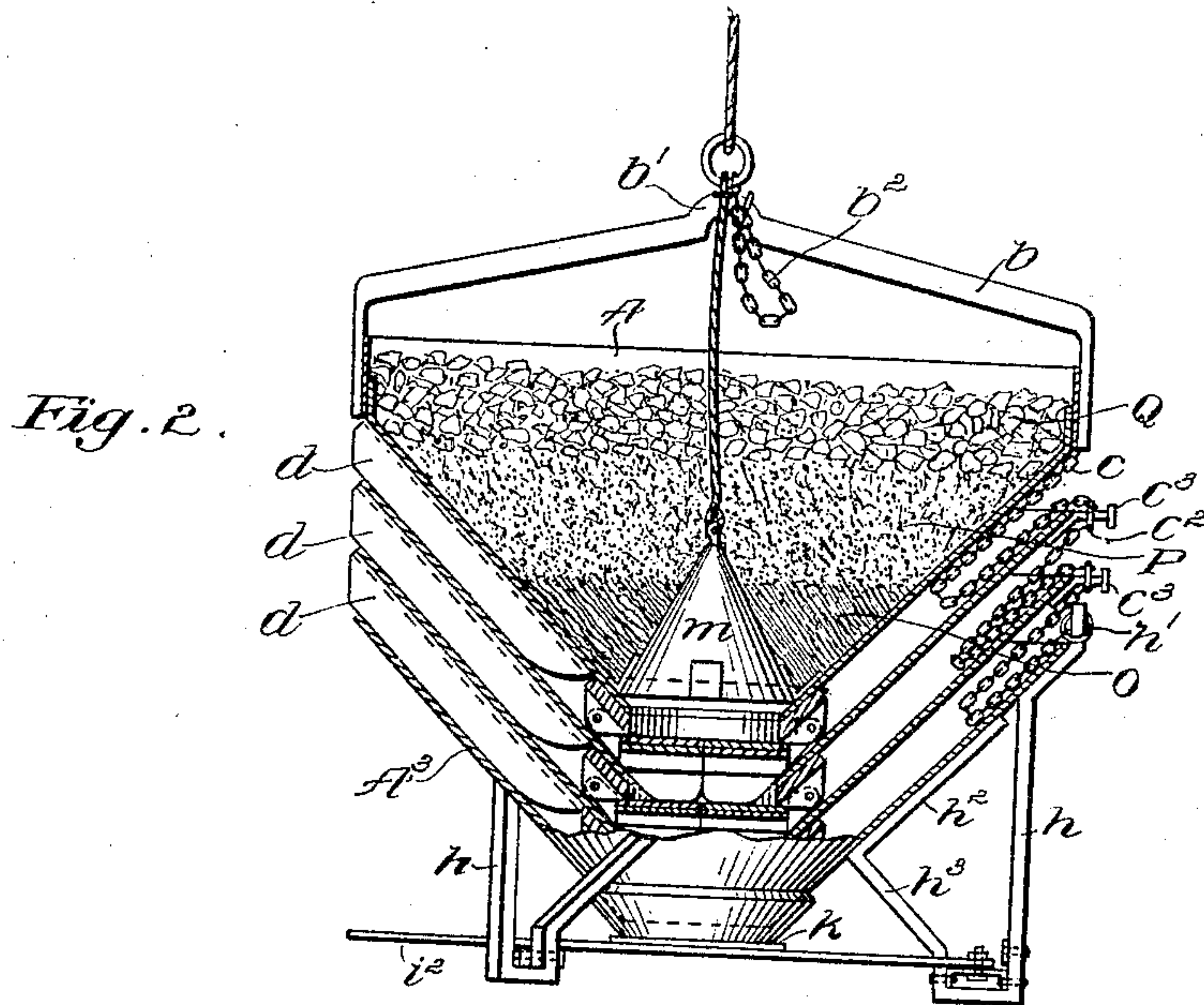
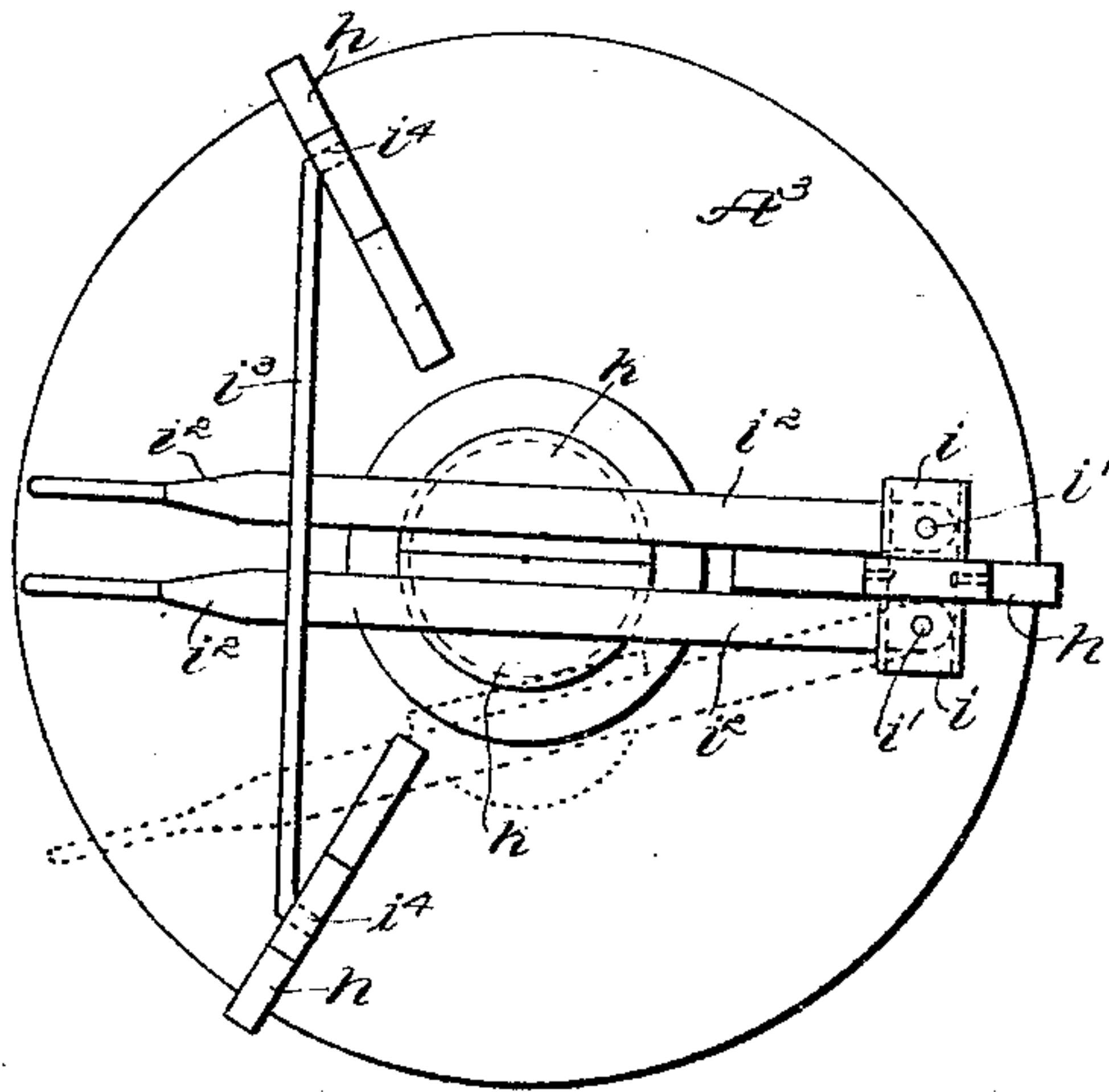


Fig. 3.



Witnesses:
Thomas G. Ogden
Edward H. Palmer.

Inventor:
Peter C. Hains, Sr.
by Robt. P. Hains.
Atty.

UNITED STATES PATENT OFFICE.

PETER C. HAINS, SR., OF WASHINGTON, DISTRICT OF COLUMBIA.

CONCRETE-MIXING APPARATUS.

No. 890,641.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed March 31, 1908. Serial No. 424,322.

To all whom it may concern:

Be it known that I, PETER C. HAINS, Sr., a citizen of the United States, residing at Washington, District of Columbia, have invented an Improvement in Concrete-Mixing Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The invention to be hereinafter described relates to concrete mixing and handling apparatus, whereby the constituent elements composing the mixture may be brought into proper relation and the product deposited in the desired location, the present invention being a further development of the device disclosed in Patent No. 818,929, dated April 24, 1906, to which reference may be had.

In the patent referred to, a series of substantially conical hoppers were connected together in such manner that they could be nested one within the other or successively raised from such nested relation, each of the upper hoppers being provided with a door hung upon arms and operated by a connection to the next lower hopper to open said door as the hopper was raised from the one below it.

The present invention aims to simplify the door construction particularly with reference to its opening and closing movements, and in other respects to modify the apparatus of said patent, all as will hereinafter more fully appear.

In the drawings: Figure 1 is a side elevation of the apparatus showing the series of hoppers raised successively from their nested position and the material passing into the lower hopper; Fig. 2 is a partial section and side elevation of the hoppers illustrating their relation in nested position, the top hopper of the series being charged with the materials to be mixed; Fig. 3 is a bottom view of the lower hopper, showing the door mounting thereof; Fig. 4 is a sectional detail representing the relation of the walls of the hoppers and the door operating fins, the fin of the upper door resting on the top of the lower door; and Fig. 5 is a bottom view of one of the doors of an upper hopper and its connection with the lugs of the door ring or flange.

Referring to Fig. 1, which shows one embodiment of the present invention, A, A', A²,

and A³ represent a series of hoppers or receptacles of any desired or preferred form or number adapted to be nested together as indicated in Fig. 2. Preferably, these hoppers or receptacles are of general conical shape, and each has a bottom opening *a*, through which the materials to be mixed may pass, as will hereinafter appear.

The receptacle A, which for identification may be termed the "top hopper" is preferably provided with an upwardly extended flange or ring portion *a'* to give additional strength and increase its capacity. To the top hopper A is connected any usual or desired form of lifting bail or sling *b* to which at *b'* may be connected the derrick-lift *b*². These parts are appropriately constructed to support the weight not only of the top hopper and contained material, as shown in Fig. 2, but of all the hoppers, as will appear. As in the patent referred to, the several hoppers of the series are connected together, the connecting element in the present form of the invention being shown as chains *c*, secured to the top hopper at suitable points, as *c'*, and provided at intervals of their length with rings *c*² which engage pins or studs secured to the lower hoppers A' and A², and have their lower ends secured to the bottom hopper, as will be explained.

Each of the upper hoppers A, A', and A² is preferably provided with an angle iron or rib extending along its outer surface, as shown, said angle iron or rib being secured to its hopper by a series of rivets or bolts *d'*.

Exterior to the bottom opening *a* of each of the hoppers there is secured a member *e*, which, for identification, may be known as the bottom ring. This ring *e* may be formed of any suitable material, preferably cast metal, and is secured about the outer surface of the hopper adjacent the opening *a* by suitable bolts or rivets *e'*, Fig. 4, the heads of which on the inner surface of the hopper are countersunk, as shown, to present a smooth unobstructed interior. Viewing Fig. 4, it will be seen that this bottom ring has its lower circular edge *e*³ formed on an incline in vertical prolongation of the opening in the bottom of the hopper. From this construction, it will be noted that the lower circular edge *e*³ of the bottom ring thus presents a sharp edge for the bottom door, as will now

be explained. The bottom ring *e* has projecting from it the lugs *e*⁴ which serve as a hinge support for the bottom door.

The bottom door of each of the upper hoppers consists of two semi-circular parts, a bottom view of one of which is shown in Fig. 5. A half door, as indicated in Fig. 5, consists of a door plate *f* which is somewhat larger than the bottom opening of the hopper formed by the circular edge *e*³ of the bottom ring, so that the door plate *f* will extend over and form a close joint with the edge of the upper ring, as illustrated by the dotted and full lines in Fig. 5.

The under surface of each of the semi-circular plates or doors *f* has secured thereto an angle iron *f*¹, said angle iron preferably being of the double flanged type and its bridging wall being secured to the bottom of the door plate *f* by suitable rivets or bolts *f*², Fig. 5. Suitably secured by bolts or rivets *f*³ to the downwardly extending portions of the angle iron *f*¹, are the door operating members *g*. These door operating members *g* preferably consist of flat plates, one being secured to each of the downturned flanges of the angle iron *f*¹ and having upwardly and backwardly extending portions *g*¹ which serve as one member of a hinged joint connecting the doors to the bottom ring. As one form of such hinged connection, and as shown in Figs. 4 and 5, a suitable rivet or bolt *g*² passes through suitable holes formed in the projecting portions *g*¹ of the door operating members and similar holes in the projecting lugs *e*⁴ of the bottom ring, all as best shown in Figs. 4 and 5.

The door operating members *g* have their outer edges *g*³ curved, as shown in Fig. 4, and their lower edges substantially horizontal, the purpose being that when the hoppers come together in nesting position, the inclined or curved portion *g*³ of the door operating members *g* will first contact with the inclined surface or inner wall of the next lower hopper, thereby causing the doors to be turned on their hinges into closing position. When in closing position, as indicated in Fig. 4, the door operating members *g* rest by their lower straight edges upon the top surface of the doors next beneath, thereby forming an effective and simple manner not only of operating the doors to closing position, but likewise for holding them in such position when the hoppers are nested.

It will be noted that the door operating members *g* have their outer edges *g*⁴, Fig. 4, inclined in an upward direction, so that this inclined edge or wall of the door closing member, coming in contact with the inclined interior surface of its other next lower hopper as the hoppers are nested, will assist in bringing the door into closing position and maintain it in such position, and as the hoppers

are successively arranged one from the other by the derrick-lift and the connecting chains, the inclined wall *g*⁴ will ride along the lower edge of the next adjacent hopper beneath to effect a gradual opening of the doors as the hoppers are moved to their full separated position, as defined by the connecting chains *c*.

It will be obvious to those skilled in the art, of course, that the door operating members *g*, while of the preferred character hereinbefore described, may, nevertheless, be changed either in form or general character of construction, or may be secured to the bottom of their respective doors by means other than that herein specifically set forth in this special embodiment of the invention, the essentials being that these door operating members will serve to automatically close the doors of the free hoppers as they are brought together into nested position, and will rest upon a support beneath, such as the top of the door of the next lower hopper, against the inclined surface of the hopper itself, and as the hoppers are raised from nested position, will gradually allow the doors to open automatically, such automatic operation being effected without special operating devices, as heretofore used.

The lower hopper *A*³ is preferably provided with three supporting members or legs *h*, which may be of any usual construction, but which are herein shown as formed of metal straps having a vertical portion terminating at its upper end in an eye, to which a link *h*¹ is secured, said link *h*¹ forming the connection for the lower end of the chains *c* with the lower hopper, as indicated in Fig. 1. These legs or supporting members *h* are also bent to provide a bearing portion *h*² against the outer surface of the lower hopper, and a bracing portion *h*³ connecting the said portion *h*² with the lower or supporting portion of the leg, all as indicated in Fig. 1.

Secured to one of the supporting legs *h* is a plate *i* extending transversely thereof, to which is pivotally connected at *i*¹ handles or operating members *i*² for the doors *k* of the lower hopper. The doors *k* of the lower hopper are of substantially the same shape and contour as the doors *f* of the upper hoppers but instead of swinging upon pivotal connections as do the doors of the upper hoppers, the doors *k* of the lower hopper rest upon one of the handles or operating members *i*², hereinbefore described. In order to support these doors in their closing position and to relieve the hinged connections *i*¹, of the handles or operating members *i*², of undue strain, the door operating ends of the handles *i*² rest upon a transverse supporting member *i*³, the ends of which are secured at *i*⁴ to the legs *h* of the lower hopper. From the construction described, it will be noted that the lower doors can be moved from their closed

position, as shown by full lines in Fig. 3, to their open position, shown by dotted lines of one of the doors, by merely moving its operating handle i^2 . The top hopper is adapted to seat within it and have seated over its bottom opening a preliminary mixer m which is or may be substantially as shown and described in the patent hereinbefore referred to, and needs no further description here.

10 In operating this device, the hoppers are first brought together and nested, as indicated in Fig. 2, the flanges d of the upper hoppers respectively resting upon the similar surface of the next adjacent lower hopper, to thereby properly support and position the hoppers with respect to each other. In this position, as already noted, the door operating members g will have closed the doors of the upper hoppers and will hold them closed preferably by resting upon the top surface of the next adjacent lower door. The doors of the lower hopper will have been closed by their operating handles and the preliminary mixing device m will be seated as indicated in Fig. 2. With the hoppers in this position, the desired quantity of cement o is first placed in the upper hopper, over this is then placed the requisite quantity of sand p , and upon this is scattered the desired quantity of cracked stone Q , a suitable amount of water being then properly scattered over the entire top surface of the stone. The derrick-hoist b^2 is then raised which first lifts the preliminary mixing device m from its seat and drags it up through the materials from position shown in Fig. 2 to that shown in Fig. 1. The derrick-hoist b^2 being then straightened out taut, the top hopper A is first raised, and as it leaves the next adjacent lower hopper, the door operating members g will ride over the top surface of the door of the lower hopper and along the lower portion of the bottom opening of said next lower hopper, thereby permitting the contents of the upper hopper to fall into the next lower hopper. As the connecting chains c continue to rise, the hopper A' will be lifted with the result that its doors will be gradually opened and the contents received by it from the top hopper be allowed to fall into the next adjacent lower hopper. This action of the successive hoppers will continue until the bottom hopper is reached, at which time the material will have been thoroughly mixed and the boom of the derrick, if used, can swing the entire mixing device into position where the concrete is to be used, whereupon the door operating handles i^2 of the lower hopper can be opened any amount desired and the material be allowed to fall to place.

I claim;

1. In a concrete mixing and handling apparatus, the combination of a plurality of hoppers having bottom openings and adapt-

ed to be nested one within the other, means for connecting the said hoppers in series to permit them to be successively raised from their nested position, doors for the bottom openings of said hoppers, and means carried by and projecting from the doors of the upper hoppers for contacting with a part pertaining to the hopper beneath for closing said doors as the hoppers are nested together.

2. In a concrete mixing and handling apparatus, the combination of a plurality of hoppers having bottom openings and adapted to be nested one within the other, means for connecting said hoppers in series to permit them to be successively raised from their nested position, doors for the bottom openings of said hoppers, and door operating fins secured to the doors of the upper hoppers for engaging a part of the next lower hopper, and serving to close said doors as the hoppers are nested together.

3. In a concrete mixing and handling apparatus, the combination of a plurality of hoppers having bottom openings and adapted to be nested one within the other, means for connecting said hoppers in series to permit them to be successively raised from their nested position, doors hinged to one side of the bottom openings of the upper hoppers, and door operating fins secured to said doors for engaging a part of the next lower hopper and serving to close said doors as the hoppers are nested together.

4. In a concrete mixing and handling apparatus, the combination of a plurality of hoppers having bottom openings and adapted to be nested one within the other, means for connecting said hoppers in series to permit them to be successively raised from their nested position, a bottom ring secured about the bottom opening of each of said hoppers, and a bottom closing door hinged to each of the rings of the upper hoppers, and means to close said doors as the hoppers are nested.

5. In a concrete mixing and handling apparatus, the combination of a plurality of hoppers having bottom openings and adapted to be nested one within the other, means for connecting said hoppers in series to permit them to be successively raised from their nested position, swinging doors for closing the bottom openings of the upper hoppers, said doors being adapted to open automatically as the hoppers are successively raised, and door operating fins secured to the bottom of each of said doors to close the same when the hoppers are nested.

6. In a concrete mixing and handling apparatus, the combination of a plurality of hoppers having bottom openings and adapted to be nested one within the other, means for connecting the said hoppers in series to permit them to be successively raised from their nested position, doors for closing the

bottom openings of said hoppers, and angle
irons or flanges secured to the outer surface
of each of the upper hoppers to contact with
the interior of the hopper beneath to sup-
5 port the upper hoppers when they are nest-
ed together.

In testimony whereof, I have signed my

name to this specification, in the presence of
two subscribing witnesses.

PETER C. HAINS, Sr.

Witnesses:

EDWARD H. JONES,

CLARENCE R. DIX.