No. 865,365. PATENTED SEPT. 10, 1907.

C. T. DRAKE.

MIXING APPARATUS.

APPLICATION FILED NOV. 13, 1903.

3 SHEETS—SHEET 1.

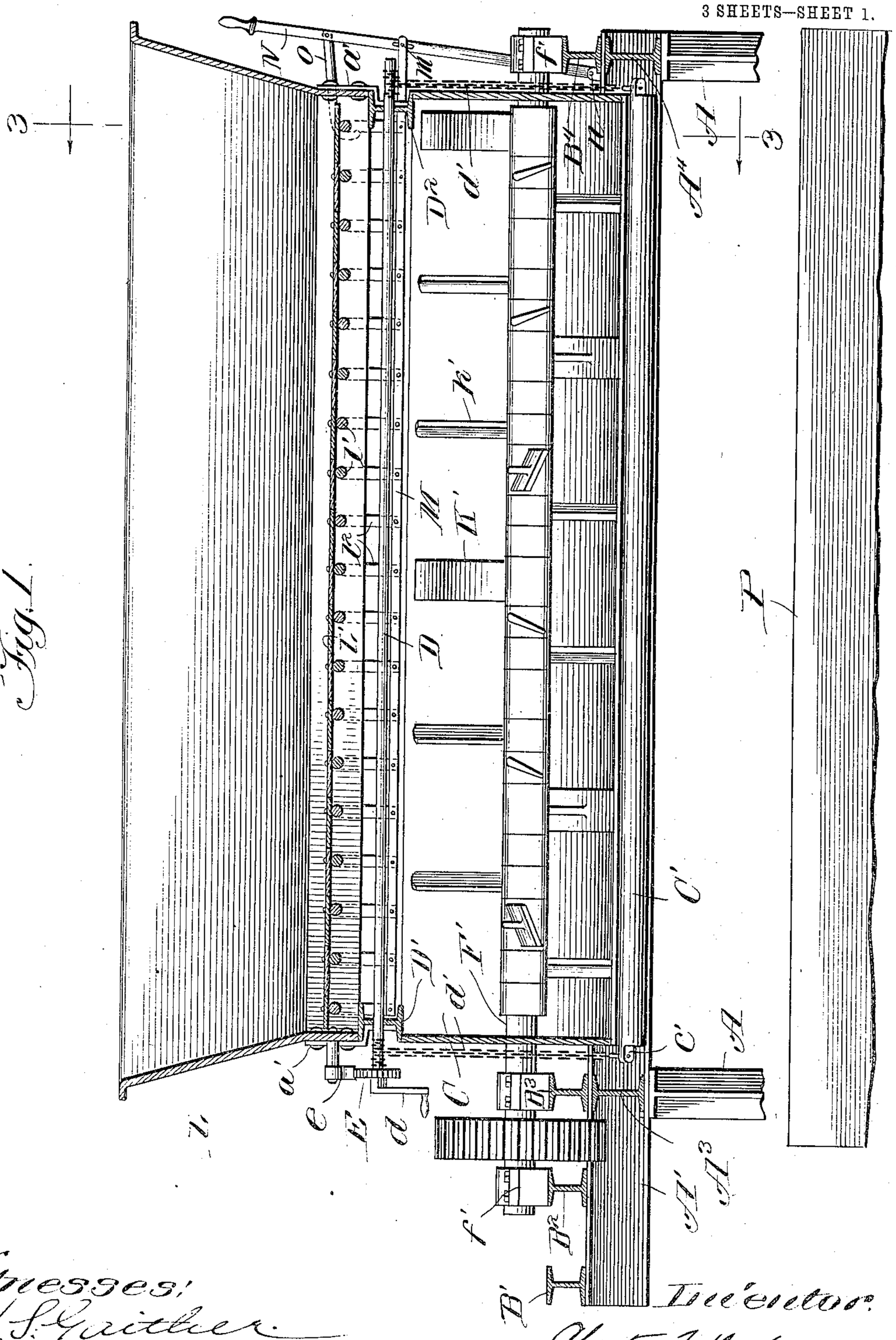

Fig. 1.

Witnesses:
H. S. Gaither.
O. C. Cunningham

Inventor:
Chester T. Drake
by Lawrence & Wilkinson
Attorneys

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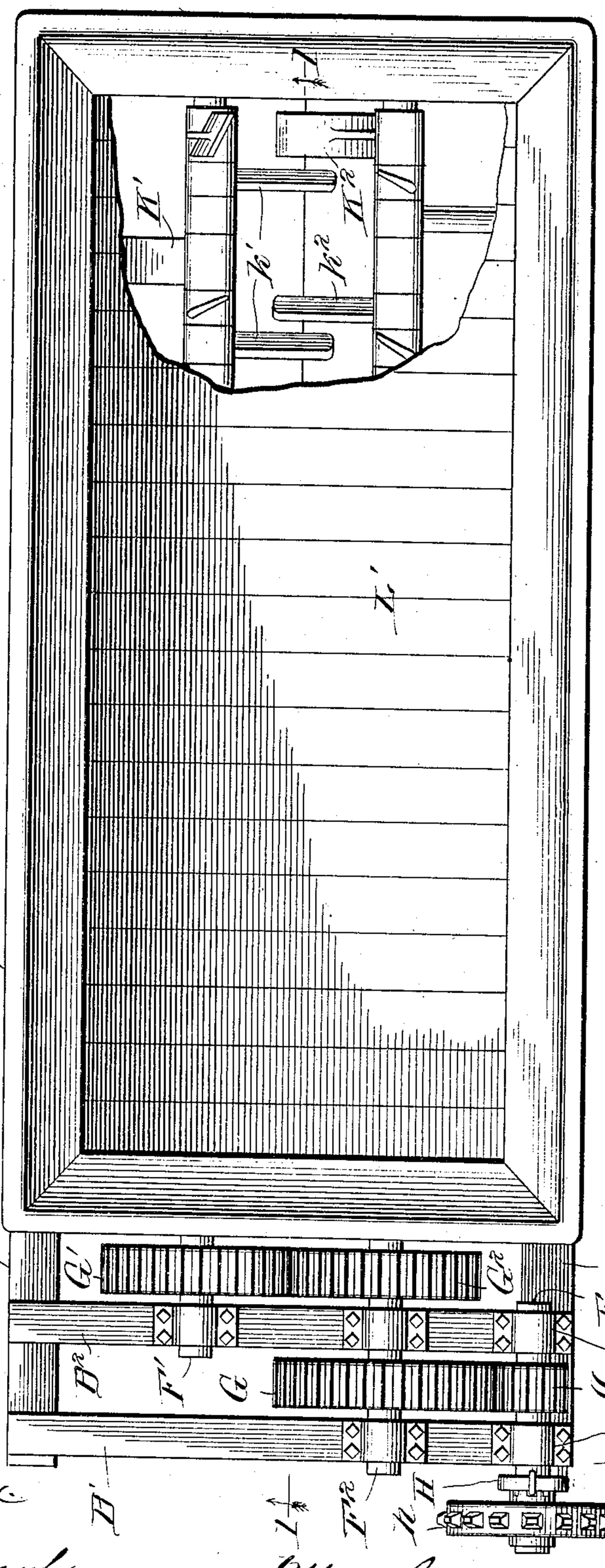

Fig. 2.

Witnesses:
H. S. Whittlesey
C. C. Cunningham

Inventor:
Chester T. Drake
by Lumbard & Wilkinson
Attorneys

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3 SHEETS—SHEET 3.

Fig. 2.

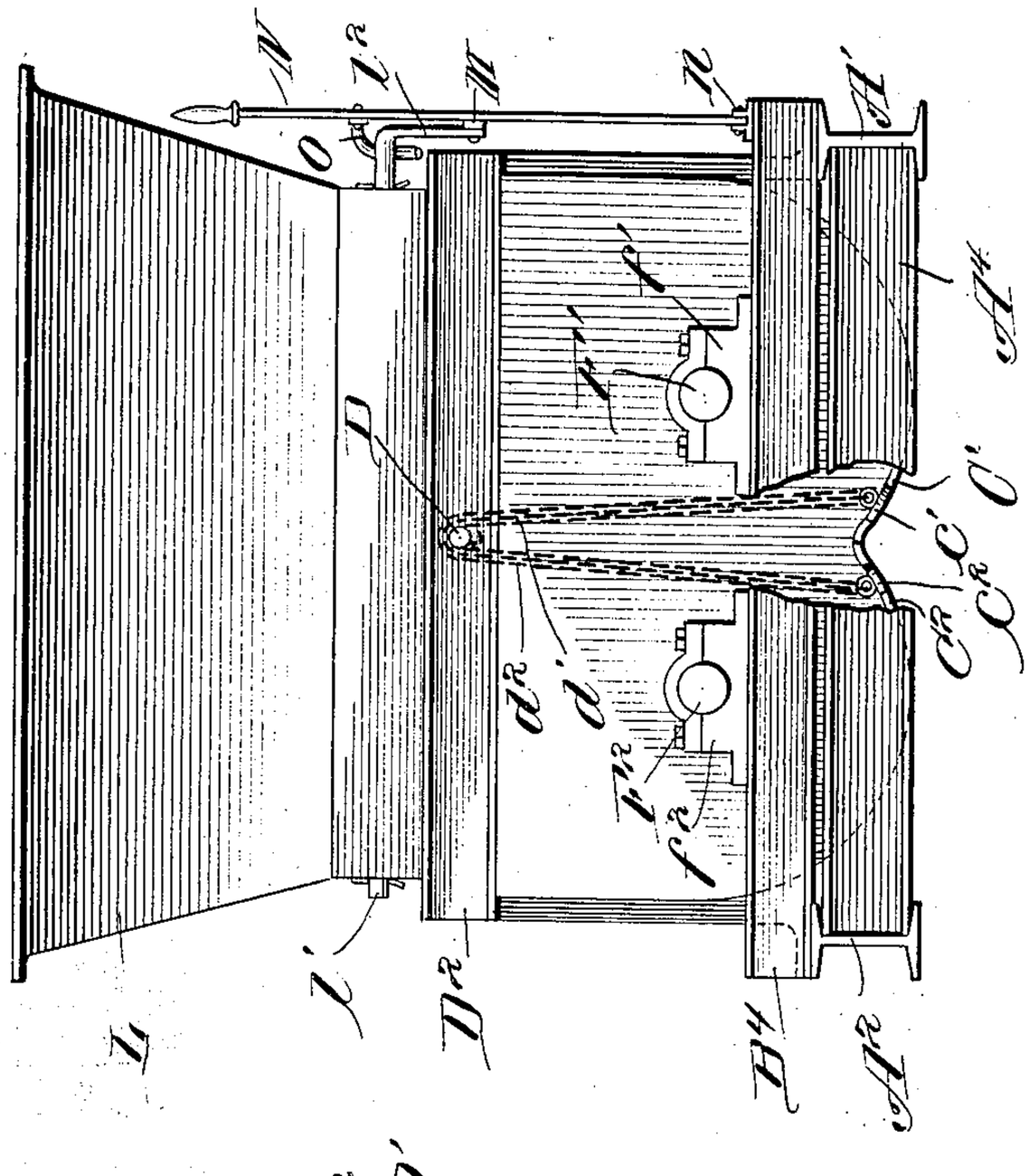
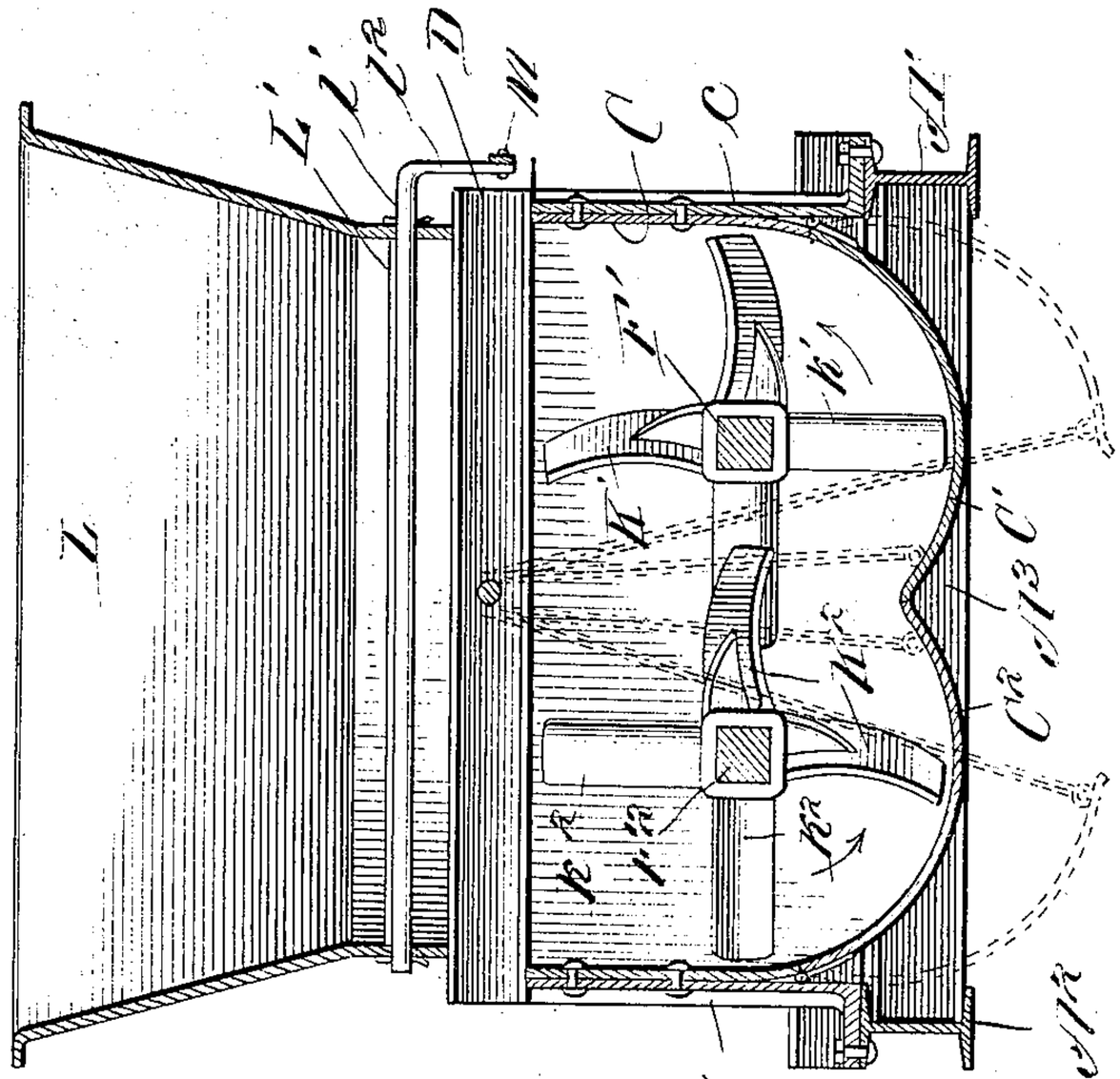


Fig. 3.



Witnesses:

H. S. Geittner

C. O. Cunningham

Inventor:

Chester T. Drake

by Lumbard & Wickerson

Attorneys

UNITED STATES PATENT OFFICE.

CHESTER T. DRAKE, OF CHICAGO, ILLINOIS.

MIXING APPARATUS.

No. 865,365. Specification of Letters Patent. Patented Sept. 10, 1907.

Application filed November 13, 1903. Serial No. 180,997.

To all whom it may concern:

Be it known that I, CHESTER T. DRAKE, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Mixing Apparatus, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates generally to mixing machines, and more particularly to concrete mixers.

It is desirable in mixing concrete and other compound materials to deposit a predetermined quantity of the ingredients thereof in the mixer and when such quantity has been sufficiently mixed to discharge the same from the mixer, after which another previously measured quantity of ingredients is mixed. In this manner the number of square yards of the mixed concrete or other material discharged from the mixer may be readily computed, the capacity in square yards of the mixer being known.

The primary object of my invention is to provide an apparatus of the character referred to in which the desired predetermined quantity of the ingredients may be first measured and then thoroughly mixed after which the mixed material may be discharged into a car or other receptacle, thereby rendering it possible to simultaneously measure one quantity of ingredients while a previously measured quantity of ingredients is being mixed.

A further object of my invention is to provide a mixing apparatus which will be simple in construction, comparatively inexpensive in cost, and efficient in use.

My invention, generally described, consists in a measuring box to receive the ingredients to be mixed, a mixing chamber located beneath and supporting the measuring box, rotary mixing blades located within the mixing chamber, the measuring box having a dumping bottom to permit the measured ingredients passing therefrom into the mixing chamber, and the mixing chamber also having a dumping bottom to permit the mixed material to be discharged therefrom.

My invention will be more fully described hereinafter with reference to the accompanying drawings in which the same is illustrated as embodied in a convenient and practical form, and in which—

Figure 1 is a vertical central sectional view taken on line 1—1, Fig. 2; Fig. 2 a plan view partially broken away; Fig. 3 a transverse sectional view on line 3—3, Fig. 1; and Fig. 4 an end elevational view looking from the right in Fig. 1.

The same reference characters are used to designate the same parts in the several figures of the drawings.

A′ and A² indicate parallel supporting sills preferably composed of I-beams.

A³ and A⁴ indicate transverse end sills uniting the side sills, while A, A, indicate vertical posts located beneath the side sills near the ends thereof to support the apparatus.

B′, B², B³ and B⁴ designate transverse beams supported at their opposite ends upon side sills A′ and A².

C designates a mixing chamber provided with a dumping bottom composed of downwardly swinging doors C′ and C² suitably hinged to the lower edges of the side walls of the chamber.

c, *c*, designate angle brackets resting at their lower ends upon the side sills A′ and A² and having vertical portions rigidly secured to the side walls of the mixing chamber C, thereby supporting the latter above the side sills.

Rotary shafts F′ and F² extend longitudinally through the mixing chamber C and are supported at their opposite ends upon bearings *f′* and *f²* mounted upon the transverse beams B′, B², B³, and B⁴. The portions of the shafts F′ and F² between the beams B² and B³ have fixed thereon meshing gear wheels G′ and G². The portion of the shaft F² lying between the beams B′ and B² has fixed thereon a gear wheel G which meshes with a relatively small gear wheel *g* fixed upon a short shaft F journaled in bearings *f*, *f*, mounted upon the transverse beams B′ and B². A sprocket wheel *h* or other power communicating means is loosely mounted upon the shaft F and is adapted to be non-rotatively secured thereto by any suitable form of clutch H.

The portions of the shafts F′ and F² extending between the end walls of the mixing chamber C are provided with mixing blades for thoroughly intermingling the ingredients which are to be mixed together to form the concrete or other compound material. The mixing blades are preferably so inclined as to move the material from the ends of the chamber C towards the center thereof. Such mixing blades consist in a series of scoops K′, K² and a series of knives *k′*, *k²*. The knives and scoops are non-rotatively secured to the shafts by any suitable means, such for instance as providing sockets on the blades having square openings therethrough which surround squared portions of the shafts. The blades are staggered on the respective shafts so that as they pass between the shafts they will not interfere with each other, as clearly shown in Fig. 3.

The doors C′ and C² at the bottom of the mixing chamber C are preferably curved to conform to the blades upon the shafts, thereby rendering it possible for the blades in their rotary movement to reach the material in all parts of the mixing chamber. Any suitable means may be provided for closing the doors C′ and C² and for permitting them to fall by gravity to allow the mixed material to pass from the mixing chamber into a car P or other receptacle. Such means are shown as comprising chains *d′*, *d′*, secured to lugs *c′* *c′*, projecting from the ends of the door C′ and chains *d²*,

d^2, secured to lugs c^2, c^2, projecting from the ends of the door C^2. The chains referred to are secured to a rotary shaft D located above the mixing chamber C and journaled in beams D′ and D^2 mounted upon the mixing chamber. One end of the shaft D is provided with a crank *d* for rotating the same to wind up the chains and thereby elevate the doors C′ and C^2 into close contact with the ends of the walls of the mixing chamber to close the bottom thereof. A ratchet wheel E is secured to the shaft D which coöperates with a pawl *e* to retain the shaft D in any position to which it may be rotated and thereby prevent the weight of the material from swinging open the doors C′ and C^2.

Mounted above the mixing chamber is a measuring box or hopper L in which the ingredients to be mixed are deposited. The measuring box is supported upon the cross beams D′ and D^2 and retained in position thereon by brackets a' and a^2. The bottom of the measuring box is closed by a series of transverse slats L′ each of which is rigidly secured to a rod l' the ends of which are journaled in the side walls of the measuring box near the bottom thereof. Each of the slats L′ projects further to one side of its supporting rod l' than to the other side of such rod so that the weight of the material within the measuring box tends to swing the slats downwardly into position to permit the material in the measuring box to pass between the slats into the mixing chamber. The ends of the rods l' which project through one side of the measuring box are provided with downwardly extending crank arms l^2 which are pivotally united to a strip M one end of which is pivotally secured to a lever N. The lower end of the lever N is pivoted to a bracket *n* mounted upon an end of the transverse beam B^4. The strip M is secured to the lever N by a slotting pin connection so as to permit the lever being swung about its pivot. A hook O is pivoted to the lever N and is adapted to engage the end of the nearest rod l', as clearly shown in Figs. 1 and 4.

The operation of my invention is as follows: The ingredients which are to be mixed to form the concrete or other compound material are placed in the measuring box or hopper L. The slats forming the bottom of the measuring box are held in alinement by engaging the hook O with the end of the adjacent rod l', thereby holding the lever N in such a position that the strip M retains the crank arms l^2 in position to aline the slats and close the bottom of the measuring box. When the measuring box has been filled with the ingredients to be mixed the hook O is disengaged from the adjacent rod l' which permits the weight of the ingredients to swing all the slats l' downwardly, thereby discharging the contents of the measuring box into the mixing chamber. The lever N is again swung towards the measuring box and the hook O engaged with the adjacent rod l' so as to again close the bottom of the measuring box preparatory to its being again filled with the ingredients to be mixed. The ingredients after being discharged into the mixing chamber from the measuring box are thoroughly mixed by means of the blades upon the rotating shafts F′ and F^2. The shafts are rotated by the sprocket chain or other power transmitting means engaging the sprocket wheel *h* which rotates the shaft F and it in turn rotates the shaft F^2 through the interposed gear wheels *g* and G. The rotary motion imparted to the shaft F^2 is transmitted to the shaft F′ by means of the meshed gear wheel G′ and G^2. When the material in the mixing chamber has been sufficiently mixed the pawl *e* is disengaged from the ratchet wheel E, thereby permitting the shaft D to be rotated by the weight of the material upon the bottom doors C′ and C^2 acting through the chains d' and d^2. The mixed material then falls by gravity into a car or other receptacle P. After the discharge of the material from the mixing chamber the shaft D is rotated by means of the crank *d* and the chains d' and d^2 thereby wound thereon so as to lift the doors C′ and C^2 into position to close the bottom of the mixing chamber which is then ready to receive another quantity of ingredients to be mixed from the measuring box.

It will be observed from the foregoing description that I have invented an improved apparatus for mixing concrete and similar compound materials by means of which a predetermined quantity of the ingredients may be first measured and then deposited in the mixing chamber from which the material when sufficiently mixed is discharged through the bottom of the mixing chamber. By locating the measuring box above the mixing chamber the capacity of the apparatus is doubled inasmuch as the measuring box may be filled with the ingredients simultaneously with the mixing of the previously measured quantity of ingredients. As the capacity of the measuring box is known it is evident that the amount of the material mixed in the apparatus may be readily computed by keeping count of the number of times the doors in the bottom of the mixing chamber are opened.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form, the proportion of parts, and the substitution of equivalents, as circumstances may suggest or render expedient, without departing from the spirit of my invention.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

In an apparatus of the character described, the combination with a supporting frame work comprising parallel side sills and transverse end sills, a mixing chamber located between and supported by said side sills, parallel rotary shafts extending through said mixing chamber, bearings for said shafts mounted upon said transverse sills, radial blades fixed to said rotary shafts, vertical brackets supported upon said parallel side sills between which the mixing chamber is supported, transverse beams supported by said brackets above and at each end of said mixing chamber, a longitudinal shaft extending through and journaled in said transverse beams, downwardly swinging doors closing the bottom of said mixing chamber, flexible connections connecting said doors with the ends of said shaft, means for rotating said shaft to lift said doors against the mixing chamber to close the same, a measuring box supported by said vertical brackets above said mixing chamber, a dumping bottom for closing said measuring box, a lever for opening and closing said dumping bottom pivoted at its lower end to one of said transverse sills.

In testimony whereof, I sign this specification in the presence of two witnesses.

CHESTER T. DRAKE.

Witnesses:
GEO. L. WILKENSON,
C. C. CUNNINGHAM.