No. 836,190. PATENTED NOV. 20, 1906.

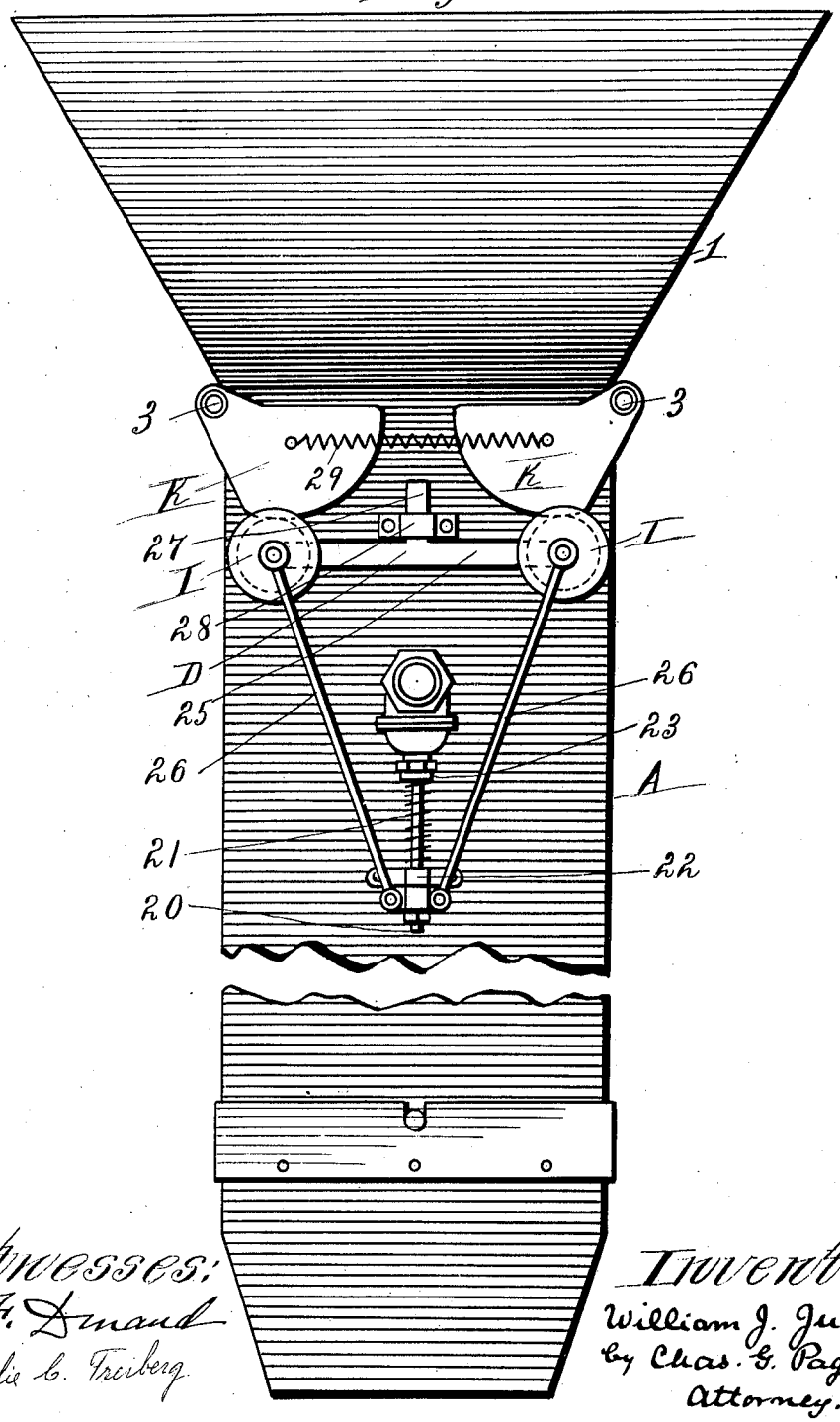
W. J. JUDD.

MIXER FOR CONCRETE, CEMENT, OR OTHER SUBSTANCES.

APPLICATION FILED JUNE 8, 1901.

7 SHEETS—SHEET 1.

Fig. 1



Witnesses:
A. F. Durand
Ottilie C. Triberg

Inventor:
William J. Judd
by Chas. G. Page
Attorney.

No. 836,190. PATENTED NOV. 20, 1906.

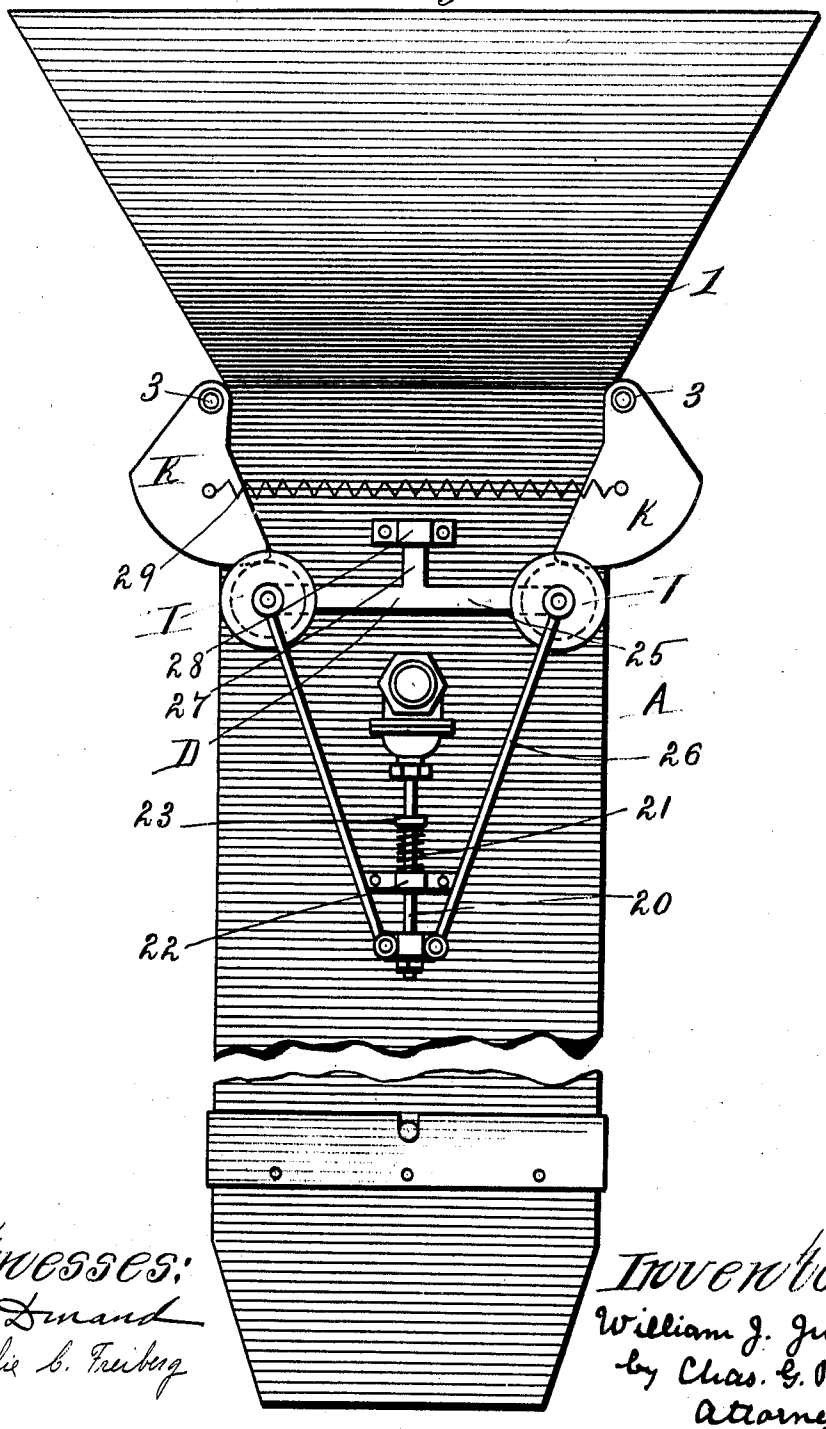
W. J. JUDD.

MIXER FOR CONCRETE, CEMENT, OR OTHER SUBSTANCES.

APPLICATION FILED JUNE 8, 1901.

7 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
A. F. Durand
Ottilie L. Friberg

Inventor:
William J. Judd
by Chas. G. Page
Attorney.

No. 836,190. PATENTED NOV. 20, 1906.

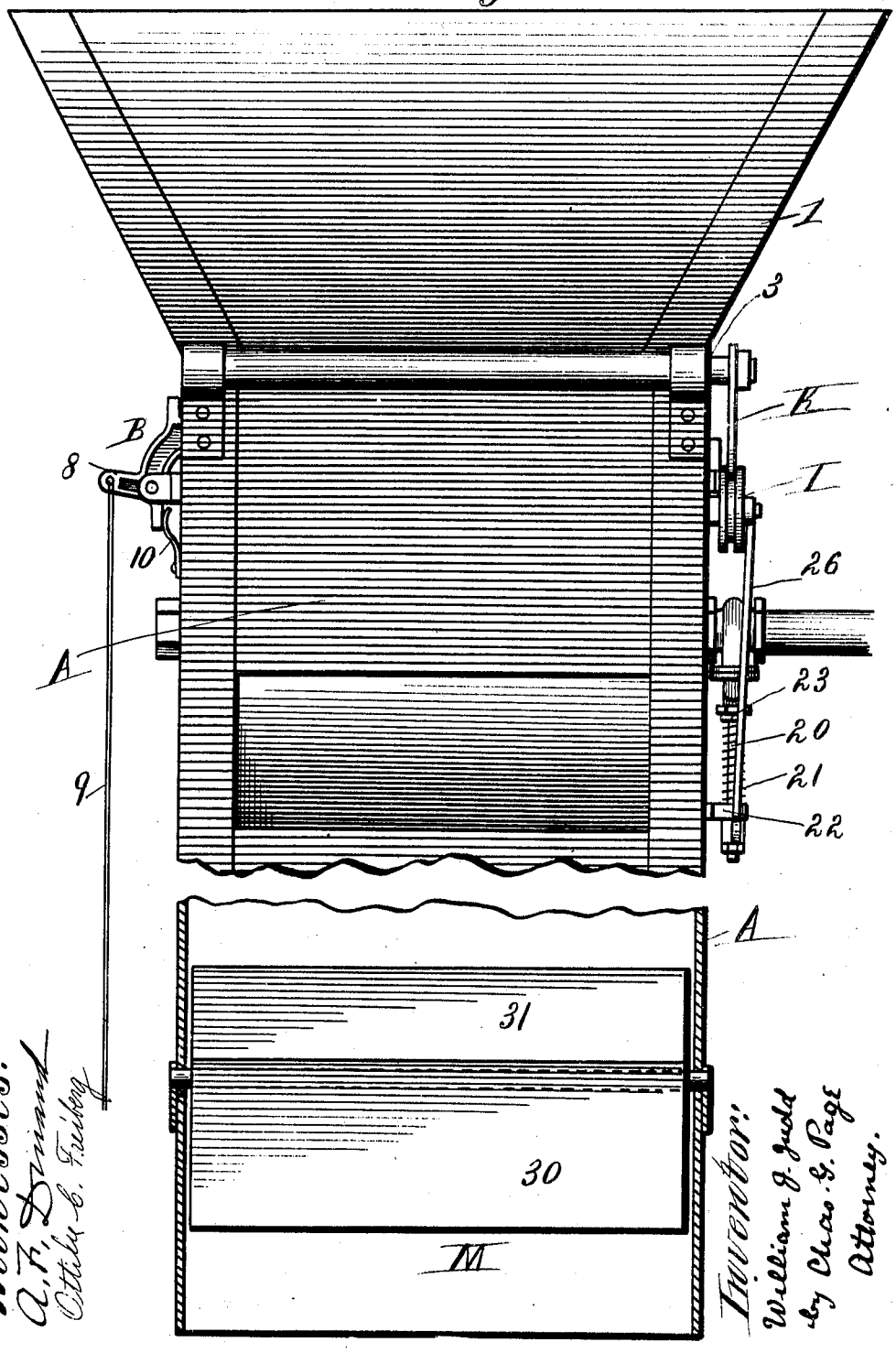
W. J. JUDD.

MIXER FOR CONCRETE, CEMENT, OR OTHER SUBSTANCES.

APPLICATION FILED JUNE 8, 1901.

7 SHEETS—SHEET 3.

Fig. 3.



Witnesses:
O. F. Dunn
Otto G. Fuibog

Inventor:
William J. Judd
by Chas. S. Page
Attorney.

No. 836,190. PATENTED NOV. 20, 1906.

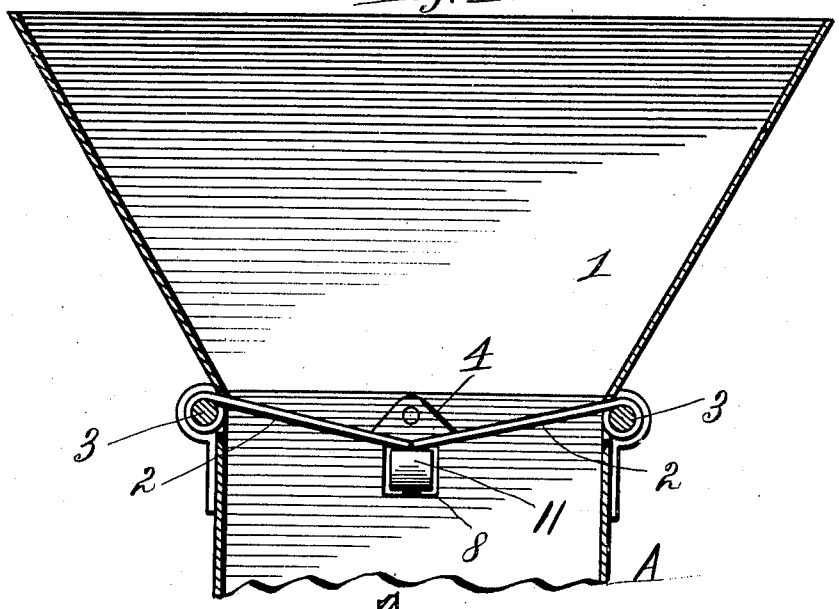
W. J. JUDD.

MIXER FOR CONCRETE, CEMENT, OR OTHER SUBSTANCES.

APPLICATION FILED JUNE 8, 1901.

7 SHEETS—SHEET 4.

Fig. 4.



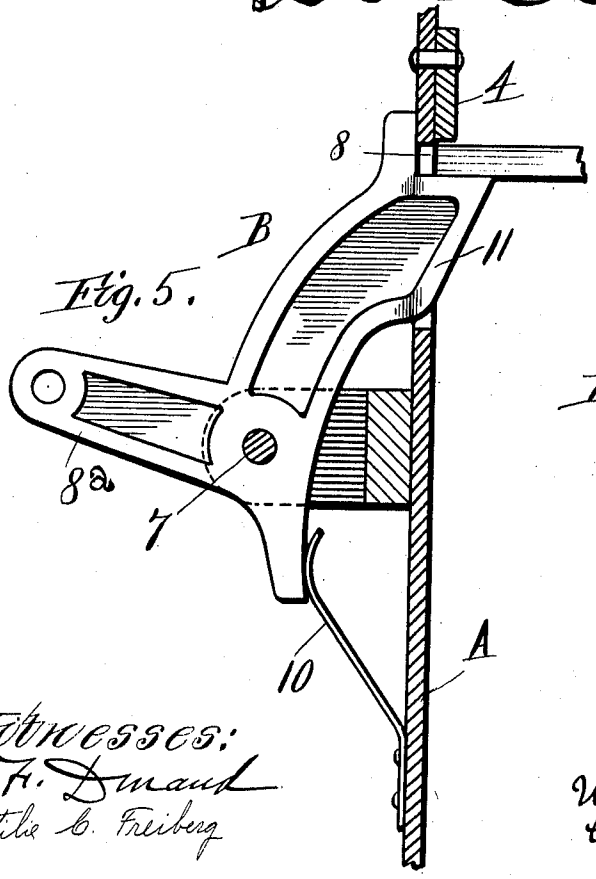


Fig. 5.

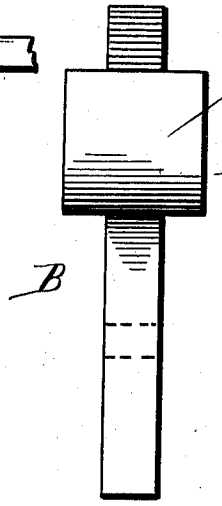


Fig. 6.

Witnesses:
A. F. Dunand
Ottilie C. Freiberg

Inventor:
William J. Judd
by Chas. G. Page
Attorney.

No. 836,190. PATENTED NOV. 20, 1906.

W. J. JUDD.

MIXER FOR CONCRETE, CEMENT, OR OTHER SUBSTANCES.

APPLICATION FILED JUNE 8, 1901.

7 SHEETS—SHEET 5.

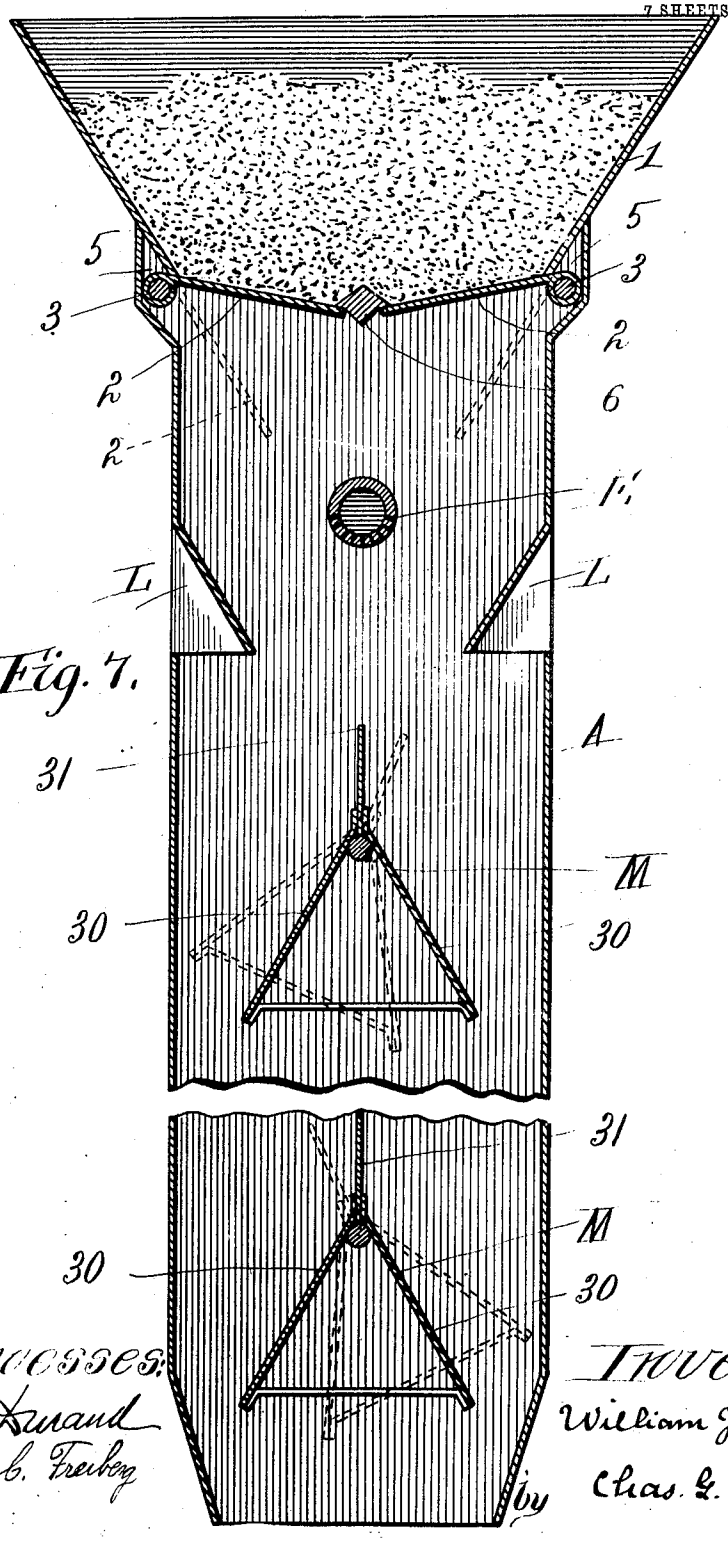


Fig. 7.

Witnesses:
Arthur W. Durand
Ottilie C. Freiberg

Inventor:
William J. Judd
by Chas. E. Page Atty.

No. 836,190. PATENTED NOV. 20, 1906.

W. J. JUDD.

MIXER FOR CONCRETE, CEMENT, OR OTHER SUBSTANCES.

APPLICATION FILED JUNE 8, 1901.

7 SHEETS—SHEET 6.

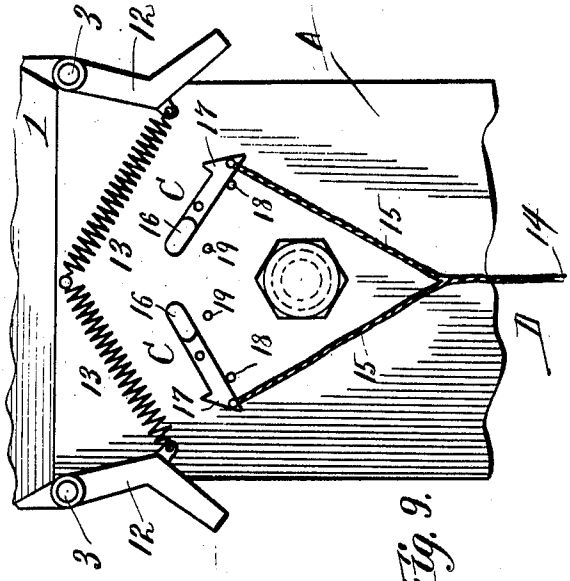


Fig. 9.

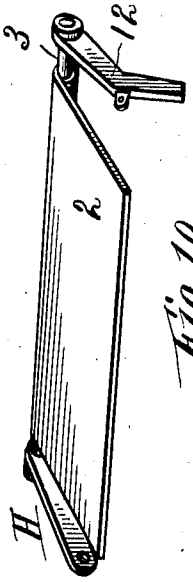


Fig. 10.

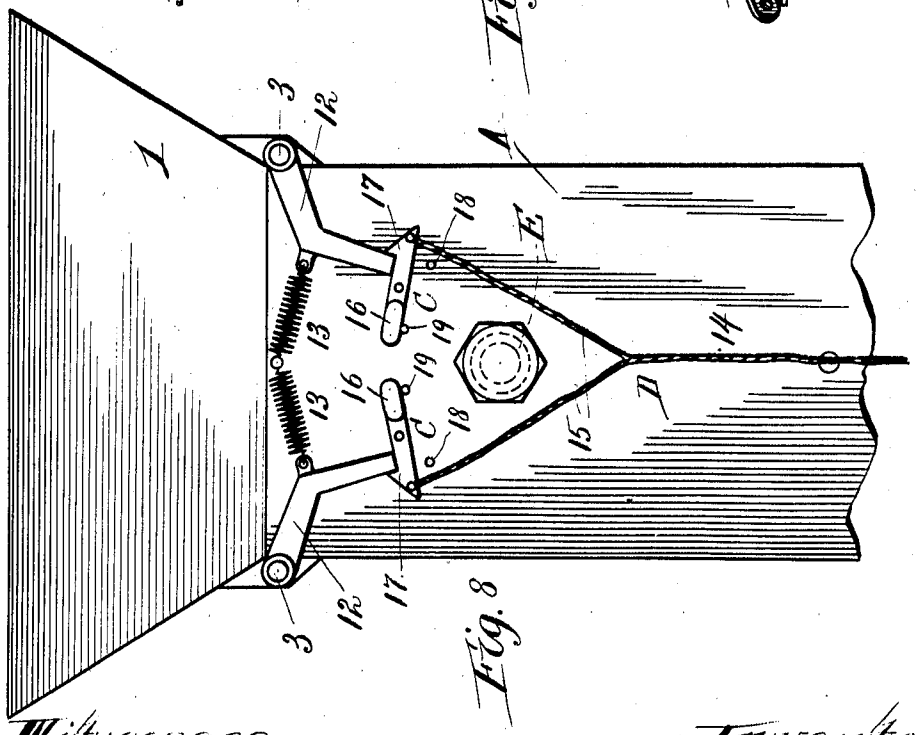


Fig. 8

Witnesses
Arthur F. Durand
Ottilie L. Freiberg

Inventor:
William J. Judd
by Elias G. Page Attn

No. 836,190. PATENTED NOV. 20, 1906.

W. J. JUDD.

MIXER FOR CONCRETE, CEMENT, OR OTHER SUBSTANCES.

APPLICATION FILED JUNE 8, 1901.

7 SHEETS—SHEET 7.

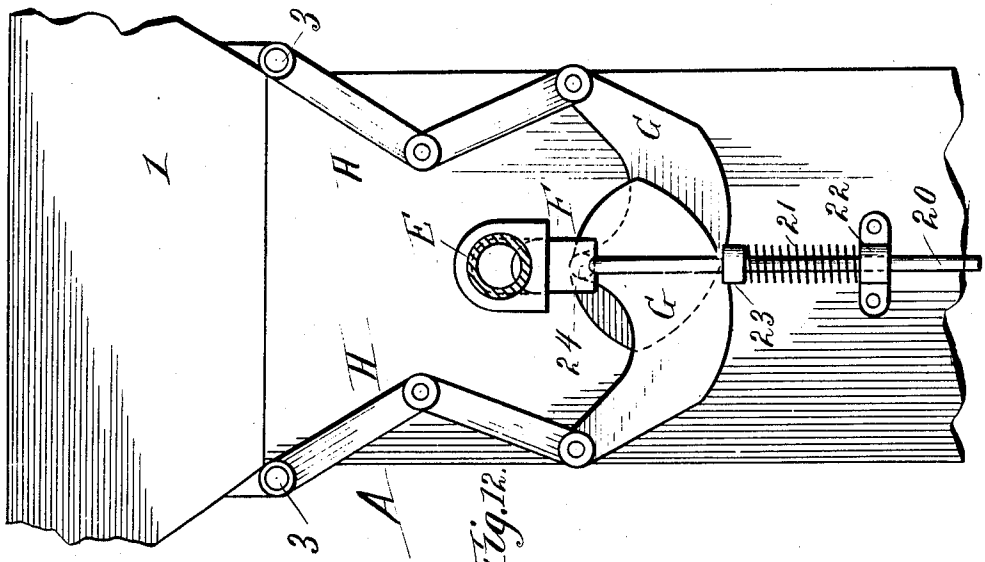


Fig. 12.

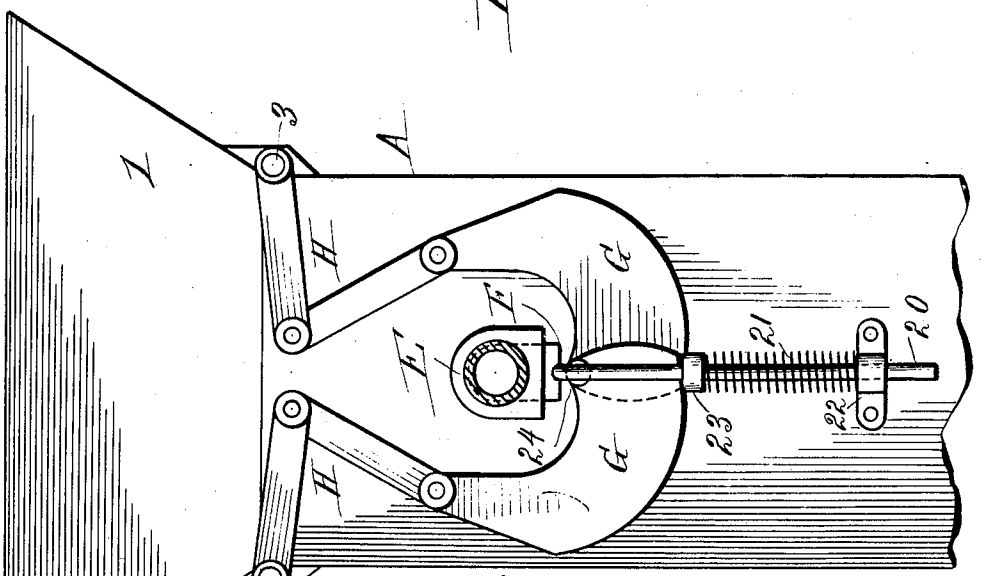


Fig. 11.

Witnesses:
Arthur F. Durand
Ottilie C. Freiberg

Inventor:
William J. Judd
by Chas. G. Page Atty.

UNITED STATES PATENT OFFICE.

WILLIAM J. JUDD, OF NEW YORK, N. Y., ASSIGNOR TO FREDERICK C. AUSTIN, OF CHICAGO, ILLINOIS.

MIXER FOR CONCRETE, CEMENT, OR OTHER SUBSTANCES.

No. 836,190. Specification of Letters Patent. Patented Nov. 20, 1906.

Application filed June 8, 1901. Serial No. 63,672.

To all whom it may concern:

Be it known that I, WILLIAM J. JUDD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Mixers for Concrete, Cement, or other Substances, of which the following is a specification.

My invention relates to mixers for concrete, cement, and other materials in which the matters to be mixed are fed into a mixer adapted for agitating and mixing the same, the principles of my said invention being herein illustrated as applied to a mixer of the class in which the mixing device or apparatus involves a trough or chute provided at intervals along the passage-way thereof with means for causing the mixing together of the passing materials and also comprising means for spraying such materials with water at a suitable point or points, an illustration of a mixer for concrete and the like of such class being, for example, afforded by British patent to John Jackson, No. 172, of January 12, 1882, in which said patent the mixing-chute contains a series of inclined deflectors and is also provided with means for the introduction of water.

Objects of my invention are to automatically control the application of water to the material, to permit the automatic application of a determinate quantity of water with reference to the quantity of material, and thereby avoid the application of unsuitable quantities of water as the result of unskilled labor, to admit the material to the chute in determinate quantities, to automatically close the bottom of a hopper arranged to discharge into the chute after such discharge has taken place, to permit the opening of the hopper-bottom to cause the establishment of a discharge of water into or against the material which passes from the hopper to the chute-passage, to automatically cut off such flow of water when the hopper-bottom closes, and to effectively agitate and mix materials passing along the chute-passage.

In the accompanying drawings, Figure 1 represents the mixer in side elevation with a portion of the chute broken away for convenience of illustration. In this view a device for automatically controlling the flow of water is in position to cut off such flow. Fig. 2 is a like view with the device for automatically controlling the flow of water in position to establish such flow. Fig. 3 represents the mixer in side elevation as viewed from a side at right angles to the side shown in preceding figures, a portion of the chute being broken away for convenience of illustration and the lower part of the chute illustrated being in central vertical section, so as to expose one of the vibratory deflectors. Fig. 4 is a section on a vertical plane through the upper portion of the mixer. Fig. 5 is a detail view, partly in section and partly in elevation, illustrating on a larger scale a latch device for locking the hopper-bottom in a closed condition. Fig. 6 is an edge view of said latch device. Fig. 7 is a section on a vertical central plane through the mixer with a portion of the chute broken away for convenience of illustration. Fig. 8 represents the upper portion of the mixer in side elevation and shows another construction of device or mechanism for locking the hopper-bottom in a closed condition. Fig. 9 is a similar view with said locking mechanism brought into a different position by reason of the opening of the hopper-bottom, the hopper being broken away for convenience of illustration. Fig. 10 is a perspective view of a vibratory member which can be employed as a hopper gate or bottom for the hopper. Fig. 11 represents the upper portion of the mixer in side elevation and shows another form of water-controlling device. Fig. 12 is a similar view with the water-controlling device in position to establish the flow of water.

The chute A is provided at its receiving end with a hopper 1, having a bottom which can be closed to permit a determinate or suitable quantity of the materials that are to be mixed to be placed within the hopper, as illustrated in Fig. 7. The hopper-bottom is also arranged whereby it can be opened at will for the purpose of permitting such materials to pass from the hopper into the chute. Broadly considered, I may adapt the hopper-bottom to open and close in any way consistent with the purpose for which it is intended, and I may also provide any suitable mechanical means for thus opening and closing the hopper-bottom.

As a matter of further improvement my invention contemplates locking the hopper-bottom in a closed position by any suitable

mechanical means and the automatic opening of such hopper-bottom when it is unlocked.

My invention further contemplates the automatic establishment and cutting off of a jet or jets of water employed for the purpose of wetting the materials which pass from the hopper or chute entrance to and along the main way or passage afforded by the chute, and it also contemplates utilizing the weight of the material as an agent for actuating the water-controlling means, so as to automatically establish a flow of water at a time when its application to material passing through the chute is needed.

As a matter of still further improvement my invention also contemplates either the establishment of such flow or the cutting off of the same, or both the establishment and cutting off of such flow of water, by the movement of the hopper-bottom through any suitable means or synchronously with the movement of the hopper-bottom by any means suitable for such purpose.

In the construction illustrated the hopper 1 has its bottom composed of a couple of hinged doors or sections 2, hung at opposite sides of the hopper and arranged to bring their free edge portions against the under side of a stop when the hopper-bottom is closed, as in Figs. 4 and 7. In Fig. 4 the rocking pintles or pivots 3 for the bottom sections of the hopper are shown outside the chute, and said sections close upwardly against stops secured to opposite walls of the chute-passage, one of such stops 4 being illustrated, while in Fig. 7 the rocking pintles 3 extend through lateral enlargements 5 of the chute-passage and the bottom sections close upwardly against a stop formed by a cross-bar 6.

The hopper-bottom can be formed by a single gate or door or by gate-sections, as illustrated, and weight or spring power can be employed for closing the hopper-bottom, but permitting it to yield to the weight of material thereon, and thereby automatically open, so as to dump or discharge the contents of the hopper into the chute-passage. The hopper-bottom can also be temporarily locked in a closed condition by any suitable latching means, so that after the hopper has discharged its contents into the chute-passage the spring or weight power will automatically close the hopper-bottom and permit it to be locked in a closed condition. Preferably the latching device is manually operated to release the hopper-bottom and allow it to open and arranged to automatically lock the hopper-bottom when the latter assumes a closed condition.

In Figs. 4, 5, and 6 a vibratory latch B is employed to automatically lock the hopper-bottom in a closed condition. Said latch is pivoted at 7 upon the mixer-casing and is arranged to permit its upper end portion to project through an opening 8 in the mixer-casing and engage under and support the meeting edge portions of the vibratory hopper-bottom sections 2. This latch has an arm 8^a, to which an operating rod or cord 9 or the like, Fig. 3, is attached. By drawing down such cord 9 the latch will be freed from the hopper-bottom sections, whereby the weight of material on the latter will cause them to swing downwardly. The latch is caused to normally maintain the position shown in Fig. 5 by a weight or spring—for example, a spring 10—and the upper portion of the latch has a beveled face portion 11, with which the vibratory sections 2 will engage when they are swinging upwardly, so as to push back the latch until the sections close against the stops, at which juncture the latch will again assume the position shown, and thereby engage under the vibratory sections 2.

As an illustration of another form of latching means, Figs. 8 and 9 show the rocking pintles provided with crank-arms 12, secured on such pintles of the gates or sections which form the hopper-bottom, springs 13, applied to swing the crank-arms in direction to normally bring such gates or sections 2 into position to close the passage between the hopper-space and the chute-passage, and catches or latches C, arranged for engaging and locking the crank-arms when the latter are in position to thus place the hopper-bottom in a closed condition, as illustrated in Fig. 8. In order to release the catches C from the crank-arms, the catches can be operated by any suitable mechanical means—for example, by a pull device D, consisting of a rod, chain, or cord 14, having portions 15 connected with the outer ends of the catches, whereby a downpull on such pull device will simultaneously release the catches from the crank-arms, and thereby permit the weight of material on the gates or sections which form the hopper-bottom to open such gates or sections and pass down into the chute, the positions of the crank-arms when the hopper-bottom is thus opened being illustrated by Fig. 9.

After the crank-arms have been released and the weight of material in the hopper has caused its bottom portions to swing downwardly to an extent to permit the crank-arms 12 to clear the catches C the pull device can be released, and thereupon the catches will be moved by spring or weight power into substantially the position shown in Fig. 8, a simple way of thus automatically righting the catches being to provide the inner end of each catch with weighted portions 16. The catches thus restored to their normal position will be in readiness to again engage the crank-arms, and hence after the hopper has been emptied of its contents the springs 13 will swing the crank-arms in direction to

close the hopper-bottom portions, and in so doing the crank-arms will engage and ride over the beveled end portions 17 of the catches and again come into engagement with the catch-shoulders back of such beveled portions, as in Fig. 8. The extent of movement on the part of these catches can be limited in any convenient way—as, for example, by stops 18 and 19 on the mixer-casing.

E, Figs. 7, 11, and 12, indicates a laterally-apertured water-spray pipe arranged to extend transversely within the chute-passage at a point below the hopper-bottom, so as to spray the materials passing down through the chute-passage.

Where the hopper-bottom comprises a couple of sections or portions which swing relatively apart, as shown, the arrangement of the jet or spray pipe across the middle of the chute-passage is very effective, since when the hopper-bottom portions are open, as shown by dotted lines in Fig. 7, they will deflect the material toward such jet-pipe. Where, however, the hopper-bottom opens in a different way—as, for example, where it is preferred to provide the hopper with a single swinging bottom—the jet-pipe can of course be arranged with reference to the course of the material.

The jet-pipe can be opened and closed by any suitable or desired valve or cut-off for controlling the supply—for example, a gate-valve F, Figs. 11 and 12. As illustrated, this valve or cut-off has a sliding stem 20 and is opened against the resistance of a spring 21, arranged between a stop 22 on the chute and a stop or shoulder 23 on the stem. Means are also provided whereby the opening of the hopper-bottom will cause such valve or cut-off device to open the jet-pipe.

As illustrated in Figs. 11 and 12, the valve or cut-off is opened by a couple of cam-levers G, pivoted at their inner ends to the chute, as at 24, and having their outer ends connected with the journals or pintles of the hopper-bottom sections by toggles H. By such arrangement the toggles will be bent, and the valve will be closed when the hopper-bottom is closed, and when the hopper-bottom is opened the toggles will have a straightening-out action and in so doing will swing the cam-levers in opposite directions, whereby the portions of such levers engaging upon stop or shoulder 23 on the valve-stem will depress the valve-stem, as in Fig. 12, and hence open the valve. After the hopper contents has been discharged the spring 13, Figs. 8 and 9, will cause the toggles and cam-levers to return to their normal positions, (shown in Fig. 11,) and the spring 21 will operate to close the valve or cut off.

As a preferred and simpler arrangement for permitting the weight of the material to automatically establish a flow of water directed against such material the form of device for releasing and automatically locking the hopper-bottom particularly illustrated by Figs. 8 and 9 and the form of device for operating the valve from the hopper-bottom illustrated by Figs. 11 and 12 can be simplified, as illustrated by the first six figures of the drawings, which include the latch B, hereinbefore described.

In Figs. 1, 2, and 3 a slide-valve similar to the valve F of Figs. 11 and 12 can be employed, and such valve can be normally closed by spring 21, arranged between a stop or shoulder 23 on the valve-stem and stop 22, arranged on the mixer-casing and forming a guide for the valve-stem. The lower end portion of the valve-stem in said first three figures is attached to a slide or carrier D, comprising an upper portion 25, connected by rods 26 with a lower portion and carrying a couple of antifriction-rolls I, which are maintained by spring 21 in engagement with cam-arms K on the pintles or journals of the vibratory hopper-bottom sections. The slide or carrier D can be guided in any suitable way—for example, it may have a stem 27, arranged to work through a guide 28 in the mixer-casing—and the cam-arms can be normally maintained in position to close the hopper-bottom by a spring 29, as in Fig. 1. When, however, the latch B is freed from the hopper-bottom, the sections of the latter will swing downwardly and in so doing will swing the cam-arms from the position shown in Fig. 1 to the position shown in Fig. 2, and in such movement said arms engaging the antifriction-rolls I will depress the slide D, and thereby open the valve. Practically, therefore, with both of the forms of valve-actuating means shown the weight of the material acting upon a vibratory member moves or swings the latter, which in turn actuates a valve-action in a way to turn on a flow of water directed against material passing through the chute. Various expedients can be designed for carrying out this principle of operation. The foregoing devices, however, are deemed sufficient to illustrate such fact.

The chute may contain any known or desired means for mixing the materials passing along its passage. As shown, the chute contains inclined deflectors L, Fig. 7, which tend to throw the passing materials from side to side, and as a matter of further improvement I provide one or more vibratory separating and deflecting devices M, comprising a pair of downwardly-diverging deflecting plates or surfaces 30, which converge upwardly to a separator-plate 31, arranged to project up from the apex formed by the junction of plates 30 and adapted to deflect the passing material to opposite sides of the chute-passage and compel the passing material to take an irregular path whether the chute be vertical or inclined, and it also constitutes a

combined separator and deflector, since its portion 31 will divide the passing material, causing part to fall upon one and part to fall upon the other of the deflecting-surfaces 30. Said device also operates, therefore, as a vibratory agitator, having surface portions arranged whereby the materials falling upon them will cause the device to vibrate, as where a greater weight of material impacts against one of the inclined deflecting-surfaces 30. The vibratory member or members M is or are arranged within the chute-passage and pivotally supported in any suitable way—as, for example, by journals having their bearings in the walls of the chute-passage.

From the foregoing it will be seen that the hopper-bottom, whether composed of one or more tilting parts or sections, is normally locked in a closed condition, and hence that an attendant may place within the hopper a quantity of material determined with reference to the quantity it is desired shall pass through and be discharged from the chute. After a desired quantity of material has been placed or let into the hopper the attendant can unlatch the hopper-bottom, whereupon the weight of such material will cause the hopper-bottom to automatically open and automatically discharge its contents into the chute-passage, which contains the mixing means. After such discharge of material has taken place the hopper-bottom can be closed and again locked, and while such closing or locking, or both, could be manually accomplished I provide as a matter of further improvement suitable means for automatically closing the hopper-bottom after such discharge and for automatically locking the hopper-bottom in its closed position, thereby relieving the attendant from the labor of closing or locking or closing and locking the hopper-bottom.

As a matter of further improvement the hopper-bottom can also serve to establish a discharge of water directed to wet the material which passes from the hopper to the chute-passage, and while the closing of the hopper-bottom could positively close the valve or cut-off which governs the supply of water I provide as a matter of further improvement means for automatically closing the valve or cut-off synchronously with the closing of the hopper-bottom, the closing of which latter permits such automatic closing of the valve or cut-off. Broadly considered, however, the weight of the material serves to open the water-supply, since the tilting member is tilted downwardly by the passage of the material and when thus tilted serves to actuate a valve device in a way to establish the flow of water.

This automatic water-supply means can be employed in a mixer for mixing water and concrete or the like—that is to say, any material or matters requiring such treatment—it being understood that this portion of my invention broadly consists in utilizing the weight of a charge or quantity of material as a means for automatically establishing flow of water for the purpose of suitably wetting such material in a mixer for concrete or the like regardless of the form or construction of the mixer. It is also evident that with the construction of mixing devices shown the material is thrown or diverted laterally to a line between the charging and discharge openings of the mixer, and hence that, broadly considered, the material is charged with water by reason of the weight of such material acting upon a movable member, which in turn serves to open a water-supply device in a mixer in which the material is agitated and mixed with the water.

It will also be obvious that where it is desired to shovel concrete or the like into the chute continuously for any length of time the hopper-bottom can be held in an open condition—for example, by drawing down and temporarily hitching either of the cords shown or by using any suitable stop or locking device for holding the hopper-bottom open.

With further reference to the vibratory mixing devices arranged within the chute or trough it will be seen that each mixing member is pivotally supported and arranged to swing about a fixed axis which is transverse to the length of the passage afforded by the chute or trough, in contradistinction, for example, to Letters Patent of the United States to Chatain & Gilletti, No. 413,820, October 29, 1889, in which the mixing devices consist of suspended chains; also, that the inclined deflectors which converge inwardly from opposite sides of the chute or trough deflect the material toward the centrally-pivoted vibratory mixing devices arranged to oscillate about axes below the spaces between the deflectors in contradistinction, for example, to mixers such as in Letters Patent of the United States No. 155,212, of September 22, 1874, to P. White, showing a gravity mortar-mixer consisting of a chute or trough presenting an inclined surface formed by the bottom portion of the trough and a set of mixing devices which operate about an axis parallel with the length of the chute or trough passage.

With further reference to the device for supplying water the mixer receives and mixes together the ingredients by agitation thereof, the hopper being provided for receiving the ingredients and supplying the same to the mixer. Broadly considered, the hopper-bottom is a valve normally in position to close communication between the hopper and the interior of the mixer and operating to open such communication when it sustains a predetermined weight of ingredients which have been fed into the hopper in

order to supply the mixer. A device for supplying water to the ingredients is controlled by mechanism which automatically establishes a flow of water from and by the action of the said valve when such action of the latter is induced by the weight of the ingredients thereon, the mechanism also including means for subsequently cutting off the flow of water at a predetermined moment.

What I claim as my invention is—

1. A mixer for concrete and the like, comprising a chute containing means for mixing the passing material; a gate arranged to open for the purpose of admitting material to the chute-passage; a member connected and operating with the gate; a spring means for normally closing the gate; a catch for automatically engaging and locking the gate in a closed condition; and means for releasing the catch from the gate to permit it to open.

2. A mixer for concrete and the like, comprising a chute containing means for mixing the passing material; a couple of hinged gates for opening and closing the chute-passage; means for automatically closing and temporarily locking the gates; and means for simultaneously unlocking both gates.

3. A mixer for concrete and the like, comprising a chute containing a vibratory deflector having a deflecting lower portion and a material-dividing upper portion.

4. A mixer for concrete and the like, comprising a chute containing a vibratory deflector having downwardly-diverging deflecting-surfaces.

5. A mixer for concrete and the like, comprising a chute containing a vibratory deflector having downwardly-diverging deflecting portions, and a deflecting and material-dividing portion rising from the junction of the downwardly-diverging deflecting portions.

6. A mixer for concrete and the like, comprising a chute containing means for mixing the passing material; a hopper having a downwardly-opening bottom; means for locking the hopper-bottom in a closed position; means for supplying water to material passing from the hopper into the chute-passage; means for establishing the flow of water when the hopper-bottom opens; and means for cutting off such flow of water when the hopper-bottom closes.

7. The combination with a mixer for concrete and the like having a tilting member which is operated by the weight of material thereon, of means for supplying water to the material; a valve device for establishing and cutting off the flow of water; a movable member connected with and operated by the movement of said tilting member and connected with the valve device; spring means arranged in opposition to the downward tilt of the tilting member; and spring means arranged in opposition to the opening of the valve.

8. A gravity-mixer for concrete and the like, comprising a chute or trough, and an automatically-operating vibratory mixing device pivotally supported within the chute or trough and arranged to oscillate about an axis transverse to the length of the passage through the chute or trough and to automatically yield to the weight of passing material, whereby it is operated by the material passing through the chute or trough.

9. A gravity-mixer for concrete and the like, comprising a chute or trough; inclined deflectors projecting inwardly from opposite sides of the chute or trough and conveying downwardly; and an automatically-operating vibratory mixing device arranged to oscillate about an axis which is transverse to the length of the chute or trough and below the space between the lower ends of said deflectors.

10. In a gravity-mixer for concrete and the like, a chute or trough; an automatically-operating vibratory mixing device presenting an inclined surface to the passing material and arranged to automatically yield to the weight of such passing material which thereby serves to operate the vibratory mixing device; and an inclined deflector projecting inwardly from the wall of the chute or trough and arranged to deflect the passing material against the inclined surface of the vibratory mixing device.

WILLIAM J. JUDD.

Witnesses:
CHARLES G. PAGE,
OTTILIE C. FREIBERG.