

No. 745,930.

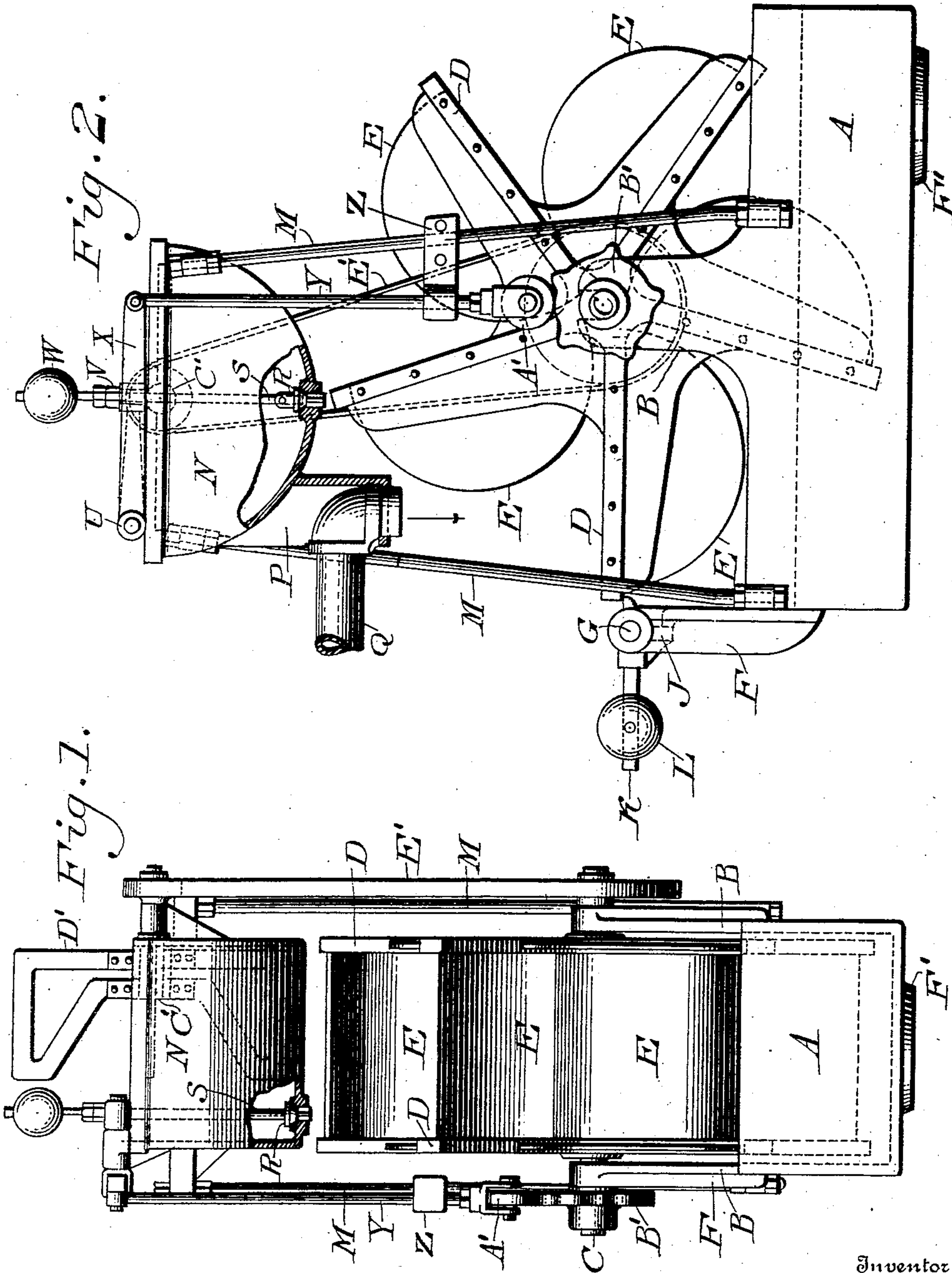
PATENTED DEC. 1, 1903.

J. W. TIERNEY.  
MIXING APPARATUS.

APPLICATION FILED JAN. 19, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Inventor

*J. W. Tierney*

By

*Friederich & Paulsen*  
Attorneys

Witnesses

*P. F. Nagle*  
*L. Houville*

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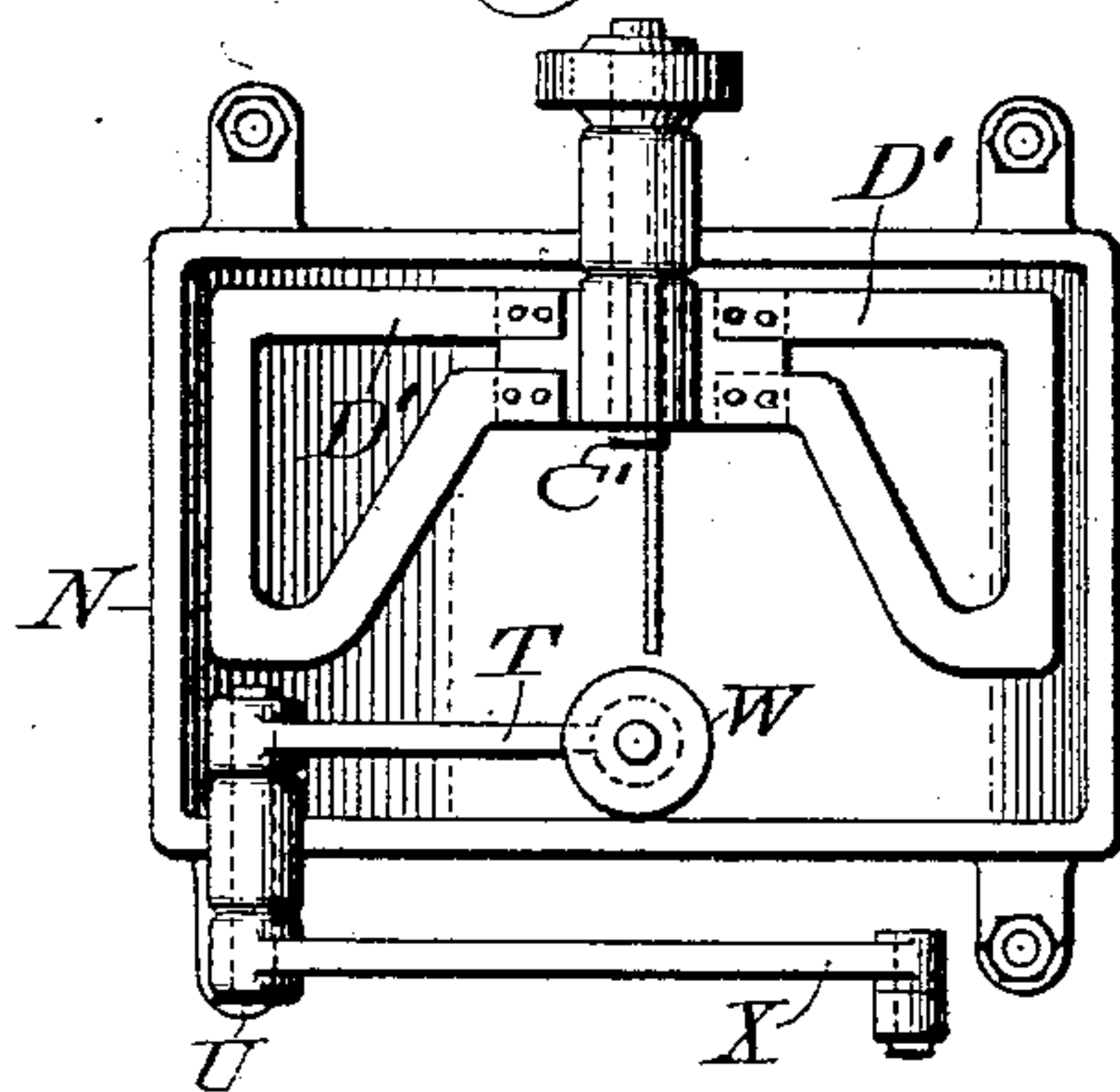
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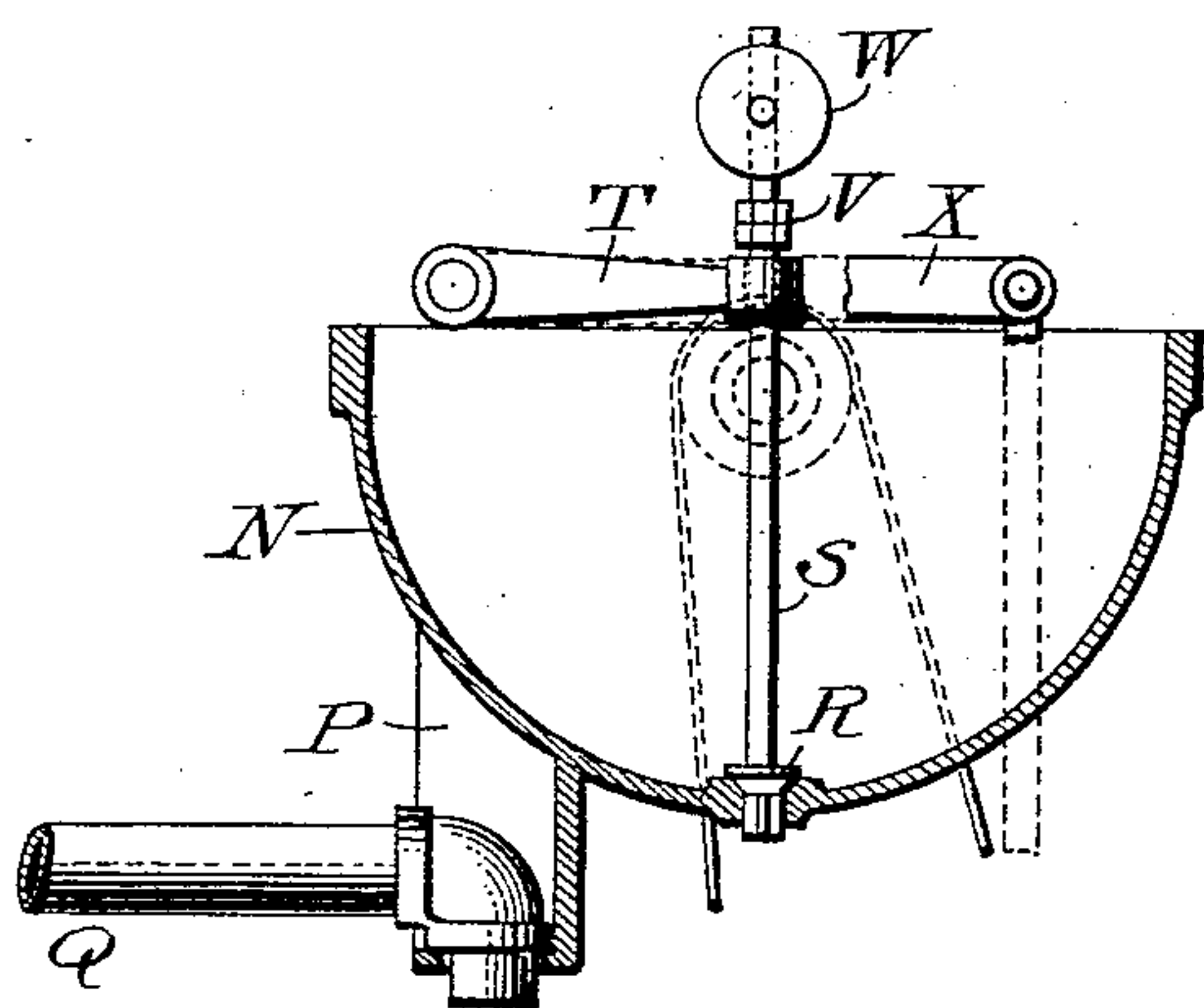
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2 SHEETS—SHEET 2

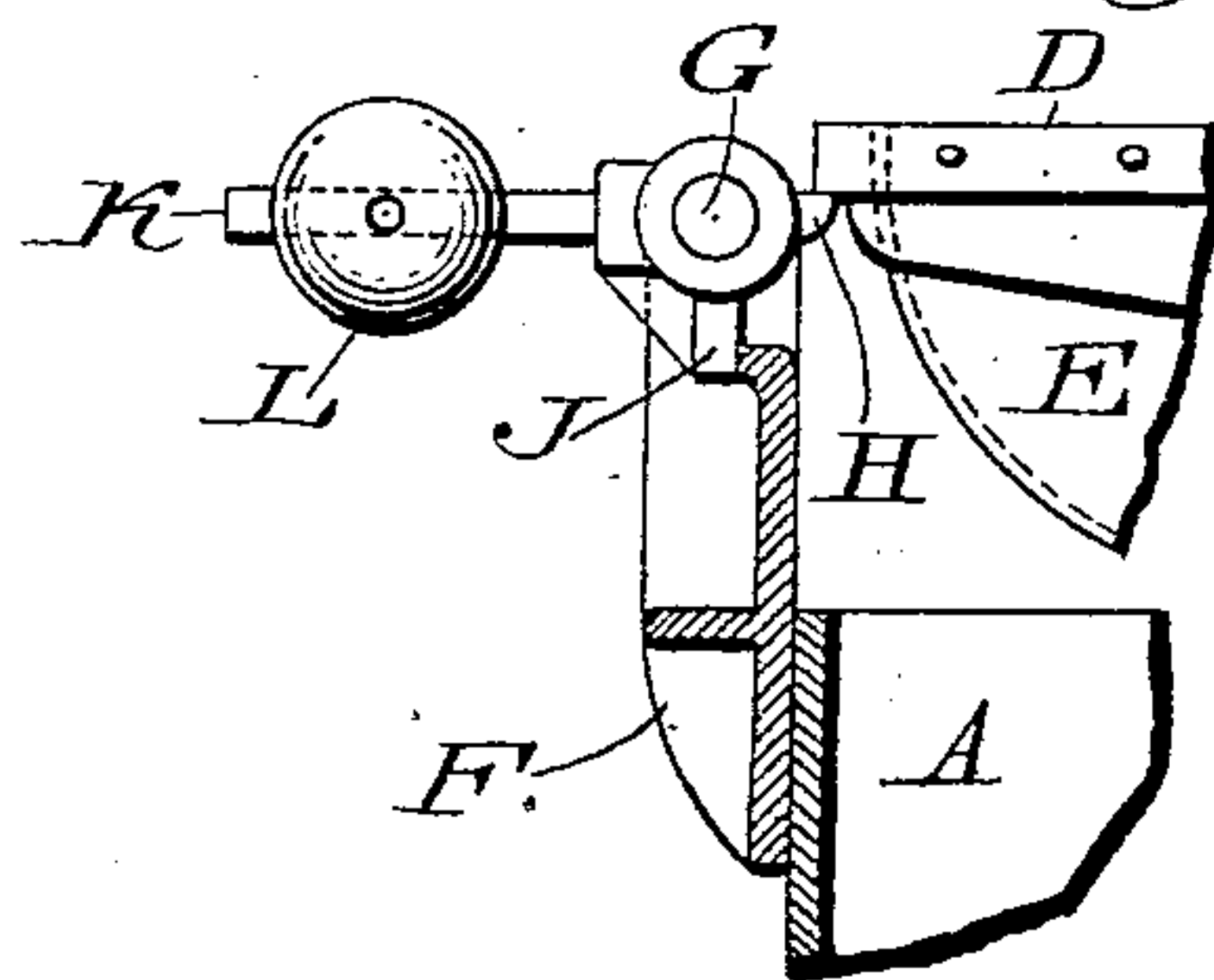
*Fig. 3.*



*Fig. 4.*



*Fig. 5.*



Witnesses

*P. F. Kagle*  
*L. Houville*

By

*J. W. Tierney*  
*Fiedersheim & Gaubatz*  
Attorneys



# UNITED STATES PATENT OFFICE.

JOHN WILBUR TIERNEY, OF PHILADELPHIA, PENNSYLVANIA.

## MIXING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 745,930, dated December 1, 1903.

Application filed January 19, 1903. Serial No. 139,542. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN WILBUR TIERNEY, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Mixing Apparatus, of which the following is a specification.

My invention consists of an improved mixing apparatus which is designed for the purpose of automatically and continuously mixing definite quantities of liquid—for instance, for mixing a definite quantity of some chemical with water for the purpose of softening or precipitating the impurities which may be held in solution in the water.

My invention further consists in the details of construction hereinafter described and claimed.

Figure 1 represents an end elevation of a mixing apparatus constructed in accordance with my invention. Fig. 2 represents a side elevation thereof. Fig. 3 represents a top plan of the upper tank. Fig. 4 represents a vertical section thereof. Fig. 5 represents a sectional view of a stop device that will be understood in connection with the following description.

Similar letters of reference indicate corresponding parts in the figures.

Referring to the drawings, A designates a tank upon which the operative parts of the device are mounted, said tank having uprising brackets B, in the upper ends of which are bearings for the shaft C. Said shaft is provided with arms D, carrying the buckets E, the ends of said arms projecting a little beyond the outer ends of the buckets to form stop-faces. At one end of the tank A is a bracket F, upon which is mounted a rock-shaft G, carrying a pawl H, a stop-face J, and an arm K, having an adjustable weight L, said weighted arm K normally holding the stop-face J in contact with a portion of the bracket F to hold the pawl H in the path of the ends of the arms D.

Mounted upon uprights M, rising from the tank A, is an upper tank N, conveniently provided with a casting P, supporting the supply-pipe Q, the ends of the latter being situated over the bucket, whose arm is held by the pawl H. In the bottom of the tank N is an outlet-port, controlled by a valve R, the

stem S of which rises through the tank and passes through an eye in the end of a lever T, mounted upon a rock-shaft U upon said tank. Upon the stem S, above the lever T, are the adjustable nuts V, while a weight W is also carried by said stem to insure the closing of the valve. Mounted upon the rock-shaft U is another lever X, that is pivotally connected with the upper end of a slide or rod Y, the lower end portion of which is suitably guided in the guide Z, while at the lower end of the rod Y is an antifriction-roller A', that contacts with the cam B', carried by the shaft C, the number of faces of said cam B' corresponding with the number of buckets E. Mounted also upon the upper tank N is a shaft C', carrying the stirrer-arms D', said shaft being geared to the shaft C conveniently by the belt E' and suitable pulleys on said shafts, it being noted that the diameter of the pulleys on these shafts varies, so that, for instance, for one-fifth of a revolution of the bucket-wheel the stirrer will be turned a half or more of a revolution.

The operation is as follows: This apparatus is designed especially for supplying a chemical or reagent to water for the purpose of softening the same or precipitating the impurities that may be held in solution therein, and by the use thereof a definite and predetermined amount of the reagent is supplied to a definite quantity of water automatically and continuously. For instance, if the parts are in the position shown in Fig. 2 and the water flowing from the pipe Q into the bucket E which is then engaged by the pawl H this bucket will be held in its position by the weighted arm K until the amount of water in the bucket is sufficient to overcome the weight of the arm K, whereupon the bucket will descend and empty into the lower tank A, the pawl H regaining its former position to arrest the next bucket in turning, and the shaft C by reason of the cam B' raises the valve R, as will be understood, and this permits a definite amount of the reagent to enter the bucket when descending to receive the next supply of water from the pipe Q, while at the same time the stirrer is turned to agitate the contents of the upper tank N to prevent the settling of any ingredients not held in solution in the reagent contained



therein. Thus it will be seen that the operation of the apparatus is continuous while the water is flowing through the pipe Q regardless of the rapidity of the flow and that  
 5 the buckets empty themselves when a given weight of water has been deposited therein and brings the next bucket in position to be filled.

The apparatus is adjustable, both as to the  
 10 quantity of water required to raise the arm K and as to the amount of lift to be given the valve R, the latter adjustment being insured by shifting the position of the nuts V.

In use it is intended to suspend the tank A  
 15 in a large receiving and settling tank, so that the water-level in the tank A will be maintained near the top. In this way the water in the tank A will act as a brake to reduce the speed of a revolving bucket-wheel, and  
 20 thus lessen the danger of injury to the device when the pawl arrests the movement of the descending bucket. The buckets in passing through the water in tank A will also act as agitators, and thus bring about a further ad-  
 25 mixture of the chemicals with the water. The water in the tank A passes out through the port F' into a suitably-arranged precipitating-tank and from there to a filter, if desired.

It will be apparent that various changes  
 30 may be made by those skilled in the art which will come within the scope of my invention, and I do not, therefore, desire to be limited in every instance to the exact construction herein shown and described.

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

1. In a device of the kind specified, a plurality of receptacles, means for imparting an  
 40 intermittent progressive rotary movement thereto, and a plurality of relatively fixed sources of supply for said receptacles.

2. In a device of the kind specified, a plurality of receptacles, means for imparting an  
 45 intermittent progressive rotary movement thereto, and a plurality of relatively fixed sources of supply for said receptacles, the outlet from one of said sources of supply being controlled by the movement of said re-  
 50 ceptacles.

3. In a device of the kind specified, a plurality of movable receptacles, a source of supply therefor, a stop device for arresting the movement of said receptacles, the weight of  
 55 the material fed to said receptacle serving to disengage the receptacles and stop device and to move said receptacles, and a second source of supply for said receptacles, the outlet of which is actuated by the movement of said  
 60 receptacles.

4. In a device of the kind specified, a bucket-wheel, a stop device for arresting the movement of the same, a source of supply for  
 65 said receptacles, the weight of the substance fed to said receptacle being adapted to overcome the stop device and to move said bucket-

wheel, and another source of supply for said receptacles, the outlet of which is opened by reason of the movement of said bucket.

5. In a device of the kind specified, a  
 70 bucket-wheel, a movable pawl situated in the path of the arms thereof for arresting the movement of said wheel, a source of supply for said buckets, the weight of the substance deposited in said buckets being adapted to  
 75 overcome the engagement of said pawl and move the bucket-wheel, and a second source of supply for said buckets, the outlet of which is opened by reason of the movement of said  
 80 bucket-wheel.

6. In a device of the kind specified, a bucket-wheel, a weighted pawl situated in the path thereof, a source of supply for the buck-  
 85 ets, the weight of said pawl being adapted to be overcome by the weight of the substance deposited in the buckets, and a second source of supply for said buckets, the outlet of which is controlled by the movement of said bucket-wheel.

7. In a device of the kind specified, a  
 90 bucket-wheel, an adjustable weighted pawl situated in the path of the arms thereof, a source of supply for the buckets, the weight of said pawl being adapted to be overcome by the weight of the substance deposited in the  
 95 buckets, and a second source of supply for said buckets, the outlet of which is controlled by the movement of said bucket-wheel.

8. In a device of the kind specified, a bucket-wheel, adapted to be moved by the  
 100 substance deposited in the buckets thereof, a source of supply, a stop device for arresting the movement of the buckets, a second source of supply for said buckets having a  
 105 valved outlet, and connections between said valve and the bucket-wheel for opening the former.

9. In a device of the kind specified, a bucket-wheel, adapted to be moved by the  
 110 substance deposited in the buckets thereof, a source of supply, a stop device for arresting the movement of the buckets, a second source of supply for said buckets having a  
 115 valved outlet, and connections between said valve and a cam movable with the bucket-wheel for operating the valve.

10. In a device of the kind specified, a bucket-wheel, adapted to be moved by the  
 120 substance deposited in the buckets thereof, a source of supply, a stop device for arresting the movement of the buckets, a second source of supply for said buckets having a  
 125 valved outlet, and adjustable connections between said valve and a cam movable with the bucket-wheel for operating the valve.

11. In a device of the kind specified, a bucket-wheel adapted to be moved by the  
 130 substance deposited in the buckets thereof, a source of supply, a stop device for arresting the movement of the buckets, a second source of supply for said buckets having a  
 135 valved outlet, the levers connected with the



stem of said valve, a slide connected with said levers, and a cam movable with the bucket-wheel engaging said slide.

12. In a device of the kind specified, a  
5 bucket-wheel having a source of supply, a stop device for said bucket-wheel, a receptacle situated above said bucket-wheel, an outlet from said receptacle controlled by the movement of the bucket-wheel, and a stirrer  
10 in said receptacle actuated by the movement of said bucket-wheel.

13. In a device of the kind specified, a

lower tank, a bucket-wheel, the buckets of which are adapted to pass through said tank, a stop device for said bucket-wheel, a source  
15 of supply for said buckets, and an upper tank having an outlet forming a second source of supply for said buckets, said outlet being controlled by the movement of the bucket-wheel.

JOHN WILBUR TIERNEY.

Witnesses:

JOHN A. WIEDERSHEIM,  
HARRY COBB KENNEDY.