

No. 689,710.

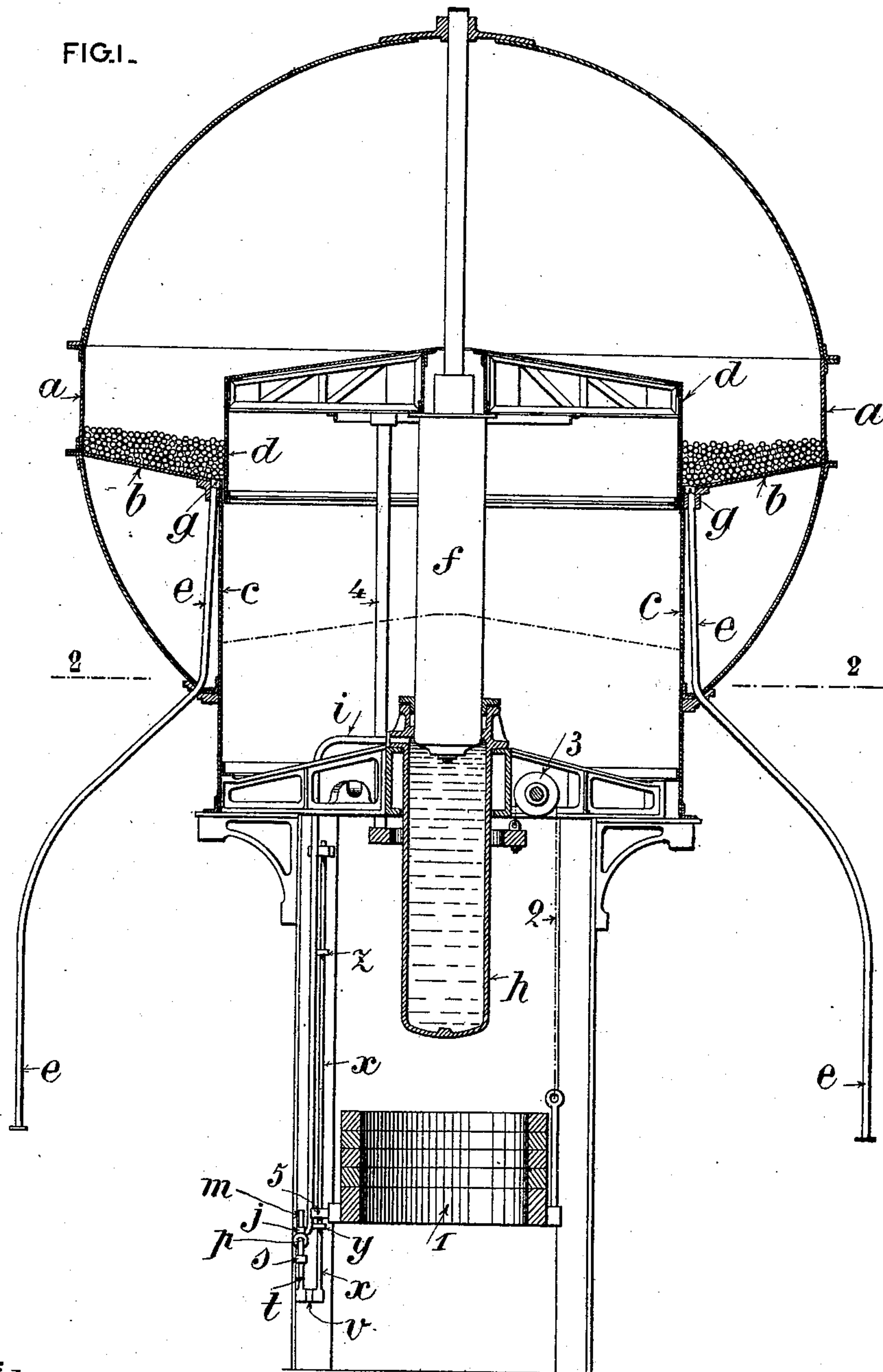
Patented Dec. 24, 1901.

C. DUHAMEL.  
BALL MIXING AND DISCHARGING APPARATUS.

(Application filed Nov. 24, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses  
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FIG. 2.

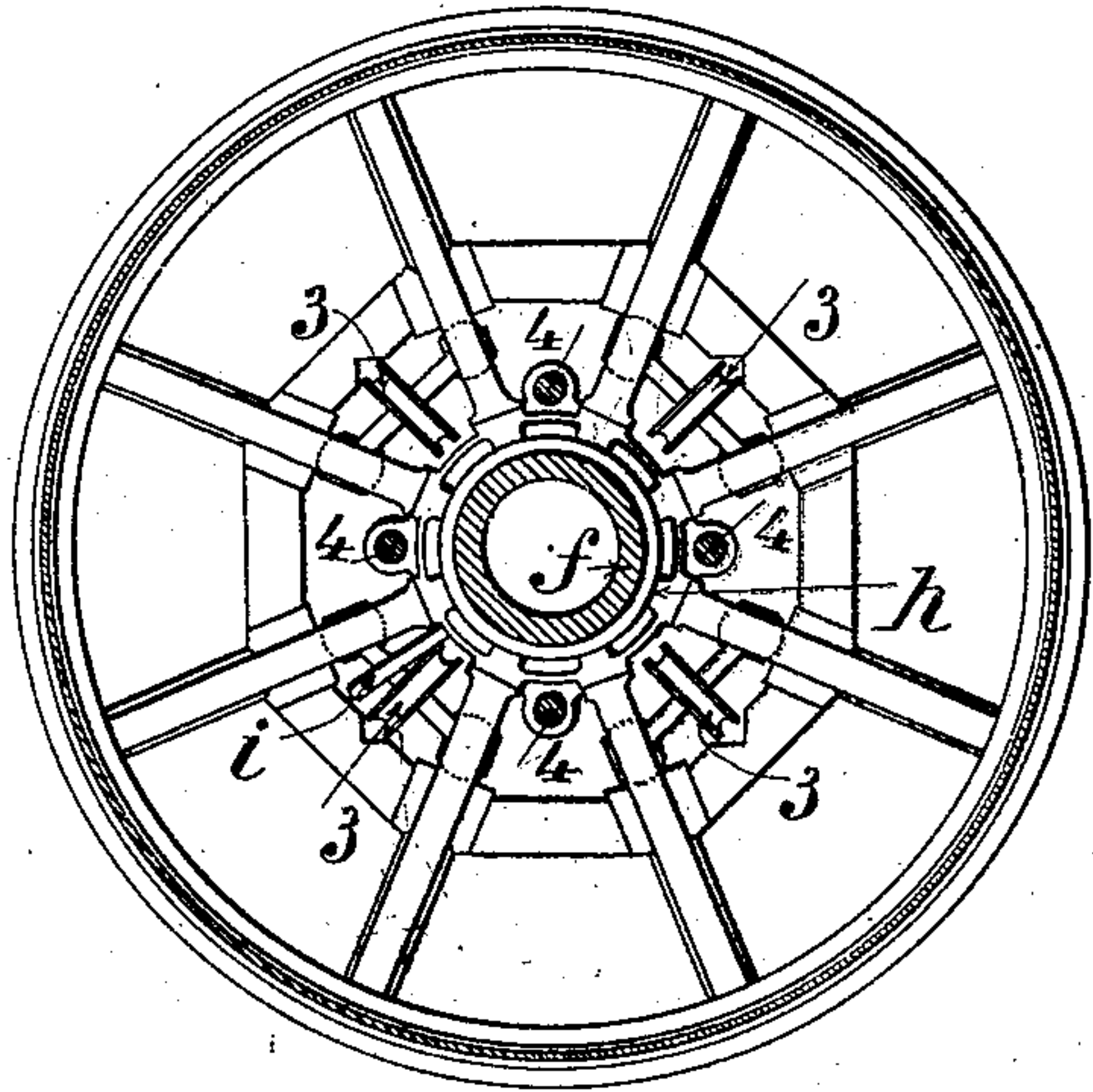


FIG. 3.

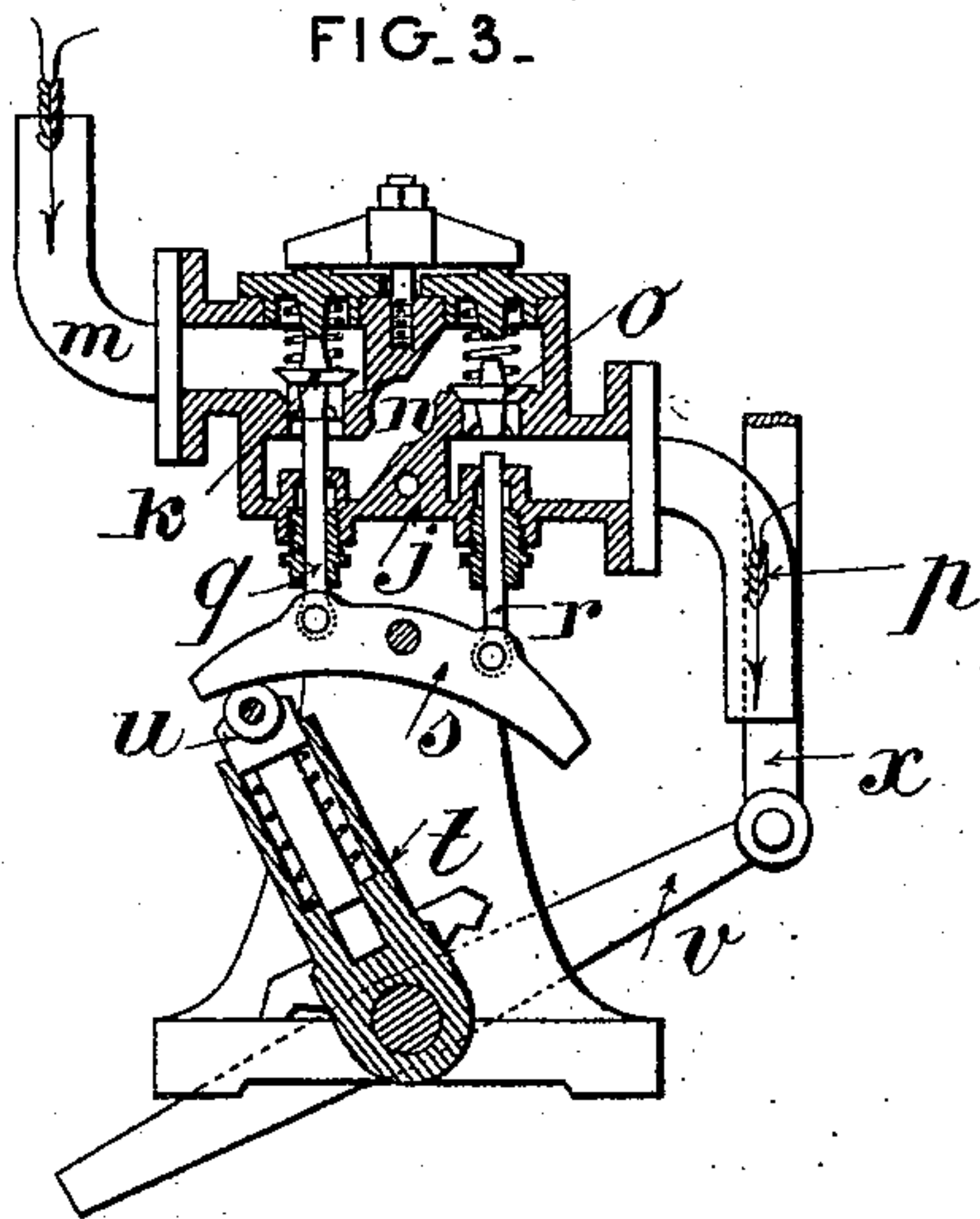
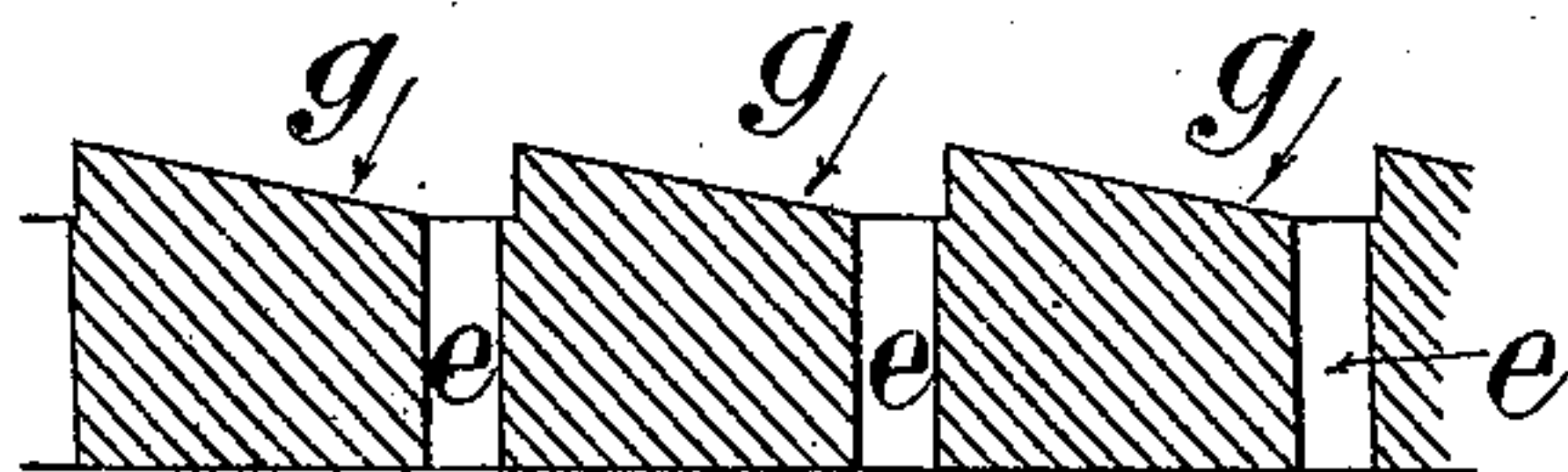


FIG. 4.



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# UNITED STATES PATENT OFFICE.

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## BALL MIXING AND DISCHARGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 689,710, dated December 24, 1901.

Application filed November 24, 1900. Serial No. 37,635. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES DUHAMEL, journalist, a citizen of the Republic of France, residing at 11 Rue Le Peletier, Paris, in the Republic of France, have invented certain new and useful Improvements in Ball Mixing and Discharging Apparatus, of which the following is a specification.

My apparatus is for the following purpose:  
Being given a number of balls located in a suitable receptacle, it is required to cause the said balls to pass from the said receptacle into a certain number of outlet tubes or channels leading to stopping or distributing devices where those interested can take the said balls one by one. The apparatus securing such a result can be applied to the automatic distribution, after prepayment, of any spherical objects—such, for example, as solid spherical balls of sweetmeats of different colors and different substances or balls bearing an inscription at the outside or hollow balls of metal or pasteboard or the like inclosing any sort of object or bearing a number or the like. It can also be used to draw names when jurymen are required, &c. The outlet tubes or channels are normally closed at their lower part and are only opened when a coin is inserted, a button is pulled, &c. They must be full at all times, and the mixing apparatus must always maintain the full feed of the tubes as required by the number of balls or the like to be discharged at one operation.

To carry the operations into effect, I use a receptacle into which the balls can be inserted and which is provided with a bottom made in two parts, one of which is fixed and the other movable. On the edge of the fixed part adjacent to the movable part there are perforations communicating with the outlet-channels. The movements of the movable part are sufficient relatively to the size of the receptacle to cause at certain moments the greater part of the balls to come together at the lower parts of the receptacle and to produce only a slight thickness of balls remaining on certain inclined parts of the bottom, the result being that these latter balls are free to roll toward the outlets, as hereinbefore described.

In the accompanying drawings, Figure 1 is a vertical section, and Fig. 2 is a sectional

plan on the line 2 2 of Fig. 1. Fig. 3 represents a distributing device for the hydraulic motor used; and Fig. 4 is a circular section, on a larger scale, made along one of the ball-distributing channels.

The apparatus shown in the drawings comprises a reservoir having an annular bottom formed by a ferrule *a*, and a bottom *b*, slightly conical, having a large round hole and extending downward by means of another ferrule *c*, in which reciprocates a plunger or bell *d*. Quite near to the bell *d* are the upper openings of the feed-tubes *e*, arranged in a circle. In the position shown in the drawings, the bell being at the top, all the balls are in the annular space formed by the bell *d* and the ferrule *a*. If now the bell is moved slowly down, the balls sliding by gravitation spread on the upper part of the bell, the said upper part when thus moving down falling in a given time to a lower level than the bottom *b*, the ferrule *c* and the top of the bell thus form a basin into which the balls come together by sliding one on another. When the basin is nearly full, the last balls remaining on the bottom *b* are completely free when passing over the opening in the tubes *e* to fall into the latter. This filling of the basin may be facilitated by a particular arrangement of the entrance into such tubes. For that purpose I form on the rim of the ferrule a circular channel *g* just large enough to receive a ball, both as to height and width. It will be seen by Fig. 4, showing the said channel *g* on a larger scale, that it is provided with a series of inclined surfaces, each leading to a tube *e*. The balls having to pass when moving from *b* toward *d*, and vice versa, above the channel *g*, the latter becomes filled each time the bell moves down or up with a row of balls, which are fed into the tubes *e*. The filling of the channels is thus made sure as well at the upward as at the downward movement of the bell *d*, because whatever may be the number of the balls there always comes a moment when the surface of the mass comes on a level with the channel *g*, which can thus become filled.

The drawings show how motion may be imparted to the bell by hydraulic power. For this purpose the bell *d* carries a piston *f*, working in a cylinder *h*. A pipe *i* puts the cylin-



der *h* in communication with a distributing apparatus *j*. (Shown separately and on a larger scale in Fig. 3.) The said apparatus is composed of two clack-valve boxes located side by side. Above the valve *k* to the left water under pressure is fed by a pipe *m*. A connecting-space *n* puts the under side of valve *k* in communication with the upper side of the escape-valve *o*, and also with the cylinder *h* through the pipe *i*. Under the valve *o* the escape takes place through a pipe *p*. Each of the clack-valves can in turn be lifted, respectively, by the rods *q r*, pivoted to a rocking bar *s*, so that one of the valves is opened when the other is being closed. The rocking bar *s* is actuated by a lever *t* through the medium of a small spring-piston *u*. According to the position, to the right or left, occupied by the lever *t* the rocking bar *s* is moved by the piston *u* in one direction or the other. An oscillating bar *v*, fixedly attached to the same spindle as the lever *t*, carries a rod *x*, having two pins *y* and *z*. The bell *d* is in part counterbalanced by a weight 1, connected to the said bell by chains 2, passing over pulleys 3 and attached to rods 4, fixed to the top of the bell. On the weight 1 is fixed a pin 5, which at the ends of the strokes acts on the pins *y* and *z* to change the direction of the motion. To move the bell upward, the valve *k* is opened and the valve *o* is closed, the closed position being shown in the drawings. Water under pressure is brought to bear on the under side of piston *f*, and the bell is moved upward. When the said piston is at the top of its stroke, the pin 5, which has moved downward, lifts the pin *y* and rocks the bar *v*. The lever *t* rocks the right part of the bar *s*, which then opens the valve *o* and closes the valve *k*. The water in the cylinder *h* is free to escape through the pipe *p*, and the piston *f* moves downward. At the end of the downward stroke of the piston the inverse movement is produced by the meeting of the pins 5 and *z*.

As modifications of the mode of operation by hydraulic power I reserve to myself the right of applying to my mixing apparatus a mechanical means for operating the same, either by connecting-rod and crank-arm, as in the case of a pump or steam-engine, or by the well-known movement applied to planing-machines. Such arrangements are too well known to need any description.

The movement may be imparted to the operating-shaft by any of the motors used in manufacturing industries, such as a steam, gas, oil, electric, or other motor.

In my invention hereinbefore described any quantity of balls up to a maximum number having been put into the basin the distribution of the same will always be sure to take place regularly, notwithstanding the gradual diminution of the number of balls, and that up to the very last of the latter.

I claim—

1. An apparatus for mixing and distribut-

ing balls, comprising a receptacle for a mass of balls having a bottom consisting of a stationary part and a movable part, the stationary part being inclined and having a series of discharge-openings arranged in a horizontal circle, the movable part being arranged to reciprocate up and down adjacent to the apertured portion of the stationary part, and means for moving the said movable part up and down so that it will be alternately above and below the apertured portion of the stationary part, thereby causing the balls to pass alternately from one part of the bottom to the other over the discharge-openings.

2. A mixing and distributing apparatus, comprising a fixed receptacle having a conical annular bottom, a bell or plunger movable in the opening in the said annular bottom, openings being made at the inner edge of the said bottom, and a mechanism for raising and lowering the said bell.

3. A mixing and distributing apparatus, comprising a fixed receptacle having a conical annular bottom provided with openings, a bell movable in the center of the bottom, the latter having a perforated groove arranged at its inner edge and provided with inclined parts leading from one opening to the next one, and a mechanism for raising and lowering the bell.

4. An apparatus for mixing and distributing balls, comprising a receptacle for a mass of balls having a bottom consisting of a stationary part and a movable part, the stationary part being inclined and having a series of discharge-openings at its lower part arranged in a horizontal circle, and the movable part being arranged to reciprocate up and down adjacent to the apertured lower portion of the stationary part of the bottom, and inclined oppositely thereto, and means for operating the movable part of the bottom so that it will be alternately above and below the apertured portion of the stationary part, to cause the balls to pass from one part of the bottom to the other, for the purpose set forth.

5. A mixing and distributing apparatus, comprising a ball-shuffling device having a stationary ball-support provided with a series of discharge-openings, a movable ball-support controlling the delivery of the balls, means for reciprocating said movable support, a counterbalancing-weight, and chains passing over pulleys and connecting the weight with the movable support.

6. A mixing and distributing apparatus, comprising a ball-shuffling device having a stationary part provided with discharge-openings arranged in a horizontal circle, and a part movable relatively to the stationary part and controlling the delivery of the balls, one of said parts having an annular bottom and the other part engaging the opening in the annular bottom, and means for operating said movable part.

7. A mixing and distributing apparatus for balls, comprising a receptacle having a slightly



conical annular bottom portion inclining toward its inner edge, and provided at said edge with apertures arranged in a circle, tubes leading from said apertures, a bell or plunger movable in the central opening formed by said annular portion, and constituting a part of the bottom of the receptacle, the upper surface of said bell inclining in a direction opposite to that of the said annular portion of the bottom, and means for moving the bell so that its upper surface will be alternately above and below the surface of the said annular portion of the bottom.

8. A mixing and distributing apparatus, comprising a fixed receptacle having an annular bottom forming a central opening and inclining in direction of the said opening, a

series of outlet-openings arranged at the inner edge of said bottom, a cylindrical casing open at the top and connected at its upper edge with the inner edge of said annular bottom, a bell or plunger arranged to fit in the casing and to reciprocate therein, the upper surface of said bell inclining in a direction opposite to that of the said annular bottom, and means for reciprocating the bell.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

CHARLES DUHAMEL.

Witnesses:

JEAN BARDET,  
EUGÈNE WATTIER.