

No. 656,474.

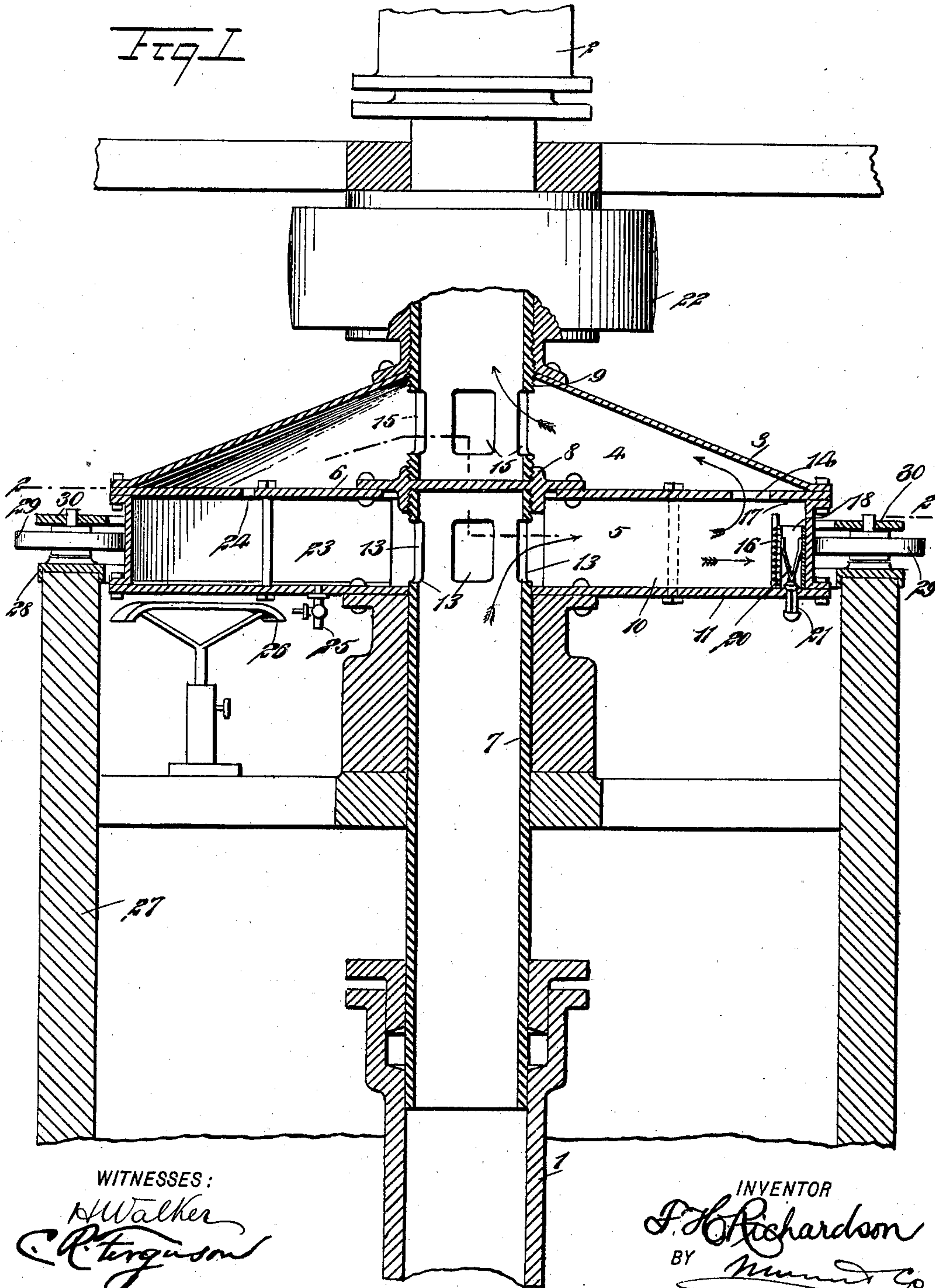
Patented Aug. 21, 1900.

F. H. RICHARDSON.
CENTRIFUGAL WATER CLARIFIER.

(Application filed Dec. 7, 1899.)

(No Model.)

2 Sheets—Sheet 1.



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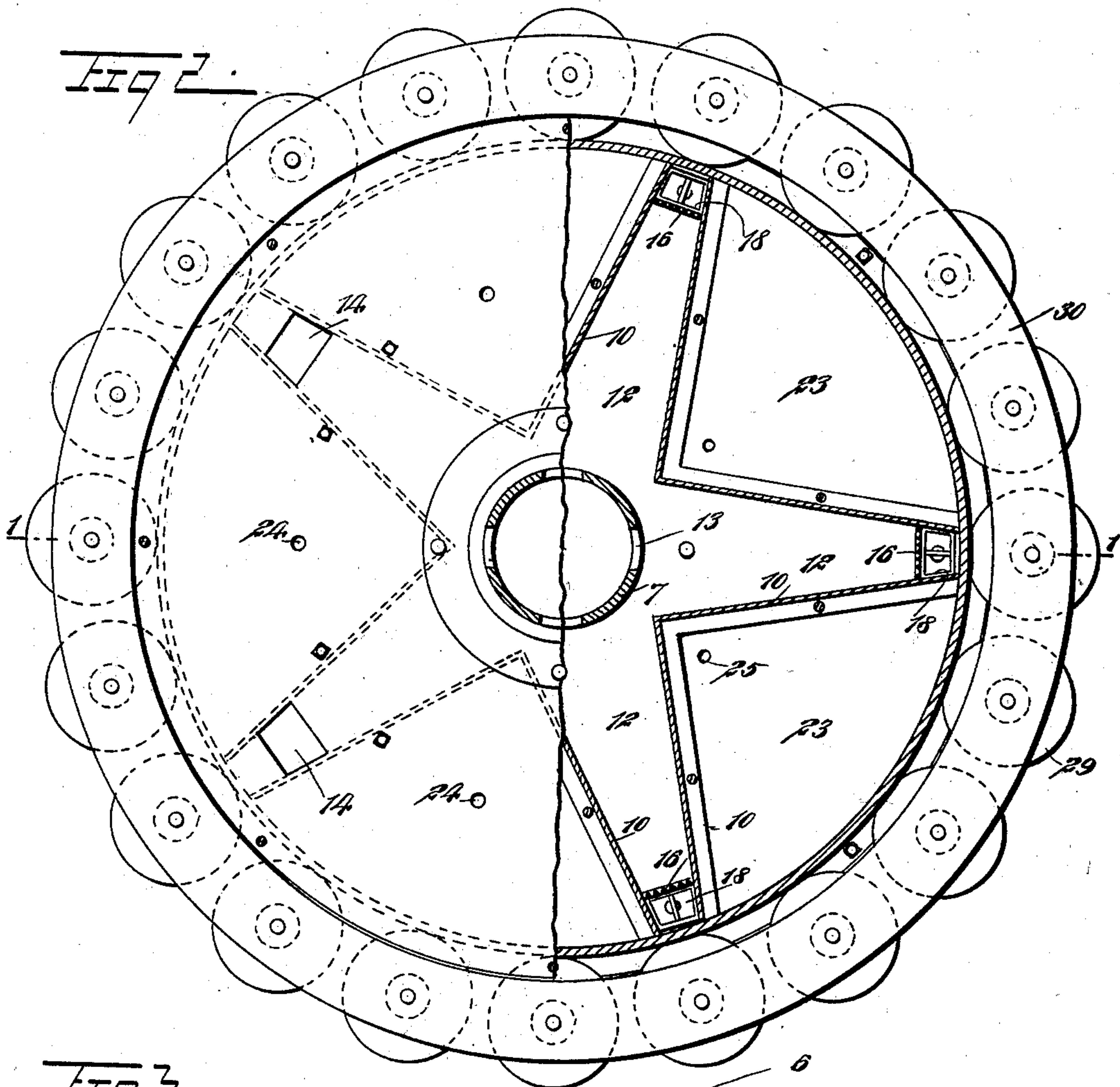
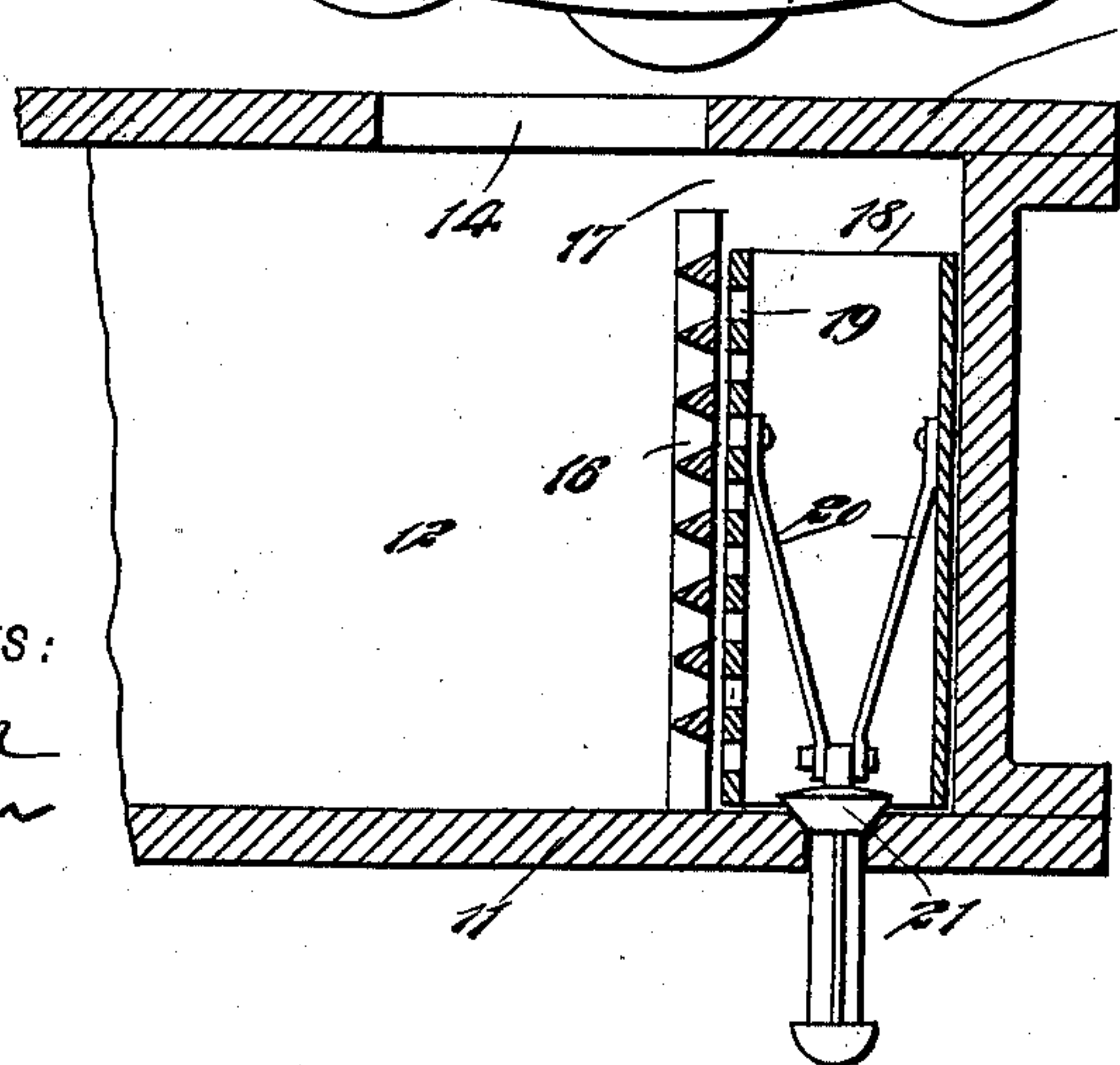


Fig 3



WITNESSES:

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FRANK HERBERT RICHARDSON, OF PUEBLO, COLORADO.

CENTRIFUGAL WATER-CLARIFIER.

SPECIFICATION forming part of Letters Patent No. 656,474, dated August 21, 1900.

Application filed December 7, 1899. Serial No. 739,523. (No model.)

To all whom it may concern:

Be it known that I, FRANK HERBERT RICHARDSON, a citizen of the United States, and a resident of Pueblo, in the county of Pueblo and State of Colorado, have invented a new and Improved Centrifugal Clarifier, of which the following is a full, clear, and exact description.

This invention relates to devices for removing solid matter and impurities from liquids, particularly water; and the object is to provide a simple device for this purpose adapted to be arranged in a water-main or supply-pipe and by centrifugal action thoroughly separate the impurities from the water passing through the pipe.

I will describe a centrifugal clarifier embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional elevation of a clarifier embodying my invention, taken on the line 1 1 in Fig. 2. Fig. 2 is a section on the line 2 2 of Fig. 1, and Fig. 3 is a sectional detail showing a valve mechanism employed.

Referring to the drawings, 1 2 designate two sections of a water-main or supply-pipe, and mounted to rotate relatively to these sections of pipe is a separating-casing 3 of cylindrical form and divided into upper and lower chambers 4 5 by means of a partition 6. A pipe-section 7 connects with a plate-like casting 8, secured to the partition 6, and the lower end of this pipe 7 connects with the pipe-section 1 in such manner as to rotate therein. A pipe-section 9 extends upward from the casting 8 and connects with the pipe-section 2 in such manner as to rotate therein.

The lower portion 5 of the separator-casing is provided with radially-disposed partitions 10, which with the partition 6 and the lower wall 11 of the casing form chambers 12 for receiving water discharged from the pipe 7 through ports 13, formed in said pipe. Water passes from these chambers 12 through ports 14, formed in the partition 6, and thence from the chamber 4 through ports 15 into the

pipe-section 9. At the outer end of each chamber 12 a perforated plate 16 is vertically arranged, the height of said plate, however, being less than the distance between the wall 11 and the partition 6, so that an opening 17 is provided at the top for the passage of water, as will be hereinafter described. Arranged within the space, one wall of which is formed by the plate 16, is a casing 18, the wall of which adjacent to the plate 16 is provided with perforations 19. This casing 18 serves as a valve to more or less close the openings through the plate 16. Connected to the casing 18 by means of rods 20 is a plug-valve 21, designed to control an opening through the bottom wall 11 of the separator-casing. Attached to the pipe-section 9 above the separator-casing is a pulley 22 for engagement with a band driven by any suitable motor. To equalize or balance the casing during its rotary motion, the spaces 23 between the partitions 10, forming the chambers 12, should be filled with water. Therefore I provide the partition 6 with openings 24, through which water may pass into said spaces 23, and the water may be drawn therefrom through valve-controlled pipes 25.

In operation as the separating-cylinder is rapidly rotated the water flowing from the pipe 1 and thence through the ports 13 will pass into the chambers 12 and by centrifugal action will be carried toward the periphery of the casing.

Heavy matter, such as dirt or sand or other impurities, will be carried out and will pass through perforations in the plates 16 and the perforations 19 into the casings 18, at the bottom of which the impurities will settle. The clear water will pass upward through the ports 14 and thence through the pipes 9 and 2. The impurities collected in the casings 18 are designed to be discharged through the openings controlled by the valves 21. Therefore during the rotary motion of the device the lower ends of the valves 21 by engaging with a cam-plate 26 will be raised, allowing the impurities to be discharged, and while these valves are raised the casings 18 will be raised to close the openings through the plates 16, and therefore the water can only enter the casings 18 by passing over the top of the plates

at 17, which will cause the sediment or matter collected in the casings to be thoroughly washed out.

To prevent vibrations of the clarifier when rotating rapidly, I arrange it in a well 27, of any suitable material, and on the top of the wall of the well is a metal coping 28, in which the lower trunnions of rollers 29 have bearing, while the upper trunnions have bearing in a ring 30. The rollers should be placed close together, but not to touch one another. Neither should they touch the periphery of the separator, except there be vibration thereof.

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

1. An apparatus for clarifying liquids, comprising a casing mounted to rotate, a partition dividing said casing into upper and lower compartments, a pipe having communication with the lower compartment, a pipe having communication with the upper compartment, radially-disposed partitions forming side walls of chambers in the lower portion of the device, perforated plates near the outer ends of said chambers, and a casing movable adjacent to each plate and having perforations, substantially as specified.

2. A device for clarifying liquids, comprising a casing mounted to rotate, a partition in said casing dividing the same into upper and lower compartments, a pipe having communication with the lower compartment, a pipe having communication with the upper compartment, chambers in the lower compartment, perforated plates near the outer ends of said chambers, a casing having a perforated wall and arranged adjacent to each plate, and valves carried by said casings for controlling openings through the bottom wall of the clarifier, substantially as specified.

3. A device for clarifying water, comprising a casing mounted to rotate relatively to

main or supply-pipes, a partition dividing said casing into upper and lower compartments, the said compartments communicating one with the other through ports formed in the partition, pipes communicating with the said upper and lower compartments, radially-disposed partitions in the lower compartment forming side walls of the water-receiving chambers, a perforated plate near the outer end of each of said chambers, there being a space between the upper end of the plate and the partition, a casing movable adjacent to each of said plates and having a perforated wall, a plug-valve carried by each of said casings for controlling an opening through the bottom wall of the clarifier, and means for opening said valves, substantially as specified.

4. The combination with a water-main or supply-pipe, of a casing mounted to rotate relatively to said pipes, the said casing being divided into upper and lower compartments, water-receiving chambers in the lower compartment, and valves for controlling openings in the bottom wall of the casing, and means for automatically moving said valves to open position, substantially as specified.

5. A device for clarifying liquid, comprising a casing mounted to rotate relatively to a main or supply-pipe, automatically-actuated valves for permitting the escape of separated material, a well in which the device is arranged, and rollers on the top of the well-wall with which the periphery of the casing may engage to prevent vibration thereof, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK HERBERT RICHARDSON.

Witnesses:

JOSEPH A. GREENE,
LEOTA WILLITS.