

No. 781,107.

PATENTED JAN. 31, 1905.

W. F. STEWART.

FILTER.

APPLICATION FILED DEC. 21, 1903.

2 SHEETS—SHEET 1.

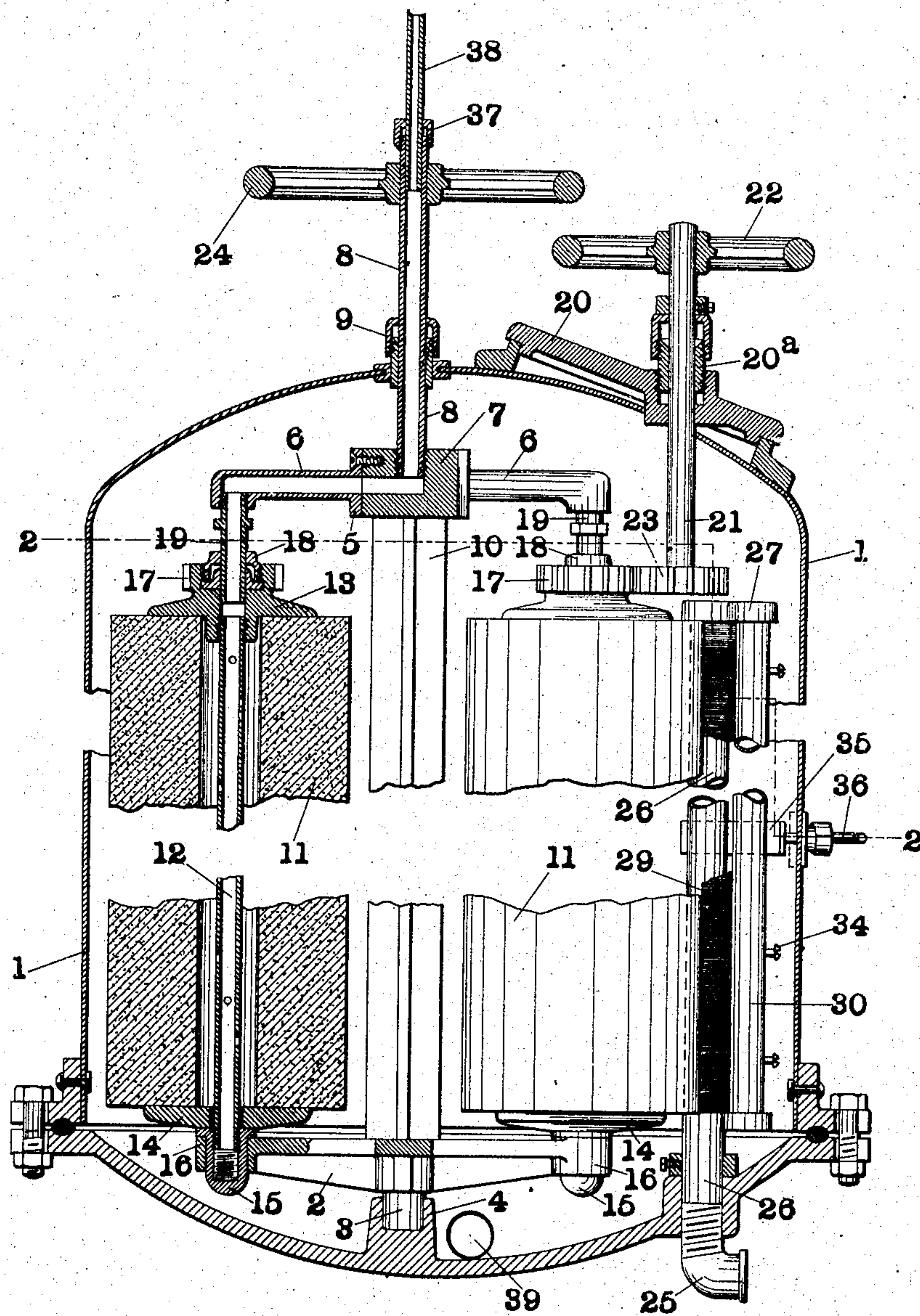


Fig. 1.

Witnesses:

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2 SHEETS—SHEET 2.

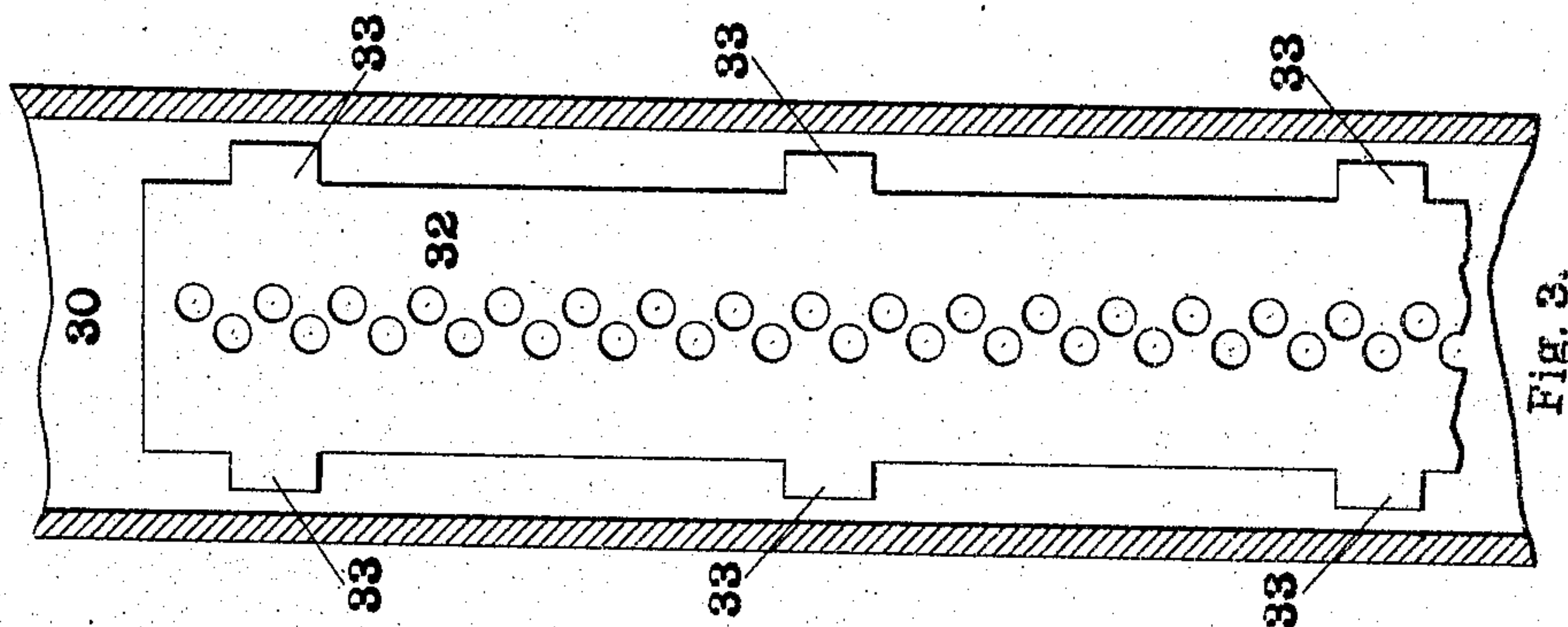


Fig. 3.

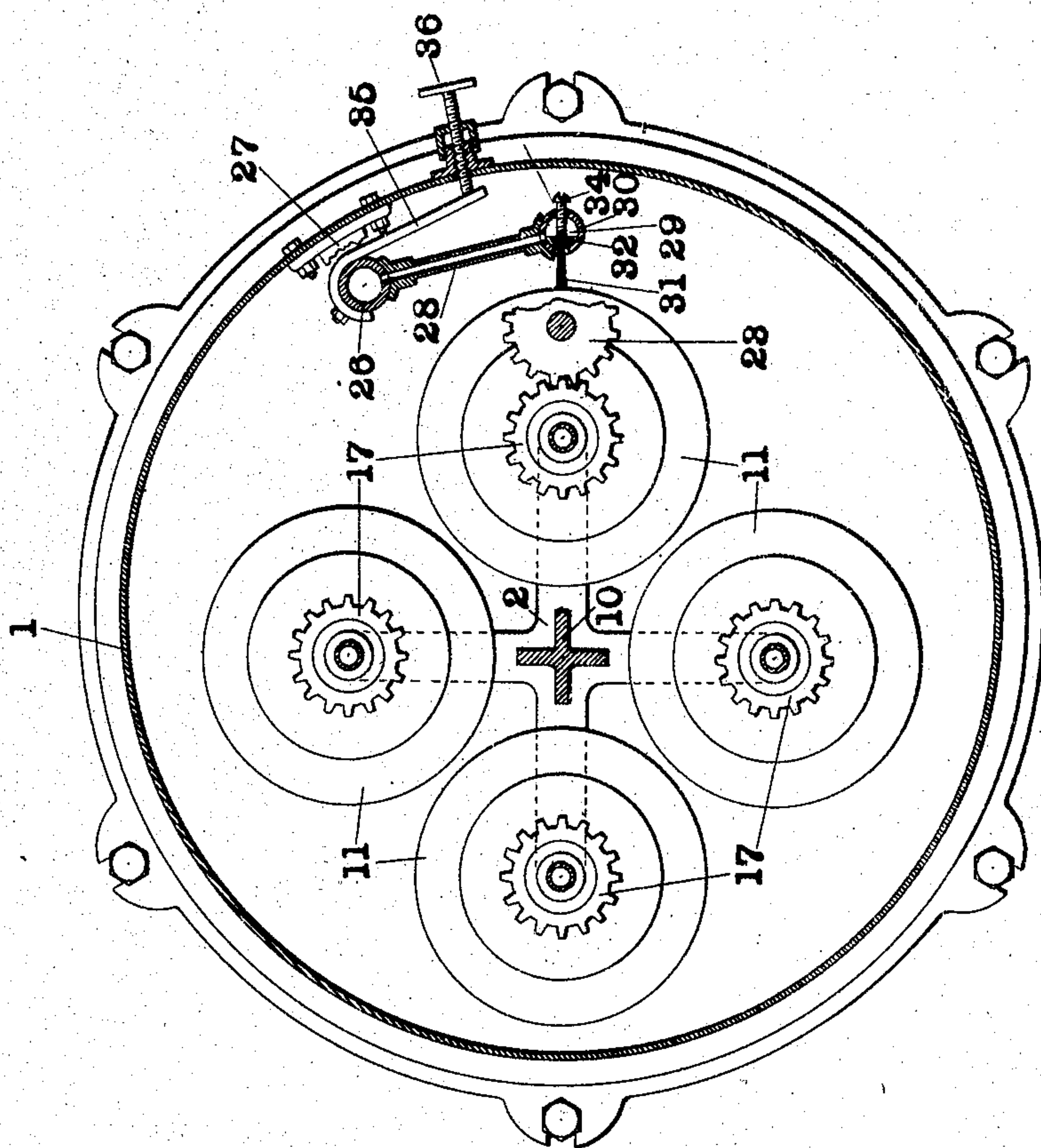


Fig. 2.

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UNITED STATES PATENT OFFICE.

WILLIAM F. STEWART, OF ST. LOUIS, MISSOURI.

FILTER.

SPECIFICATION forming part of Letters Patent No. 781,107, dated January 31, 1905.

Application filed December 21, 1903. Serial No. 185,996.

To all whom it may concern:

Be it known that I, WILLIAM FRASER STEWART, a citizen of Great Britain, and a resident of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Filters, of which the following is a specification.

My invention relates to filters, and especially to water-filters; and its principal objects are to clean the cleaner for the filter-stone without removing it from the casing, to subject the cleaner to the action of a stream of water flowing continually while the filter is in operation, to subject the cleaner to the action of the inflowing current of water, to clean the filter-stones by the simultaneous action of a reverse current of water through them and of a mechanical cleaner, to clean a plurality of filter-stones by means of a single cleaner without the removal of any part from the casing, and other objects hereinafter appearing.

My invention consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

In the accompanying drawings, forming a part of this specification, and wherein like symbols refer to like parts wherever they occur, Figure 1 is a vertical sectional view through my improved filter. Fig. 2 is a horizontal sectional view on the line 2 2 of Fig. 1, and Fig. 3 is a vertical sectional view through the cleaner-pipe.

Within a casing 1 a frame is revolubly mounted. The frame consists of a spider 2, which is provided on its lower side with a thrust-journal 3, adapted to rest in a step-bearing 4 in the casing, a hollow spider 5, consisting of pipes 6, centrally connected to a box 7, with registering ducts and a discharge-duct opening into a discharge-pipe 8, journaled in a stuffing-box 9 in the top of the casing, and a bar 10 uniting the two spiders.

Upon each arm of the frame a filter-stone 11 is mounted. The stone is preferably a hollow cylinder. A perforated pipe 12 extends through the center of the stone and is screw-threaded at its ends. A plate 13 is screwed upon the upper end of the pipe 12. A second plate 14 is loosely mounted on the

lower end of the pipe 12. It is secured in position by a nut 15, which also constitutes a journal to turn in the bearing 16 on the lower spider. The upper plate 13 has a gear-wheel 17 made integral therewith and is also provided with a stuffing-box 18. A connecting-pipe 19 extends downwardly from the pipe 6 and is journaled in the stuffing-box 18. By this construction the filter-stones are revolubly secured to the arms of the spider.

The casing 1 is provided at the top with a cover 20, removably secured in position. A stuffing-box 20^a is arranged in the cover 20, and through it extends a shaft 21, having a hand-wheel 22 at its upper end and a gear-wheel 23 at its lower end. This gear-wheel is in the same plane as the gear-wheels 17 and adapted to mesh with each of them. The discharge-pipe 8 is equipped with a hand-wheel 24, by means of which the frame may be rotated. Thus any one of the filter-stones can be brought into position for its gear-wheel 17 to mesh with the gear-wheel 23. Then by manipulating the hand-wheel 22 the stone may be rotated on its axis and may thus be cleaned by the stationary cleaner.

A connection 25 for the supply-pipe is secured in the bottom of the casing near one side. An admission-pipe 26 registers with this connection and extends upwardly to a bracket 27, secured to the casing at about the height of the tops of the filter-stones. This bracket supports and seals the upper end of the admission-pipe, the connection being such as to permit rotation of the latter in its bearings. A plurality of connecting-pipes 28 (only one of which is shown) extend from the admission-pipe to a cleaner 29. The cleaner 29 consists of a slitted pipe 30, in which is secured a brush 31 with its bristles extending through the slit. The brush preferably has a back with lugs 33 on the sides adapted to bear on the inner wall of the slitted pipe, and thus permit the water to pass around it. The bristles are preferably metallic and sufficiently thick to fill the slit in the pipe without choking it. The water not only passes over the separate tufts of the brush, but passes through them. Thus not only the exterior

bristles but all the bristles are cleansed by the inflowing water. By my arrangement the supply-stream, which is also the cleansing-stream, plays upon the advance side of the cleaner, upon which especially the material removed from the filter-stones tends to accumulate. Screws 34, extending through the pipe and bearing on the back of the brush, secure it in position. The brush is located in position to bear upon the filter-stone that is in position to be rotated. Means to adjust the pressure of the cleaner upon the stone are provided. A spring-arm 35 is secured on the admission-pipe. An adjusting-screw 36 extends through the casing and bears upon the spring-arm 35. Thus by advancing or retracting the screw the cleaner may be caused to bear with more or less force on the filter-stone.

The discharge-pipe 8 is provided with a stuffing-box 37 at its end, and through it extends a fixed pipe 38 to conduct the filtered water away. At the bottom of the casing a wasteway 39 is provided, which can be opened and closed at will.

In use the casing is closed and water is admitted through the admission-pipe 26 and is discharged therefrom through the bristles of the cleaner. All the water admitted must come in this way, and thus the cleaner is being continually washed off. The casing being filled with water under the pressure of the water-mains, water is forced through the pores of the filter-stones to the internal chambers thereof and from thence is discharged through the pipes 6, box 7, and pipes 8 and 38. When it is desired to clean the filter-stones, the wasteway is opened, and thus the pressure in the casing and external with respect to the filter-stones is relieved. The clear water inside of the filter-stones and the reservoir with which the filter is connected is still under pressure, however, and hence it will be forced back through the filter-stones. Simultaneously the stone, which is connected with the gear 23, is rotated and the cleaner thus brushes the dirt and slime from its surface. The water being still admitted through the admission-pipe and the bristles of the brush, the clogging up of the latter is prevented, for the water carries the impurities away as rapidly as they are scraped from the stone. This filter-stone being cleaned, the frame is turned by means of the hand-wheel 24, and the next filter-stone is brought into such a position that its gear-wheels 17 will mesh with the gear-wheel 23, when it can be cleaned in the same manner, and so on until all of the filter-stones are cleaned.

I do not wish to be limited to the specific construction shown and described, as the device is obviously capable of modification within the scope of my invention.

Although I have referred to the filtering

element as a "filter-stone" throughout the foregoing description and in the claims hereinafter, I wish it to be understood that such filter-stone is the equivalent of any concrete filtering element, such as asbestos, carbon, cement, and the like.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A filter comprising a casing, a filter-stone therein, a cleaner for said filter-stone, said filter-stone and cleaner being relatively movable, and means to supply a cleansing stream of water to the advance side of said cleaner as a whole, whereby the matter removed from the filter-stone is removed from the cleaner and is not permitted to accumulate.

2. A filter comprising a casing, a supply-pipe therefor, a filter-stone in said casing, and a cleaner for said filter-stone arranged to be cleaned on both sides by water from the supply-pipe.

3. A filter comprising a casing, a plurality of filter-stones in said casing, and means to bring each of said stones into the same position to be cleaned.

4. A filter comprising a casing, a filter-stone therein, a cleaner for said filter-stone comprising an abrasive member permeable to water, and means to supply a cleansing stream of water to said abrasive member.

5. A filter comprising a casing, a filter-stone therein, a cleaner for said filter-stone comprising a brush and arranged in the path of the supply-stream, whereby said supply-stream may flow over and through said brush longitudinally of its bristles.

6. A filter comprising a casing, a filter-stone therein, a cleaner for said filter-stone comprising a brush, and means to supply a cleansing stream of water to flow over and through said brush longitudinally of its bristles.

7. A filter comprising a casing, a filter-stone therein and a cleaner for said filter-stone consisting of a pipe having a discharge-opening, and an abrasive member projecting through said discharge-opening in said pipe in position to make contact with said filter-stone, the supply-stream being admitted to the casing through said cleaner-pipe and over said abrasive member.

8. A filter comprising a casing, a filter-stone therein and a cleaner for said filter-stone comprising a slitted pipe, and a brush secured therein with the bristles thereof projecting through the slit in said pipe, the supply-stream being admitted to the casing through said slitted pipe and over said bristles.

9. A filter comprising a casing, a filter-stone therein, a pivoted cleaner for said filter-stone, means to adjust the pressure of said cleaner upon said filter-stone, and means to supply a cleansing stream of water to said cleaner.

10. A filter comprising a casing, a filter-stone therein, a pivoted cleaner for said filter-stone,

means to adjust the pressure of said cleaner upon said filter-stone, and means to supply a cleansing stream of water to said cleaner.

11. A filter comprising a casing, a filter-stone therein, and an adjustable pivoted cleaner for said filter-stone arranged to be cleaned by water from the supply-pipe.

12. A filter comprising a casing, a filter-stone therein, a pivoted cleaner for said filter-stone arranged to bear thereon and in the path of the supply-stream, and means to adjust the pressure of said cleaner on said filter-stone.

13. A filter comprising a casing, a filter-stone therein, an admission-pipe revolubly mounted in said casing, and a cleaner for said filter-stone rigidly connected to said admission-pipe and arranged in the path of the supply-stream discharged therefrom whereby said cleaner is cleansed by said supply-stream.

14. A filter comprising a casing, a filter-stone therein, an admission-pipe revolubly mounted therein, a cleaner for said filter-stone comprising a pipe having a discharge-opening and an abrasive member projecting through said discharge-opening, and connections between said admission-pipe and said cleaner-pipe whereby the former may discharge the supply-stream through the latter.

15. A filter comprising a casing, a filter-stone therein, an admission-pipe revolubly mounted in said casing, adjusting means to turn said admission-pipe, and a cleaner for said filter-stone rigidly connected to said admission-pipe and arranged in the path of the supply-stream discharged therefrom.

16. A filter comprising a casing, a filter-stone therein, an admission-pipe revolubly mounted in said casing, an arm rigidly mounted on said admission-pipe, an adjusting-screw projecting through said casing into contact with said arm, and a cleaner for said filter-stone rigidly connected to said admission-pipe and arranged in the path of the supply-stream discharged therefrom.

17. A filter comprising a casing, a filter-stone therein, a fibrous cleaner for said filter-stone, and means for forcing water through the interstices between the fibers of said cleaner.

18. A filter comprising a casing, a filter-stone therein, and a cleaner so arranged in the path of the supply-stream that it may be cleaned on all sides without removal from said casing.

19. A filter comprising a casing, a filter-stone therein, an admission-pipe revolubly mounted in said casing, an arm rigidly mounted on said admission-pipe, an adjusting-screw projecting through said casing into contact with said arm, and a cleaner for said filter-stone rigidly mounted on said admission-pipe.

20. A filter comprising a casing, a filter-stone and a cleaner therefor relatively revolubly mounted therein, and means to revolve the

revoluble member projecting through said casing and detachably connected to said revoluble member.

21. A filter comprising a casing, a plurality of filter-stones revolubly mounted therein and each provided with a gear-wheel, a shaft revolubly mounted in said casing and provided with a gear-wheel in position to releasably mesh with the gear-wheel of any one of said filter-stones, and a cleaner arranged to operate on the filter-stones geared to said shaft.

22. A filter comprising a casing, a plurality of filter-stones mounted therein, a cleaner for said filter-stones, and means to bring any one of said filter-stones and said cleaner into co-operative relation.

23. A filter comprising a casing, a plurality of filter-stones mounted therein, a cleaner for said filter-stones, and means to bring any one of said filter-stones into position to be operated on by said cleaner.

24. A filter comprising a casing, a revoluble frame therein, a plurality of filter-stones mounted on said frame, a cleaner for said filter-stones, and means on the exterior of said casing to revolve said frame to bring any one of said filter-stones into position to be operated on by said cleaner.

25. A filter comprising a casing, a frame revolubly mounted therein, a plurality of filter-stones revolubly mounted in said frame, a cleaner for said filter-stones, and means on the exterior of said casing to revolve said frame to bring any of said filter-stones into position to be operated on by said cleaner.

26. A filter comprising a casing, a frame revolubly mounted therein, a plurality of filter-stones revolubly mounted in said frame, a cleaner for said filter-stones, and means to rotate said filter-stones arranged in position to be operatively connected to any one of said filter-stones when it is in position to be operated on by said cleaner.

27. A filter comprising a casing, a frame revolubly mounted therein, a plurality of filter-stones revolubly mounted in said frame, a cleaner for said filter-stones and means to supply a cleansing stream of water to said cleaner.

28. A filter comprising a casing, a supply-pipe therefor, a frame revolubly mounted in said casing, a plurality of filter-stones revolubly mounted in said frame, and a cleaner for said filter-stones arranged to be cleaned by water from said supply-pipe.

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

WILLIAM F. STEWART.

Witnesses:

FRED F. REISNED,
J. B. MEGOWN.