

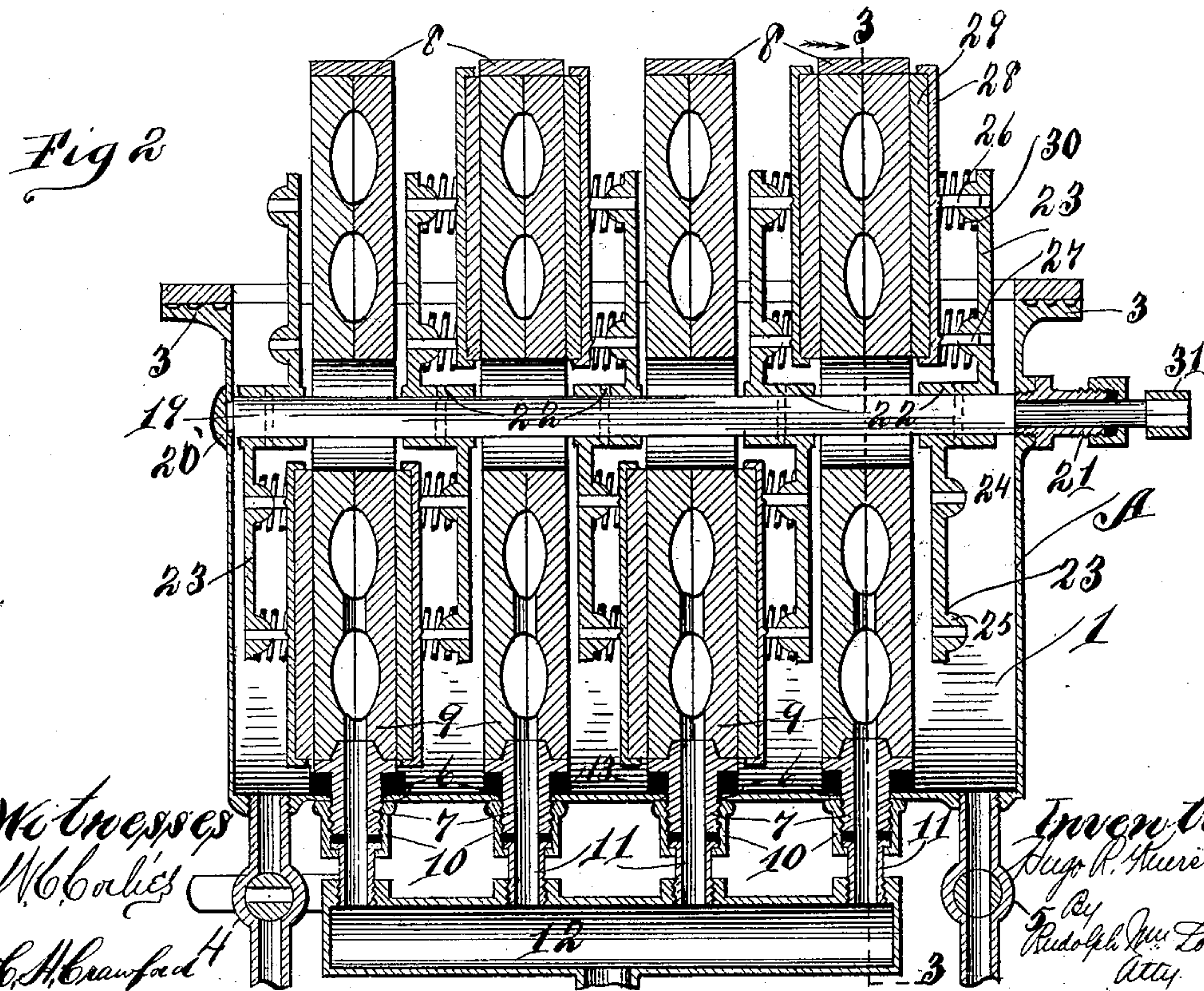
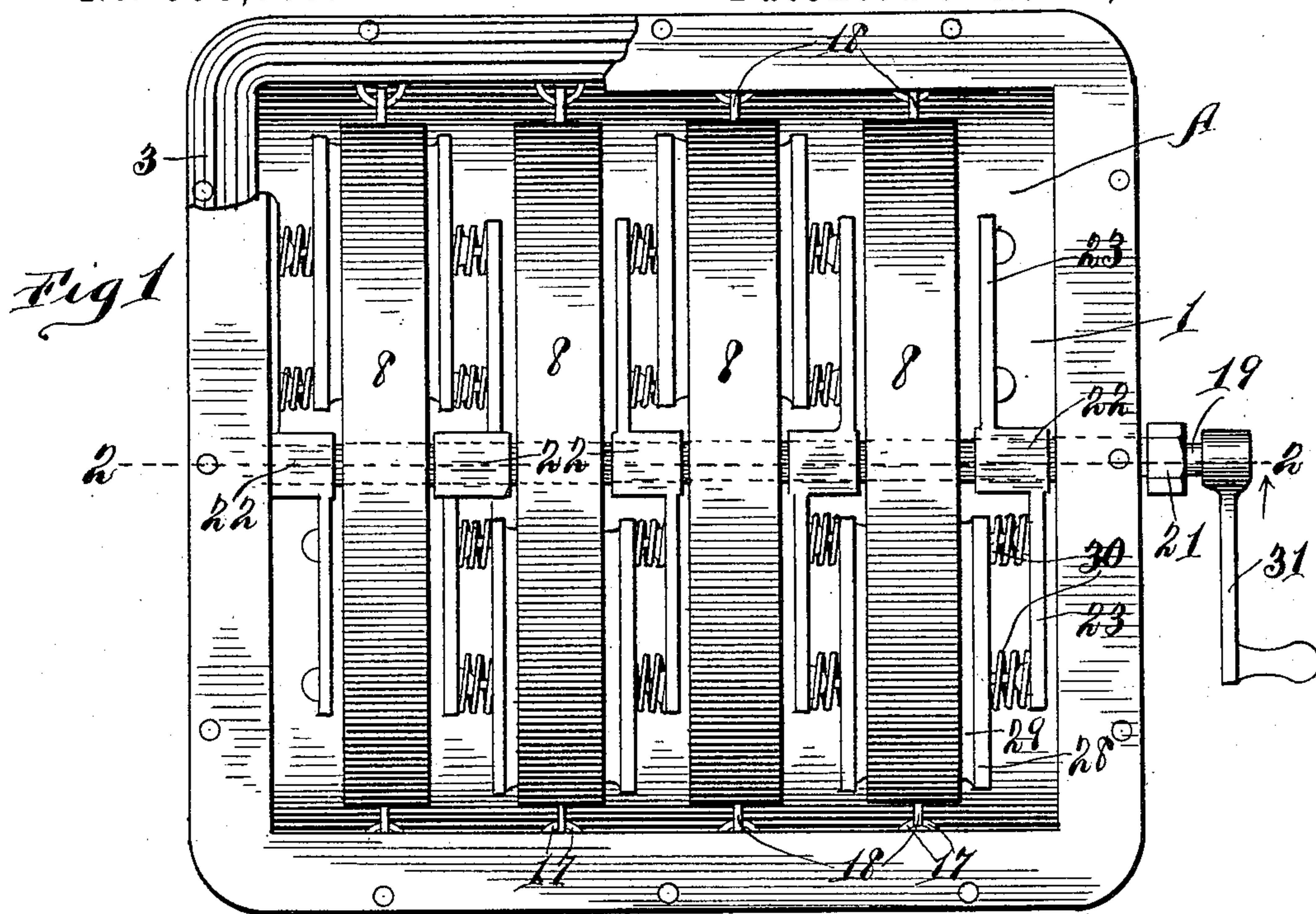
(No Model.)

2 Sheets—Sheet 1.

H. R. KUERSTEN.  
FILTER.

No. 605,883.

Patented June 21, 1898.



Witnesses  
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C. H. Crawford

Inventor  
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Att'y



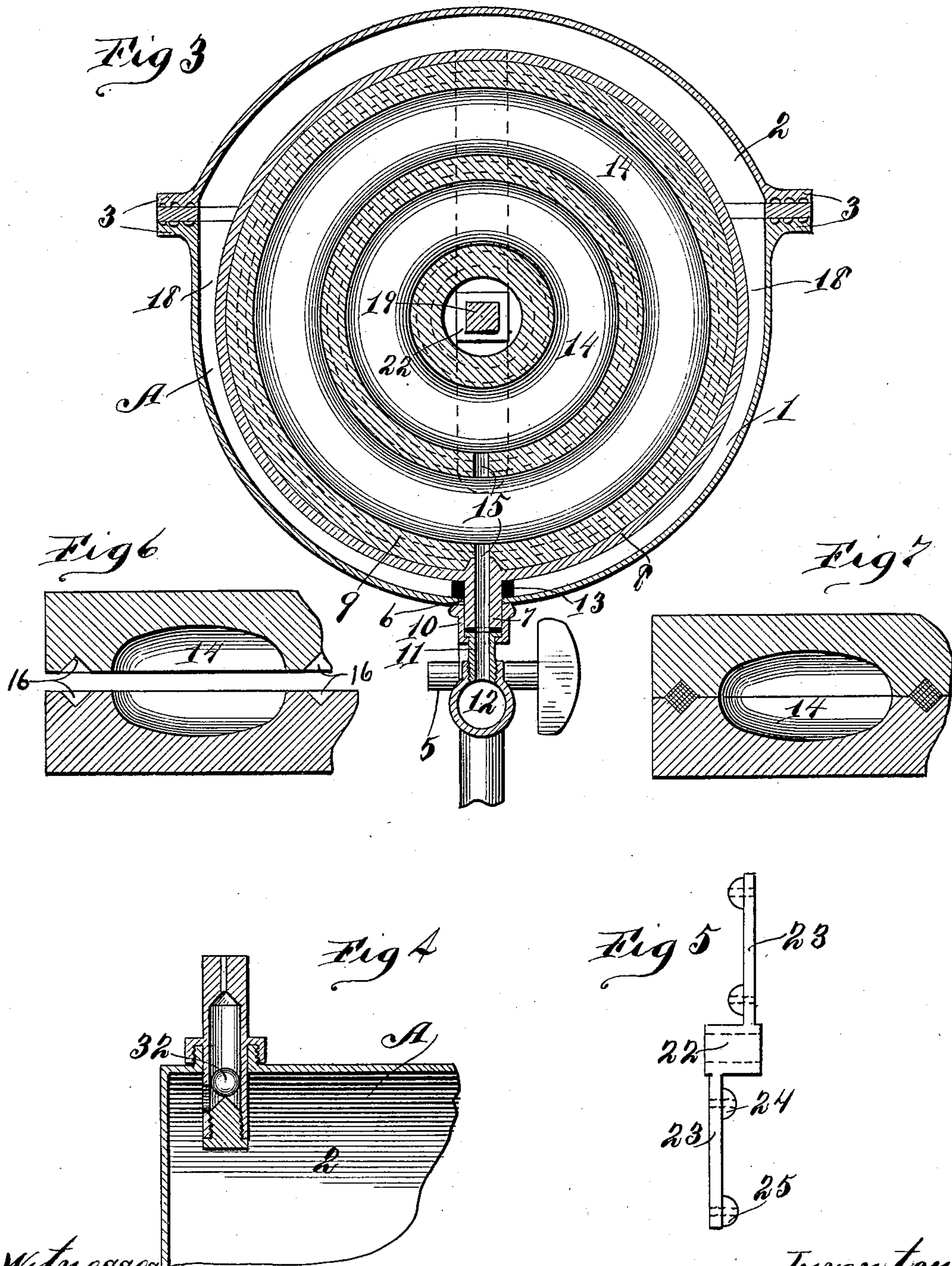
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# UNITED STATES PATENT OFFICE.

HUGO R. KUERSTEN, OF CHICAGO, ILLINOIS, ASSIGNOR TO ANDREW M. KNOBLE, OF SAME PLACE.

## FILTER.

SPECIFICATION forming part of Letters Patent No. 605,883, dated June 21, 1898.

Application filed November 29, 1897. Serial No. 660,093. (No model.)

*To all whom it may concern:*

Be it known that I, HUGO R. KUERSTEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Filters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a novel construction in a filter, the object being to provide a device of this character of large capacity, compactness, and which can be thoroughly cleaned without being taken apart; and it consists in the features of construction and combinations of parts hereinafter fully described.

In the accompanying drawings, illustrating my invention, Figure 1 is a top plan view of a filter constructed in accordance with my invention with the cover or upper portion of the casing removed. Fig. 2 is a vertical longitudinal section of the same on the line 2 2 of Fig. 1, also with the cover removed. Fig. 3 is a vertical transverse section on the line 3 3 of Fig. 2, showing the cover in place. Fig. 4 is a detail sectional view of a valve on the cover. Fig. 5 is a detail view in elevation of an arm adapted to be mounted upon a shaft in said filter and to carry brushes or scrapers for cleaning the filter-tubes. Figs. 6 and 7 are detail fragmentary sectional views illustrating the manner in which the filter-tubes are made.

Referring now to said drawings, A indicates a practically cylindrical casing consisting of two sections 1 and 2, which are adapted to be secured together by means of screws passing through the flanges 3 thereof, a rubber packing being interposed between said flanges to effect a water-tight joint. Said portion 1 of said casing A is provided with valve-controlled inlet and outlet ports 4 and 5, respectively, and with a series of openings 6 between the same, through which the nipples 7 of metallic rings 8 surrounding the earthenware filter-tubes 9 are adapted to pass. Said nipples 7 are coupled by means of unions 10, of ordinary construction, with the branches 11 of a common receiving-pipe 12, adapted to re-

ceive the filtered water, rubber washers being interposed in said connections to make water-tight joints. Rubber washers 13 surround said nipples 7 and are compressed between said rings 8 and said casing by means of said unions 10 in an obvious manner, thus preventing said casing from leaking at said openings 6. Said filter-tubes 9 are made in the form of flat cylindrical disks having central openings and are provided interiorly with annular passages 14, which are connected together by means of radial passages 15 and have a common outlet through said nipples 7 of said metallic rings 8, in which said tubes are rigidly mounted. Each of said tubes is composed of two sections of cylindrical form, provided with annular and radial grooves, which when said sections are joined form said passages 14 and 15, respectively. Said sections are further provided with annular grooves 16 between, outside, and within said grooves above referred to, which prior to the burning of said tubes in the kiln are filled with wet clay, which serves to cement same together, as shown in detail in Figs. 6 and 7, so as to appear to have been formed of one piece in the finished tube. The tube when finished is laid within and firmly cemented to said ring 8 in such a manner as to bring its outlet into alinement with the opening in said nipple 7 for obvious reasons. Said rings 8 obviously serve to strengthen said tubes and also to afford a means for securing and supporting them in said casing. To hold said rings 8 in said casing so that they stand transversely therein and to hold them parallel, I provide pairs of lugs 17 on said casing at regular intervals, between which lugs 18 on said rings 8 are adapted to fit, thus obviously preventing said rings 8 from turning when coupling same to said outlet-pipes 11.

All filters after they have been in operation for some time become clogged as the fine sediment contained in the water enters and fills the pores of the porous filtering material and thus gradually decrease in capacity. This necessitates taking the filters apart very frequently and thoroughly cleaning the tubes, thus requiring time and labor. In constructing my filter I have kept in mind all the objections to be overcome and have thus aimed



to attain all the advantages desired—namely, compactness, a large surface of porous material, simplicity and cheapness of construction, durability, and easy and simple means for cleaning the tubes or porous material without removing same from the casing and while the filter is in operation.

By means of the form of my tubes I obviously attain the large surface of porous material without making a bulky tube, and by means of the remaining features above described I attain simplicity, durability, and cheapness of construction. I also provide simple and efficient means for keeping said tubes constantly clean without removing same from the casing or interrupting the operation of the filter. To this end I provide a shaft 19, running longitudinally through said casing A practically in the center thereof and through said central openings in said tubes. This shaft is journaled in a bearing or cup 20 in one end of said casing and passes through the other end thereof, a stuffing-box 21 being provided at said last-named end to form a tight joint. On said shaft 19, between said tubes and between the latter and said casing, a series of sleeves 22 are rigidly secured, which carry radially outwardly extending arms 23 at their opposite ends, which extend in opposite directions. Said arms 23 are provided with bushings 24 and 25, which are centrally perforated and adapted to receive the pins 26 and 27 of socket-pieces 28, in which pieces 29 of said porous material of which said filter-tubes are provided are mounted and which serve as brushes to scrape the sediment which collects on said tubes. Said brushes or scrapers 29 are held in close contact with said tubes by means of springs 30 interposed between said arms 23 and said socket-pieces 28 in an obvious manner. Said arms 23 are preferably so arranged relatively to each other as to bring said scrapers 29 in direct alinement with each other on opposite sides of each tube, so as to avoid any torsional pressure thereon. Said shaft 19 is turned by means of a crank-handle 31, and by giving same a few turns at intervals it will be obvious that said tubes can be kept clean and the capacity of the filter remain unimpaired. During the time that said crank-handle is being turned it would be advisable to open the outlet-port of said casing, so as to lead the sediment thus removed from the tubes into the waste-pipe. I also supply suitable means for enabling me to empty said casing when said filter is not in use, and to this end provide a ball-valve 32 on the upper end of the casing, which will admit and permit the outflow of air from said casing, so that when the latter is being filled it will allow free exit of air, but as soon as the water-level reaches the ball the latter will be raised, thus closing said valve and preventing the escape of water therethrough.

I claim as my invention—

1. In a filter, a filter-tube composed of two

flat cylindrical disks of clay each provided on one of its flat faces with annular and radial grooves which when said disks are fitted together to form a tube, form annular and radial passages therein, substantially as described. 70

2. In a filter, a filter-tube composed of two flat cylindrical disks of clay each provided in one of its flat faces with wide annular grooves bordered by narrow grooves adapted to receive material to cement said disks together to form said tube, said wide annular grooves forming annular passages in said finished tube, and radial passages connecting said annular passages and forming an outlet from said tube, substantially as described. 80

3. In a filter, a filter-tube comprising a flat cylindrical disk having internal annular passages and radial passages connecting said annular passages and forming an outlet from said tube, a metal ring or band around said tube, and a nipple on said band having an opening adapted to communicate with the outlet of said tube, substantially as described. 85

4. In a filter, a filter-tube comprising a flat cylindrical disk having internal annular passages and radial passages connecting said annular passages and forming an outlet from said tube, a metal ring or band around said tube, an exteriorly-screw-threaded nipple on said band communicating with said outlet of said tube, a casing adapted to contain said tube and having an opening through which said nipple is adapted to pass and means for securing said tube firmly within said casing, substantially as described. 90

5. In a filter, a filter-tube comprising a flat cylindrical disk having internal annular passages and radial passages connecting said annular passages and forming an outlet from said tube, a metal ring or band around said tube, an exteriorly-screw-threaded nipple on said band communicating with said outlet of said tube, a casing adapted to contain said tube and having an opening through which said nipple is adapted to pass and means for securing said tube firmly within said casing comprising a union adapted to couple said nipple with an outlet-pipe and clamp said ring or band firmly against said casing around said opening, substantially as described. 105

6. In a filter, a casing, a filter-tube within said casing comprising a hollow flat cylindrical disk having a central opening there-through and a peripheral outlet, a ring or band around said tube having an outwardly-extending nipple provided with an opening communicating with said peripheral outlet, an opening in said casing through which said nipple is adapted to pass, means for coupling said nipple with an outlet-pipe and serving to firmly secure said tube within said casing, valve-controlled inlet and outlet pipes for said casing, and an exhaust-valve on said casing adapted to permit the exit of air therefrom, substantially as described. 120

7. In a filter, a casing, a filter-tube within 125



said casing comprising a hollow flat cylindrical disk having a central opening there-through and a peripheral outlet, a ring or band around said tube having an outwardly-extending nipple provided with an opening communicating with said peripheral outlet, an opening in said casing through which said nipple is adapted to pass, means for coupling said nipple with an outlet-pipe and serving to firmly secure said tube within said casing, a shaft passing centrally through said casing and through said central opening in said tube, and devices carried by said shaft adapted to remove sediment from the outer faces of said tube when said shaft is revolved, substantially as described.

8. In a filter, the combination with a plurality of parallel filter-tubes comprising hollow flat cylindrical disks having central openings and firmly mounted within a casing, of a shaft passing longitudinally through said casing and through said central openings in said tubes and carrying devices adapted to scrape the outer faces of said tubes to clean the same when said shaft is revolved, substantially as described.

9. In a filter, the combination with a plurality of parallel filter-tubes comprising hollow flat cylindrical disks having central openings and firmly mounted within a casing, of a shaft passing longitudinally through said casing and through said central openings in said tubes and carrying arms extending outwardly between said tubes, and devices carried by said arms and bearing against said tubes to clean the same when said shaft is revolved, substantially as described.

10. In a filter, the combination with a plurality of parallel filter-tubes comprising hollow flat cylindrical disks having central openings and firmly mounted within a casing, of a shaft passing longitudinally through said casing and through said central openings in said tubes and carrying arms extending outwardly between said tubes, and movable spring-actuated scrapers carried by said arms and bearing against said tubes to clean the same when said shaft is revolved, substantially as described.

11. In a filter, a casing made in two parts, a plurality of filter-tubes mounted within said casing and consisting of hollow flat cylindrical disks surrounded by peripheral bands having nipples communicating with the outlets of said tubes and passing through openings in said casing, means for coupling said nipples with branches of an outlet-pipe for filtered water, central openings in said tubes, a crank-shaft passing through said casing and through said central openings in said tubes, arms on said shaft, scrapers carried by said arms and bearing against said tubes to clean the same when said shaft is revolved, valve-controlled inlet and waste pipes for said casing, and an air-outlet valve on said casing adapted to be closed automatically by the rise of water in said casing, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HUGO R. KUERSTEN.

Witnesses:

RUDOLPH WM. LOTZ,  
ERWIN J. LOTZ.