(No Model.)

H. STANTON.

CENTRIFUGAL SEPARATOR.

No. 454,408. Patented June 16, 1891.

Fig. 1.

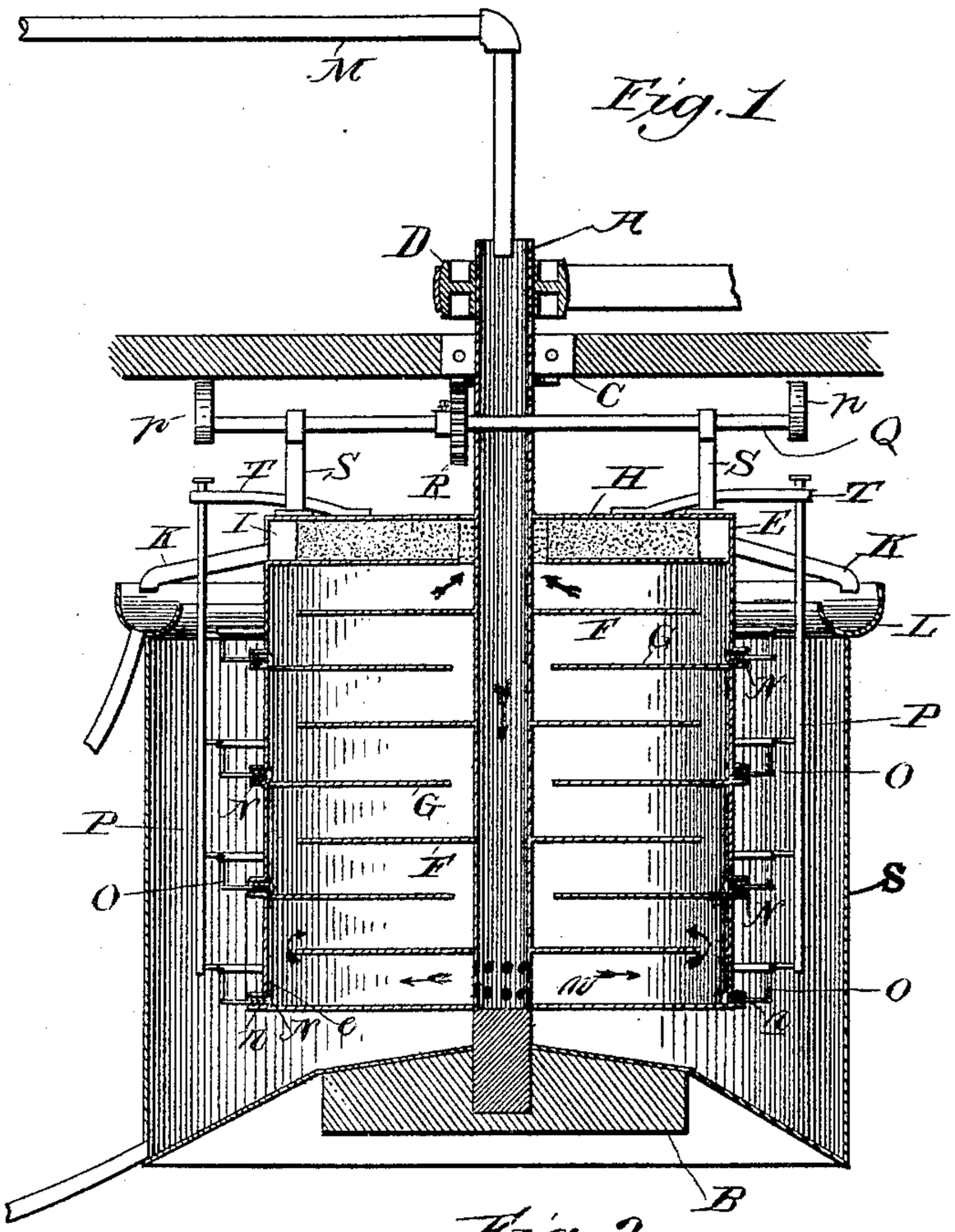
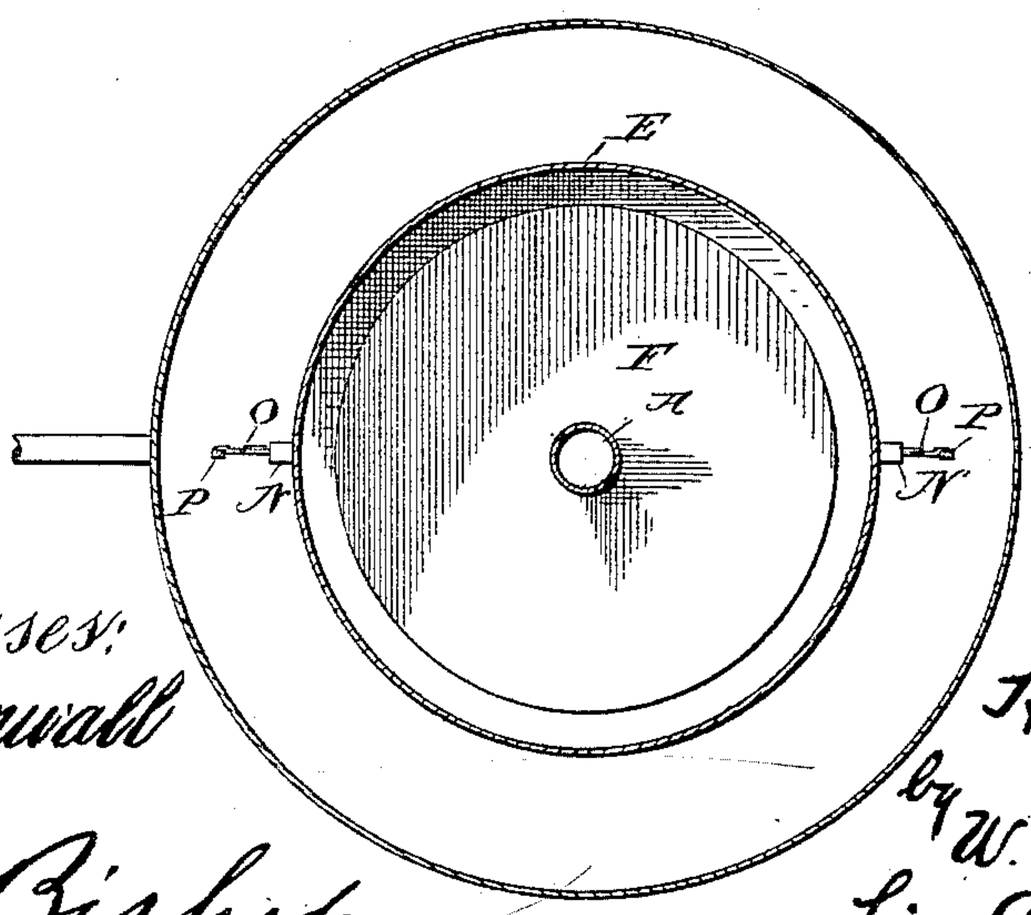


Fig. 2.



Witnesses:
P. W. Cornwall
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UNITED STATES PATENT OFFICE.

HENRY STANTON, OF FLUSHING, ASSIGNOR OF ONE-HALF TO ELLIS J. HOYLE, OF MARTIN'S FERRY, OHIO.

CENTRIFUGAL SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 454,408, dated June 16, 1891.

Application filed May 28, 1890. Serial No. 353,471. (No model.)

To all whom it may concern:

Be it known that I, HENRY STANTON, a citizen of the United States, residing at Flushing, in the county of Belmont, State of Ohio, have invented certain new and useful Improvements in Centrifugal Separators, of which the following is a full, concise, and clear specification.

My invention is in the nature of a centrifugal liquid filter, separator, and purifier; and it consists in the improved construction, arrangement, and combination of parts hereinafter fully described, and afterward specifically pointed out in the appended claims.

In the drawings, Figure 1 is a vertical sectional view through my complete apparatus. Fig. 2 is a similar view on a plane at right angles to that on which Fig. 1 is taken.

Like letters of reference mark the same parts in both the figures of the drawings.

Referring to the drawings by letters of reference, A is a vertical hollow shaft stepped at its lower end in a bearing B, journaled in a bearing C near its upper end, and having a band-pulley D, by which it is rotated from a suitable drive-wheel at a very high velocity. Around the shaft A is secured an upright cylinder E, having within it two series of shelves or partitions F and G, the series F extending from the shaft to near the circumference or outer shell *e* of the cylinder and the other series G alternating with the series F and extending from the outer shell *e* to near the center. In the top of the cylinder is a filter H, surrounded by a chamber I, having spouts K leading therefrom to a circular trough L, surrounding the cylinder. A water-supply pipe M leads into the upper end of the hollow shaft, and near the bottom of the shaft are perforations *m* to permit the passage of the water into the cylinder.

N N are valves opening inward and held normally closed by springs *n n*, and may be opened by pressure downward upon the elbow-levers O, connected in series to upright bars P.

Q is a cross-shaft passing through shaft A, provided near each end with a cam or tappet *p* and near the center with a gear tappet-wheel R. This shaft is supported by bearings at the top of rods S, rising from the top of the cylinder and secured to rods T, project outward from the top of the cylinder, and serve as supports in which the bars P move.

Under the bearing C, in the track of the revolution of the wheel R around shaft A, is a tooth, which, when the wheel comes in contact with it, rotates that wheel the width of one tooth. This happens once in each revolution of the machine, so that the machine must revolve as many times as there are teeth in the wheel R to cause one revolution of the cross-shaft Q, and thus cause the rods P to be pressed down to open the valves.

The operation of the machine is as follows: The water passes into the central shaft at its upper end, escaping through the openings at the lower end of said shaft and taking the course shown by the arrows, entering the filtering-basket H at the center, the liquid as well as any solid material—such as sand—being thrown toward the periphery, where the liquid is discharged after the manner of separating the sirup from the crystallized sugar in a centrifugal sugar-separator. The liquid will pass from the chamber and from thence to the circular trough L, through spouts K, and from said trough it is conveyed by a suitable pipe to a storage-receptacle. It is evident that the circulation of the liquid over the above course is maintained by the head of the liquid in the hollow shaft A, as well as by centrifugal force, the top of the pipe A being above the upper end of the cylinder. All heavy matter—such as sand, dirt, &c.—will be thrown outward by centrifugal force and will accumulate against the inner wall of the cylinder between the series of shelves G in front of the valves. When the cross-shaft Q has made a complete rotation, as before described, the tappets *p* will push the bars P downward, opening all the valves simultaneously and permitting the escape of the sediment. As soon as the tappets pass the bars P the valves will be automatically closed by their springs and the bars P raised. These springs may be set partially open, so as to allow a small portion of liquid with the mud or sand to escape continuously. The shelves F and G serve to form a tortuous passage through the cylinder, so that the separation of the solid from the liquid portions of the material to be filtered will be effected gradually, the heavier matters being separated at

the bottom of the cylinder, while matter of less specific gravity, according to its gravity, is separated successively between each series of shelves until the liquid enters the filtering-basket A.

I do not limit myself to a cylinder, as there could be used a square box with valves at the corners, or, if desired, the box could be made hexagonal, octagonal, or having any desired regular polygonal shape in section, and in any case it will be inclosed in a suitable casing, as at S, to receive the liquid and impurities thrown through the valves.

I have described the machine as vertical; but I desire it to be known that it may be horizontal and work just as well.

My device is specially useful in cleaning freshly-pumped petroleum of the sand which is always pumped up with it, and for separating all sorts of heavy impurities from all kinds of liquids.

Having thus fully described my invention, what I claim herein as new is as follows:

1. In combination, the hollow perforated rotating shaft, the cylinder having the series of shelves F and G, the filter, the annular chamber around it, and the annular trough, the top of the said cylinder being below the top of the said shaft, as set forth.

2. In combination, the hollow perforated rotating shaft, the cylinder, the inward-opening valves in the outer shell thereof, the bars P, connecting the valves, and devices operated by the rotating shaft to periodically open said valves, as set forth.

3. In combination, the rotating shaft and cylinder, the valves, the bar P, the shaft Q, carrying tappets and gear-wheel, and the tooth engaging said gear-wheel at each revolution of the cylinder, as set forth.

4. In combination, the hollow perforated rotating shaft, the cylinder, the top thereof being below the top of the said shaft, the shelves F and G, the valves, the bar P, cross-shaft Q, with its tappets and gear-wheel, and the stationary tooth engaging such gear-wheel, as set forth.

5. The herein-described filter and centrifugal purifier, consisting of the hollow perforated shaft, the cylinder provided with shelves F and G and inward-opening normally-closed valves, the filter, the annular chamber around it, the annular trough, the bars P, connecting the valves in series, the cross-shaft having a gear-wheel and tappets to engage bars P, and the stationary tooth engaging said gear, the top of the said cylinder being below the top of the said hollow shaft, as set forth.

6. The combination, with a central hollow-apertured shaft having shelves thereon, of a cylinder carried by the said shaft, the top of the said cylinder being below the top of the said shaft, the said cylinder having shelves carried by its sides, and valves in the said sides on a level with the shelves thereon, the said shelves on the cylinder alternating with the shelves on the hollow shaft, as described.

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

HENRY STANTON.

Witnesses:
EZRA M'CONNELL,
A. E. WALKER.