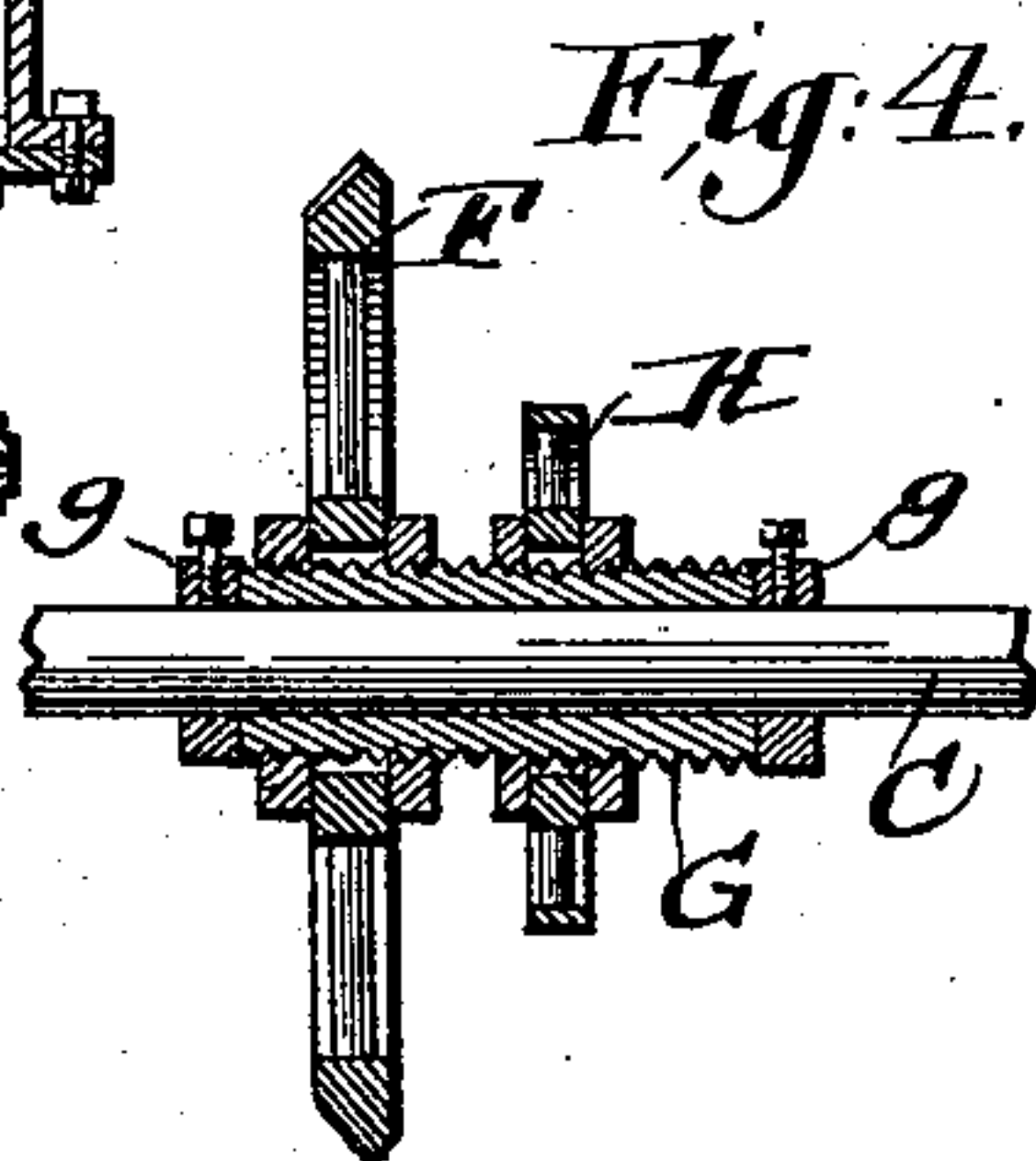
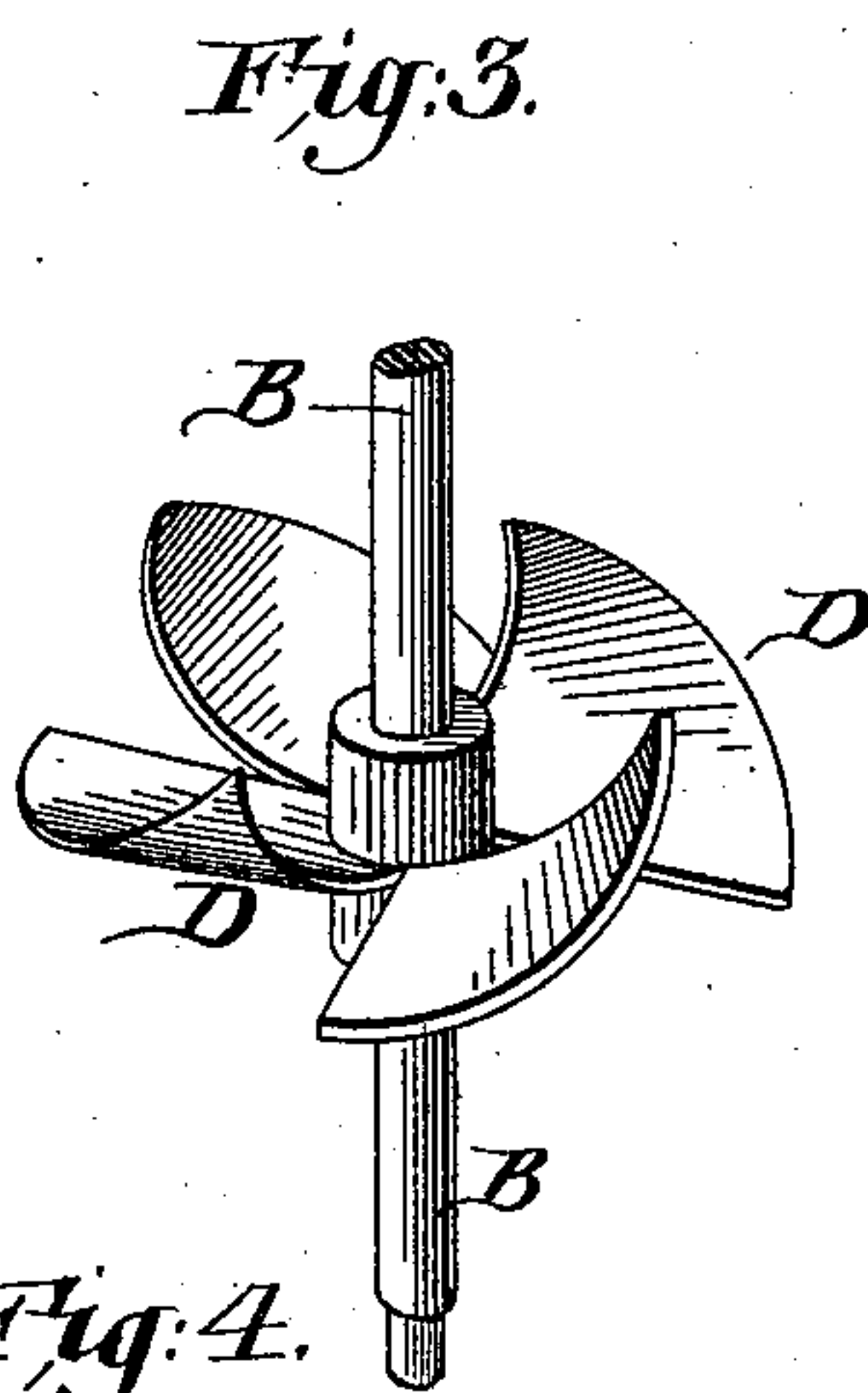
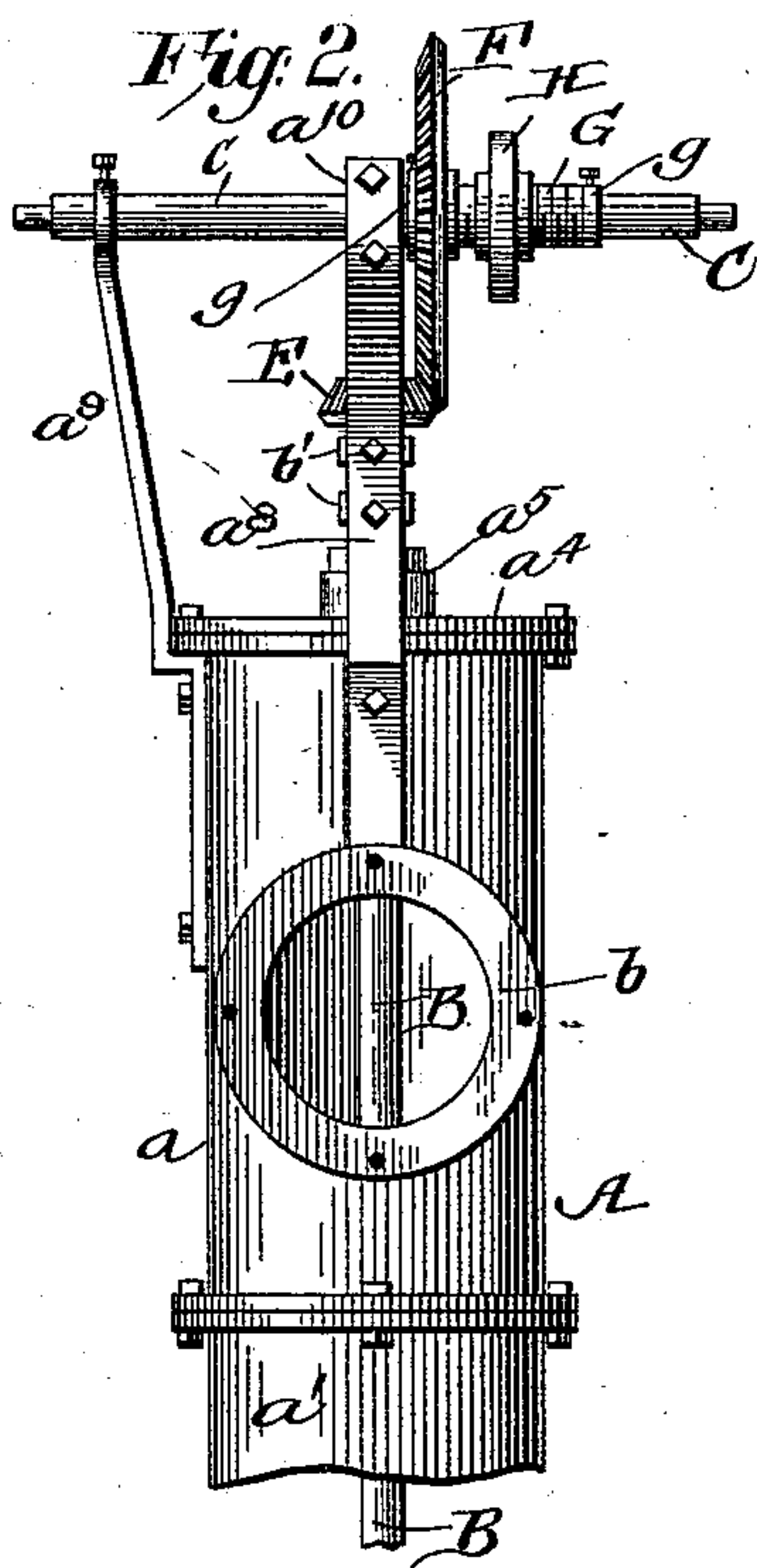
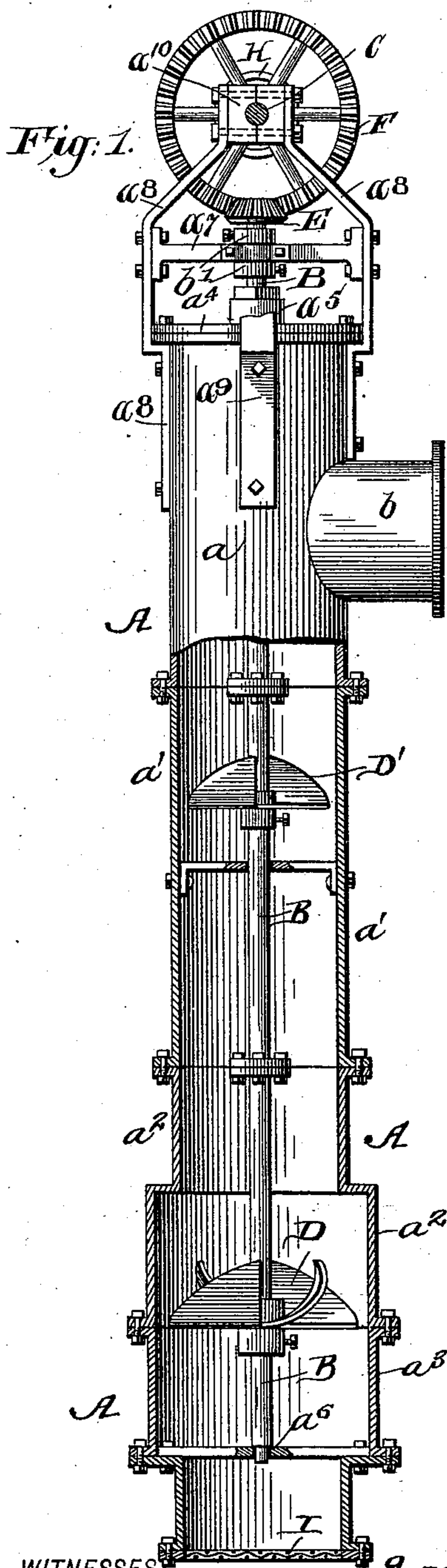


(No Model.)

H. W. & W. W. SMITH.
SUBAQUEOUS MINING MACHINE.

No. 549,830.

Patented Nov. 12, 1895.



WITNESSES.

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UNITED STATES PATENT OFFICE.

HENRY WRIGHT SMITH AND WILLIAM WALLACE SMITH, OF PORTLAND,
OREGON.

SUBAQUEOUS MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 549,830, dated November 12, 1895.

Application filed June 1, 1894. Serial No. 513,213. (No model.)

To all whom it may concern:

Be it known that we, HENRY WRIGHT SMITH and WILLIAM WALLACE SMITH, of Portland, in the county of Multnomah and State of Oregon, have invented a new and Improved Subaqueous Mining-Machine, of which the following is a specification.

Our invention is an improved machine for raising and thereby recovering gold and other valuable minerals from the beds of streams or other bodies of water. The machine acts upon the so-called "suction" principle, the gold or other valuable substances being dislodged and carried upward by a strong current of water through the machine, along with sand, gravel, or other heavy material with which it may be commingled. Such current is produced by a rotary wheel arranged in the tubular body of the machine.

The novel features are embodied in the details of construction, arrangement, and operation of certain parts, as hereinafter described with reference to accompanying drawings, in which—

Figure 1 is a partial side view and partial section of our machine. Fig. 2 is a side view at a right angle to Fig. 1 of the upper portion of the machine. Fig. 3 is a detail perspective. Fig. 4 is a detail section view.

The tubular body A of the machine is composed of several tubular sections a a' a^2 a^3 , which are provided with radial flanges and secured together by means of screw-bolts as shown. The lower portion a^3 is enlarged in diameter for a purpose hereinafter stated. The upper section a has a lateral tubular projection b , that serves as a discharge-spout. The top of said section a is closed by a head a^4 , having a central opening and provided with a stuffing-box a^5 .

A shaft B is arranged in the longitudinal center of the sectional tube A, and it is likewise constructed in detachable flanged sections, its joints coinciding in position or location with those of said tube, for a purpose hereinafter stated.

The shaft B is stepped in a cross-bar a^6 , secured to the lower shoulder of the bell-like enlargement of the tube A, and its upper end passes through the stuffing-box a^5 and is held in boxing secured to or forming part of a

cross-bar a^7 , whose ends are bolted to opposite angular bars a^8 , that are arranged vertically and constitute hangers or means for suspending the tube A from the horizontal shaft C. Removable collars b' are clamped on the vertical shaft immediately above and below the cross-bar a^7 to prevent longitudinal movement of the shaft B.

A four-blade wheel D is mounted on the lower portion of the shaft B within the bell-like enlargement, and one or more two-blade wheels D' are keyed on the shaft at higher points.

The construction and arrangement of the wheel D are particularly important to successful operation of our machine. Its several blades or flukes radiate from a hub clamped on the shaft. They are sector-shaped, and one side and corner of each is joined to the hub, and one of the other corners and sides is turned or curved regularly upward, as shown best in Fig. 3. By this construction the lower straight edges of the blades or flukes easily cut the water, and their opposite edges gradually turn and impel upward the body of water that at any moment rests on them. The diameter of the bell-like portion a^3 of the tube A is sufficiently larger than that of the wheel D to provide an annular space between them, through which small stones may pass without danger of injuring, binding, or clogging the wheel.

The shaft B is rotated by a gearing—that is to say, a bevel pinion or gear E is keyed on the upper end of the shaft B and meshes with a large gear F, supported on the horizontal shaft C. Said gear F is, however, keyed on a sleeve G, Fig. 2, that is held between clamping-collars g and is free to rotate on the shaft C. A band-pulley H is also secured on the same rotary sleeve G by means of collars, as shown.

In addition to the hangers a^8 for suspending the tube A and its attachments, we employ a brace a^9 , Fig. 2, which is also bolted to the upper section a . A two-part journal-box a^{10} is bolted between the upper ends of the hangers a^8 . The ends of the suspending-shaft C are constructed to form journals that fit in bearings in supports forming part of a rigid framework. Not shown.

A wire-screen cap I, Fig. 1, is secured to the lower end of the tube A to prevent entrance of anything too large to safely pass the fluked wheel D.

5 Any suitable motor will be employed and duly connected with the machine by a belt running on the pulley H. Thus rotation will be imparted to the shaft B and fluke-wheels D D', and the lower end of the tube A being
10 properly directed or located, an upward current of water and commingled sand, gravel, and other materials created and caused to discharge from spout b. The tube A, hanging from the shaft C, may be swung freely in
15 two opposite directions to adapt it to be suitably placed for most effective operation at different points on the bed of the stream. It may also be obviously extended to any desired or practicable length by attaching addi-
20 tional sections. The shaft B is likewise extensible in the same manner. The lower end of the bell-like enlargement, with the attached step a⁶, may be detached to allow access to the fluke-wheel D when required for
25 repair or other purpose. The wheel may be removed downward when such lower end or section of the tube is detached, since the step-bar a⁶ is then removed.

A flexible hose will in practice be attached
30 to the lower end of the tube A, when required, to enable the machine to work more successfully on a rough surface, among rocks, stones, &c. A hose may also be attached to the spout b to carry the water and the solid
35 material contained therein to a farther point where it is desired to discharge them.

The water raised by the machine may be utilized for sluicing or other purpose.

What we claim is—

1. The tube composed of a series of detach- 40
able sections, the lower one being provided with an interior, annular shoulder, a cross bar, a⁶, secured detachably on said shoulder, a shaft stepped in said cross bar and made in detachable sections having connections or 45
joints which are located directly opposite the joints of the tube sections, and one or more removable fluke wheels, keyed on the shaft, as shown and described.

2. The combination, with the vertical shaft, 50
and a fluke wheel which is removably attached to it, of a tube inclosing said shaft and having its lower section removable and provided with a step cross bar which is attached to and removable with such section, 55
as shown and described.

3. In a machine of the character described, the combination, with the vertical shaft carrying the fluke wheel, of the horizontal shaft 60
suspending the other parts of the machine, the threaded sleeve secured on said horizontal shaft, a gear and pulley mounted on the sleeve, and screw collars for clamping them adjustably in place, as shown and described.

In testimony whereof we have hereunto set 65
our names in the presence of two subscribing witnesses.

HENRY WRIGHT SMITH.

WILLIAM WALLACE SMITH.

Witnesses:

H. H. PARKER,

ALBERT E. GEBHARDT.