(No Model.)

4 Sheets—Sheet 1.

O. B. PECK.

CENTRIFUGAL SEPARATOR.

No. 560,637. Patented May 19, 1896.

Fig. 1.

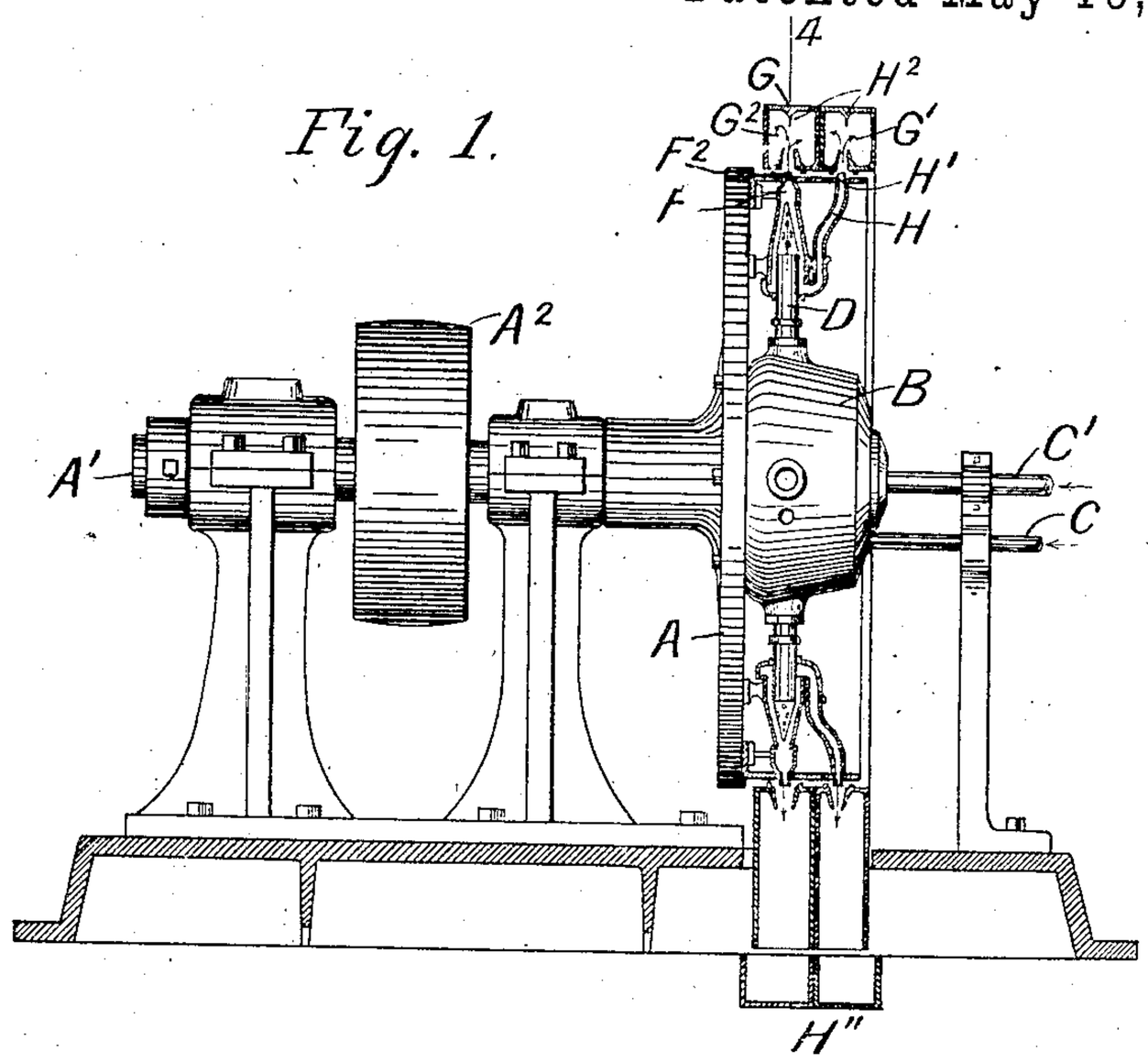
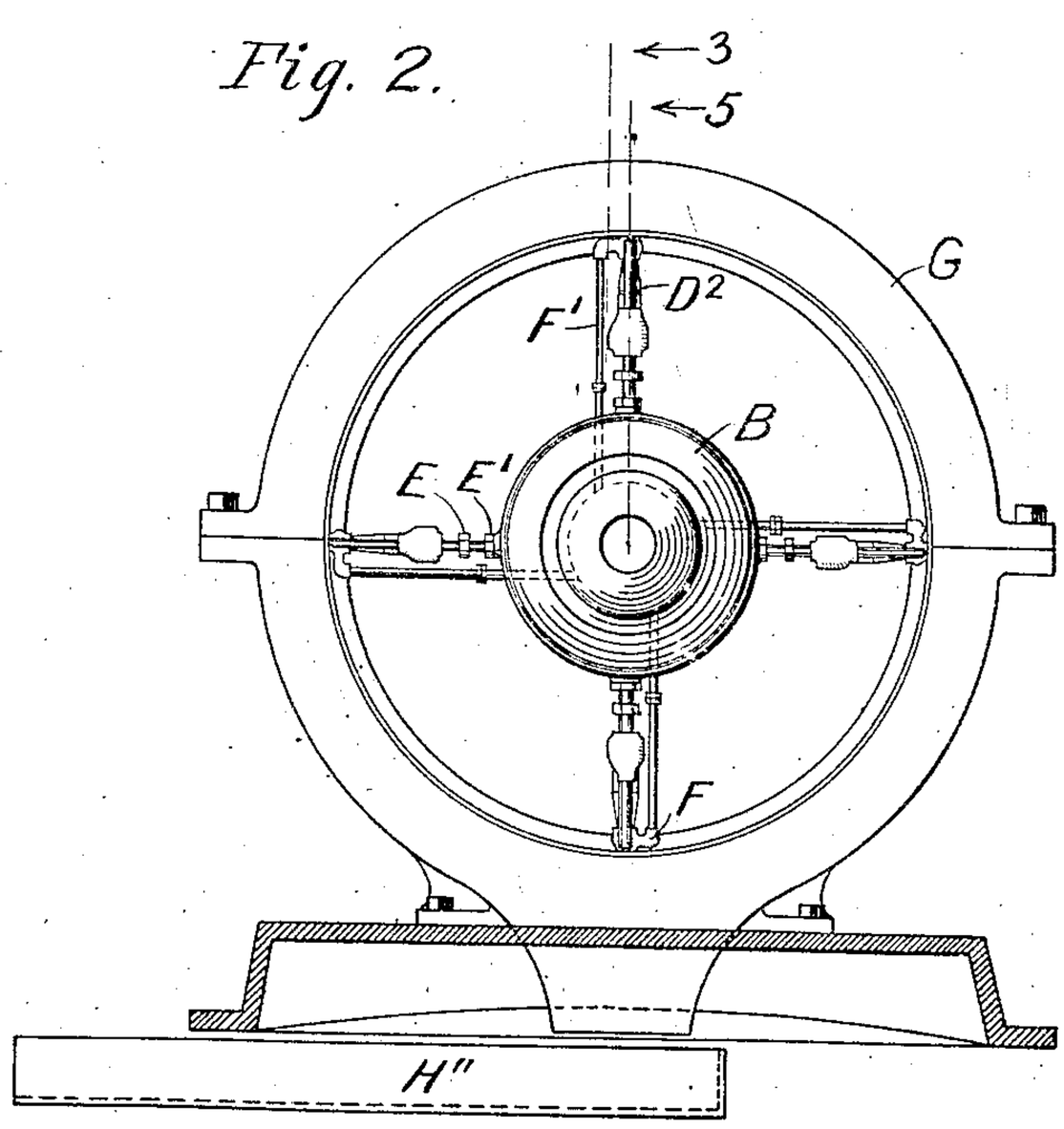


Fig. 2.



Witnesses;
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John B. Warren Jr.

Inventor;
Orrin B. Peck.

(No Model.) 4 Sheets—Sheet 2.

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CENTRIFUGAL SEPARATOR.

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Fig. 5.

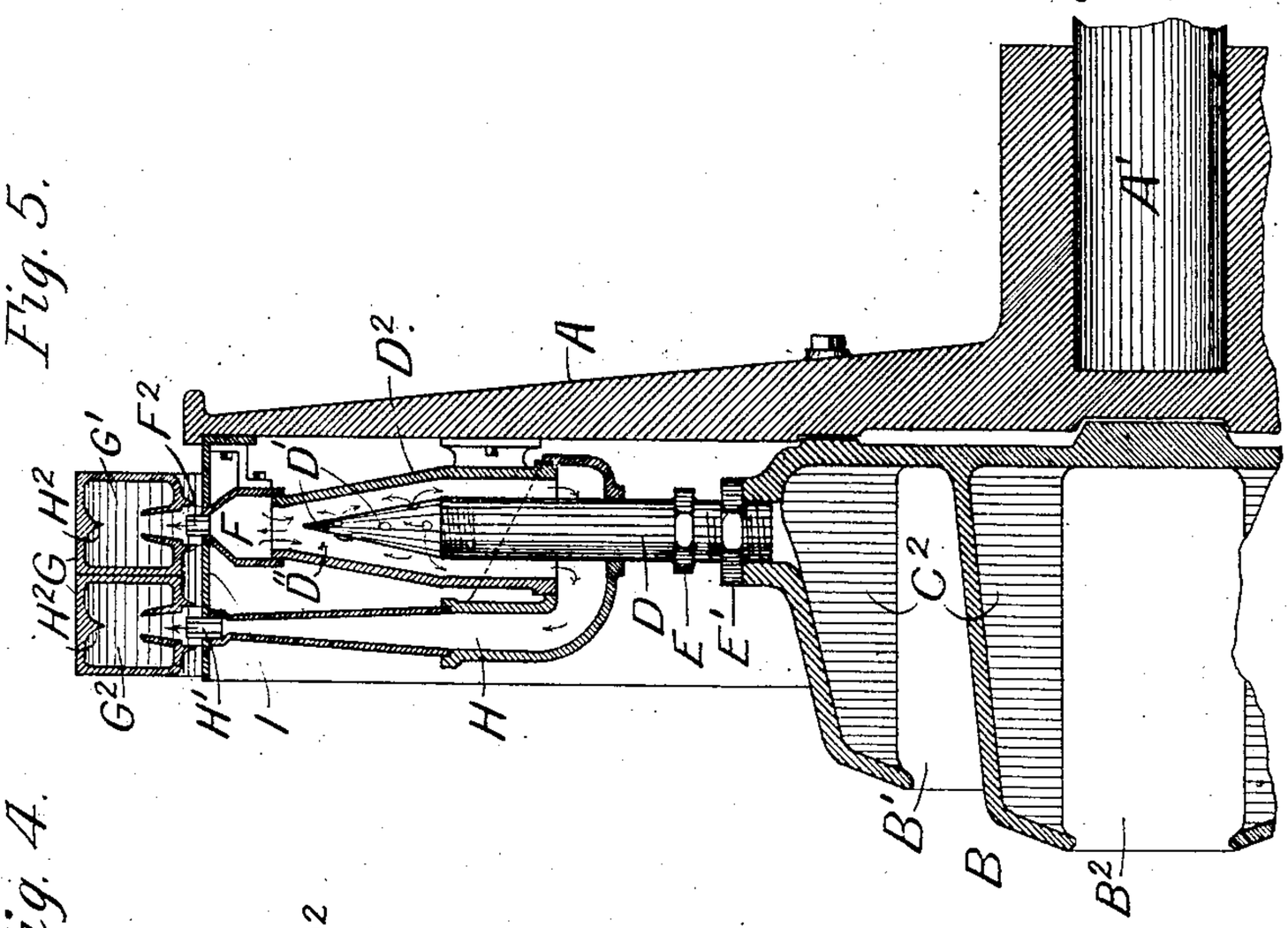


Fig. 4.

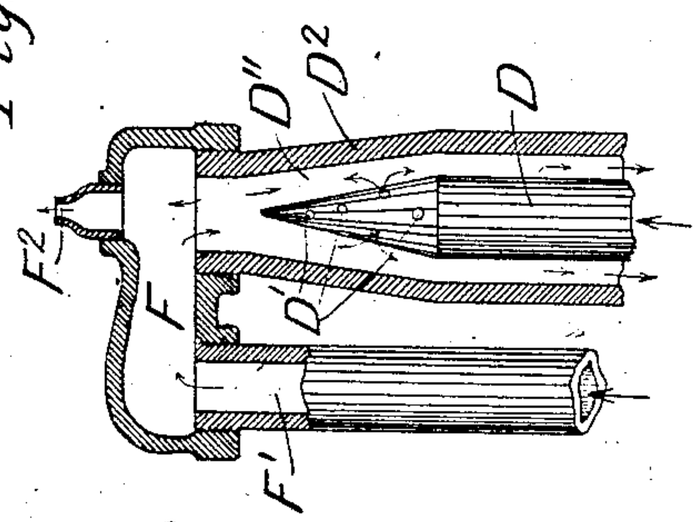
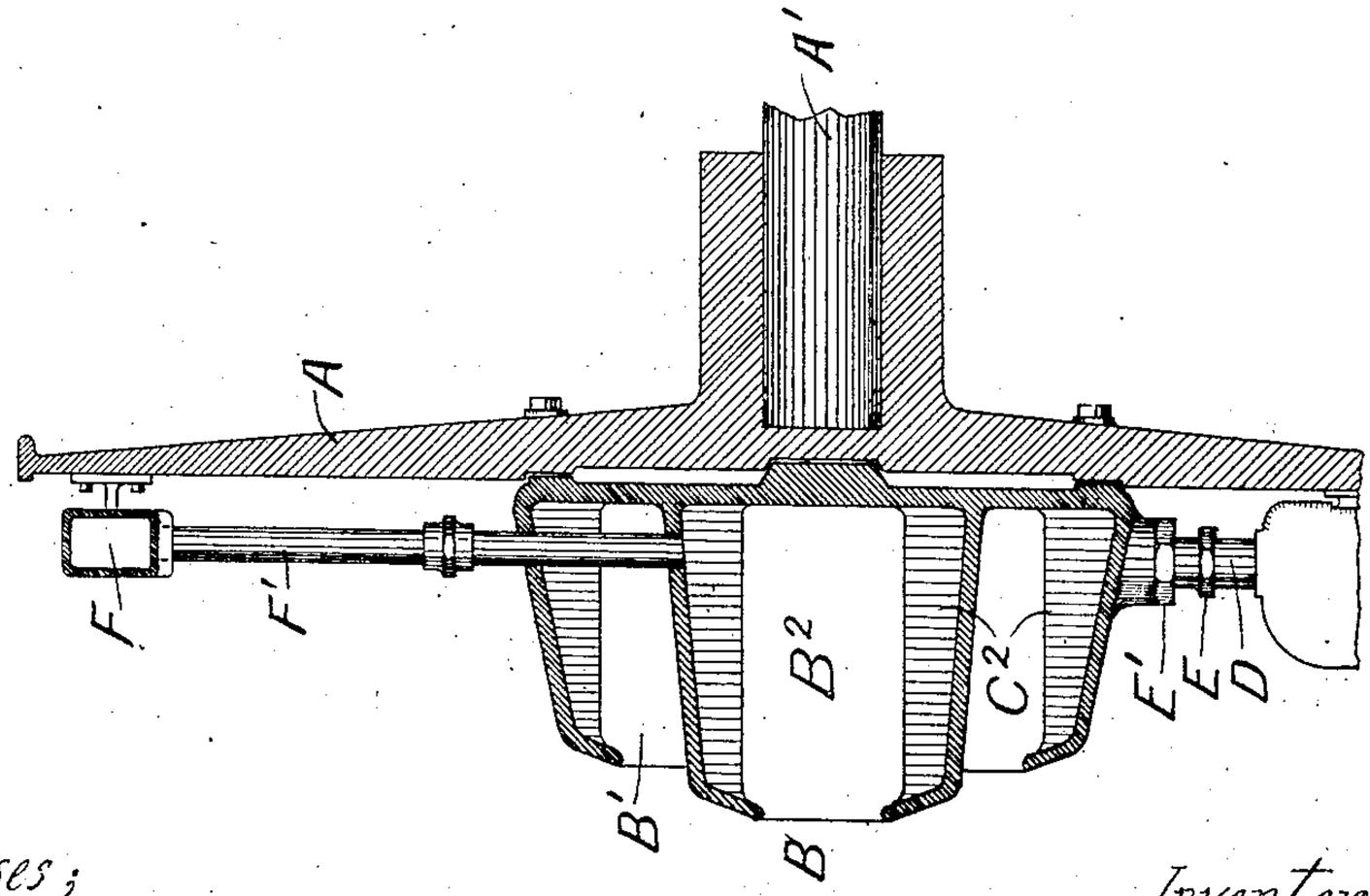


Fig. 3.



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(No Model.) 4 Sheets—Sheet 3.

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No. 560,637. Patented May 19, 1896.

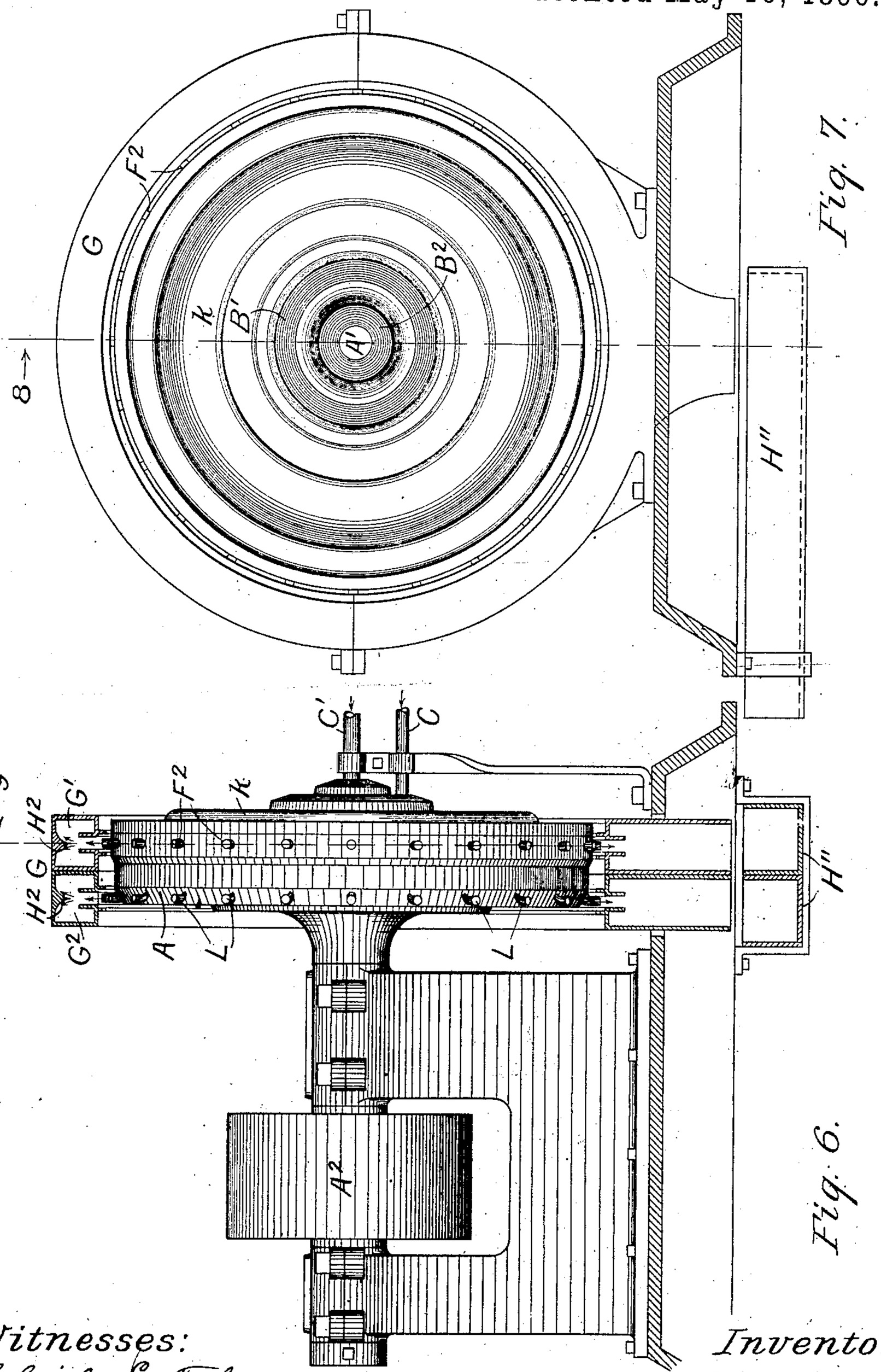

Fig. 7.

Fig. 6.

Witnesses:
Charles E. Tetley
S. H. Whitaker

Inventor:
Orrin B. Peck

(No Model.) 4 Sheets—Sheet 4.

O. B. PECK.

CENTRIFUGAL SEPARATOR.

No. 560,637. Patented May 19, 1896.

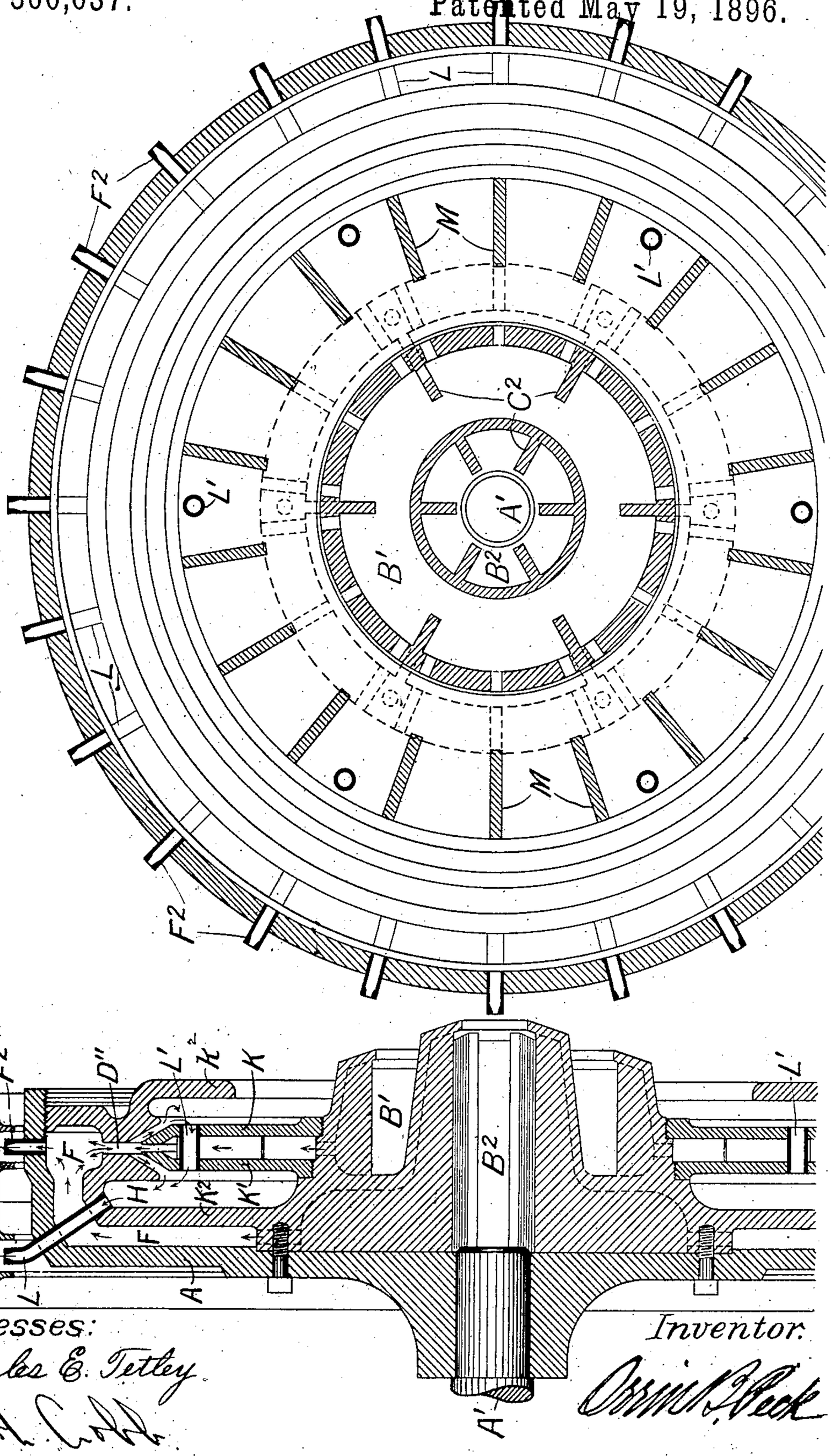

Fig. 9.

Fig. 8.

Witnesses:
Charles E. Tetley
S. H. Church

Inventor.
Orrin B. Peck

UNITED STATES PATENT OFFICE.

ORRIN B. PECK, OF CHICAGO, ILLINOIS.

CENTRIFUGAL SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 560,637, dated May 19, 1896.

Application filed September 12, 1895. Serial No. 562,331. (No model.)

To all whom it may concern:

Be it known that I, ORRIN B. PECK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Centrifugal Separators, of which the following is a specification.

My invention relates more particularly to improvements in separators for ore; and it consists in the various details of construction hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation, parts being in section, of my improved separator. Fig. 2 is an end elevation thereof, looking from the right. Fig. 3 is a partial longitudinal section on the line 3 of Fig. 2. Fig. 4 is a sectional detail, somewhat enlarged, on the line 4 of Fig. 1. Fig. 5 is an enlarged partial longitudinal section on the line 5 of Fig. 2. Fig. 6 is a side elevation of a modification of my improved machine. Fig. 7 is an end elevation thereof, looking from the right. Fig. 8 is an enlarged partial longitudinal section on the line 8 of Fig. 7, and Fig. 9 is an enlarged partial transverse section on the line 9 of Fig. 6. All sections are taken in the direction indicated by the arrows.

Like letters refer to like parts throughout the several views of the drawings.

A designates a disk or wheel mounted on one end of a shaft A′, suitably journaled in standards and rotated at the desired speed by a pulley A^2, belted to any source of power. At the center of the disk A is bolted a substantially cylindrical receptacle B, divided into two concentric annular sections B′ B^2. Into the former extends a pipe C, through which is fed ore or other material, preferably mingled with a suitable amount of water, and into the latter a pipe C′, supplying clear water. Within the sections are a number of radial wings or webs C^2, which compel the rotation with the receptacle of the body of material and liquid contained therein. From the section B′ lead pipes D, forming passages for the material. These pipes are tapered at their outer ends and pierced with orifices D′, through which said material passes. About the pipes are shells or casings D^2, forming with the pipes channels or passages D″. These shells are supported on brackets bolted to the disk A. The form of that portion which encircles the ends of the pipes D corresponds nearly to them in form, but is of somewhat less abrupt inclination at the tapered portion, thus gradually widening the channels. The ends of the pipes D are made adjustable toward and from the shells D^2 to permit a variation in the width of the channels by providing the ends entering the wall of the receptacle B with threads and placing on the pipes angular portions E, which may be engaged by a wrench to effect their movement. When the orifices D′ become worn by the passage of material, these pipes may be removed and new ones substituted. Lock-nuts E′ secure the pipes in place.

The channels D″ terminate in chambers F, formed by casings *f*, into which also lead pipes or passages F′, communicating with the section B^2. Opposite the end of the channel D″ in the outer wall of the chamber F are discharge-orifices F^2, which deliver heavier material through an annular opening in a section G′ of an encircling hood or annular trough G. From the lower end of the shells D^2 lead pipes or passages H, forming a continuation of the passages D″, surrounding the material-pipe and terminating in discharge-orifices H′ for lighter material in another transverse plane from that in which lie discharge-orifices F^2 and delivering to section G^2 of the hood G. On the outer walls of the sections opposite the discharge-orifices are pointed annular ribs H^2, which serve to deflect the discharge to each side thereof, preventing the caking or accumulating of material on the walls from which it would drop back from above upon the separator. A horizontal double trough H″ beneath the hood G receives heavier and lighter substances and conducts them away separately to desired points.

A ring I, secured near the outside of the disk A, assists in supporting the chamber F and pipe H. The joints between various passages and chambers are made practically water-tight to prevent leakage.

In operation the disk A and parts supported thereby are rotated at a speed sufficient to develop the desired degree of centrifugal force. The ore or other material to be separated in a finely-divided state and mingled with a suitable quantity of water is fed by the pipe C into the section B′, from which it passes

outward, urged by the centrifugal force developed by its rotation through the pipes D and is delivered by the orifices D′ into the separating-channels D″. At the same time clear water enters the section B^2 through pipes C′ and is forced through pipes F′ into the chambers F, which direct it into the channels D″, where it meets the material flowing in the opposite direction. The area of the passages or channels is so proportioned and may be further adjusted by the movement of the pipes D, and the quantities of material and liquid fed so arranged that there will be a resultant current inward through the channel of sufficient strength to carry with it lighter substances against the action of centrifugal force, which flowing back into the pipes H will be discharged thereby into the section G^2 of the hood and conducted away. The heavier and valuable substances will have sufficient impulse imparted to them by the centrifugal force to carry them through the inflowing water filling the channel and chamber toward the orifices F^2, by which they are discharged with some water into section G′ of the hood and conveyed to a suitable receptacle.

The area of the various portions of the channel in which separation occurs is so proportioned that there shall be in all parts an approximately equal resultant velocity of flow of the ore and water entering through orifices D′ and from the chamber F, so that its impulse may be great enough to carry back into the pipes H all substances below a certain specific gravity and permit those above it to be forced through the flowing liquid into the discharge-orifices F^2.

The modification illustrated in Figs. 6 to 9 is in the main similar in construction and operation to that already described, but instead of separated pipes and casings the passages and chambers are continuous and are formed between disks or plates *k* K K′ K^2. The disks K K′ form between them the material-feeding passage D, while the water-feeding passage F′ is between disk K^2 and the supporting-disk A, and H, which receives the lighter substances, is between K′ and K^2. The separating-channel D″ is between the inwardly-turned peripheries of disks K^2 K′ and inclined surfaces on K K′. Transverse wings M, placed at intervals about the annular passage D, compel the rotation of the material at the same speed as the disks in a manner similar to the wings C^2 in the receptacles B′ B^2. Separate pipes L lead through the liquid-feeding passage, conveying the lighter substances. Short tubes L′ lead from disk K through the material-feeding passage and disk K′ and permit the lighter substances passing into the channel to the right of the disk K to enter the discharge-passage.

The outer edge of the disk *k* is threaded and engages a thread on the interior of the bent outer portion of disk A. This enables *k* to be moved slightly to the right or left, thus permitting the width of the separating-channel to be adjusted.

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

1. In a centrifugal separator, the combination of a rotatable receptacle, passages through which material is forced, means for effecting separation of lighter and heavier substances by forcing a current of liquid against the flow of material, a channel or passage in which separation occurs, one of the walls of which is provided with a screw-thread engaging a thread upon its support to permit adjustment to vary the width of such separating-channel, substantially as described.

2. In a centrifugal separator, the combination of a rotatable receptacle, a passage leading therefrom having a tapering end through which material is fed, and a tapering shell or casing surrounding the same and forming therewith a channel or passage gradually increasing in width as it extends outward, substantially as described.

3. In a centrifugal separator, the combination of a rotatable receptacle, a passage leading therefrom having a tapering end through which material is fed, and a tapering shell or casing surrounding the same and having a different inclination, thus forming a separating-channel the varying width of which maintains the velocity of flow approximately constant throughout, substantially as described.

4. In a centrifugal separator, the combination of a rotatable receptacle, a passage leading therefrom having a tapering end through which material is fed, a tapering shell or casing surrounding the same and forming a channel or passage, one side of the channel being movable endwise to vary its width, substantially as described.

5. In a centrifugal separator, the combination of a rotatable receptacle, a separating channel or passage rotating therewith, and a pipe leading from the receptacle to the channel adjustable to vary the width of the latter, substantially as described.

6. In a centrifugal separator, the combination of a rotatable receptacle, a channel in which separation is effected extending outward from said receptacle, discharge-passages for heavier substances at one end thereof, and passages for discharging lighter substances from the opposite end continuous with the separating-channel and extending outward in a different plane, the openings of both passages being in proximity to a double receptacle, substantially as described.

ORRIN B. PECK.

Witnesses:
MARTHA W. RIDDELL,
RAYMOND H. GARMAN.

Correction in Letters Patent No. 560,637.

It is hereby certified that Letters Patent No. 560,637, granted May 19, 1896, upon the application of Orrin B. Peck, of Chicago, Illinois, for an improvement in "Centrifugal Separators," were erroneously issued to said Orrin B. Peck as sole owner of the invention; whereas said Letters Patent should have been issued to *The Patent Title Company, of same place*, said The Patent Title Company being assignee, by mesne assignments, of the entire interest in said invention, as shown by the assignments of record in this Office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 23d day of June, A. D. 1896.

[SEAL.]

JNO. M. REYNOLDS,
Assistant Secretary of the Interior.

Countersigned:

S. T. FISHER,
Acting Commissioner of Patents.