

(No Model.)

2 Sheets—Sheet 1.

W. S. PHELPS.
VALVE FOR STEAM ENGINES.

No. 401,853.

Patented Apr. 23, 1889.

Fig. 1

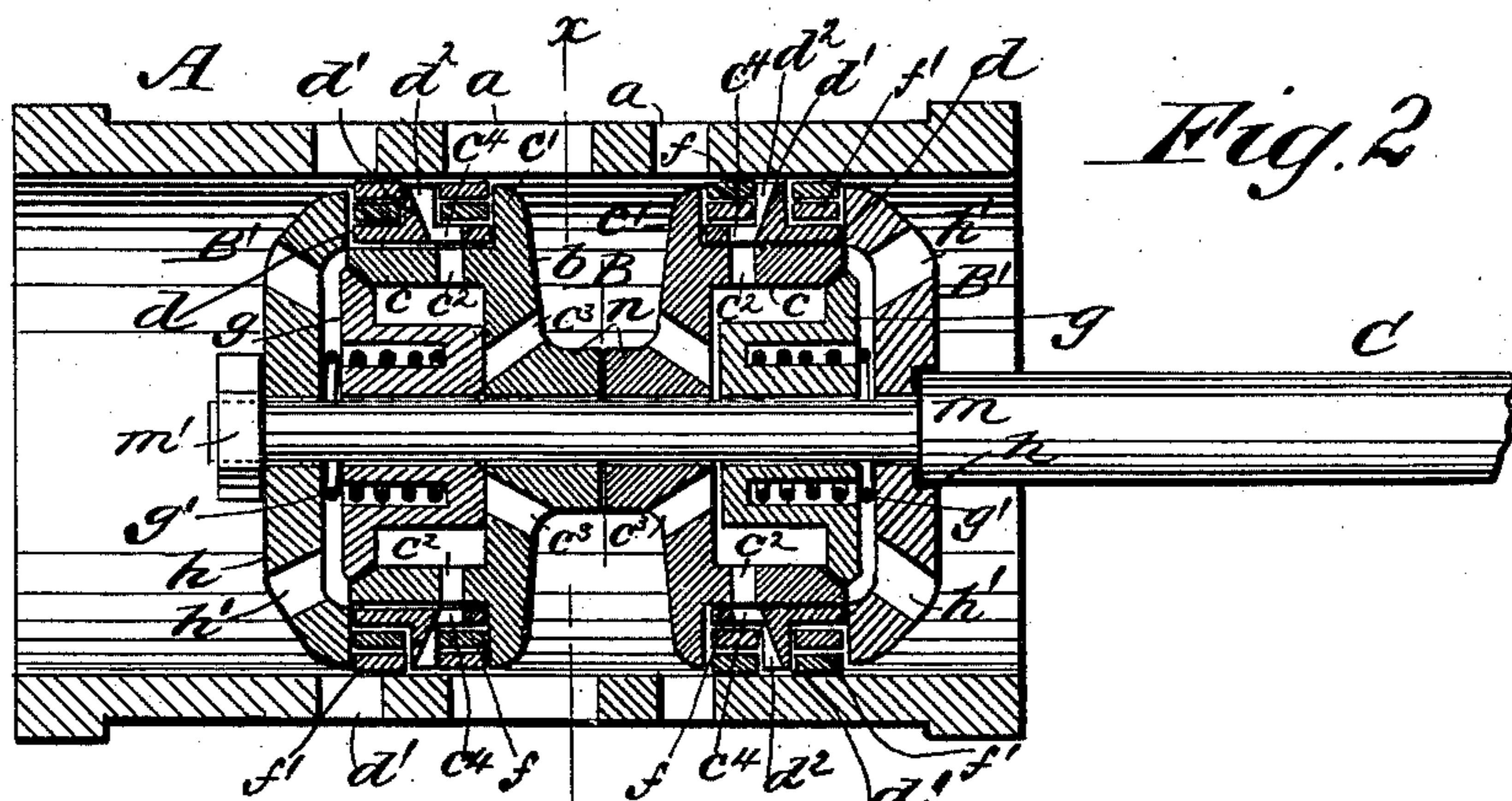
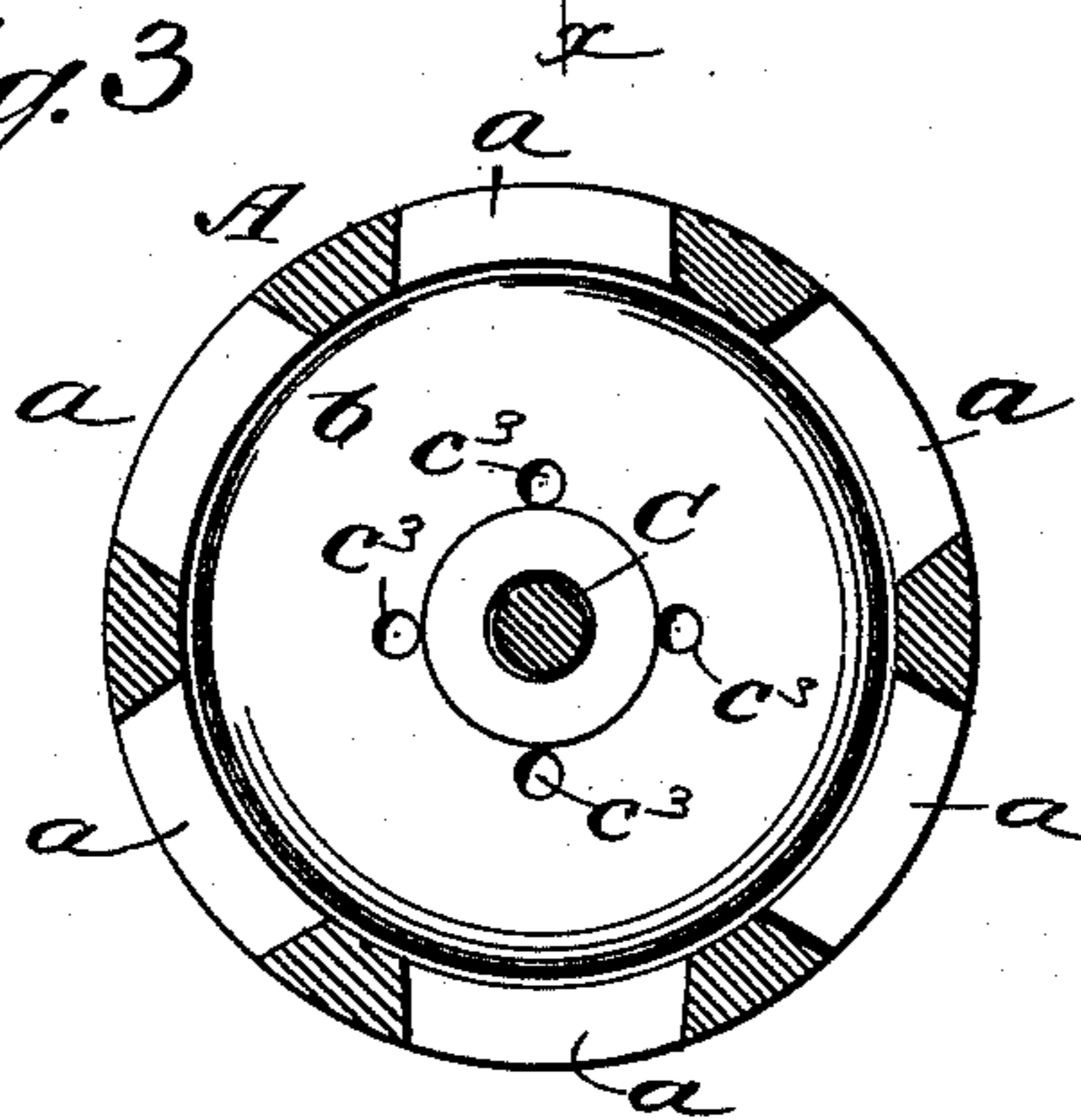


Fig. 3



WITNESSES:

F. McArdle.
C. Sedgwick

INVENTOR:

W. S. Phelps
BY Munn & Co

ATTORNEYS.

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2 Sheets—Sheet 2.

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Fig. 4

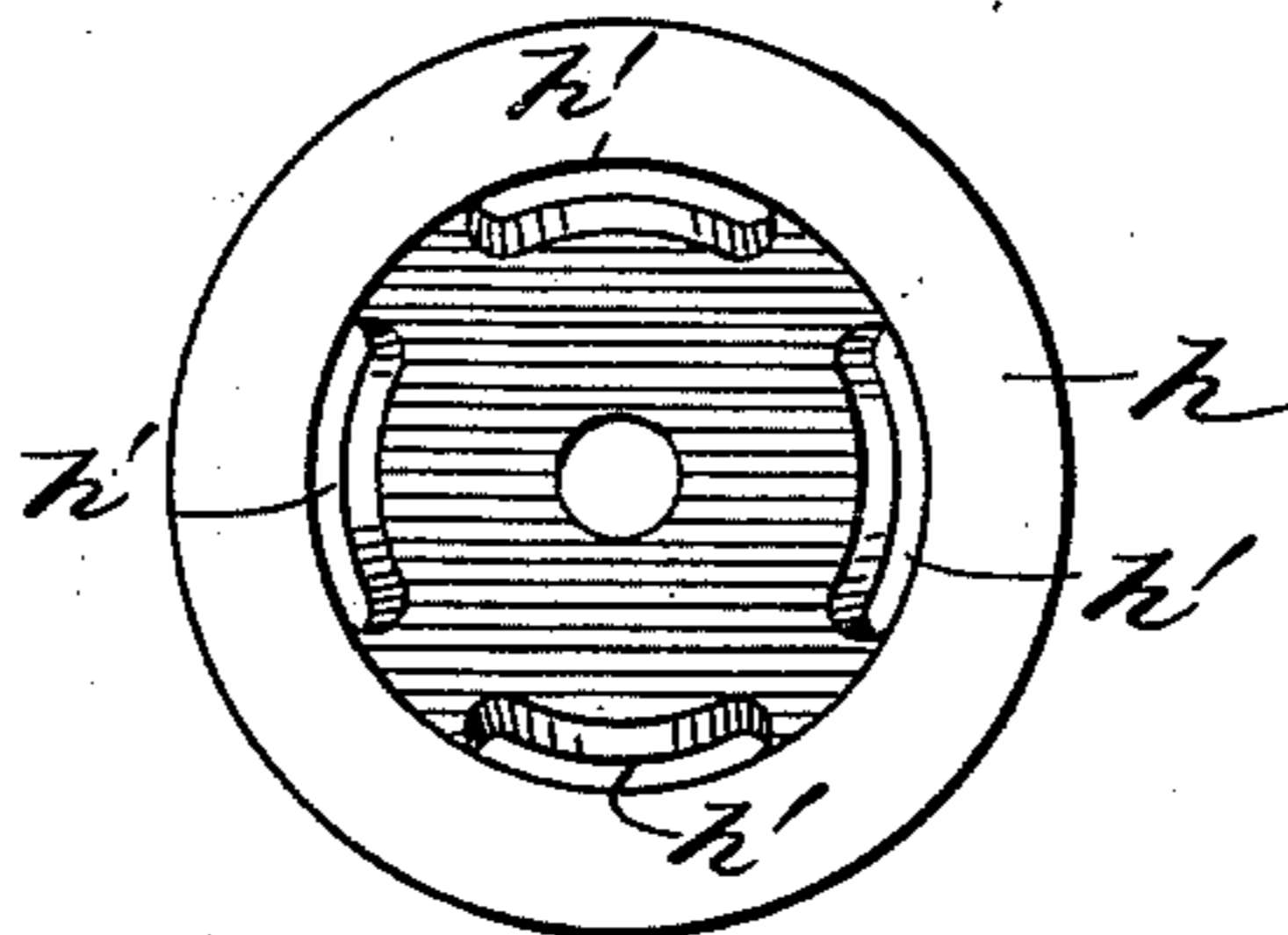


Fig. 5

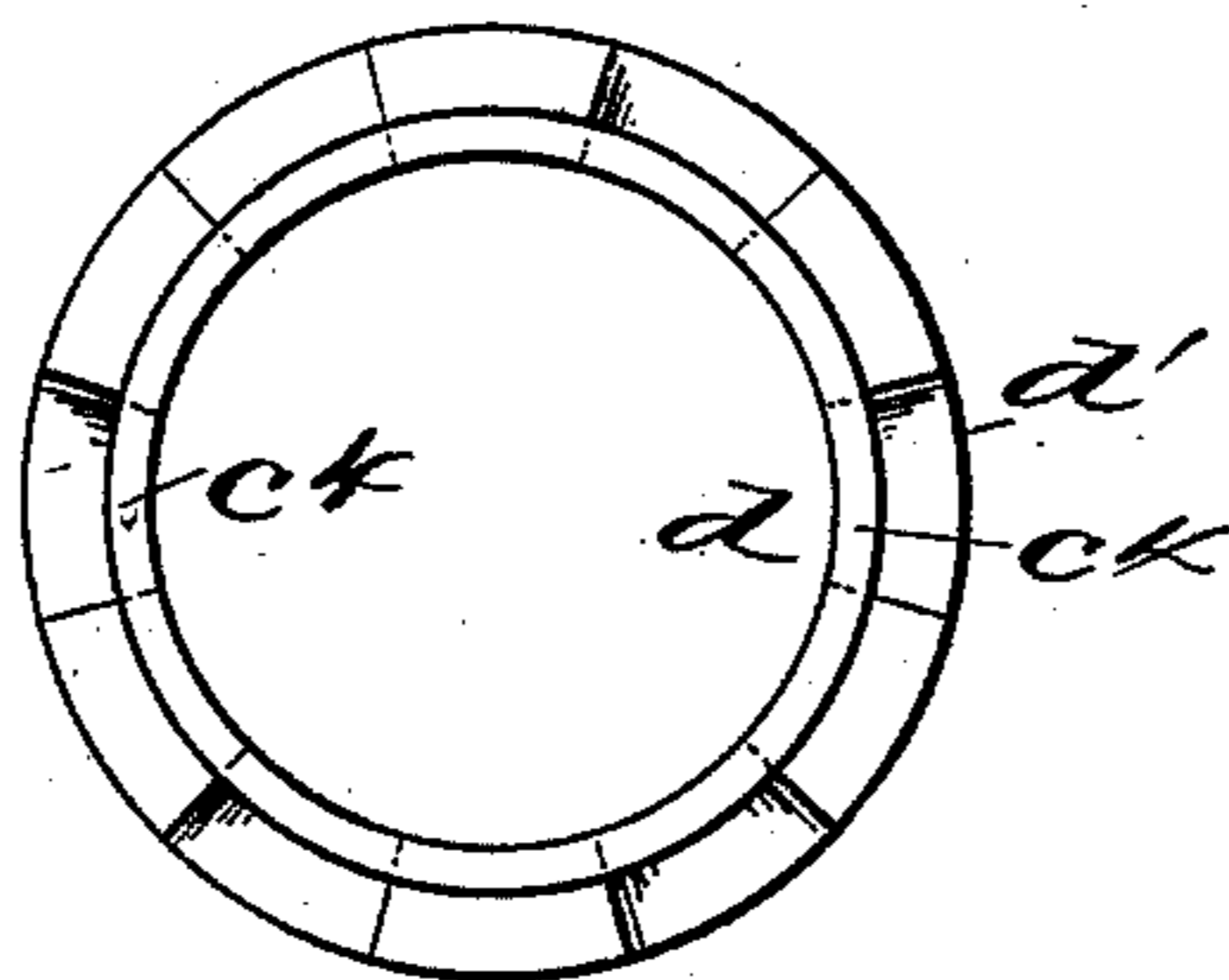


Fig. 6

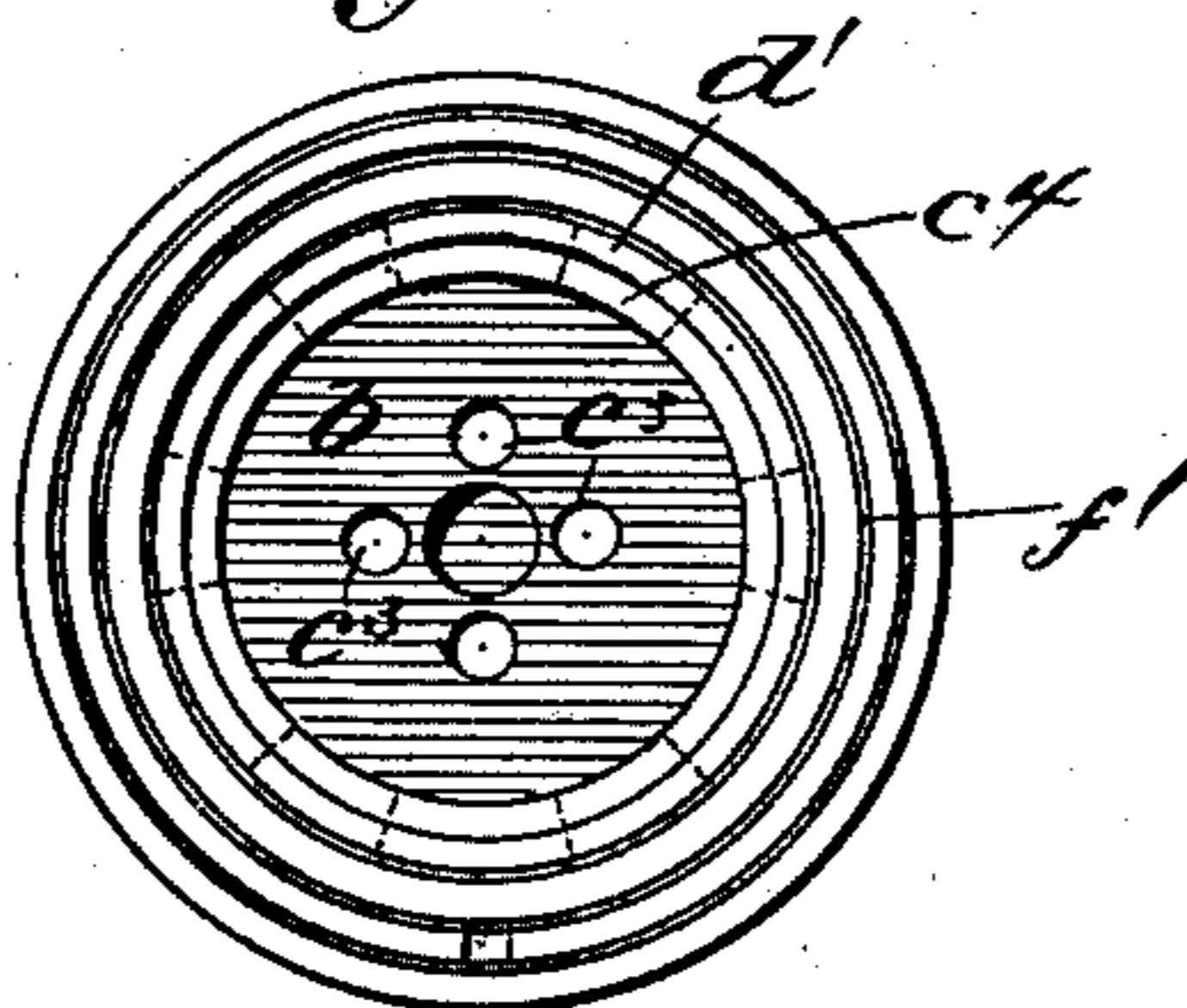
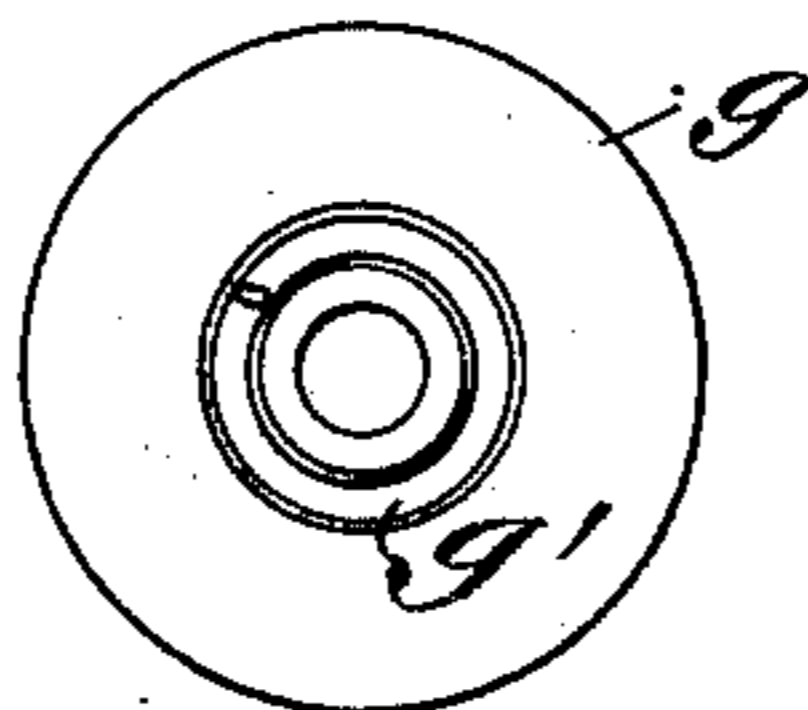


Fig. 7



WITNESSES:

F. Mc Ardle,
C. Sedgwick

INVENTOR:

W. S. Phelps,
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UNITED STATES PATENT OFFICE.

WALTER SCOTT PHELPS, OF ST. CATALINA, GUANTANAMO, CUBA.

VALVE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 401,853, dated April 23, 1889.

Application filed September 21, 1888. Serial No. 285,989. (No model.)

To all whom it may concern:

Be it known that I, WALTER SCOTT PHELPS, of St. Catalina, Guantanamo, Cuba, have invented a new and Improved Valve for Steam-Engines, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of my new and improved steam-valve and valve-casing. Fig. 2 is a longitudinal sectional elevation of the same. Fig. 3 is a transverse sectional elevation taken on the line $x x$ of Fig. 2. Fig. 4 is an end view of the valve without the casing. Fig. 5 is a front elevation of the center ring. Fig. 6 is an end view of one of the heads of the valve, and Fig. 7 is a front elevation of the compression and vacuum relief-valve having two seats.

The object of this invention is to avoid excessive compression in the steam-cylinder, and also to destroy the strong suction caused by vacuum created in the valve-chamber; and to this end my invention consists, principally, of a relief-valve held seated by a spring, but exposed at the opposite side to the pressure of the steam, so that in case of excessive compression, suction, or vacuum, the engine being in motion and steam shut off, the valve will lift, and steam or hot vapor and gases will enter and destroy compression and vacuum by way of the apertures under the valve leading to the exhaust, as well as opening directly into the steam-pipe through the piston-valve, thereby giving free openings from the steam-pipe direct to the atmosphere through the exhaust-pipes.

A represents the valve-casing, and B the valve attached to the rod C. The casing A is formed with numerous steam-ports, $a a$. The valve B is composed of two heads or pistons, $B' B'$. These are duplicates of each other, and are each formed of a circular plate, b , with the rim c parallel with the rod C and vertical flange c' . Through the rim c are formed the openings c^2 . Through the said plate b are formed the openings c^3 . Around the outer surface of the rim c is placed a ring, d , formed with a median circumferential flange, d' , and

in said rings are formed openings c^4 , to correspond with the openings c^3 in the rim c . The flange d' is recessed at intervals, as shown at d^2 . Upon the ring d each side of the circumferential flange d' are placed double packing-rings $f f'$. Within the rim c is fitted the relief-valve g , which is held to its two seats by a coiled spring, g' , held in contact with the valve by the large circular plate h on the rod C, and which holds the packing-rings and the ring d firmly against the flange c' of the body b . Through the plate h are formed the passages h' .

The two heads $B' B'$ are held on the shaft C by the shoulder m and nut m' , and the adjacent faces of the plates $b' b'$ are formed with bosses n , which space said plates one from the other, as shown in Fig. 2.

In case the piston when in operation causes a compression upon the relief-valve g with the vacuum or suction at either end of the valve, which exceeds the pressure of the spring g' , the valve g will lift and destroy all compression in the cylinders or vacuum in the pipes, whereupon the spring g' will reseal the valve until operated upon again from the same forces. In this manner excessive suction and compression is avoided, and a waste of steam is obviated.

The relief-valve g has two seats—one covering the holes c^3 , leading to the exhaust, the other (a seat upon its outer rim) covering the passage leading into the steam pipe and chest. The unseating of this valve will open all connecting passages through the piston-head, including passages c^2 , c^4 , and d^2 from the throttle to the escape-pipe or atmosphere simultaneously.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A piston-valve for steam-engines, having passages through it from end to end and formed with two valve-seats, in combination with a valve held to said two seats by a spring, substantially as and for the purposes set forth.

2. A piston-valve for steam-engines, having passages $c^3 h'$, in combination with the interposed valve g , held by spring g' , substantially as described.

3. A piston-valve for steam-engines, having

passages $c^3 h'$ and side passages, $c^2 c^4 d^2$, in combination with the valve g , held by spring g' , substantially as and for the purposes set forth.

- 5 4. The plate b , formed with flange c and rim c' , and formed with passages c^2 and c^3 , in combination with the ring d , packing-rings f , valve g , and spring g' , substantially as described.

5. In a valve, the ring d , formed with the passages c^4 , flange d' , and recesses d^2 , substantially as described.

WALTER SCOTT PHELPS.

Witnesses:

ANTONIO NAVARRO,
ERNESTO VILLASANA.