

(No Model.)

C. VOGEL.
VALVE FOR STEAM ENGINES.

No. 495,282.

Patented Apr. 11, 1893.

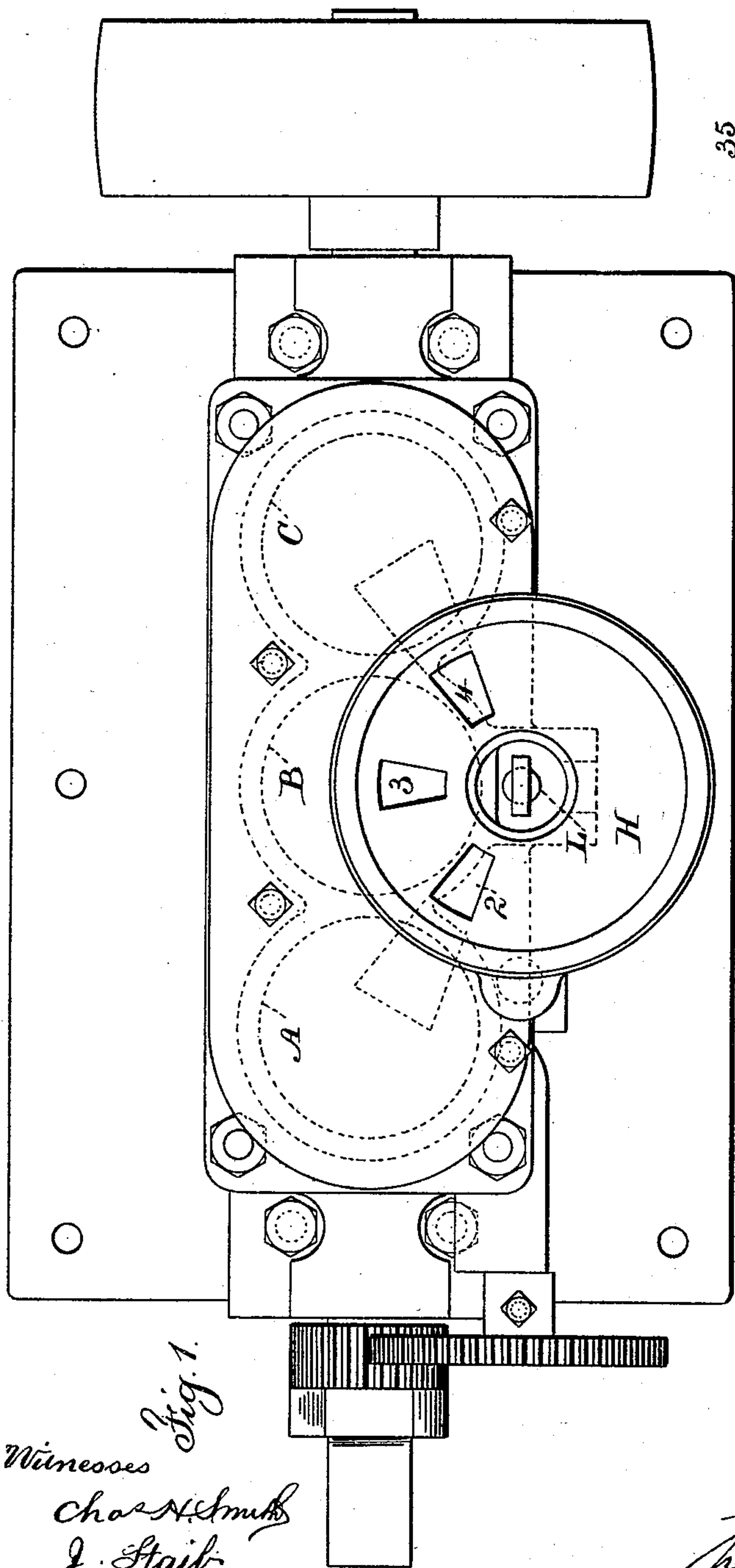
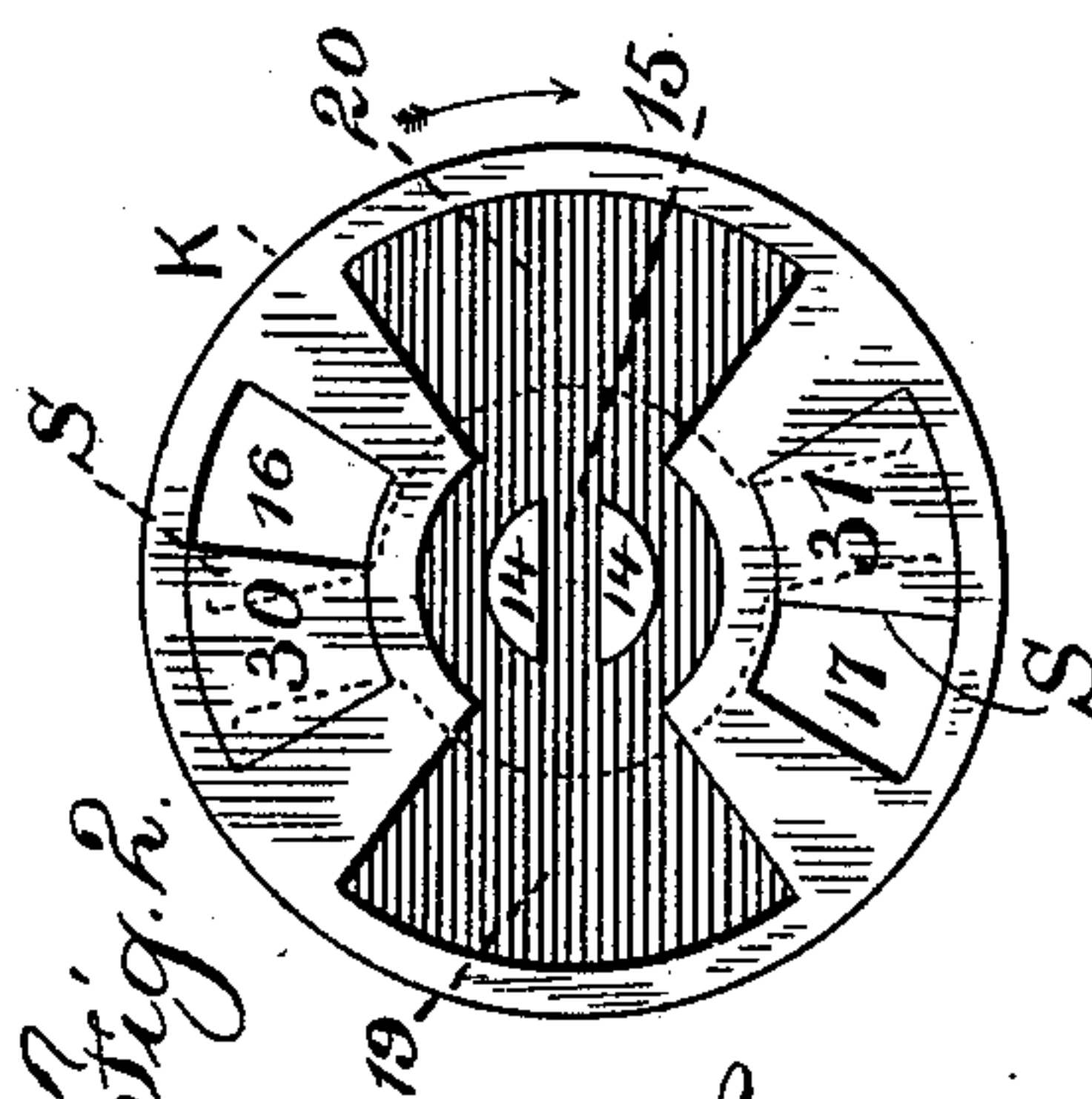
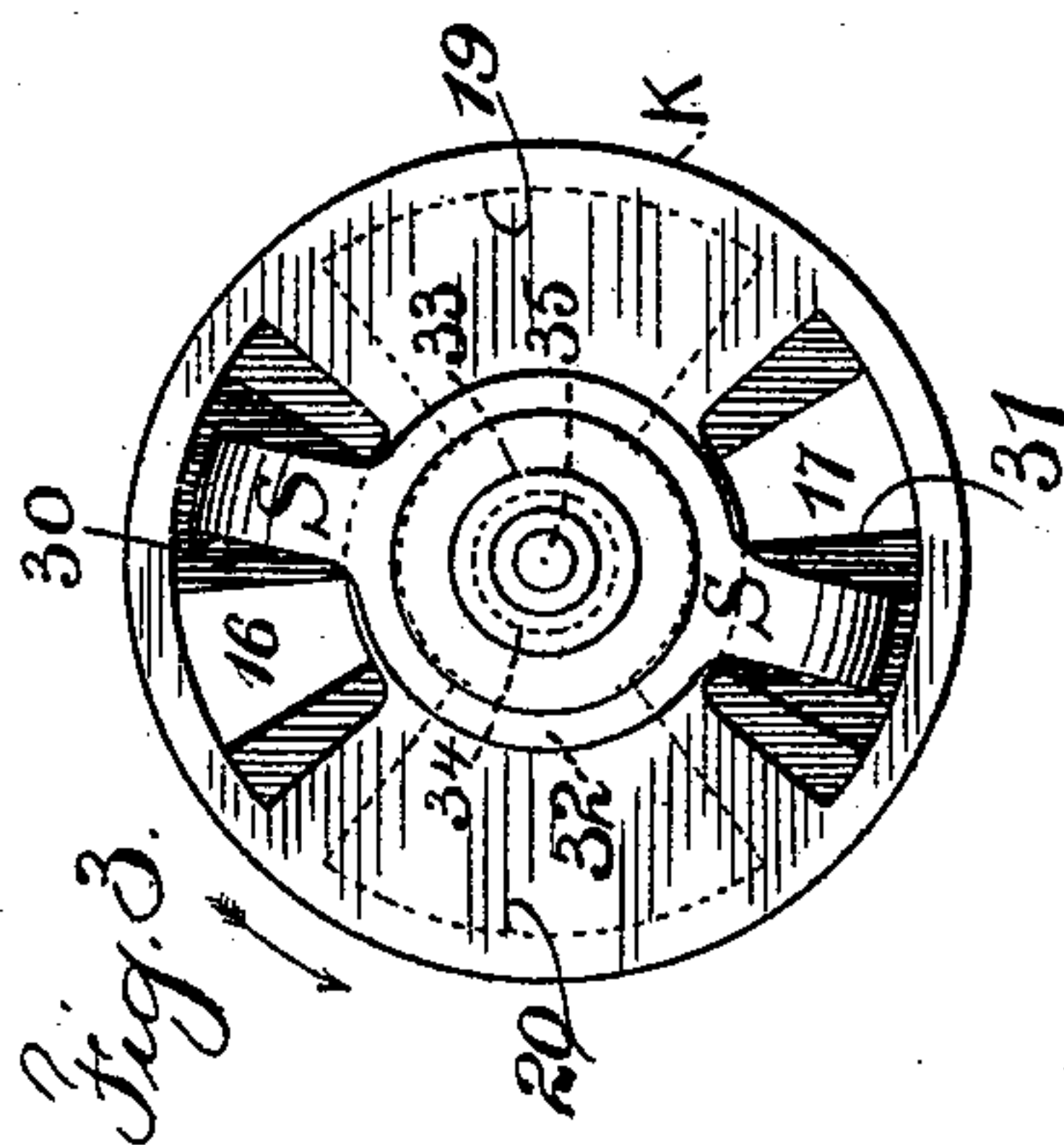
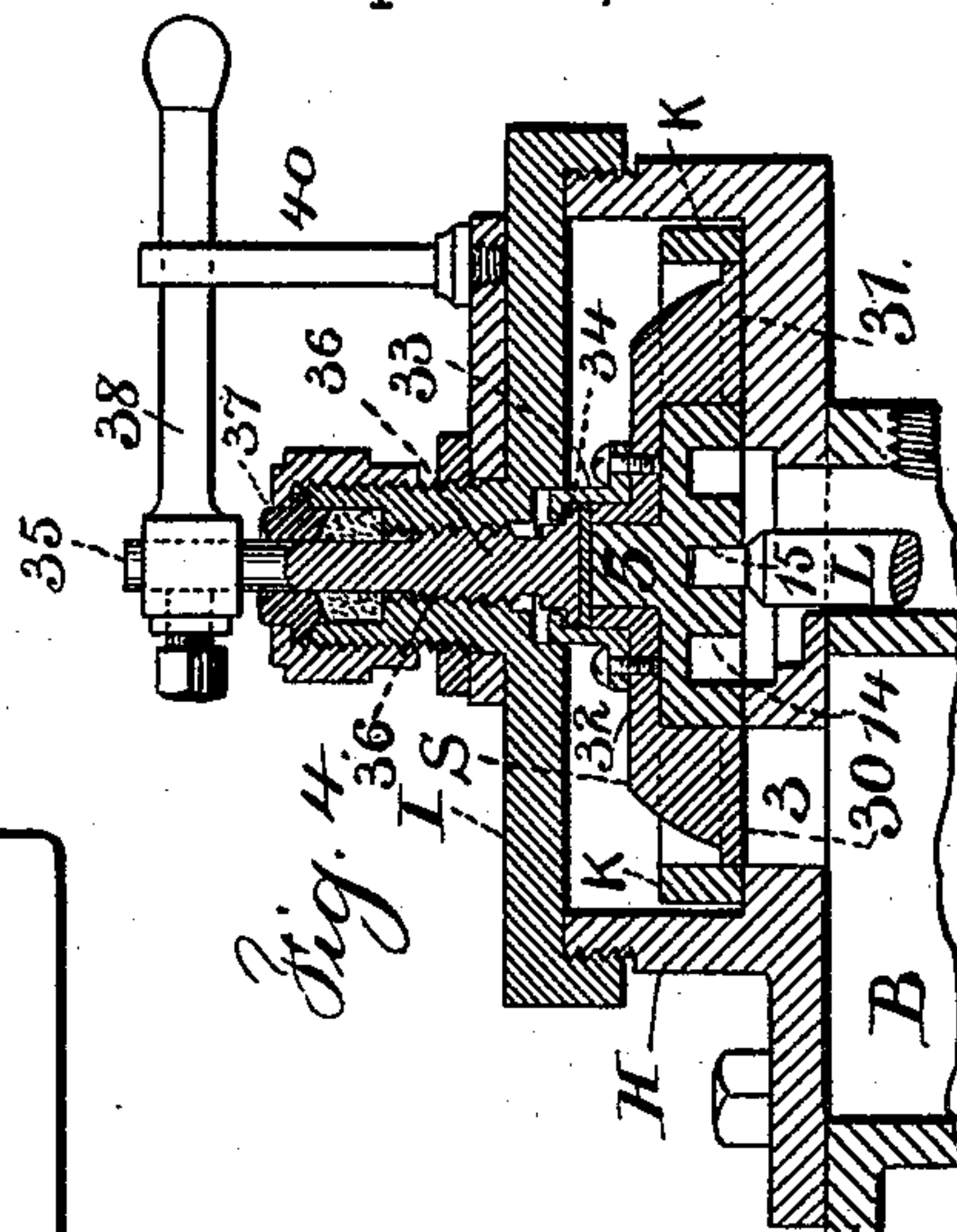


Fig. 1.

Witnesses

Chas. H. Smith

J. Stair



Inventor
Charles Vogel
per Lemuel W. Perrell
Atty.

UNITED STATES PATENT OFFICE.

CHARLES VOGEL, OF FORT LEE, NEW JERSEY.

VALVE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 495,282, dated April 11, 1893.

Application filed July 18, 1892. Serial No. 440,312. (No model.)

To all whom it may concern:

Be it known that I, CHARLES VOGEL, a citizen of the United States, residing at Fort Lee, in the county of Bergen and State of New Jersey, have invented an Improvement in Valves for Steam-Engines, of which the following is a specification.

In Letters Patent No. 411,944, granted to me October 1, 1889, a circular valve is represented to which a rotary movement is communicated by a connection to the main or crank shaft, and this rotary valve is adapted to admitting steam to three cylinders in succession and to receiving the exhaust from such cylinders, and a reference is hereby made to the said patent for a more full description of this valve and its mode of operation.

The present invention relates to the combination with the rotary disk valve, of a cut off, whereby the steam is made to work expansively. It is to be borne in mind that the rotary valve shown in the aforesaid patent might be made to act as a cut off by broadening the face of the valve and narrowing the ports, but such valve would not act with the proper lap and lead when such valve and the engine were rotated in the opposite direction. I combine with the rotary valve a cut off segment which substantially broadens the surface of the valve and narrows the port, and such cut off segment receives its motion from the rotary disk valve, and when the direction of rotation of the valve is reversed, the friction upon the valve seat of the cut off segment, causes the cut off segment to change its position in relation to the rotary valve, opening the port at the opposite edge of such cut off segment so as to give the proper lap and lead. If this cut off segment alone were made use of, the engine might be stopped at such a place that all of the ports leading to the engine might be closed and prevent the engine being started; I therefore combine with the cut off segment a lifter that raises the cut off segment from the valve seat, admitting the steam through the valve to the engine the same as it would pass in my aforesaid patent, and as soon as the engine is started the lifter is thrown out of action so that the cut off segment rests upon the valve seat to perform its duties in cutting off the steam and causing the same to work expansively. According to the width of the cut off

segment so the steam will be cut off earlier or later in the stroke of the engine.

In the drawings Figure 1 is a plan view showing the valve seat, the ports leading to the engine and the upper end of the valve-operating spindle. Fig. 2 is a face view of the valve and the cut off segment in position. Fig. 3 is a view of the valve and cut-off segment at the opposite side, and Fig. 4 is a section through the valve-spindle, the cut-off and the lifter.

The cylinders A B C are provided with the ports 2 3 4 passing through the heads of the cylinders into the steam chest H, which is provided with a suitable cover I, and the circular valve K has a central hub 14 with a cross slot 15 for the upper end or T head of the spindle L. These parts are substantially the same as those shown in my aforesaid patent and hence do not require further description; I however remark that the proportions of the steam ports 16 and 17 and the exhaust ports 19, 20 in the valve, are slightly different, and I find it is unnecessary to employ any cross bar or bridge in the ports as shown in my aforesaid patent at 21. The cut off S is made with the segments 30 and 31, that are sufficiently deep to extend to the valve seat with the valve K intervening between the body or disk 32 and such valve seat, and there is a hub 33 to the cut off S with a central cavity for the pin or stem 5 of the valve, and this hub 33 passes into a recess in the cover I of the steam chest. Hence the valve and the cut off are both guided by the stem and hub while being rotated by the spindle L. The cut off segments 30 and 31 pass into the respective valve ports 16 and 17, and the edges of the cut off segments and of the valve at the ports are radial so as to set closely together when the valve is rotating in either direction, and the proportionate width of the cut off segments 30 and 31 to the entire width of the ports 16 and 17 is to be such that the proper opening will be left for the passage of the steam, and the necessary lap and lead will be provided; or in other words, when the valve is rotating in the direction represented in Fig. 3, the advancing edge of the valve at the port 16 or 17 will act to admit steam at the proper moment, and the opposite edge of the cut off will cover the port so as to allow the steam to work expansively, and the wider the cut-off-segment the sooner the steam will be cut off

and vice versa; and it will be observed that the friction of the cut off segments upon the valve seat, acts to hinder the movement of the cut off, so that when the direction of rotation of the valve is reversed, the cut off remains stationary until the valve is moved sufficiently to open the port at the opposite side of the cut off, and then the cut off receives its motion by a pushing action from the valve.

If the cut off as before described is used with an engine that can be started by hand, then, if the steam should be turned on and the engine does not move, the fly wheel or pulley might be moved by hand to cause the valve to open one of the steam ports, but where this is not desirable the cut off is provided with the devices next described.

The hub 33 is made in two parts so as to receive between the two parts thereof the disk 34 at the end of the stem 35, and these parts fit loosely, so that the stem 35 stands still while the valve rotates freely, and this stem 35 passes through the center of the cover I, there being a screw 36 on the stem 35 that is screwed into the central portion or hub of the cover I, and the plain portion of this stem 35 passes through a packing box or gland 37, and there is upon the stem 35 a lever arm 38 by which the stem 35 can be rotated in either one direction or the other, and in the normal position of the parts the stem 35 allows the cut off to rest upon the valve seat and to rotate about the end of the screw stem freely. If now the lever arm 38 is rotated, or partially so, the screw 36 acts to draw the cut off segments away from the valve seat and thereby admit steam between the cut off and the valve seat, so that the valve would, in this condition, operate the same as though it had no cut off, and the parts may be so proportioned that for heavy loads the engine could be run without a cut off when such cut off was withdrawn from the valve seat as aforesaid, but usually it is disadvantageous, as there is a saving effected without any loss of power by the action of the cut off and the working of the steam expansively, and as soon as the engine has started or the cut off is to be brought into action, the lever 38 is rotated in the opposite direction to allow the cut off to press down upon the valve seat, and it is advantageous to provide a stop 40 to arrest the movement of the lever 38 at the proper point, so that it may not be turned so far as to produce unnecessary friction by forcing the cut off upon the valve seat, because ordinarily the pressure of the steam is sufficient to keep the valve and the cut off properly upon their seat.

I remark that the exhaust ports and their operation are not changed by the present improvement, it only being necessary to provide exhaust ports 19 and 20 in the valve K of sufficient width for keeping the exhaust port open to the end of the stroke when the engine is rotating in either direction.

Any suitable device may be used for acting upon the stem 35 to raise the cut off from the valve seat when required.

I claim as my invention—

1. The combination with a rotary valve for engines having steam and exhaust ports in the same, of a cut off with segments partially filling the steam ports, such cut off segments being moved by the valve itself so as to change their positions when the direction of rotation of the valve is reversed, substantially as set forth.

2. The combination with the circular valve K having steam ports 16 and 17 and exhaust ports 19 and 20 and mechanism for rotating the same, of the cut off having segments 30 and 31 in the respective steam ports, such segments being united together and having a hub with a recess for the stem of the valve, substantially as set forth.

3. The combination with the circular valve K having steam ports 16 and 17 and exhaust ports 19 and 20 and mechanism for rotating the same, of the cut off having segments 30 and 31 in the respective steam ports, such segments being united together and having a hub passing into a recess in the cover of the steam chest, a stem connected with the cut off and a gland upon the cover of the steam chest through which the stem passes, and mechanism for lifting the cut off from the valve seat, substantially as set forth.

4. The combination with the circular valve K having steam ports 16 and 17 and exhaust ports 19 and 20 and mechanism for rotating the same, of the cut off having segments 30 and 31 in the respective steam ports, such segments being united together and having a hub passing into a recess in the cover of the steam chest, a stem connected with the cut off and a gland upon the cover of the steam chest through which the stem passes, a lever arm connected with the stem and a screw for acting upon the cut off to withdraw the same from the valve seat, substantially as set forth.

5. The combination with the circular valve K having steam ports 16 and 17 and exhaust ports 19 and 20 and mechanism for rotating the same, of the cut off having segments 30 and 31 in the respective steam ports, such segments being united together and having a hub passing into a recess in the cover of the steam chest, a stem connected with the cut off and a gland upon the cover of the steam chest through which the stem passes, a lever arm connected with the stem, a screw for acting upon the cut off to withdraw the same from the valve seat, and a stop for determining the position of the lever arm, substantially as set forth.

Signed by me this 13th day of July, 1892.

CHARLES VOGEL.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.