(No Model.) 2 Sheets—Sheet 1.

C. S. KELLOGG.

CUT-OFF VALVE.

No. 590,841. Patented Sept. 28, 1897.

Fig. 1.

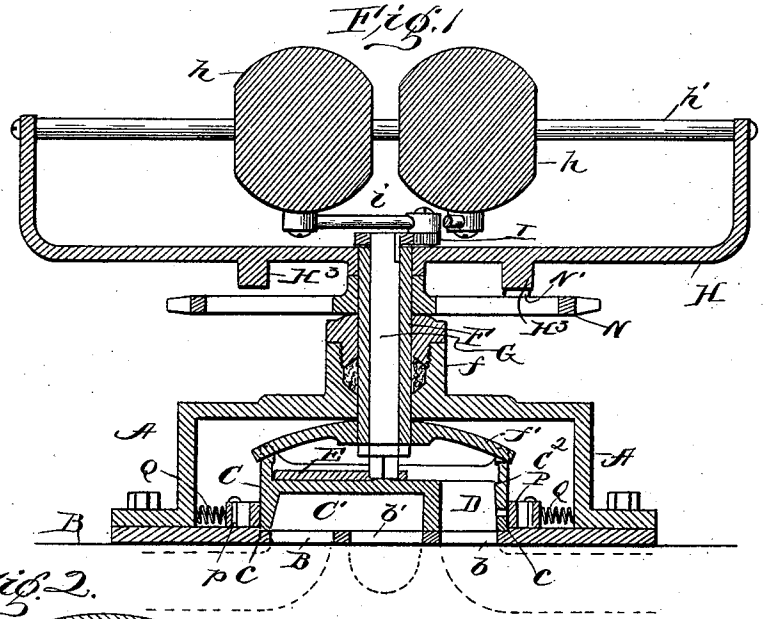
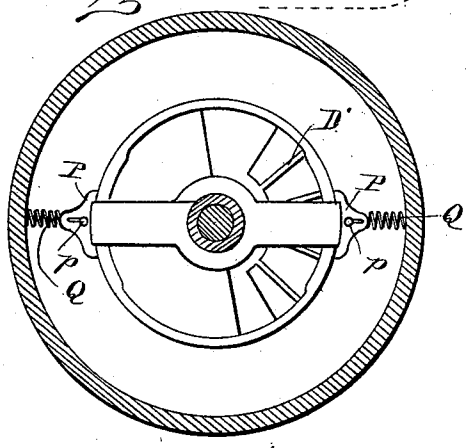


Fig. 2.



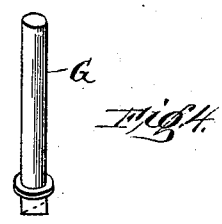
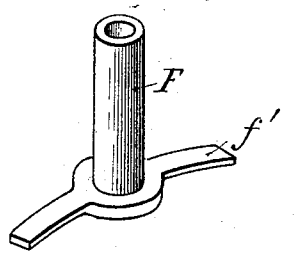
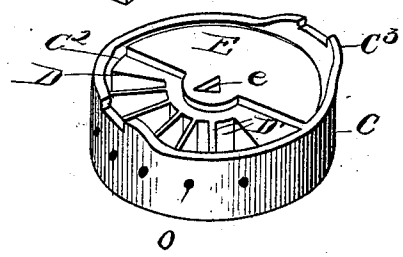


Fig. 4.





O

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(No Model.) 2 Sheets—Sheet 2.

C. S. KELLOGG.

CUT-OFF VALVE.

No. 590,841. Patented Sept. 28, 1897.

Fig. 3.

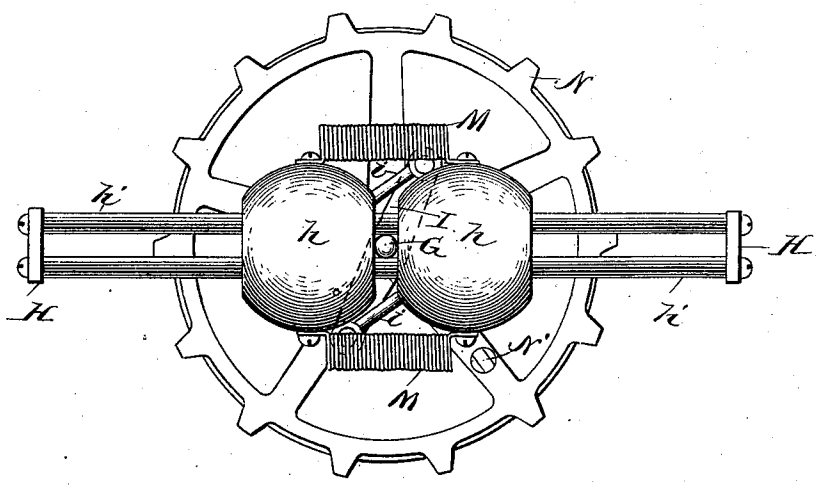
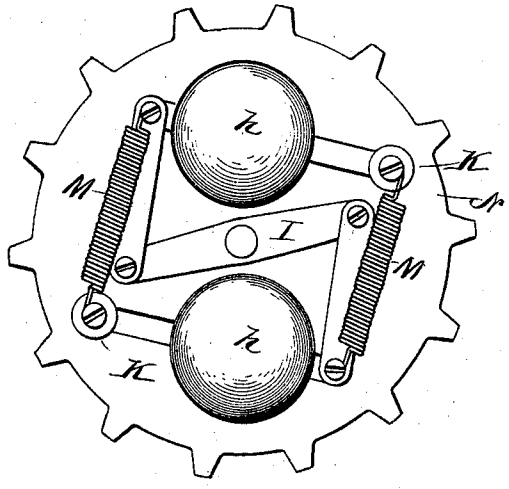


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES S. KELLOGG, OF AUSTIN, ILLINOIS.

CUT-OFF VALVE.

SPECIFICATION forming part of Letters Patent No. 590,841, dated September 28, 1897.

Application filed January 26, 1897. Serial No. 620,824. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. KELLOGG, of Austin, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cut-Off Valves; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention relates to improvements in automatically-controlled cut-off valves adapted for use in connection with steam-engines and like motors; and it has for its object to produce a simple valve which will accurately govern the point of cut-off with relation to the speed of the engine and at the same time a valve which, while it is kept seated by the steam-pressure, nevertheless such pressure is reduced to such an extent as to prevent excessive friction and wear.

A further object of the invention is to produce a valve which may maintain its seat at all times regardless of the particular adjustment of the controlling mechanism.

To these ends the invention consists, primarily, in a rotary valve and operating mechanism therefor with a loose connection between said valve and its operating mechanism whereby, while the valve and its operating mechanism rotate in unison, the angular position of the two may be varied to some extent.

The invention further consists in a valve having in its entrance-port a series of partitions combined with a cut-off for closing one or more of the cells formed by said partitions to effect the cut-off of the steam at the proper point, and, finally, the invention consists in certain novel details of construction and combinations and arrangements of parts, all as will be now described, and pointed out particularly in the appended claims.

Refering to the accompanying drawings, Figure 1 is a vertical section taken through a valve and its controlling mechanism constructed in accordance with my present invention. Fig. 2 is a cross-sectional view taken immediately beneath the top of the valve-chest and looking down on the valve and cut-off. Fig. 3 is a top plan view of the controlling mechanism. Fig. 4 is a detail perspective view of the rotary valve and cut-off with their operating-stems as they would appear removed from the valve-chest. Fig. 5 is a top plan view of a modified arrangement of controller or governor for the cut-off.

Like letters of reference in the several figures indicate the same parts.

The letter A indicates the steam-chest or valve-casing, which is adapted to seat on the cylinder B and having in its lower walls three openings, the outside openings (lettered *b*) leading to the opposite ends of the cylinder and the central openings *b'* to the exhaust. The valve lettered C is of the rotary type and its lower edge preferably seats in an annular seat *c* in the bottom of the steam-chest and its under surface is cut away in the form of a channel C' for connecting one or the other of the ports *b* with the port *b'* for exhausting. The opposite side of the valve from that containing the exhaust-passage is perforated or chambered way through, preferably in the form of a series of cells or passages D D D. These cells or passages are preferably formed by partitions D' D' D', extending from top to bottom of the valve, and any one of which is capable of forming the end wall of the entrance-passage if the cells to either side of it are closed. In order to effect the cut-off with such an arrangement, I seat in the top of the rotary valve, preferably within an annular seat or depression C^2, a segmental cut-off E, adapted to move concentrically with the rotary valve and to be controlled in its movement by a centrifugal governor of an approved type or by any other well-known means. For the purpose of operating the valve and cut-off a valve-stem F extends out through a suitable packing box or bearing *f* in the top of the steam-chest, and carries at its lower end transverse arms *f'*, which enter notches or recesses formed by projections C^3 on the valve, whereby when the stem is rotated the valve will be rotated in unison therewith, but at the same time a certain independence of lateral movement is permitted, and consequently no binding can take place if the top of the steam-chest is not mounted in exact alinement with the axis of the valve, and there is no tendency to lift the valve from its seat at one side if the axis of the stem is not in line with the axis of the valve, as would be the case were the parts rigidly connected.

The valve-stem F is tubular, and through it extends a cut-off stem G, having its lower end made of irregular shape—three-cornered, for instance, as shown—and adapted to fit into a correspondingly-shaped opening e' in the cut-off.

In the preferred arrangement the valve-stem at its upper end is rigidly connected with a base-piece H of a centrifugal governor, and upon this base-piece are mounted outwardly-moving balls or weights h, to which a cross-arm I upon the cut-off stem is attached by suitable links, such as i. In the form shown in this preferred arrangement the outwardly-movable balls or weights are mounted upon slide-rods h', although, if desired, this arrangement may be changed to one wherein the weights are pivoted, as shown in Fig. 5, at K, and connected to the cut-off stem in the manner just described. Springs M are preferably employed to return the weights to their central or normal position when the engine is stationary, and suitable gearing is interposed between the governor-base and a moving part of the engine to impart rotary motion thereto, as usual.

For the purpose of permitting the engine to be reversed readily a loose connection is preferably interposed between the rotary governor and the moving mechanism, as shown, such loose connection consisting of two projections or bearings H^3, lying in the path of a corresponding projection N', mounted on a wheel N, journaled concentrically with the valve-stem and preferably upon it, and adapted to receive its motion through a sprocket-chain or through connecting-gearing from the beforementioned moving part of the engine. The bearing surfaces or projections H^3 are located on opposite sides of the axis of the governor and a sufficient distance out of line with said axis to permit of a movement of the valve throughout exactly one-half of a revolution, thereby enabling the parts to be used in driving the engine in either direction and permitting of a manipulation of the valve independently of the moving part of the engine to start the engine in either direction, as will be readily understood.

Steam-pressure is relied upon mainly to hold the valve and the cut-off firmly to their seats, but as an excessive pressure might be exerted upon the cut-off throughout that portion which has been moved over one or more of the cells in the valve I provide said cells with pressure-relief ports or openings O, preferably formed by small openings in the side of the valve, and in order to prevent the passage of steam through these openings into the entrance-passages beneath the valve I locate plates P in the valve-chest and adapt it to bear against the periphery of the valve throughout those portions lying directly opposite the entrance-ports to the cylinder. These plates P may be mounted loosely upon pins p in the steam-chest, so as to move toward and from the valve, and held in contact with the valve preferably by springs Q, as shown.

Having thus described my invention, what I claim as new is—

1. In a steam-engine valve, the combination with the steam-chest, the rotary valve seated in said steam-chest and having entrance and exhaust passages therethrough and the cut-off movably seated on the upper surface of the valve, of a tubular valve-stem extending through the walls of the steam-chest, connections between said valve-stem and valve extending outside of the cut-off, whereby an unobstructed space is left for the cut-off, and a cut-off stem passing through the valve-stem and connected at its inner end with the cut-off; substantially as described.

2. In a steam-engine valve, the combination with the steam-chest, the rotary valve seated therein and having the entrance and exhaust passages therethrough, and the cut-off seated in an annular bearing within the periphery of the top of the valve to control the entrance-passage, of a tubular valve-stem passing through the wall of the steam-chest, transversely-extending arms on said valve-stem, connections between the ends of said arm and periphery of the valve whereby an unobstructed space is left for the cut-off and a cut-off stem extending through the valve-stem and connected with the cut-off at a point coincident with the axis of the valve; substantially as described.

3. In a steam-engine valve, the combination with the steam-chest and the rotary valve seated therein and having the exhaust-passage therethrough and the entrance-passage therethrough, provided with a series of partitions or webs dividing said passage into cells, of a segmental cut-off seating on the top of the valve and adapted to close one or more of said cells, and valve and cut-off stems arranged concentrically, connected with said valve and cut-off respectively, and passing through the wall of the steam-chest; substantially as described.

4. In a steam-engine, the combination with the steam-chest, the rotary valve seated in an annular seat therein and having the exhaust-passage therethrough and the entrance-passage therethrough with a series of partitions or webs dividing said entrance-passage into cells and also having the annular raised periphery, of a segmental cut-off seated on said valve within the raised periphery thereof, a tubular valve-stem having transverse arms engaging the raised periphery of the valve and a cut-off stem passing through the valve-stem and engaging the central portion of the cut-off; substantially as described.

5. In a valve for steam-engines, the combination with the rotary valve having the exhaust-passage therethrough and the entrance-passage having a series of partitions or webs therein forming cells, said cells having pressure-relief openings therein and a segmental cut-off adapted to work over said entrance-

passage to reduce the number of cells through which pressure may pass; substantially as described.

6. In a valve for steam-engines, the combination with the steam-chest having the entrance and exhaust ports, therein, the rotary valve having the exhaust-passage therethrough and the entrance-passage therethrough, provided with a series of partitions or webs forming cells, with pressure-relief ports opening into said cells at the side of the valve, of a cut-off working on the valve to reduce the number of cells through which live steam may pass and plates coöperating with the sides of the valve opposite the ports in the steam-chest for closing the pressure-relief ports at these points; substantially as described.

7. In a valve for steam-engines, the combination with the steam-chest, a rotary valve and rotary cut-off located within said chest, and the concentric valve-stem and cut-off stem extending through the wall of said chest, of the governor-base mounted on the valve-stem, the cross-head mounted on the cut-off stem, the outwardly-moving weights or balls carried by the governor-base and links connecting said weights or balls and the cut-off cross-heads; substantially as described.

8. In a steam-engine valve, the combination with the steam-chest, the rotary valve in said steam-chest and the rotary cut-off cooperating with the passage through said valve of the concentric cut-off and valve-stems extending through the walls of the steam-chest, the governor-base mounted on said valve-stem, the governor mounted on said base and connected with the cut-off stem, a governor-driving gear and a loose connection between said governor-driving gear adapted to permit said governor to move a half-revolution independently of the driving-gear; substantially as described.

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