

No. 658,754.

Patented Oct. 2, 1900.

F. W. BOHN.
COMBINED CUT-OFF AND GOVERNOR.

(Application filed Mar. 13, 1900.)

(No Model.)

Fig. 2.

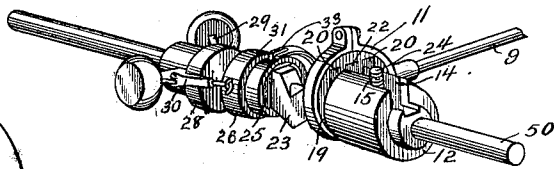


Fig. 6.

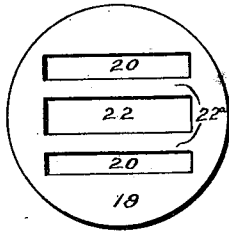


Fig. 1.

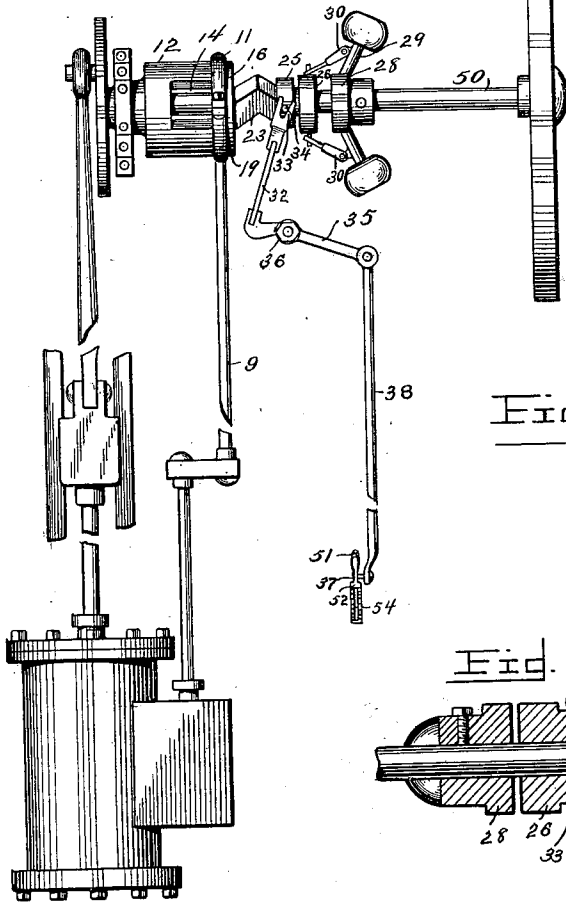


Fig. 5.

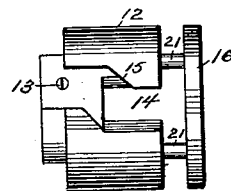


Fig. 4.

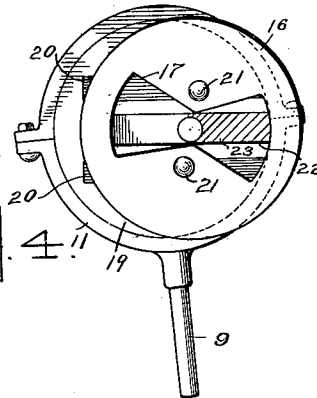
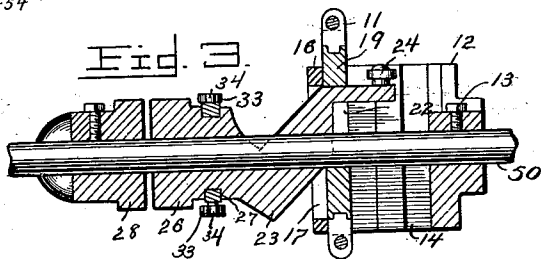


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

FREDERICK W. BOHN, OF INDEPENDENCE, WISCONSIN.

COMBINED CUT-OFF AND GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 658,754, dated October 2, 1900.

Application filed March 13, 1900. Serial No. 8,510. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. BOHN, a citizen of the United States, residing at Independence, in the county of Trempealeau and State of Wisconsin, have invented a new and useful Combined Cut-Off and Governor, of which the following is a specification.

This invention relates to cut-off and governing mechanism for steam-engines in general, and more particularly to that class employed in connection with reciprocating engines, the object of the invention being to provide a construction of this nature in which the cut-off and governing mechanisms are adapted for conjoint operation to control the admission of steam automatically to the piston-cylinder and to also provide for an independent manual adjustment of the cut-off, so as to regulate the starting, stopping, speed, and reversal of the engine.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a plan view of the cut-off and governor. Fig. 2 is a detail perspective view of said combined cut-off and governor. Fig. 3 is an enlarged vertical section. Fig. 4 is an enlarged detail view, in side elevation, of the revoluble and slidable elements of the cut-off. Fig. 5 is a detail plan view of the cam-slotted head for the cut-off mechanism. Fig. 6 is a detail view of the valve-motion eccentric.

Referring now to the drawings, the engine-shaft is shown at 50, and on this shaft is mounted a cam-slotted head 12, held firmly in place by any suitable means, such as set-screw 13, thus making the head fast for rotation with the shaft. This head is shown as cylindrical in form, with a longitudinal opening 14, and in one side of the head is a cam-slot 15, the latter having communication with the opening. For properly confining the shiftable eccentric in operative relation to the cam-slotted head I employ a cap-plate 16, which is provided with a transverse enlarged opening 17 of the form shown in Fig. 4 of the drawings. The shiftable eccentric is arranged between one end of the head 12 and its cap-plate 16, as shown at 19, and this eccentric is provided with transverse slots 20, through which pass the screws

21, that serve to fasten the cap-plate 16 to one end of the cam-slotted head 12. This cap-plate is thus made fast with the head, to be supported thereby in a manner to loosely confine the shiftable eccentric between the head and the plate, and as the screws 21 pass loosely through the slots 20 of this eccentric it is evident that the eccentric may have free play within certain limits between the head and its cap-plate. The eccentric is furthermore provided with a slot or opening 22, which is separated from the screw-slots 20 by the intermediate bridge-bars 22^a. (See Fig. 6.)

Another element of the cut-off is a slidable cam 23, which passes loosely through the opening 17 of the cap-plate and is received in the opening 14 of the head 12, and this cam is provided with a stud or roller 24, that projects into the cam-slot 25 of the head 12, whereby the cut-off cam 23 is made to rotate with the head of the engine-shaft, and at the same time said cam is capable of a limited endwise movement through the head and in a direction longitudinally of the engine-shaft. This cam has working faces which are inclined to the axis of the engine-shaft and the slotted head 12, and said cam passes through the slot 22 of the eccentric, so as to have the opposite cam-faces engaged by the bridge-bars 22^a of said eccentric. The cam terminates at one end in a sleeve 25, which is fitted loosely on the engine-shaft, so as to slide freely thereon, and this sleeve is formed with an annular collar 26 and with a circumferential groove 27.

The rotary collar of the governor is indicated at 28 as being made fast with the engine-shaft at a point close to the limit of travel of the cut-off cam in one direction, and on this collar is fulcrumed the weighted governor-levers 29, said levers being connected by the links 30 with the collar 26 on the sleeve of the governor-cam. A shifting collar 31 is loosely received in the groove 27 of the sleeve forming a part of the cut-off cam, and a spring-arm 32 is provided with a fork 33, which has its ends connected loosely to studs 34 on the shifting collar 31. This arm 32 is made of inherently-elastic spring metal, so as to form a flexible connection between the governor-controlled cam and the cut-off mechanism and a shifting lever 35. Said arm is se-

cured fast to one end of the lever 35, which is fulcrumed to a suitable end of the lever 36, which is made fast with a suitable support. A shifting rod 38 is connected with the lever 37 and may have a handle of any form for operating it. This handle may be in the form of a lever 51, pivoted to the shifting rod and to a suitable support and carrying a latch 52 for engagement with a notched segment 54 for holding the shifting rod in different positions to correspondingly hold the mechanism connected therewith. When the hand-lever 51 is moved in one direction, the cam of the cut-off is moved in one direction to change the relation of the shiftable eccentric to the cam-slotted head 12, thereby adjusting the slide-valve through the medium of the eccentric-strap 11, mounted upon the eccentric and having connection with said valve through the medium of the usual eccentric-rod 9.

The train of operative connections between the slidable cam 23 and the lever 37 enables the engineer to adjust the cam in a manner to control the admission of steam to the piston-cylinder through the medium of the valve for the purpose of starting and stopping the engine. The cam 23 may be adjusted more or less by the lever 37 to regulate the volume of steam to control the speed of the engine, and by moving the cam from one extreme position to the other the engine may be reversed. All of the elements of the combined cut-off and governor rotate with the engine-shaft; but the cut-off cam is capable of a limited adjustment by the train of connections with the hand-lever, and the weighted levers of the governors are free to move under centrifugal action for the purpose of adjusting the cam to reduce the speed of the engine-shaft by reducing the admission of steam when the speed of the engine-shaft becomes too high. The automatic adjustment of the slide cut-off cam under the centrifugal force of the governor does not affect the hand-lever 37, which may be locked in place, because the arm 32 affords a spring or yielding connection between the cut-off cam and the shipping-lever, so that the cam may have the necessary movement under the action of the governor, while the lever 35, the link, and the lever 37 may remain stationary.

The engagement of the cut-off cam with the cam-slotted head and its cap-plate insures the rotation of the cam with said head and the engine-shaft, and when the parts of the cut-off rotate with the engine-shaft the eccentric is operated in a manner to shift the valve back and forth at regular intervals to control the admission and exhaust of steam to and from the piston-cylinder. With the cam 23 adjusted in the position opposite to that shown in Fig. 1 of the drawings its stud or roller fits in one end of the slot 15 of the head 12, so as to control the admission of steam for propelling the engine in one direction; but the position of this cam may be reversed by the hand-lever, so as to make its stud or roller

occupy the opposite end of the cam-slot in the head 12, thus reversing the engine, owing to the fact that the cam acts on the eccentric so as to change the position of the valve. This change in the position of the valve is due to the fact that the position of the cam is changed during the endwise movement of the cam and by the stud or roller traveling in an inclined length of the cam-slot between the straight terminal portions of said cam-slot. It is evident that the movement of the cut-off cam may be varied at any point between the limits of its adjustment in either direction, and thus the cam is capable of adjustment to regulate the speed of the engine.

Changes within the scope of the appended claims may be made in the form and proportions of the parts without departing from the spirit of the invention.

What is claimed is—

1. A combined cut-off and governor comprising a cam-slotted head adapted for oscillatory movement, an eccentric mounted in the head and adapted for radial sliding movement with respect to the head, a cam slidably disposed in the head and engaging the eccentric to shift it radially, a projection upon the cam engaging the cam-slot of the head to shift the head and therewith the eccentric rotatably, and governing elements connected with the cam.

2. A combined cut-off and governor comprising a cam-slotted head adapted for oscillatory movement, an eccentric mounted in the head and adapted for radial sliding movement with respect to the head, a cam slidably disposed in the head and engaging the eccentric to shift it radially, a projection upon the cam engaging the cam-slot of the head to shift the head and therewith the eccentric rotatably, and means for operating the cam.

3. In a combined cut-off and governor mechanism, the combination of a cam-slotted head, a cam slidably connected with the head, an eccentric engaging with said slidable cam for radial movement thereby, a projection upon the cam engaging the cam-slot to rotate the eccentric, and an automatic governor connected operatively with the slidable cam.

4. In a combined cut-off and governor mechanism, the combination with a cut-off mechanism, an automatic governor connected therewith, a hand-lever, and a train of connections between an element of the cut-off mechanism and said hand-lever, said connections including an elastic link.

5. In a combined cut-off and governor mechanism, the combination of a revoluble head having a cam-slot and a cap-plate, a radially and rotatably shiftable eccentric loosely confined between the head and cap-plate, a cam movable longitudinally of the head and having a working surface inclined to the axis of the head and in engagement with said eccentric to shift it radially, a projection upon the cam engaging the cam-slot to shift the eccentric rotatably, a governor mechanism in op-

erative relation to the cam, and means for manually shifting the cam.

6. The combination with a rotatable shaft, of a cut-off mechanism mounted upon the shaft and having a shiftable element, ballast-balls connected with the shiftable element to shift it, a hand-lever, and a shipping-lever linked to the hand-lever and having a spring-arm connected with the shiftable element of

the cut-off, whereby it may be shifted manually or from the ballast-balls. 10

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FREDERICK W. BOHN.

Witnesses:

PAUL N. KULIG,
JOHN F. KULIG.