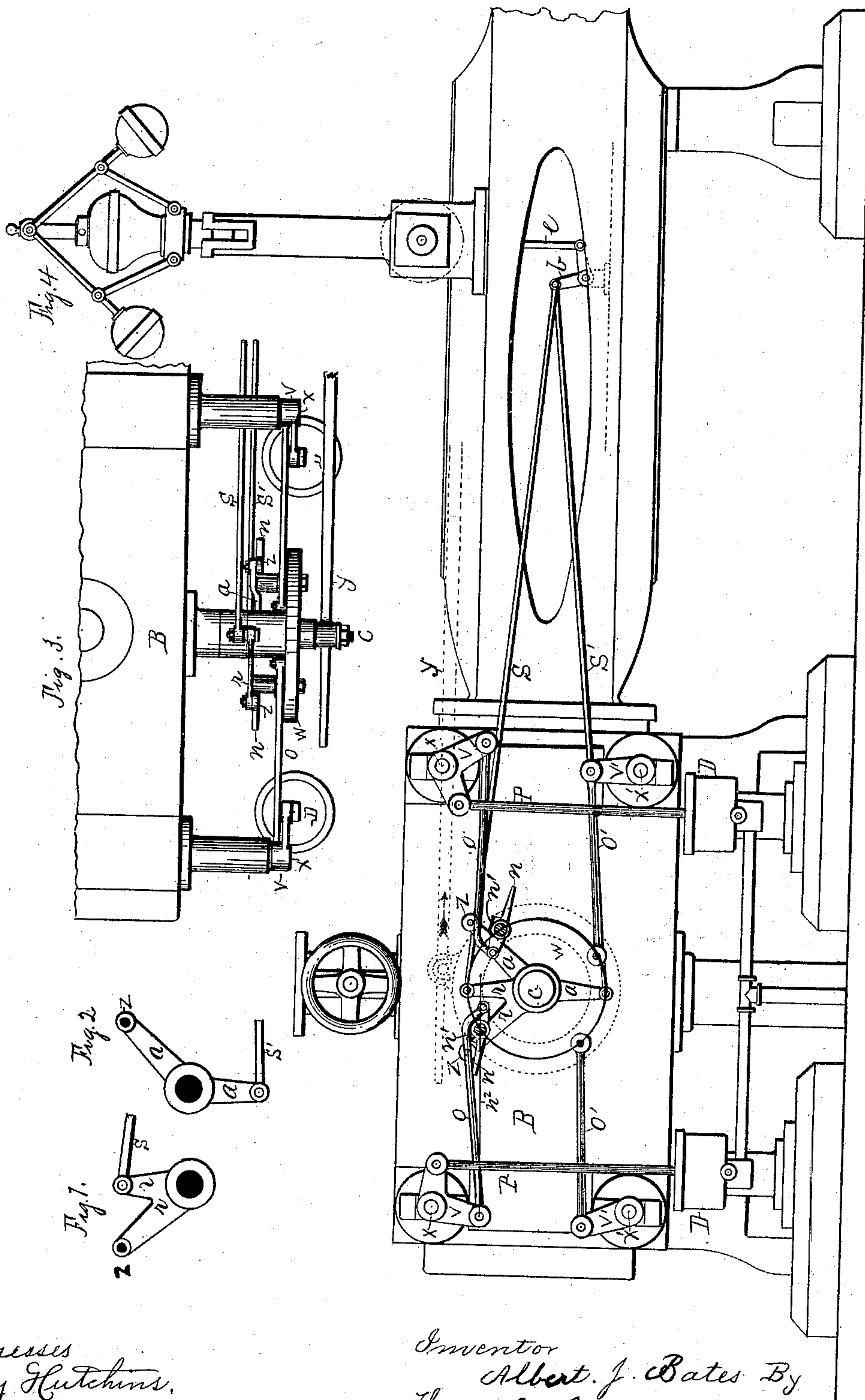


(No Model.)

A. J. BATES.
CUT-OFF FOR STEAM ENGINES.

No. 505,153.

Patented Sept. 19, 1893.



Witnesses
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UNITED STATES PATENT OFFICE.

ALBERT J. BATES, OF JOLIET, ILLINOIS.

CUT-OFF FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 505,153, dated September 19, 1893.

Application filed January 3, 1893. Serial No. 457,202. (No model.)

To all whom it may concern:

Be it known that I, ALBERT J. BATES, a citizen of the United States of America, residing at Joliet, in the county of Will and State of Illinois, have invented certain new and useful Improvements in Automatic Cut-Offs for Steam-Engines, of which the following is a specification, reference being had therein to the accompanying drawings and the letters of reference thereon, forming a part of this specification, in which—

Figures 1 and 2 are side views of the bell cranks for engaging the trip mechanism. Fig. 3 is a plan view of the automatic cut off mechanism, and Fig. 4 is a side elevation of the automatic cut off mechanism applied to the side of a four valve cylinder.

This invention relates to certain improvements in automatic cut offs for steam engines, which improvements are fully set forth and explained in the following specification and claim.

Referring to the drawings B, represents the side of an ordinary four valve steam cylinder having a stud C attached to it about centrally at its side, upon which stud is journaled a wrist plate W, which receives an oscillating motion from an eccentric located preferably on the main shaft of the engine, through the medium of the eccentric rod Y, detachably connected to said wrist plate through the medium of a wrist pin in the ordinary manner. In Fig. 4 the said wrist plate is shown only in broken lines, so as to expose to view parts located behind it.

a and *r*, are a pair of bell cranks journaled on the hub of the wrist plate between it and the cylinder. The bell crank *a* has its arms arranged at an obtuse angle from each other so that normally one arm projects downwardly while its other arm is inclined toward the crank end of the cylinder, and its depending arm is connected with the bell crank *b*, attached to the lower end of the governor stem *e*, through the medium of the rod *S'* by means of which connection with the governor, bell crank *a* will receive an oscillating motion on the stud C as the governor balls rise or fall. The bell crank *r*, has its arms arranged at an acute angle with each other so that normally one arm will stand in a vertical position while its other arm is inclined at an angle toward

the opposite or head end of the cylinder, and its vertical arm is connected with bell crank *b*, at the same point with rod *S'* through the medium of rod *S*, by means of which connection with the governor, bell crank *r* will receive an oscillating motion, and as said bell cranks *a* and *r* are both connected with the same arm of bell crank *b*, their free arms will be oscillated simultaneously in opposite directions, or to and from each other simultaneously.

Z, Z, are friction rollers respectively, pivotally attached to the outer ends and at the side of the free arms of the bell cranks *a* and *r*, and are engaged alternately by the trips.

N, N, are a pair of oscillating trips pivotally attached to the inner side of the wrist plate W, on suitable wrist pins their point of pivot with said wrist plate being at or near their center so as to form arms extending in a parallel line with each other in opposite directions from their point of pivot. Their inner arms are connected respectively with the bell cranks *V, V*, of the inlet valve shafts *X, X*, by means of the rods *O, O*, leaving their free opposite arms to be engaged alternately by the friction rollers *Z, Z*, or bell cranks *a* and *r*. The exhaust valve shafts *X', X'*, are connected with the wrist plate W, through the medium of their cranks *V', V'*, and rods *O', O'* in the ordinary manner. The inner ends of rods *O, O*, are connected to said trips *N, N*, and curved downward so that when said rods and trips alternately fold together the point of pivot of said rods with said trips will be below the point of pivot of said trips, with the wrist plate W, as shown by the horizontal line *N²*, in Fig. 4, and will remain in such position until oscillation of the wrist plate causes the free arm of the trip to engage one of the friction rollers *Z*, and unfold the said trip and arm *O*, for the purpose hereinafter set forth. The hubs of the trips form respectively seats *N'* for the curved part of arms *O, O*, to rest upon when the trip and its arm are folded together.

D, D, are ordinary dash pots connected with the bell cranks *V, V*, of the inlet valve shafts *X, X*, by means of the rods *P, P*.

Looking at Fig. 4, the wrist plate W, is represented as being turned in the direction of the arrow, and steam being admitted to the

cylinder from its head end, the inlet valve at
 its head end being opened by means of ten-
 sion on rod O at that end of the cylinder con-
 necting the wrist plate with said valves by
 5 means of its bell crank V and the trip toward
 the head end of the cylinder being folded
 with rod O. Further rotation of wrist plate
 W will cause the free arm of said trip to en-
 10 gage friction roller Z on bell crank *r* and ar-
 rest its further movement upward, and cause
 the point of pivot of rod O with said trip to
 be brought above the point of pivot of the trip
 with said wrist plate, causing the trip and its
 15 rod to suddenly unfold and permit the dash
 pot mechanism connected with the inlet valve
 to suddenly and quickly close said valve.
 When the wrist plate completes its movement
 in the direction of the arrow, trip N and rod O
 20 will fold together, and a reverse movement of
 wrist plate W will commence to open the inlet
 valve at the crank end of the cylinder and con-
 tinue to open said valve until said trip engages
 the friction roller Z on bell crank *a* and per-
 25 form the same operation as its fellow trip just
 described performed, and permit steam to be
 cut off by the dash pot mechanism connected
 to said valve. The point of cut off is thus
 controlled by the governor as the arms of bell
 cranks *a* and *r* are moved to and from each
 30 other by the governor. As the speed of the
 governor increases or diminishes the free
 arms of the bell cranks *a* and *r* carrying the
 friction rollers Z, will be brought nearer to-
 35 gether or farther apart. If nearer together
 said friction roller will be elevated and en-

gage the trips later and thus cause the steam
 to be cut off later, and vice versa if said roll-
 ers are farther apart and lower down so that
 the point of cut off is thus automatically reg-
 40 ulated by means of the governor through the
 medium of the trips and bell crank mechan-
 ism described.

Having thus described my invention, what
 I claim as new, and desire to secure by Letters
 Patent, is as follows, to wit:

In an automatic cut off for steam engines,
 the combination of a wrist plate carrying a
 pair of oscillating trips pivotally connected
 to its side, reach rods for connecting the in-
 50 ner ends of said trips with one end of a bell
 crank secured on the inlet valve shafts, said
 reach rods having their ends connected with
 said trips curved downward to bring their
 point of pivot with said trips below a line
 drawn through the point of pivot of said trips
 55 with said wrist plate, and the center of said
 valve shafts, bell crank arms journaled on the
 wrist plate hub, and having one arm con-
 nected through the medium of a rod with the
 governor, and their free arms provided with
 60 friction rollers adapted to be alternately en-
 gaged by the free ends of said trips, and a
 dash pot mechanism connected with the other
 arm of said valve shaft bell cranks, all ar-
 65 ranged to operate substantially as and for the
 purpose set forth.

ALBERT J. BATES.

Witnesses:

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