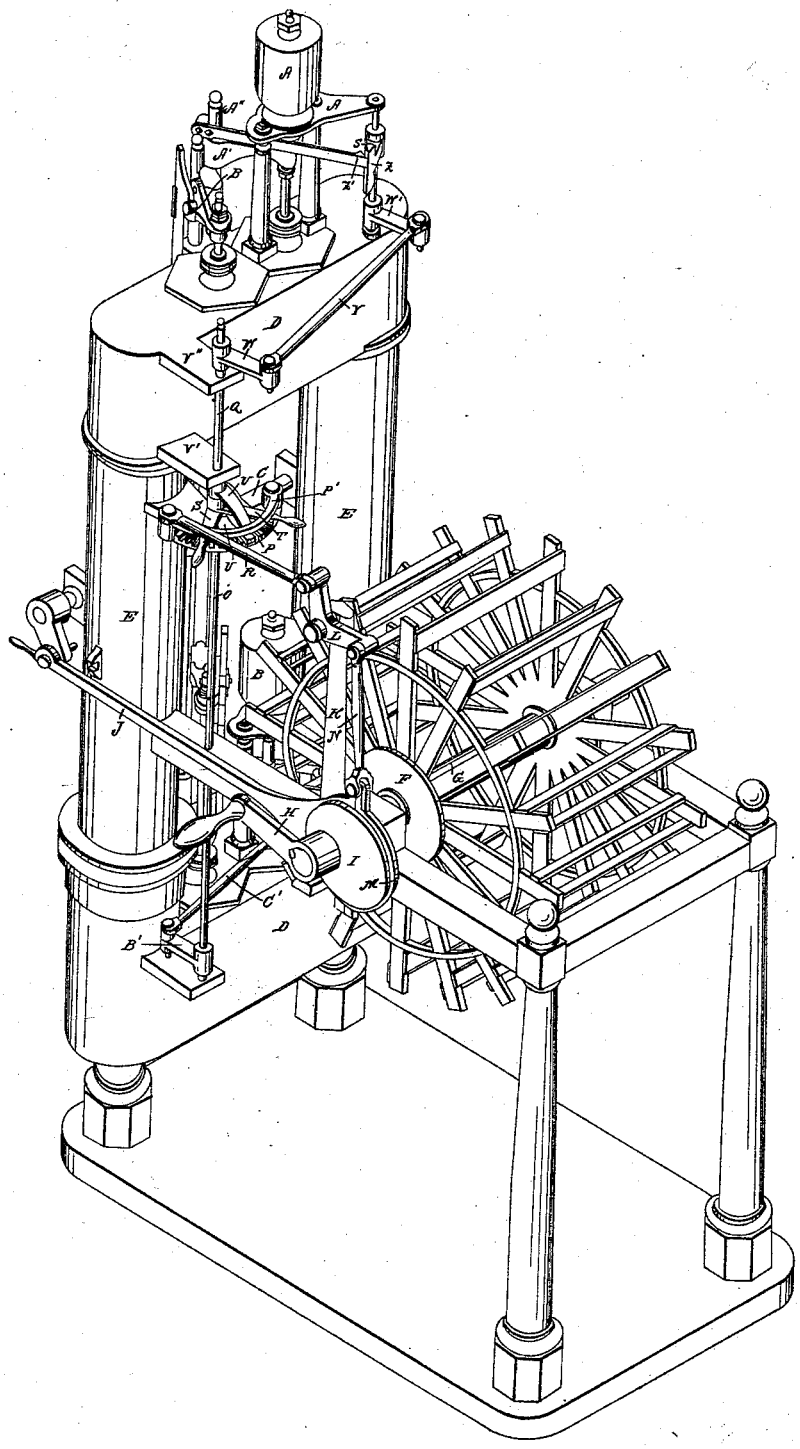
F. E. SICKELS.

Mode of Tripping Cut-off Valves.

No. 4,201.

Patented Sept. 19, 1845.



UNITED STATES PATENT OFFICE.

FREDERICK E. SICKELS, OF NEW YORK, N. Y.

MODE OF TRIPPING CUT-OFF VALVES.

Specification forming part of Letters Patent No. 4,201, dated September 19, 1845; Reissued February 21, 1860, Nos. 907, 908, 909, 910, 911, and 912.

To all whom it may concern:

Be it known that I, FREDERICK ELSWORTH SICKELS, of the city, county, and State of New York, have invented a new and useful Method of Tripping Drop Cut-Off Valves of Steam-Engines and Regulating and Adjusting the Same, and that the following is a full, clear, and exact description of the principle or character thereof which distinguishes it from all other things before known and of the manner of making, constructing, and using the same, reference being had to the accompanying perspective drawing, which makes part of this specification.

By the method now practised of operating the drop-cut-off valve, the motion is derived from the lifter which approaches its state of rest as the piston of the engine approaches the middle of its stroke, or its maximum velocity, and the valve is tripped by the same motion which lifts it so that there must be very great nicety in the adjustment to regulate the extent of the cut-off at about the half stroke. The object of my invention is to remedy this, and its principle or character consists in tripping the valve by a motion independent of the motion of the lifting rod or rods. And also in combining the various parts in such manner as to regulate the cut-off with accuracy during the action of the engine by connecting the two shafts, that trip the two cut-off valves, end to end by means of adjustable spring arms that take into and are, when set, held in the teeth of a sector which vibrates on the axis of motion of the shafts and receives its vibratory motion from the eccentric; which spring arms may be shifted in the teeth of the sector, brought nearer to, or farther from each other, and thus cut off at a less or greater portion of the stroke.

In the accompanying drawing (A) represents my improved drop cut off secured to me by Letters Patent on the —— day of —— 184— with the lifter (A′) projecting from the lifting rod (A″) and operated by the toes of the rock shaft (C) in manner not necessary to describe; but instead of disengaging the spring of the lifter (A′) from the stem of the drop valve by causing it to strike a permanent cam as it rises, I employ a long spring (Z′), projecting from the lifter and fitting in a notch in the stem of the drop valve, as heretofore made, but extending beyond this and having a curved projection (*s′*) on one of its faces, and at the extreme end, against which the outer face of an arm or wiper (Z) strikes as it vibrates on its vertical axis. The outer face of this arm or wiper is parallel with its shaft or axle, and of greater length than the motion of the lifter so that it can act on the curved projection of the spring (Z′), as it is carried up and down by the lifter, and thus cause it to drop the valve. The vibratory motion of the arm or wiper (Z) is obtained from the eccentric in the following manner: On its axle there is an arm (W′) connected by a rod (Y) with a similar arm (W) on the upper end of a vertical shaft (Q) which has a spring arm (T) at its lower end, (with the outer end handle form,) and its under face provided with a fillet or catch to fall into teeth on the upper face of a sector (P) that vibrates on the axis of the shaft (Q), it being attached by means of arms (U,U) that project from two collars that turn, one on the lower end of the shaft (Q) and the other on the upper end of a corresponding shaft (O) below it. From one end of this sector, a connecting rod R extends to one arm of a bell crank (L) the other arm of which is connected by a connecting rod (N) with the strap (M) of the eccentric (I), and at right angles to the eccentric rod (J) that operates the rocking shaft (C) of the lifters, so that the sector (P), and the parts deriving motion from it are at their maximum velocity while the rod (J) is passing the dead points of the eccentric (I), and therefore the motions of the arm or wiper (Z) correspond with the motions of the piston of the engine instead of the lifters, and therefore the liberation of the drop valve will be more rapid, and can be regulated with more accuracy than when the motion is derived from the lifting rods that move slower as the piston moves faster, and vice versâ. The shaft (O) which is below and corresponds with the one (Q) has a spring arm (S) similar to, and corresponding with the one (T) before described, and at its lower end an arm (B′) and connecting rod (C′) corresponding with the arm (W) and rod (Y) above, and all other corresponding parts to work the lower drop-cut off valve (B) which is not distinctly represented in the drawings, and which needs not to be shown as all these parts correspond in every particular with those above described.

The sector (P) has a plate (P′) above and

parallel with it for the purpose of strength, and to act as a guard for the spring arms (S) (T). The face of the sector (P) is provided with two sets of teeth each extending from the middle or arms (U, U) to the ends, and the length of each section should be such that the motion of the spring arms (S, T) from one extremity to the other shall shift the position of the wiper or arm (Z) so that when the arm is at the outer end of the segment of teeth the arm or wiper shall vibrate without dropping the valve, and thus act without the cut-off, and by moving it toward the middle the extent of the cut-off shall be decreased from the maximum to the minimum—that is to say—cut-off from the most to the least portion of the stroke.

It will be evident from the foregoing that any motion derived from any part of the engine may be substituted for the vibration of the arms or wipers, provided the character above described be maintained, as for instance, instead of the horizontal vibrating motion of the arm or wiper the spring may be disengaged from the stem of the valve by a vertical descending motion as the lifter rises, and this may be derived from any moving part of the engine other than the lifters or their rocking shaft, such as the piston rod, the beam, the crank shaft, &c.

What I claim as my invention and desire to secure by Letters Patent, is—

1. Tripping the drop valve of the cut-off by a motion independent of the lifters, substantially in the manner and for the purpose herein described.

2. I also claim combining the wiper that drops the valve of the cut-off, whether working horizontally or vertically, with any of the moving parts of the engine, other than the lifters, or their rocking shaft, by means of the sector and arm or arms by means of which the extent of the cut-off can be regulated at pleasure during the action of the engine, from the full to the least portion of the stroke, as herein described.

FREDERICK ELSWORTH SICKELS.

Witnesses:

C. W. M. KELLER,

A. P. BROWNE.

[FIRST PRINTED 1913.]