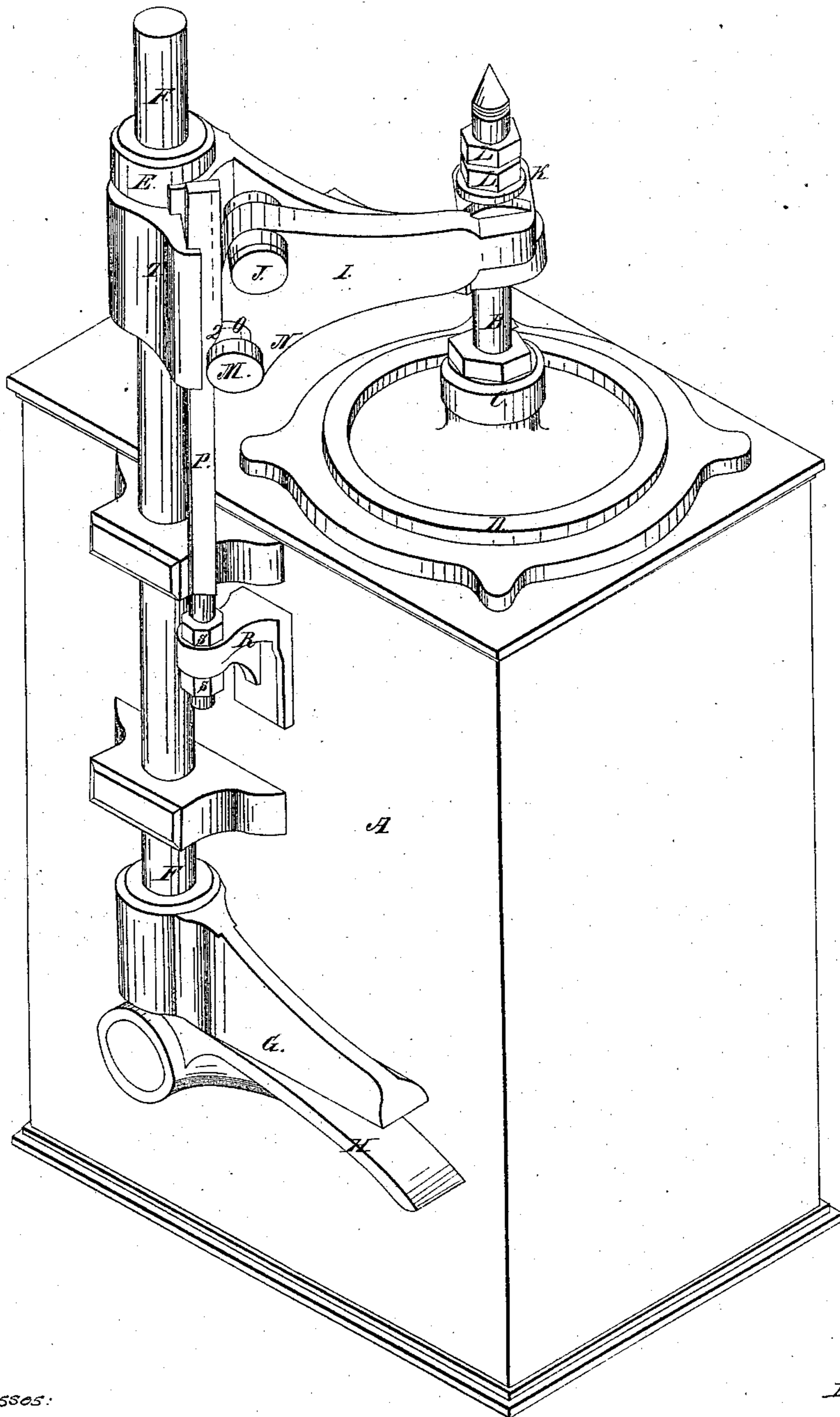


F. E. Sickels,
Steam-Engine Valve-Gear.
N^o 3,189. Patented July 20, 1843.



Witnesses:
J. E. Sickels
J. B. Brown

Inventor:
Frederick Sickels

UNITED STATES PATENT OFFICE.

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

MANNER OF OPENING AND CLOSING VALVES OF STEAM-ENGINES.

Specification of Letters Patent No. 3,189, dated July 20, 1843.

To all whom it may concern:

Be it known that I, FREDERICK ELLSWORTH SICKELS, of the city of New York, in the State of New York, have invented certain
5 improvements in the manner of opening and closing the exhaust-valves of steam-engines, thereby causing the steam to act more readily, favorably, and forcibly on the piston in
10 the cylinder than by any other means heretofore adopted, the invention being of such a nature as to admit of being easily adapted to nearly all kinds of steam-engines.

In the accompanying drawing A represents a portion of the steam chest containing
15 the puppet valves which are to be opened and closed, B the valve stem which passes through the stuffing box C of the bonnets D on the steam chest A; E the lifter, F the lifting rod, G the foot on the lifting rod F,
20 H the toe which acts upon and moves the foot G, being worked in the usual way producing the usual effect on the lifting rod and lifter, the construction of which being well known to engineers and machinists.
25 The lifter E is inverted and keyed on the lifting rod F. I represents a lever which vibrates on a pin J made fast to the lifter E, the projection K being the end of the lever I, through which passes the valve stem
30 B, the valve stem nuts L, L, being screwed on immediately above the projection K, the pin M being fastened to the lever at another terminus N, on which is placed the friction collar O, (represented by dotted lines). P
35 the bar on which there is a cam Q or curved projection, which may be continued up to the end of the bar P, or may recede as represented by dotted lines so as to make the same width above the cam that it is below;
40 the bar P is fastened to the knee R by screw nuts S, S, the knee R being attached to the steam chest A, T the knee attached to the lifter in which there is a groove sliding up and down on the bar P.

45 Shortly before the engine arrives at its

center, motion of the lifter E may be produced by any of the ordinary methods; motion will be communicated to the lever I, by means of the pin J; as the lever moves upward the collar O, revolving on the pin
50 M comes in contact with the cam Q causing the lever I to vibrate on the pin J, the projection K rising at the same time carries with it the valve stem B, thereby effecting
55 a more rapid opening than would be produced by any of the ordinary means. The lifter after having reached its greatest height descends and allows the friction collar O to slip back to the position as represented in the drawing, effecting a more rapid
60 closing of the exhaust valves at or near the first and last periods of their movements.

If the bar P should have the shape represented by the dotted lines the whole lift of
65 the exhaust valve will not be greater than would be without the cam and lever, the motion only being changed or different; but if the bar should have the shape as represented in the drawing an increase of the
70 lift of the valve as well as an alteration of the motion thereof would be effected.

Having thus fully described the nature of my improvements in the apparatus for opening and closing the exhaust valves of
75 steam engines, what I claim therein as new, and desire to secure by Letters Patent is—

The application of the within described cam and lever in connection with any of the ordinary apparatus for working the exhaust
80 valves of steam engines, or in any other wire, so as to effect the quicker opening of the exhaust valves at or near the first period of their movements, and the quicker closing of the exhaust valves at or near the last period of their movement.

FREDERICK ELLSWORTH SICKELS.

Witnesses:

THEOPH. E. SICKELS,
WM. COOPER.