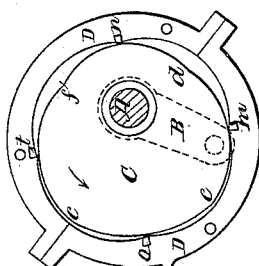
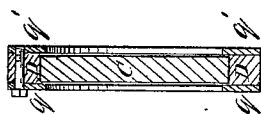
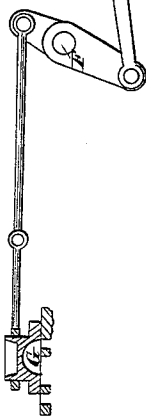


*W. G. Snook,*  
*Steam-Engine Valve-Gear.*  
*N<sup>o</sup> 41,128.                      Patented Jan. 5, 1864.*

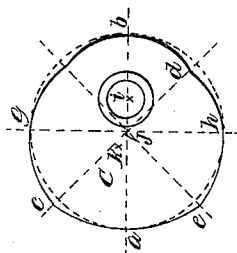
*Fig. 4.*



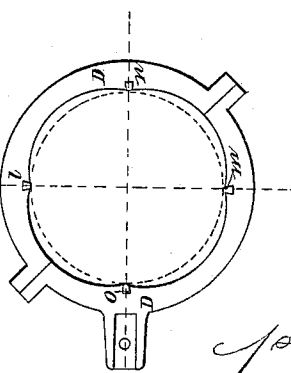
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



*Witnesses:*  
*J. W. Coombs.*  
*J. W. Reed.*

*Inventor:*  
*W. G. Snook.*  
*J. W. Coombs & Co.*  
*Attorneys.*

# UNITED STATES PATENT OFFICE.

WILLIAM G. SNOOK, OF CORNING, NEW YORK, ASSIGNOR TO HIMSELF,  
AND J. C. PATCHILL, OF BLOSSBURG, PENNSYLVANIA.

## IMPROVEMENT IN THE VALVE-GEAR OF STEAM-ENGINES.

Specification forming part of Letters Patent No. 41,128, dated January 5, 1864

*To all whom it may concern:*

Be it known that I, WILLIAM G. SNOOK, of Corning, in the county of Steuben and State of New York, have invented a new and useful Improvement in Eccentrics for Working the Valves of Steam and Other Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side view illustrating the application of my eccentric in connection with the slide-valve of a steam-engine. Fig. 2 is a side view of the eccentric. Fig. 3 is a side view of the strap. Fig. 4 is a section of the eccentric and strap in a plane passing directly through the axis of the shaft.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in a certain novel construction of an eccentric and its encircling strap, whereby it is made so to operate the valve or valves as to give a full opening to the ports both for induction and eduction during the first quarter of the stroke of the piston, and to close the ports during the last quarter of the stroke, leaving the valve stationary and the ports full open during the second and third quarters of the stroke, whereby I am enabled not only to maintain the full pressure of steam on the piston more nearly to the termination of its stroke, but to provide for a freer exhaust than is possible when the valve is connected with a common eccentric.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

A is the crank-shaft of the engine, B is the crank, C the eccentric, D the eccentric strap, E the eccentric-rod, F the valve rock-shaft, and G the slide-valve.

The valve and its ports and its whole system of connections with the eccentric strap may be the same as commonly used with the common eccentric or any construction and arrangement of valve and ports; and any system of connections that could be used in connection with the common eccentric may be used with my improvement.

To construct my improved eccentric C, I first describe the circle shown in red color in Fig.

2, of about the desired circumference of the eccentric, and then divide this circle into eight equal parts by lines *a b*, *c d*, *e f*, and *g h* intersecting the center thereof, and on the line *a b*, I mark a point, *i*, at a distance from the center *j* of the circle equal to the desired throw or half the desired stroke of the eccentric, the said point representing the center of the eccentric and coinciding with the axis of the shaft. I then with the radius *i a* strike from the point *i* the arc *c e*, touching the circle in the point *a* and terminating in the lines *c d* and *e f*, and from the points *c* and *e*, with a distance equal to the diameter of the circle, I strike the points *d* and *f* on the lines *c d* and *e f*. I next, with the radius of the circle, strike from a suitable point, *k*, in the line *a b*, the two arcs *c f* and *e d*, connecting the points *c* and *f* and those *e* and *d*, before described. I afterward describe between the points *d* and *f* an arc which will touch the circumference of the circle at *b*. The eccentric thus constructed is of uniform diameter on all right lines intersecting the center *j*. It is set in the usual manner relatively to the crank of the engine.

The eccentric-strap D is made with but four bearing-points, *l m n o*, which are arranged as shown in Fig. 3, at equal distances apart in a circle of the same circumference as that described in Fig. 2, the spaces between the said points being so hollowed out that the eccentric will only touch the said points, all of which will have a bearing owing to the diameter of the eccentric being uniform. The eccentric, instead of having flanges on it to confine the strap in place laterally, is represented as having the strap confined to it laterally by means of plates *q q'*, bolted to the strap and lapping over the sides of the eccentric. In Fig. 1 the plate on the front side of the eccentric is supposed to be removed to expose the eccentric and strap better to view.

In the operation of the eccentric the points *n o* are the only points in the strap upon which it acts to produce the movement of the valve. This movement is produced by the action of the two arcs *d e* and *c f*, the valve being stationary while the arcs *c e* and *d f* are between the points *n o*. As each arc of the eccentric is equivalent to one-quarter of its circumference, the whole stroke of the valve is produced during a quarter of a

revolution of the valve, commencing when the piston has made about three-fourths of one stroke, and terminating when the piston has made one-fourth of its return-stroke, the first half of the stroke of the valve closing the ports just as the stroke of the piston terminates, and the remaining half opening the ports full during the first quarter of the return-stroke of the piston.

To render the eccentric-strap durable, its several bearing-points, *l m n o*, may be composed, as shown in Figs. 1 and 3, of pieces of

hardened steel fitted into dovetail grooves cut across the strap.

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

The combination of the eccentric C, having its periphery composed of four arcs, and a strap, D, having four bearing-points, the whole operating substantially as and for the purpose herein set forth.

Witnesses: WILLIAM G. SNOOK.  
GEO. B. BRADLEY,  
J. S. ROBINSON.