No. 45,252. PATENTED NOV. 29, 1864.

A. E. KLINE.

CONVERTING MOTION.

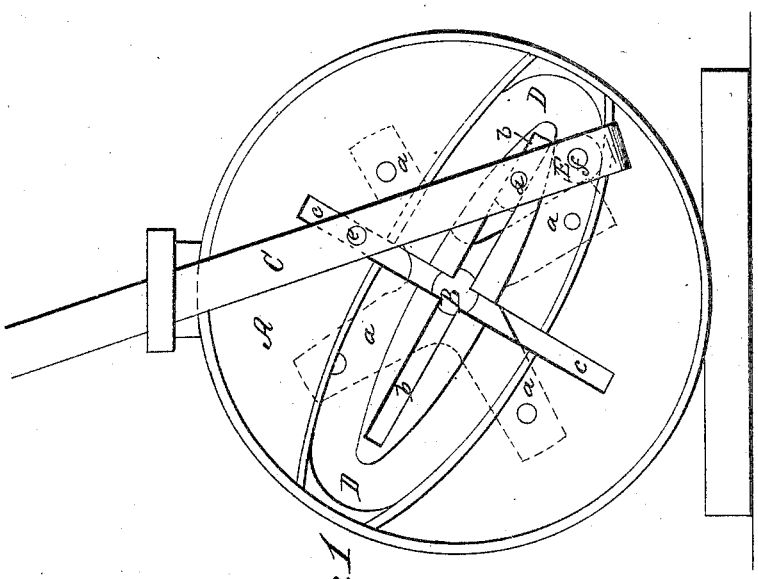

Fig. 1

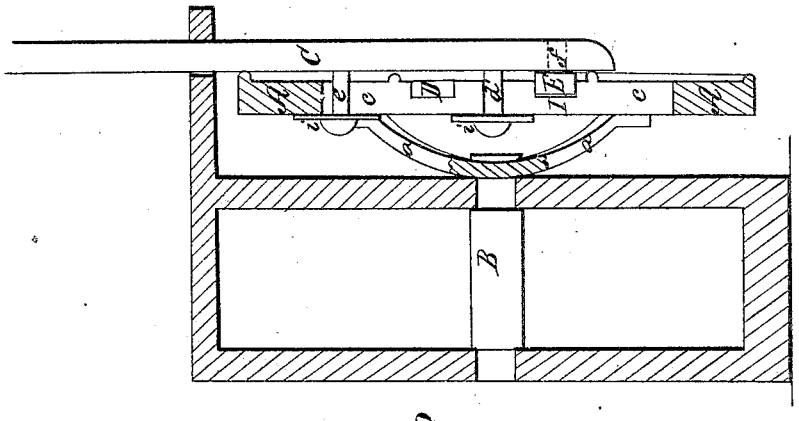

Fig. 2

Witnesses;
J. W. Coombs
A. S. Spencer

Inventor;
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UNITED STATES PATENT OFFICE.

A. E. KLINE, OF GOODVILLE, PENNSYLVANIA.

IMPROVEMENT IN CONVERTING MOTION.

Specification forming part of Letters Patent No. **45,252**, dated November 29, 1864; antedated December 20, 1863.

To all whom it may concern:

Be it known that I, A. E. KLINE, of Goodville, in the county of Lancaster and State of Pennsylvania, have invented a new and useful Improvement in Devices for Converting Rotary into Reciprocating Motion, and vice versa; 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, making a part of this specification, in which—

Figure 1 is a view of the device parallel with the planes of the rotary motion. Fig. 2 is a central section of the same at right angles to Fig. 1.

Similar letters of reference indicate corresponding parts in both figures.

This invention relates to that kind of device for converting rotary into reciprocating motion, and vice versa, which is composed of a rotary disk or plate containing two straight slots crossing its center at right angles to each other, and a reciprocating rod furnished with two pins to work in the said slots.

The improvement consists in constructing the disk or plate with an elliptic groove surrounding one of the said slots and furnishing the reciprocating rod with a roller to work in the said groove for the purpose of easing the movement of the pins in the straight slots and dispensing with the use of sliding boxes in the said slots.

To enable others to make and use my invention, I will proceed to describe its construction and operation.

A is the rotary disk or plate, attached rigidly by curved arms, *a a*, to a shaft, B, which is arranged in suitable fixed bearings.

b and *c* are the slots crossing each other at right angles in the center of the disk and extending equal distances on either side of the said center.

C is the reciprocating rod, and *d* and *e* are the two pins secured to the said rod to work in the slots *b* and *c*. The distance between the centers of these pins is equal to the desired length of the stroke of the rod, and the length of the slots *b c* is equal to at least twice the intended length of stroke of the rod with the diameter of one of the pins added. The said pins are inserted through the slots from the back of the disk and screwed into the rod, and, being made with heads and furnished with washers *i i*, they attach the rod to the disk.

D is the elliptical groove in the disk A, and E is the roller attached to the reciprocating rod C to work in the said groove, the said roller being arranged to turn freely on a pin, *f*, which is secured rigidly to the rod outside of the two pins, *d e*, and the said groove completely surrounding the slot *b*. The length of the ellipse forming the inner side of the groove is equal to twice the distance between the center of the roller-pin *f* and the pin *a* farthest from it minus the diameter of the roller E, and the width of the said ellipse is equal to twice the distance between the center of the roller-pin *f* and pin *d* nearest to it, minus the diameter of the roller. The ellipse forming the outer side of the groove is just as much larger as to provide room in the groove for the roller to run.

When rotary motion is given to the disk A by turning the shaft B, the pin *d* is caused to move back and forth along the slot *b* and across the slot *c*, and the pin *e* is caused to move back and forth along the slot *c* and across the slot *b*, and the roller E to travel round the groove D, and the rod C is thereby caused to receive a combined longitudinally-reciprocating and laterally-vibrating motion, making two complete strokes during every revolution of the disk. The rod C will, however, generally be connected with a rod or slide fitted to guides, and that rod or slide will derive from it a simple longitudinal-reciprocating motion. By giving a longitudinal movement directly to the rod by any suitable means—as for instance by connecting it with the piston of a steam-engine—the pins *d e* are caused to travel back and forth along the slots *b c* and the roller E to run round the groove D, as before specified, and a rotary motion is thereby imparted to the disk, giving it half a revolution for every stroke of the rod.

I do not claim, broadly, the combination of a double-slotted disk and a rod having two pins applied to work in the slots of the disk, as herein described; but

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

The combination of the elliptical groove D and roller E with the cross-grooves *b c* and disk A, in the manner and for the purpose herein shown and described.

A. E. KLINE.

Witnesses:
CLEMENT K. BIXLER,
HENRY S. ROYER.