

W. W. GAINES.  
Rock-Drill.

No. 196,574

Patented Oct. 30, 1877.

Fig. 1

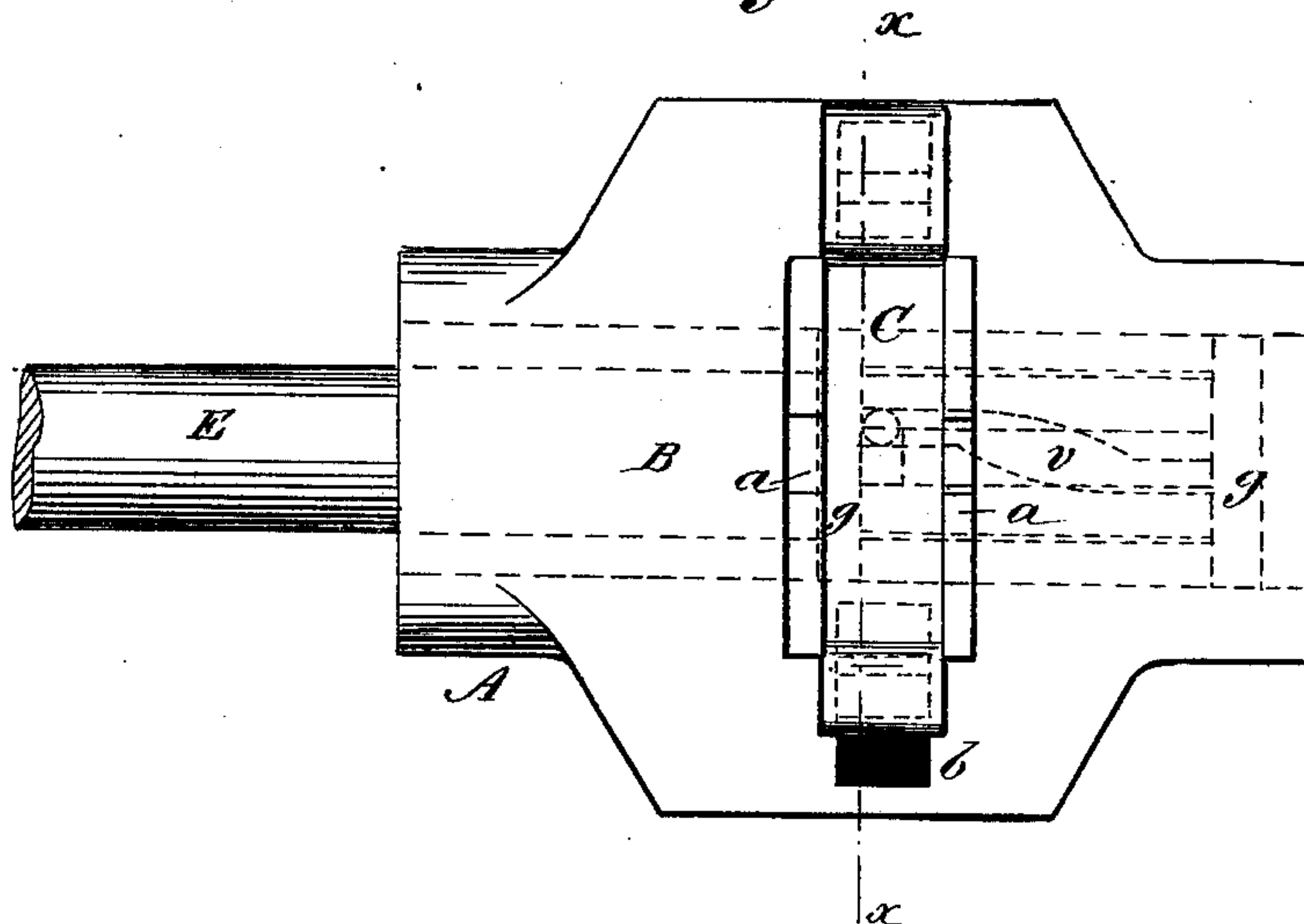


Fig. 2.

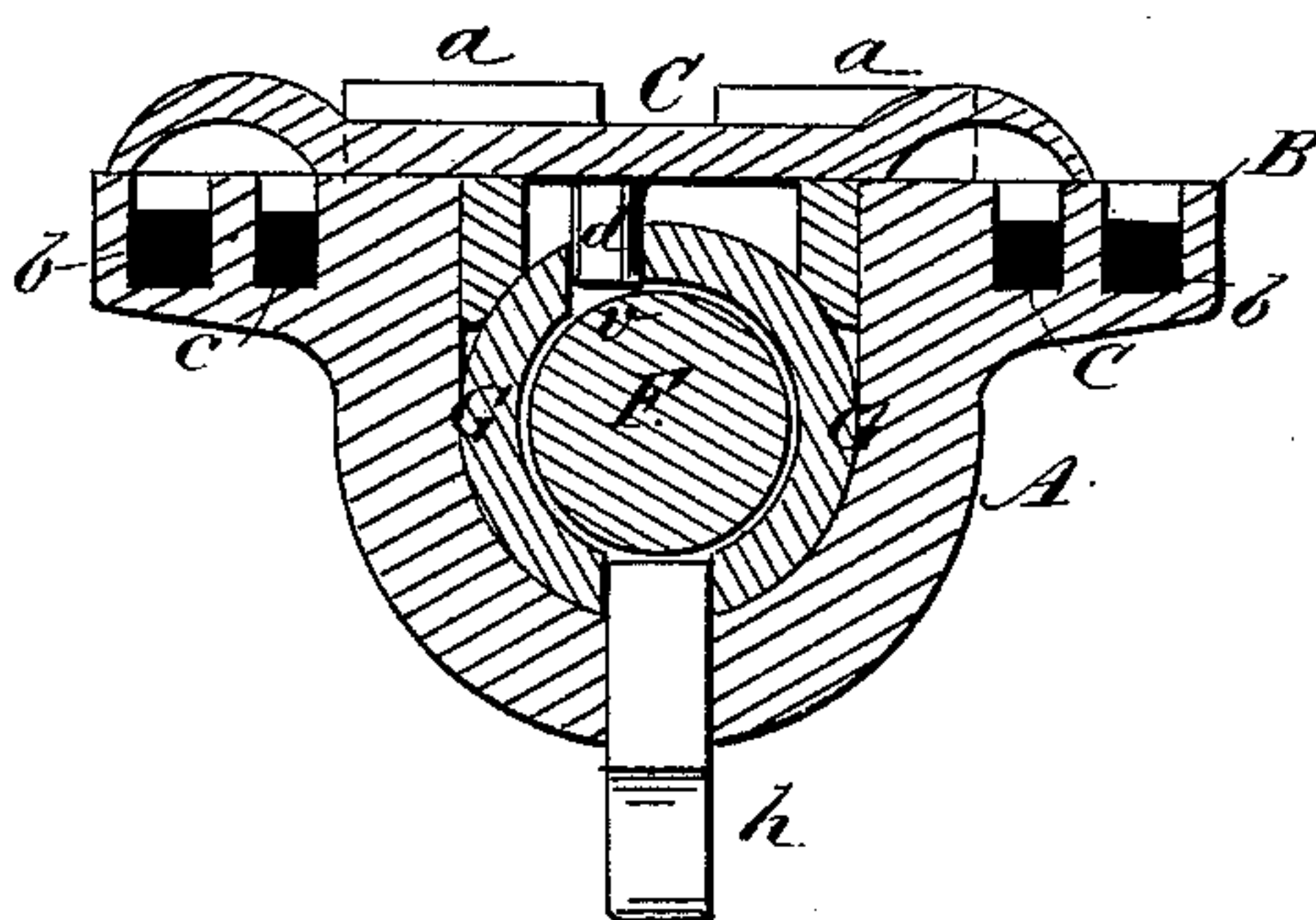
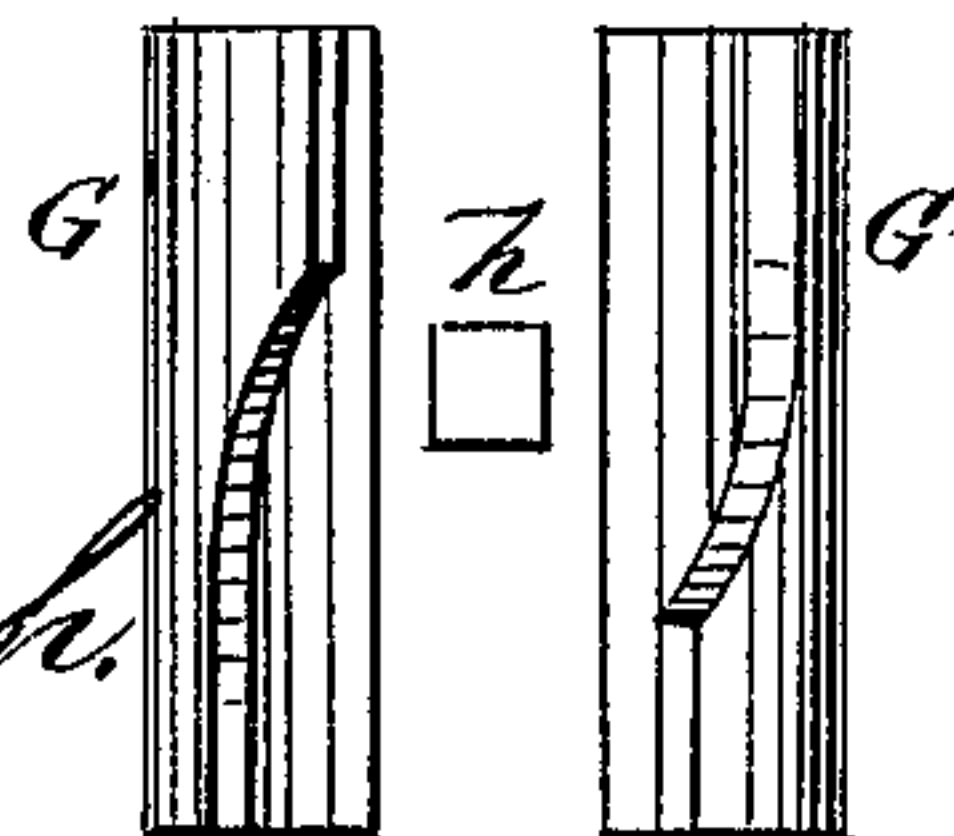


Fig. 3



WITNESSES:

C. Neveu  
J. H. Scarborough.

INVENTOR:

W. W. Gaines.  
BY Mumford

ATTORNEYS.

# UNITED STATES PATENT OFFICE.

WILLIAM W. GAINES, OF AU SABLE FORKS, NEW YORK.

## IMPROVEMENT IN ROCK-DRILLS.

Specification forming part of Letters Patent No. **196,574**, dated October 30, 1877; application filed August 24, 1877.

*To all whom it may concern:*

Be it known that I, WILLIAM W. GAINES, of Au Sable Forks, in the county of Essex and State of New York, have invented a new and Improved Rock-Drill, of which the following is a specification:

This invention relates to an improvement which is applicable to rock-drills where the piston acts directly on the drill-rod; and the nature of my invention consists in forming the cam-shaped groove which actuates the slide-valve of two separate pieces of metal, whereby I am able to form the pieces of hardened steel without liability of having them broken in the process, as will be better understood from the following description.

In the annexed drawing, Figure 1 shows part of a steam or air cylinder, a slide-valve, and drill-rod. Fig. 2 is a section taken in the plane indicated in Fig. 1 by dotted line *x x*. Fig. 3 shows the concave pieces which form the cam-groove.

Similar letters of reference indicate corresponding parts.

The letter A designates a cylinder, having a broad valve-face, B, on one side, which will be covered by a steam-chest. (Not shown in the drawing.) The ends of the cylinder will be provided with suitable heads.

C designates a slide-valve, which receives endwise motion at right angles to the piston, and is guided by means of flanges *a a*, removably applied to the cylinder, and inserted into an opening made into the cylinder through the valve-face.

The valve is a "double D," and admits steam into the cylinder, and exhausts through ports *b c*, in the usual well-known manner.

A stud, *d*, is formed on the slide-valve C at the middle of its length, which stud enters a groove, *v*, of serpentine form, which is between

the curved edges of two concave plates, G G. (Shown in Fig. 2.)

E designates a drill-rod, on which two annular flanges or piston-heads, *g g*, are formed, which are provided with suitable packing and fitted into the cylinder A. Between the flanges *g* the concave plates G G are applied so as to fit snugly.

Diametrically opposite the serpentine groove *v* is a straight groove between the lower edges of plates G G, which groove receives a key, *h*, that passes through the bottom of the cylinder A. (Shown in Fig. 2.)

Prior to my invention, the serpentine groove which gave motion to the slide-valve was formed in a single segment of a cylinder, which was made of hardened steel. These segments would often crack in hardening them, and also while using them.

By forming the groove as above described, there is no liability of the segments cracking, and they can be readily removed from the piston-head when they wear out.

I do not claim the construction of the cylinder, the slide-valve, nor the piston-head, as these features are not new with me.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In the drilling-machine herein described, the serpentine groove *v*, formed by the segments G G, arranged between the piston-heads *g g*, substantially as described.

2. The key-piece or guide *h*, passed through the bottom of the cylinder A, in combination with the segments G G, substantially as described.

WILLIAM W. GAINES.

Witnesses:

JACOB OBRIST,  
H. D. GRAVES.