

(Model.)

2 Sheets—Sheet 1.

J. FERN.

APPARATUS FOR SEPARATING SLATE FROM COAL.

No. 274,747.

Patented Mar. 27, 1883.

Fig. 2.

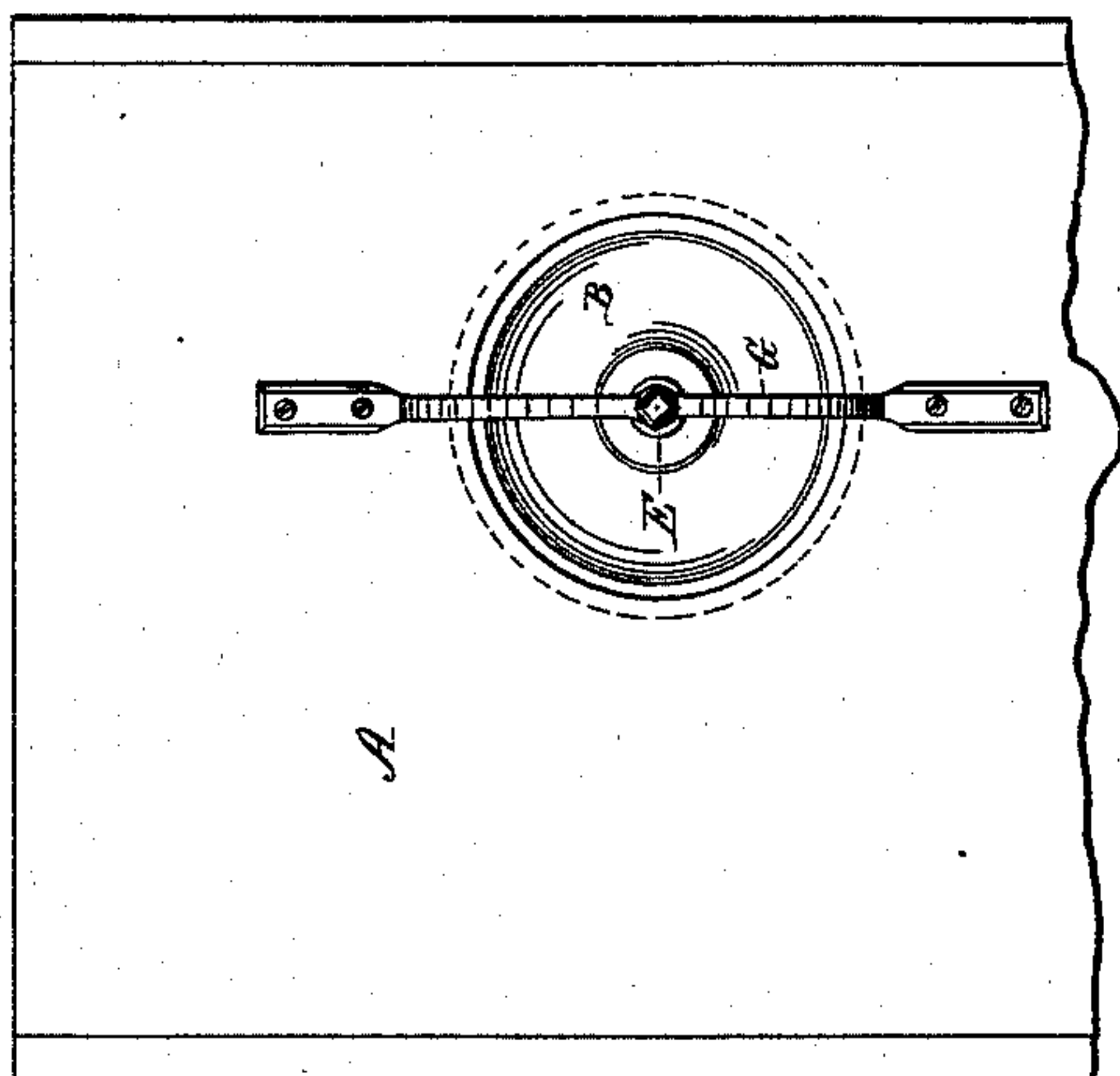


Fig. 3.

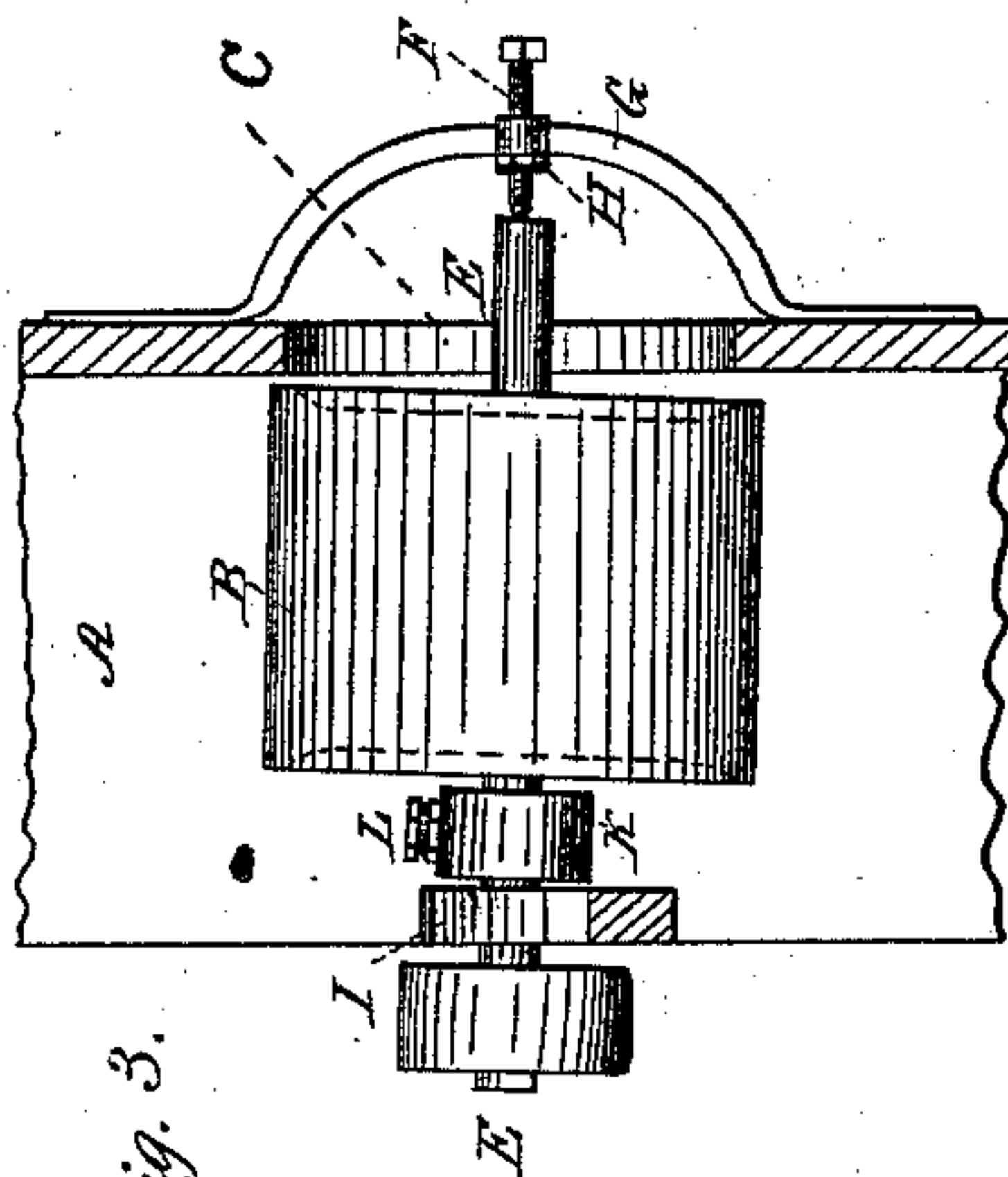
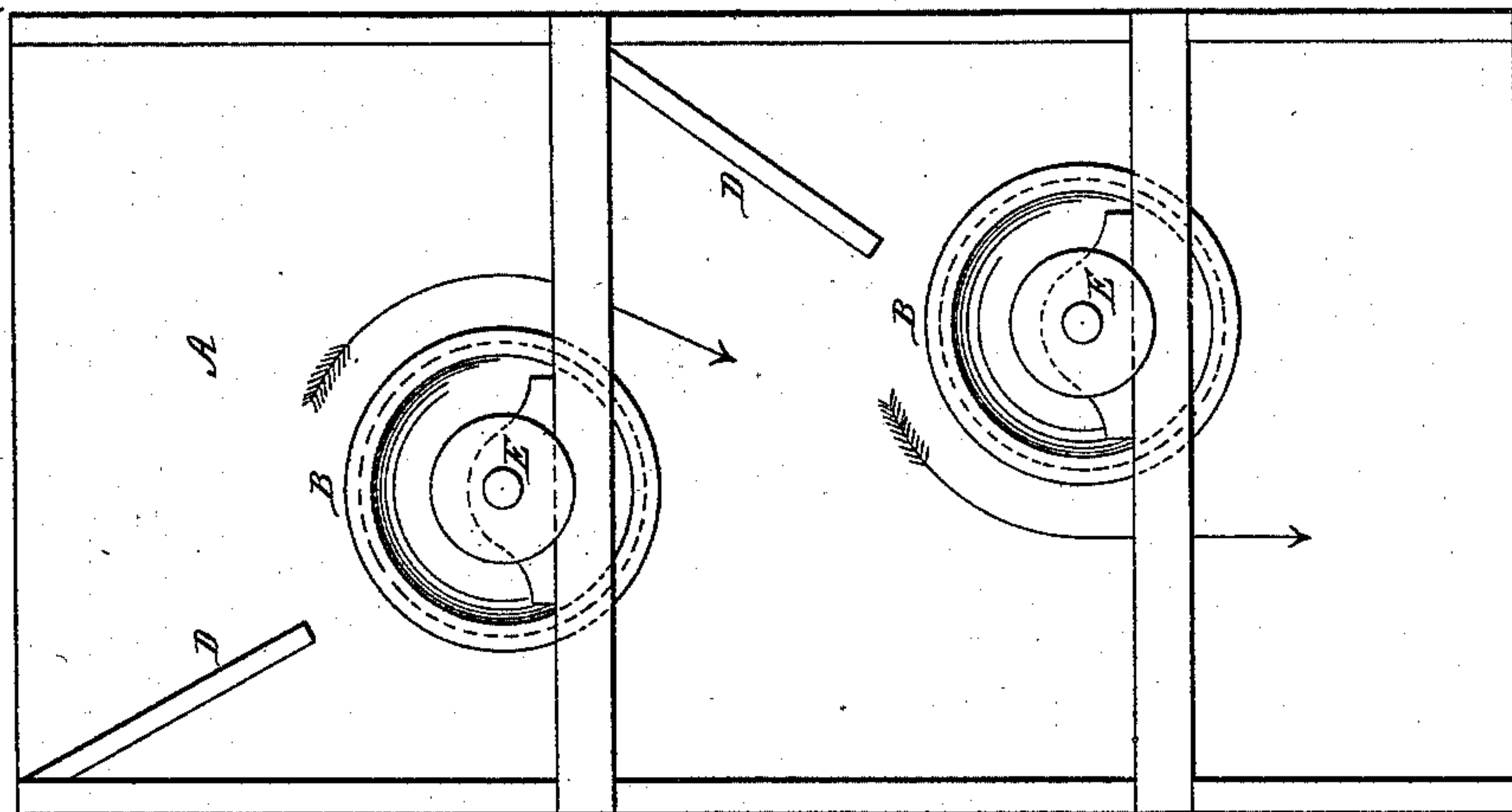


Fig. 1.



Witnesses:

W. C. Jindinstou.  
Fred F. Church.

Inventor:

John Fern,  
By *Merrell*  
His atty

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Fig. 4.

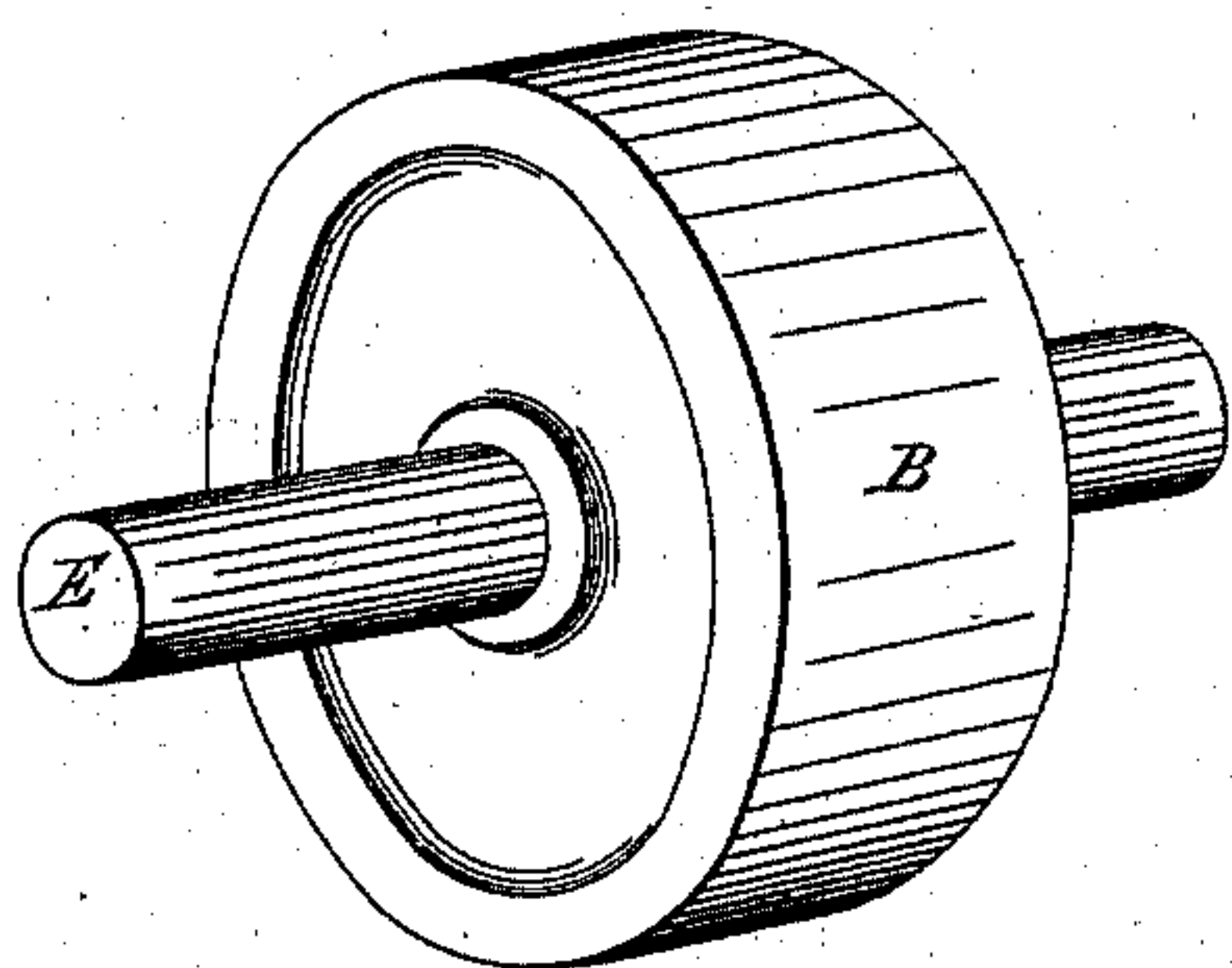


Fig. 6.

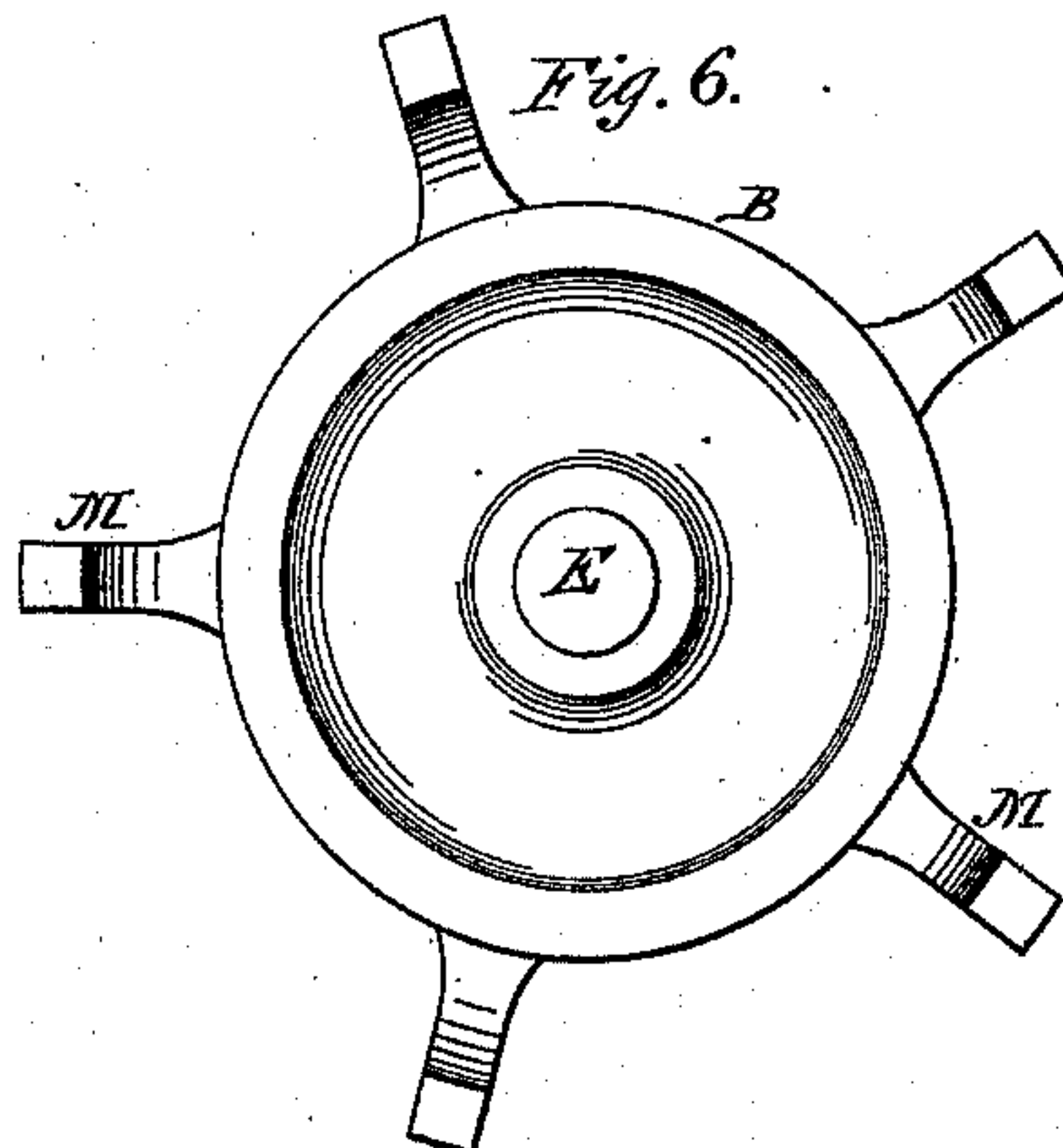
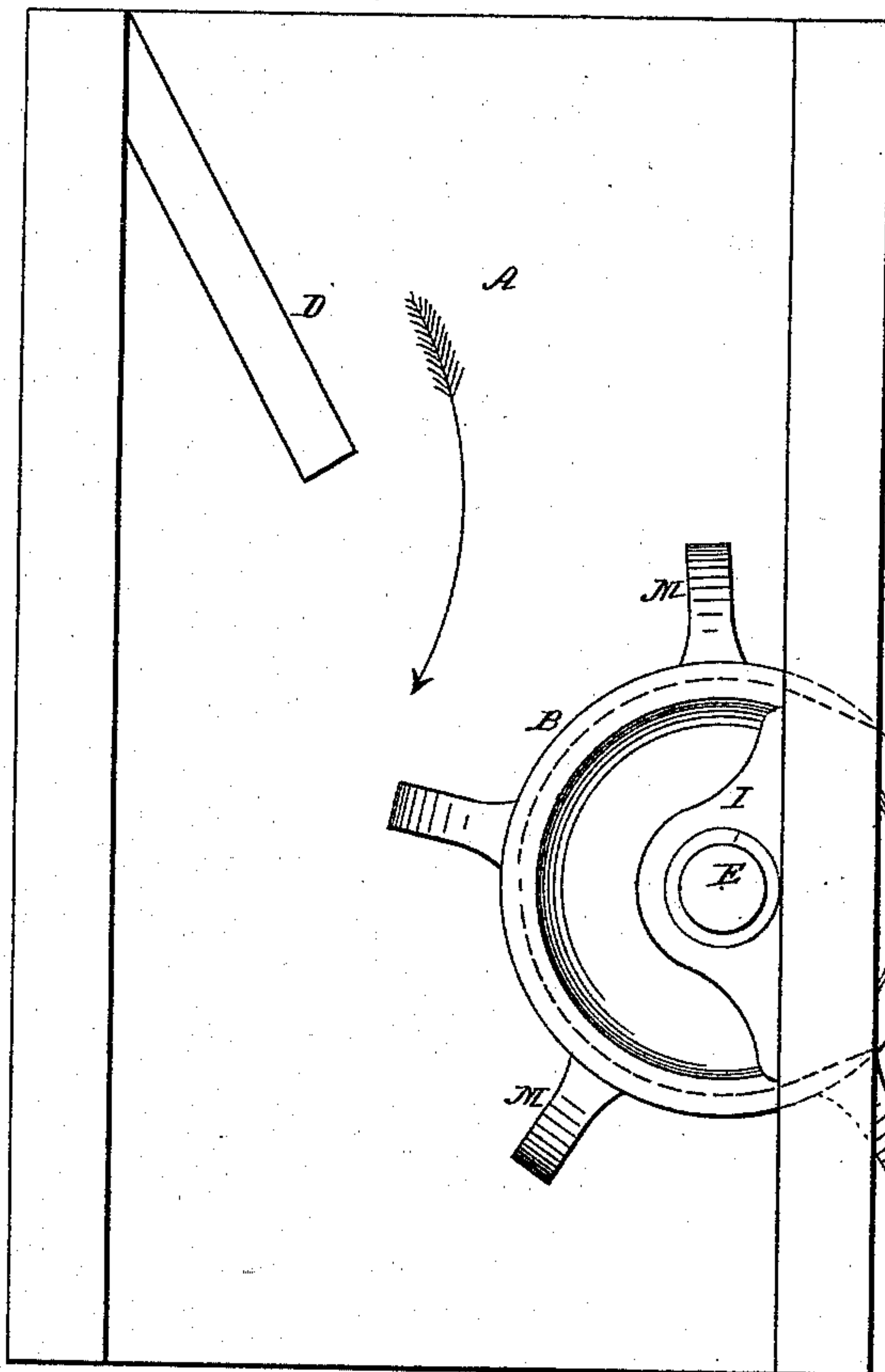


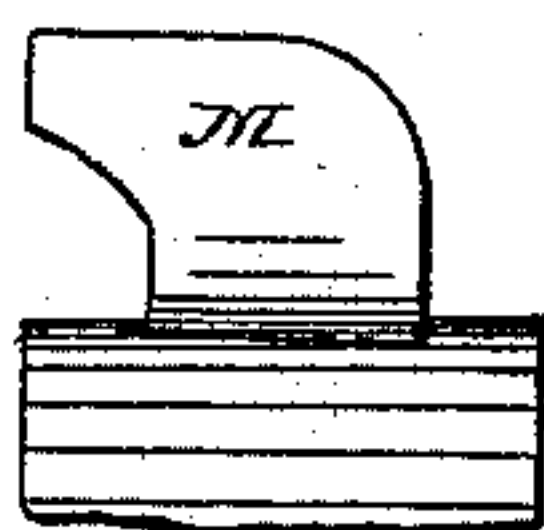
Fig. 5.



Witnesses:

W.C. Jindinston.  
Fred P. Church.

Fig. 7.



Inventor:

John Fern,  
by Maxwell Church  
His Atty.



# UNITED STATES PATENT OFFICE.

JOHN FERN, OF HYDE PARK, PENNSYLVANIA.

## APPARATUS FOR SEPARATING SLATE FROM COAL.

SPECIFICATION forming part of Letters Patent No. 274,747, dated March 27, 1883.

Application filed September 14, 1882. (Model.)

*To all whom it may concern:*

Be it known that I, JOHN FERN, of Hyde Park, in the county of Lackawanna and State of Pennsylvania, have invented a certain new and Improved Apparatus for Separating Slate from Coal; and I do hereby declare the following to be 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 top plan view of a coal-chute provided with my improved extractor. Fig. 2 is a bottom plan view, and Fig. 3 a side elevation, of the same. Fig. 4 is a perspective view of the extractor detached. Fig. 5 is a view showing a modification of the invention; and Figs. 6 and 7 are detail views of the extractor shown in Fig. 5.

Similar letters of reference in the several figures denote the same parts.

I will first describe my invention, and then point out its novel features in the claims at the end of this specification.

Referring to the drawings, A represents an inclined chute down which the coal containing the slate to be removed passes. Located within this chute are one or more circular rotating extractors, B, each of which is adapted to cover a corresponding opening, C, in the bottom of the chute; and secured to the sides of the chute are deflectors D, whose function is to direct the descending coal with positiveness against the extractors B. Each of the extractors consists of a rotating drum or cylinder mounted rigidly upon a shaft, E, whose lower end is stepped upon a set-screw, F, working through a yoke, G, and held at the required adjustment by a jam-nut, H, and whose upper end is supported in a bearing, I, as shown. The extractor-cylinder is raised above the bottom of the chute, so as to permit of the passage of the slate under it, and it but slightly overlaps the edge of the opening C, so that as the slate passes under it it will quickly be discharged through said opening. For the purpose of giving the extractor-cylinder a clearance and preventing wedging pieces of slate from passing under and clogging it, I pitch said cylinder so that its lower face shall be at an angle to the bottom of the chute and closer at the upper part of the cylinder, as

shown in Fig. 3, and effectually accomplish the desired object.

Mounted upon the shaft E below its upper bearing, I, is an adjustable collar, K, which is adapted to be held where adjusted by a set-screw, L. When it is desired to change the height of the extractor-cylinder with respect to the bottom of the chute, the collar K is loosened and the requisite adjustment is effected by a manipulation of the lower screw, F, and jam-nut H, after which the collar is again secured.

In Fig. 1 I show the extractors arranged entirely within the chute, while in Fig. 5 I show them at the sides of the chute with about a third of them projecting out of the chute. Either arrangement works well and may be adopted by the constructor.

In some instances I prefer to provide the extractor with radial arms for the purpose of stirring and agitating the coal and preventing it from clogging when it comes thick and fast in the chute. When such radial arms are employed I prefer that they be constructed as shown in Figs. 6 and 7—that is to say, in the form of hooks, M, projecting from the periphery of the extractor-cylinder at or about its middle, and turned down at the end flush with (or nearly so) the bottom of the cylinder, as shown. Constructed in this manner, the arms offer no obstruction to the passage of the slate under the cylinder. The pulley or cog-wheel by which each extractor is driven is mounted upon the shaft E either above or below the chute, as preferred.

The operation of the invention is as follows: The extracting-cylinders are imparted a rotary motion in the direction indicated by the arrows, and the coal to be cleaned is caused to pass down the chute. As it descends it meets the deflectors D, and is by them directed against the cylindrical extractors. The slate, being of greater specific gravity than the coal, lies at the bottom of the chute, and when the mass strikes the first extractor the flat and smooth pieces of slate (which have been considered the most difficult to remove by hand) pass under said extractor and out through the openings C beneath it, the remaining material passing down the chute, and being subjected to a like operation by the succeeding extract-



ors. I preferably adjust the several extractors so that each will permit the passage under it of larger pieces of slate than its predecessor.

By the use of my invention the work of separating the slate is effected automatically, and much hand-labor is dispensed with and time saved.

Having thus described my invention, I claim as new—

10 1. The combination, with the coal-chute having the slate-discharge opening, of a rotary cylindrical slate-extractor having its lower face above the bottom of the chute and arranged over the slate-discharge opening, substantially as described.

15 2. The combination, with the coal-chute having the slate-discharge opening, of a rotary cylindrical slate-extractor arranged over the slate-discharge opening and above the bottom of the chute, said extractor having a pitch with respect to the chute-bottom, substantially as described, whereby the clogging of the extractor by wedging pieces of slate is prevented.

25 3. The combination, with the coal-chute having the slate-discharge opening, of the rotating

cylindrical slate-extractor and the deflectors for directing the descending coal onto said extractor, substantially as described.

4. The combination, with the coal-chute having the slate-discharge opening, of the rotating cylindrical extractor, mounted upon the shaft, and the means for raising and lowering the shaft, so as to adjust it nearer to or farther from the bottom of the hopper, substantially as described.

5. The combination, with the coal-chute having the slate-discharge opening, of the rotary cylindrical extractor having radial arms or stirrers for stirring and agitating the passing coal, substantially as described.

6. The combination, with the coal-chute having the slate-discharge opening, of the cylindrical extractor having the radial arms bent down so as to form hooks, which agitate the coal, but do not prevent the passage of the slate under the extractor, substantially as described.

JOHN FERN.

Witnesses:

A. GODSHALL,  
WM. A. GAUL.