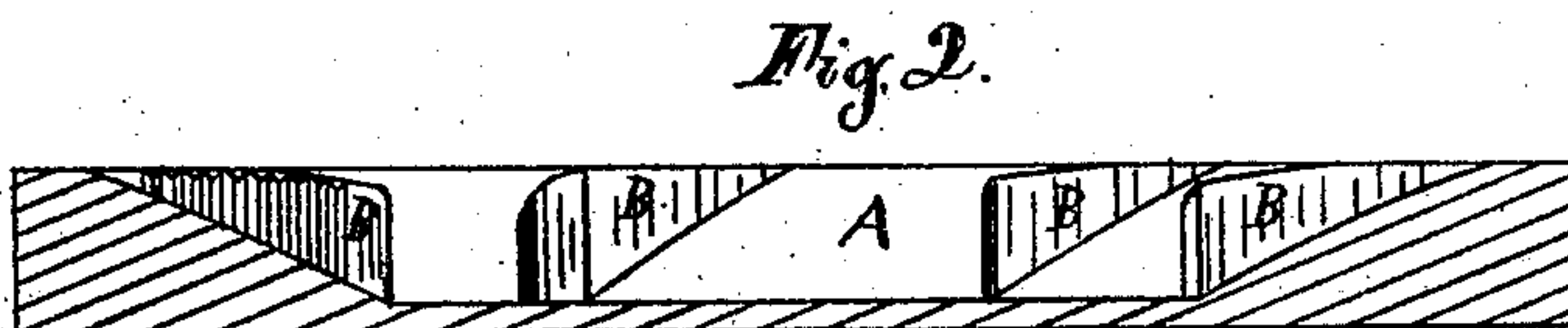
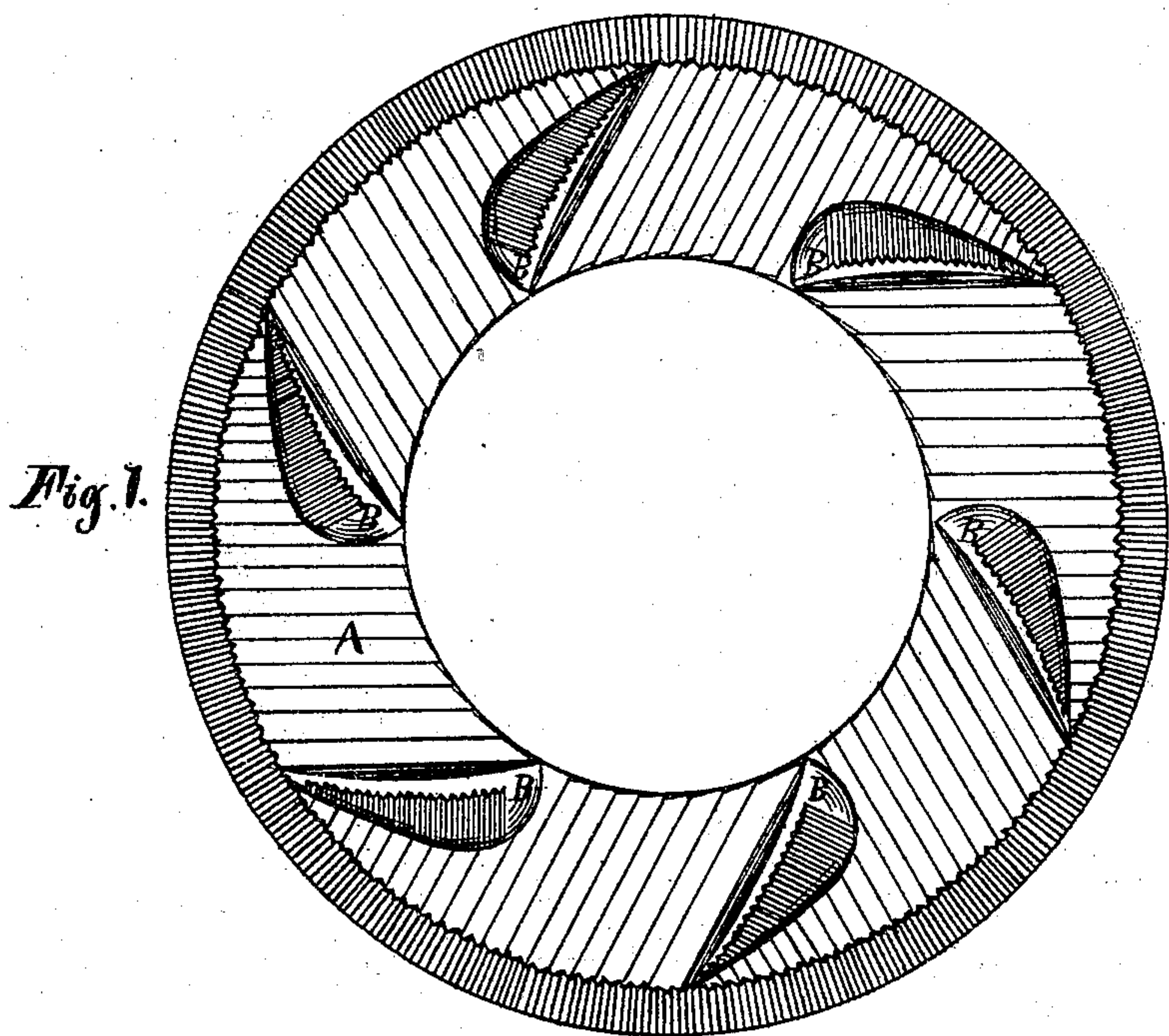


*E. S. Howland.*

*Millstone Dress.*

*No. 113433.*

*Patented Apr. 4, 1871.*



Witnesses.  
*A. C. Gutley*  
*C. H. Sherburne*

Inventor  
*E. S. Howland*  
By *Parwell Geo.*  
*his Atty*

# UNITED STATES PATENT OFFICE.

EDMUND S. HOWLAND, OF BATAVIA, ILLINOIS.

## IMPROVEMENT IN GRINDING-PLATES.

Specification forming part of Letters Patent No. **113,433**, dated April 4, 1871.

*To all whom it may concern:*

Be it known that I, EDMUND S. HOWLAND, of Batavia, in the county of Kane and State of Illinois, have invented a new and useful Improvement in Metallic Feed-Mill Grinding-Surfaces; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable others skilled in the art to which my invention appertains to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a top view of my invention, showing the fluted surfaces thereof; and Fig. 2 is a vertical central section of the same.

Similar letters of reference indicate corresponding parts in both figures of the drawing.

My invention relates to that class of metallic mills used for grinding feed; and the improvement consists in providing the grinding-surface of the rings with a series of curvilinear projections, extending from the inner side of the rings outward to a point near its periphery, the curved or working sides of which are provided with a series of furrows, which extend across their periphery at a right angle to the line of their center, by which the grain is mashed and forced outward to the outer grinding-surface of the ring.

In the drawing, A represents the ring proper, which may be of any desired size to fit the mill within which it is to be used, having its surface beveled from a point near its periphery inward toward its center and furrowed in the ordinary manner.

The outer surface of the ring is made flat, and is provided with a system of furrows finely graduated, the lines of which extend inward toward the center or axis of the ring.

Upon the beveled surface of the ring is

formed a series of curvilinear projections, B, which are so arranged as to bring their bearing-surfaces on a level with the outer furrowed surface of the ring. The front or curved portion of said projections which come in direct contact with the grain are also finely furrowed, the lines of which extend across the periphery of the curve. Said projections are cast solid upon the ring, and their positions arranged oblique to the line of their diameter, by which a centrifugal movement is imparted to the grain.

In the drawing it will be noticed that but one ring is shown; but in all cases two are employed, being of the same general form, one of which is secured in a fixed position, the other being inverted and so arranged as to revolve, thus bringing the grinding-surfaces in contact with the grain, by which means the grain is forced to the outer grinding-surface of the rings by the action of the projections, and is discharged therefrom in the ordinary manner.

Having thus described my invention, I would say that metallic rings having a furrowed surface have been previously used in feed-mills, but such I do not claim, broadly; but

What I do claim as new, and desire to secure by Letters Patent, is—

The grinding-rings A of a feed-mill, provided with the furrowed curved projections B, arranged as described, for the purpose specified.

The above specification of my invention signed by me this 27th day of January, A. D. 1871.

EDMUND S. HOWLAND.

Witnesses:

N. C. GRIDLEY,

N. H. SHERBURNE.