

(No Model.)

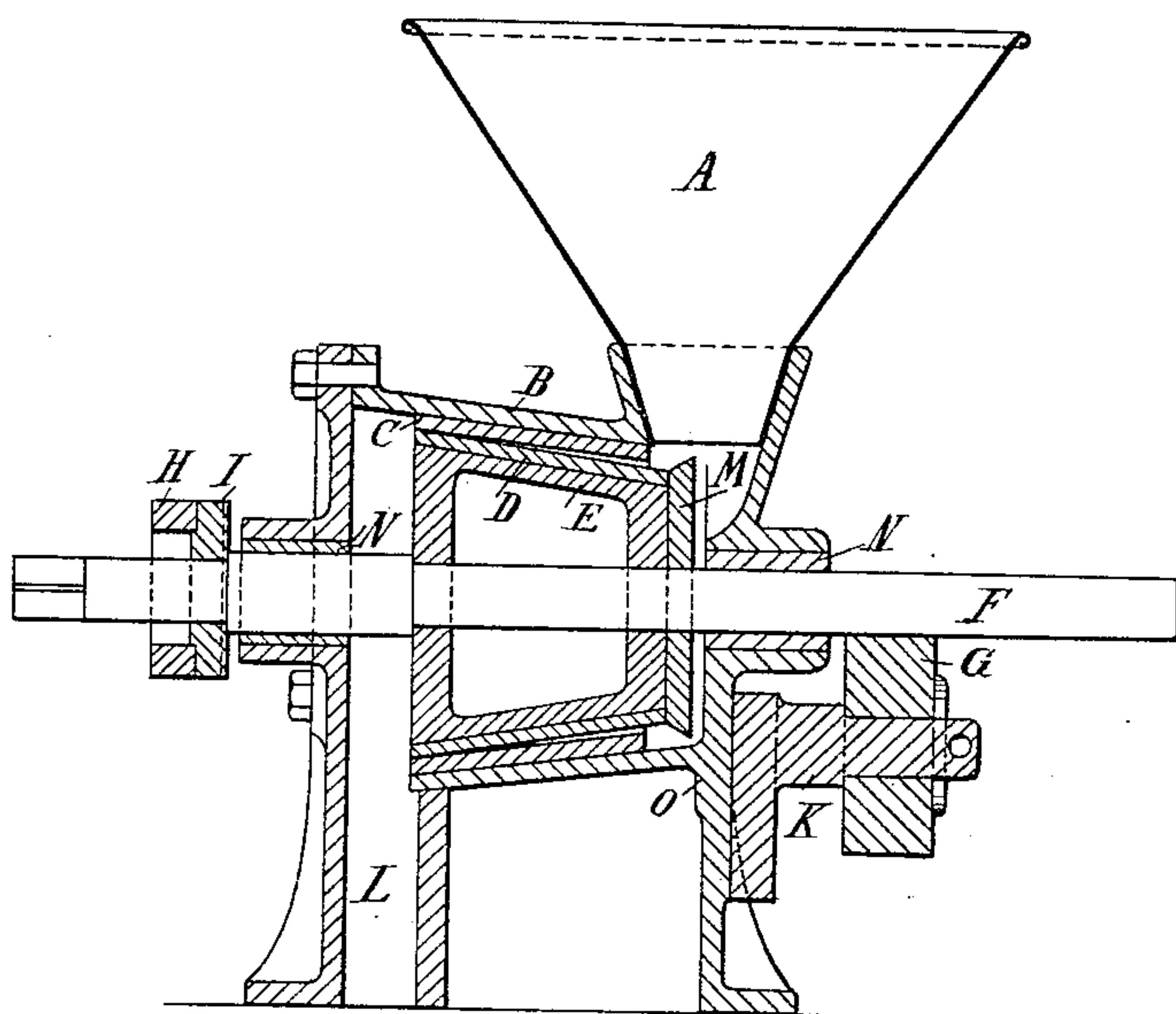
R. A. LISTER & G. S. RICHMOND.

GRINDING MILL.

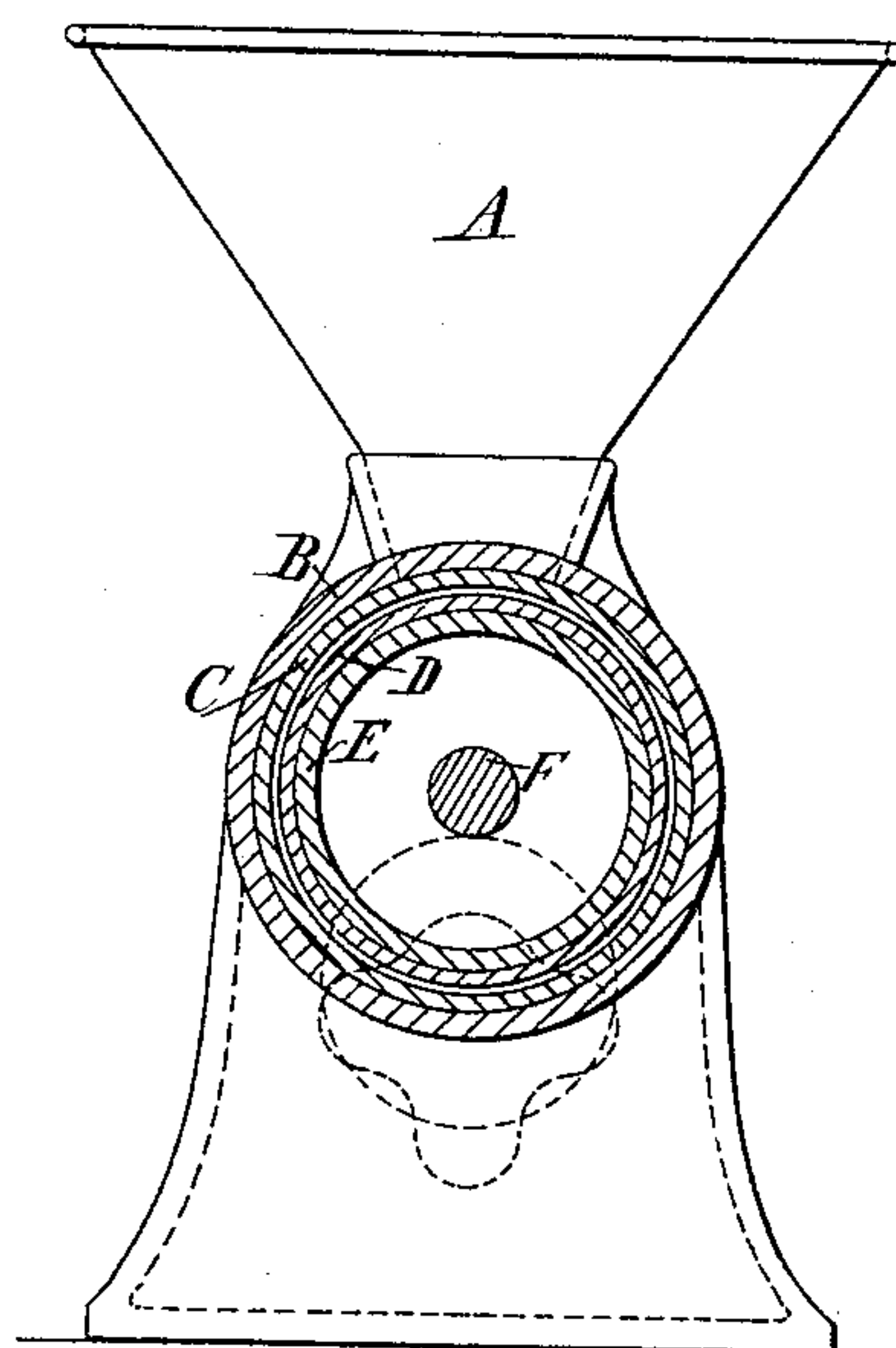
No. 389,310.

Patented Sept. 11, 1888.

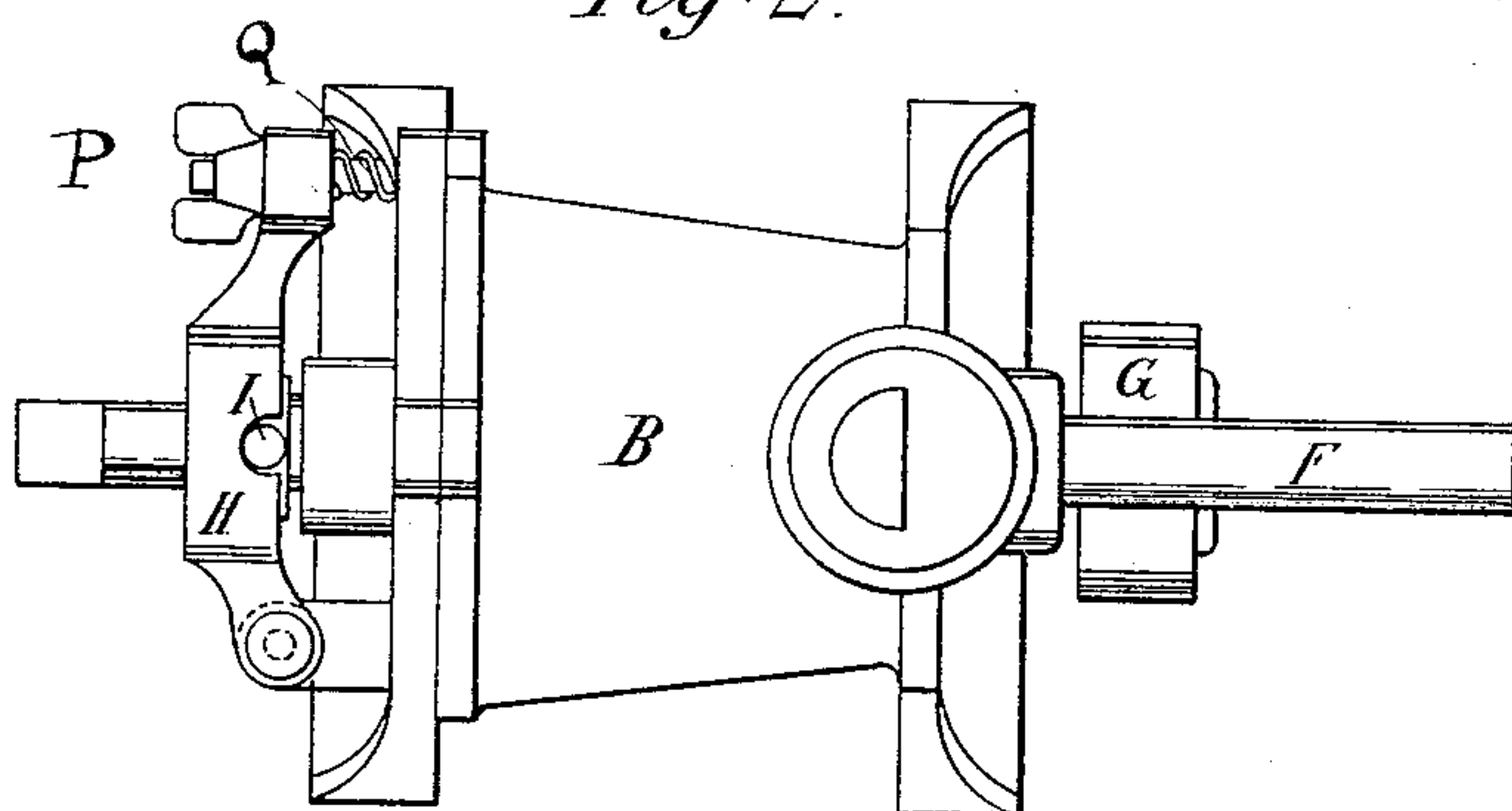
*Fig. 1*



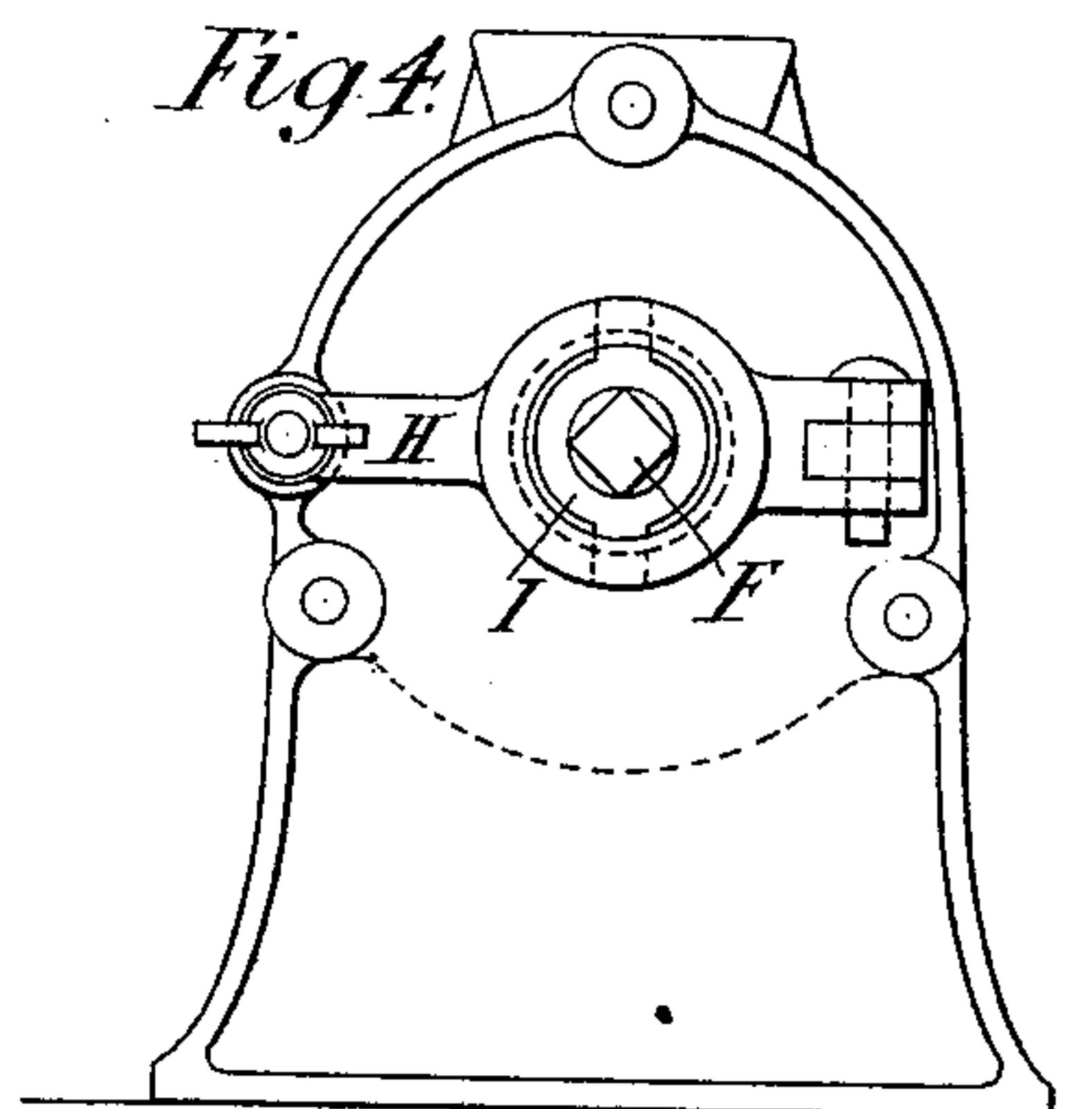
*Fig. 3.*



*Fig. 2.*



*Fig. 4.*



Witnesses:

*Wm. S. Norton*  
*J. B. Douglass*

Inventors

*Robert Ashton Lister*  
*George Shaw Richmond*  
by *John J. Baested & Son*  
their Atty's.

# UNITED STATES PATENT OFFICE.

ROBERT ASHTON LISTER AND GEORGE SHAW RICHMOND, OF DURSLEY,  
COUNTY OF GLOUCESTER, ENGLAND; SAID RICHMOND ASSIGNOR TO  
SAID LISTER.

## GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 389,310, dated September 11, 1888.

Application filed January 18, 1888. Serial No. 261,091. (No model.) Patented in England March 15, 1887, No. 3,882.

*To all whom it may concern:*

Be it known that we, ROBERT ASHTON LISTER and GEORGE SHAW RICHMOND, subjects of the Queen of Great Britain, residing at Dursley, in the county of Gloucester, England, have invented new and useful Improvements in Grinding-Mills, (patented in Great Britain, No. 3,882, dated March 15, 1887,) of which the following is a specification.

This invention relates to mills having metal grinding-surfaces, and wherein a fluted conical roller works within a fluted conical cylinder.

The objects of this invention are to simplify the construction of the mill, to increase its efficiency, and to enable the wearing parts to be more expeditiously and inexpensively replaced than heretofore.

In carrying out our invention, instead of the cylinder, which is generally of steel fluted on the inner surface and bolted to the end plates, as is usual, we propose to construct a mill having a conical cylindrical body cast with the end frame and bored true in one piece. Into this conical cylindrical body we press a liner, of steel or other hard metal, which is fluted on the inner surface and is securely fixed therein. This liner is easily removed when a new one is required. We propose to key a hollow cast-iron conical roller, accurately turned, onto the main shaft and upon the conical cast-iron roller we press a ring, of steel or other hard metal, fluted on the outside and firmly fixed by a suitable device, which is easily removed and replaced by a new one instead of the hollow steel roller forged in one piece, as is usually done. As a further improvement, we adjust the conical roller by means of a hinged lever and thumb-screw acting on a pivoted collar fixed on the spindle instead of a set-pin against the end of the roller, as is usually done.

In order that our invention may be clearly understood and readily carried into effect, we will explain the drawings hereunto annexed, by reference to the letters thereon.

In the drawings, Figure 1 is a longitudinal

section of the improved mill. Fig. 2 is a plan of the same. Fig. 3 is a transverse section, and Fig. 4 is an end view showing the adjusting-lever.

A represents the hopper, into which the material to be ground is placed.

B is the conical casing cast in one piece with the end frame, O.

C is the steel conical cylinder pressed and fixed into the casing B.

D is the conical steel lining-ring fixed onto the hollow cast-iron conical roller E.

F is the spindle upon which the hollow cast-iron conical roller E is securely keyed.

G is the friction-roller carrying the spindle F.

H is the adjusting-lever.

I is the pivoted collar.

K is the stud carrying the friction roller G.

L is the spout from which the ground material is delivered.

M is the fluted plate for holding on the steel lining-ring and for forcing the material onto the grinding-surface.

N is the metal bush.

P is a thumb-screw for adjusting the spindle and the roller E, and Q a spring between the hinged lever and the head of the frame.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

In combination, the frame having the conical casing B, the hollow conical grinding-roller surfaced by a conical steel lining, D, made in one piece, and the plate M, abutting directly against the smaller end of such lining and serving the double purpose of deflecting the grain to the grinders and of assisting to hold the lining, all as shown and described.

ROBERT ASHTON LISTER.

GEORGE SHAW RICHMOND.

Witnesses:

W. HEES EDMUNDS,

E. FRANKLYN DAVIES,

Attended Clerks to Mr. William Howell, Solicitor,  
Llanelli.