

W. HAINSWORTH.

Shoes and Dies for Stamping Mills.

No. 158,702.

Patented Jan. 12, 1875.

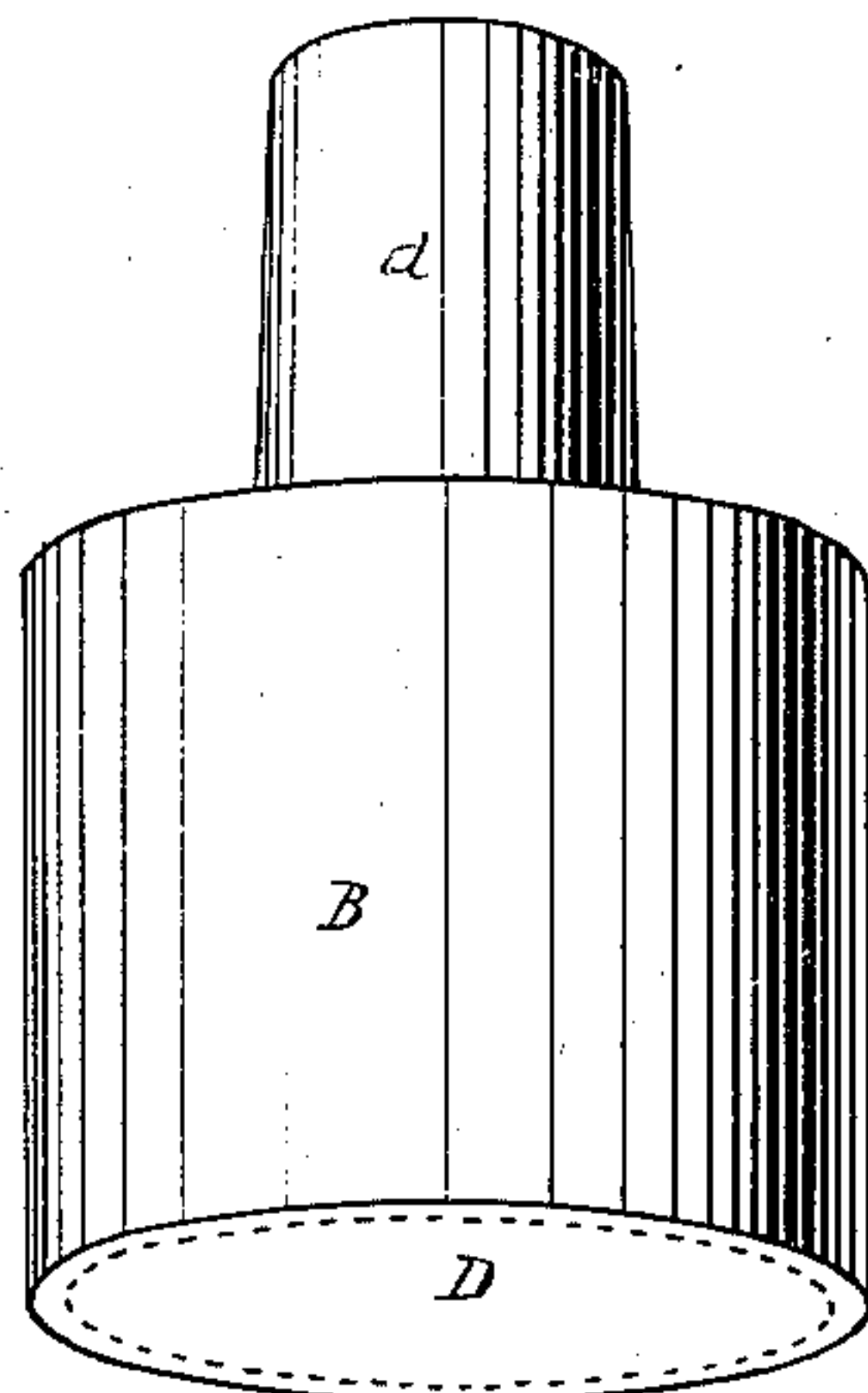


Fig. 2

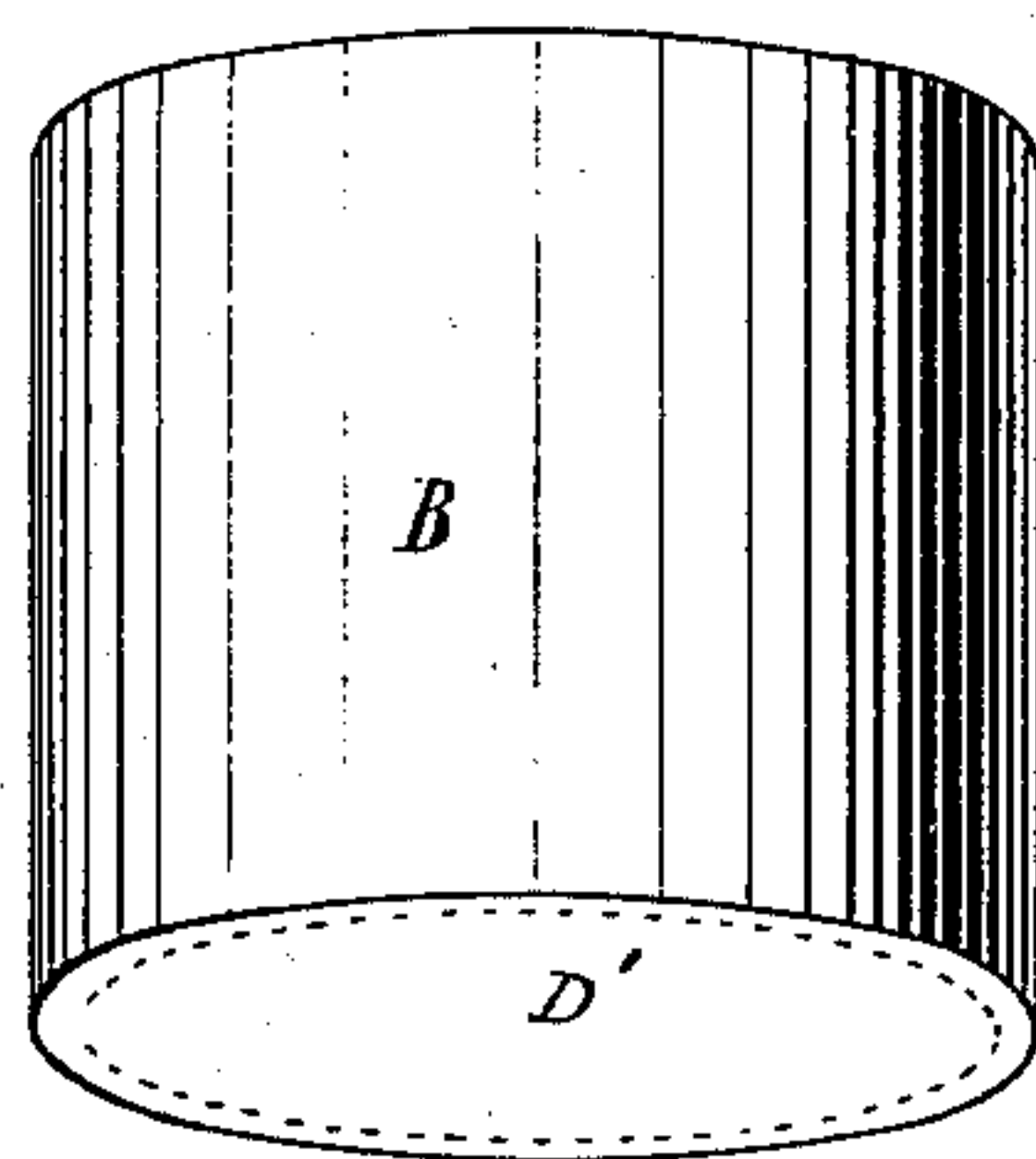


Fig. 3

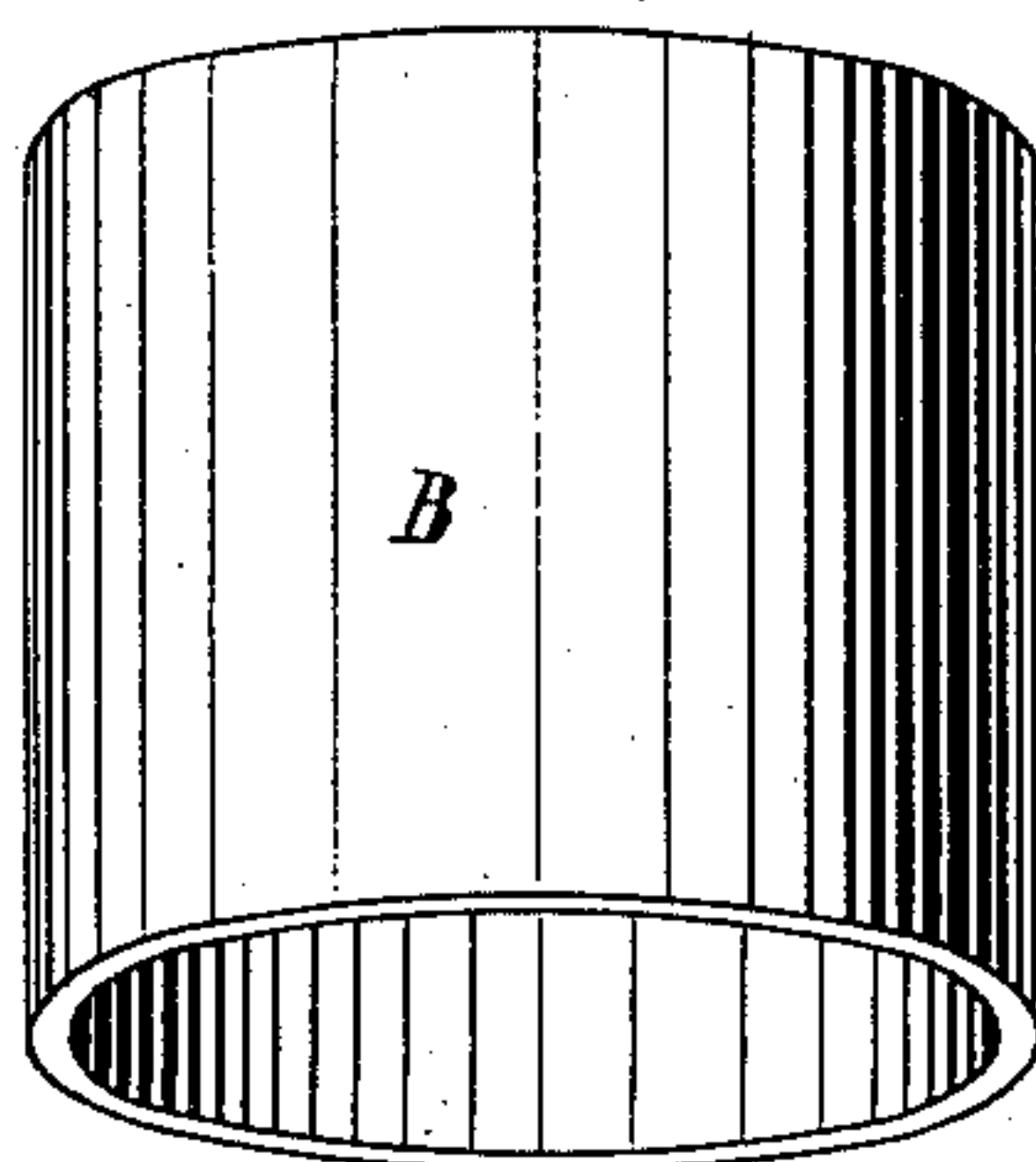


Fig. 1

Witnesses { Chas. G. Page.  
                  { C. L. Parker.

Inventor: William Hainsworth  
by George H. Christy  
his atty -

# UNITED STATES PATENT OFFICE.

WILLIAM HAINSWORTH, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO  
PITTSBURG STEEL-CASTING COMPANY, OF SAME PLACE.

## IMPROVEMENT IN SHOES AND DIES FOR STAMPING-MILLS.

Specification forming part of Letters Patent No. **158,702**, dated January 12, 1875; application filed  
December 19, 1874.

*To all whom it may concern:*

Be it known that I, WILLIAM HAINSWORTH, of Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Shoes and Dies for Stamping-Mills; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which like letters indicate like parts.

Figure 1 is a perspective view of a wrought-iron ring, such as I employ in working my improvement. Fig. 2 is a like view of one of the shoes complete; and Fig. 3 is a like view of a die complete.

My improvement relates to the manufacture of shoes and dies for that class of stamping-mills used in the crushing or pulverization of quartz, rock, ores, stone, &c.

These shoes and dies have heretofore been commonly made of cast-iron or cast-steel. When made of cast-iron they have been found to be too brittle for long and continuous use in the crushing of hard rock, so that they spall or splinter off at the outer edge, and consequently have to be frequently renewed. And the difficulty encountered in the manufacture of cast-steel shoes and dies for such work is, that to be durable they must be made very hard in tempering, but blocks of steel of such shape and size can be properly tempered successfully to a slight depth only, and are liable to burst or fracture if tempered over about two inches deep.

In carrying out my improvement, I make a wrought-iron tubular shell or ring, B, of about the size of the exterior of the shoe or die to be made. This shell is heated to about or a little above a welding heat. Into this heated shell, arranged in a suitable mold, if need be, I cast the body of the shoe as at D, or of the die D', these parts being the same generally in shape, except that the shoe has a stem, d,

by which it is attached to the vertically-moving plunger, which carries it, the die being seated in the usual or any convenient way in the box or hopper.

In casting the body part of the shoe or die, I use cast iron or steel, or other hard metal suitable for the purpose. The molten metal so cast into the shell makes a fused or welded joint or union with the inner face of the shell, so that the two make the solid shoe or die required.

Another way of effecting this union so as to make substantially the same article is to shrink and weld the wrought-iron shell onto the previous'y cast or forged hard-metal body.

The product secured in either case, gives me a hard-metal working face, surrounded by a tough fibrous band or shell, such as to prevent the splintering or spalling above referred to, (when cast-iron or like material is used,) or if the body be made of steel or like material requiring tempering, the bursting or fracturing of the shell either in or as a consequence of the tempering, is practically prevented, and a much more complete, perfect, and deeper tempering can be effected in consequence of the use of the wrought-iron surrounding shell.

Instead of wrought-iron for the ring or shell, other tough fibrous metal having like qualities may be employed.

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

In the manufacture of shoes and dies for stamping-mills, the combination of a wrought-iron or other tough fibrous shell with a hard-metal body, substantially as set forth.

In testimony whereof I have hereunto set my hand.

WILLIAM HAINSWORTH.

Witnesses:

J. H. HILLERMAN,  
GEORGE H. CHRISTY.