

(No Model.)

H. D. HIBBARD.
CRUSHER HEAD.

No. 575,549.

Patented Jan. 19, 1897.

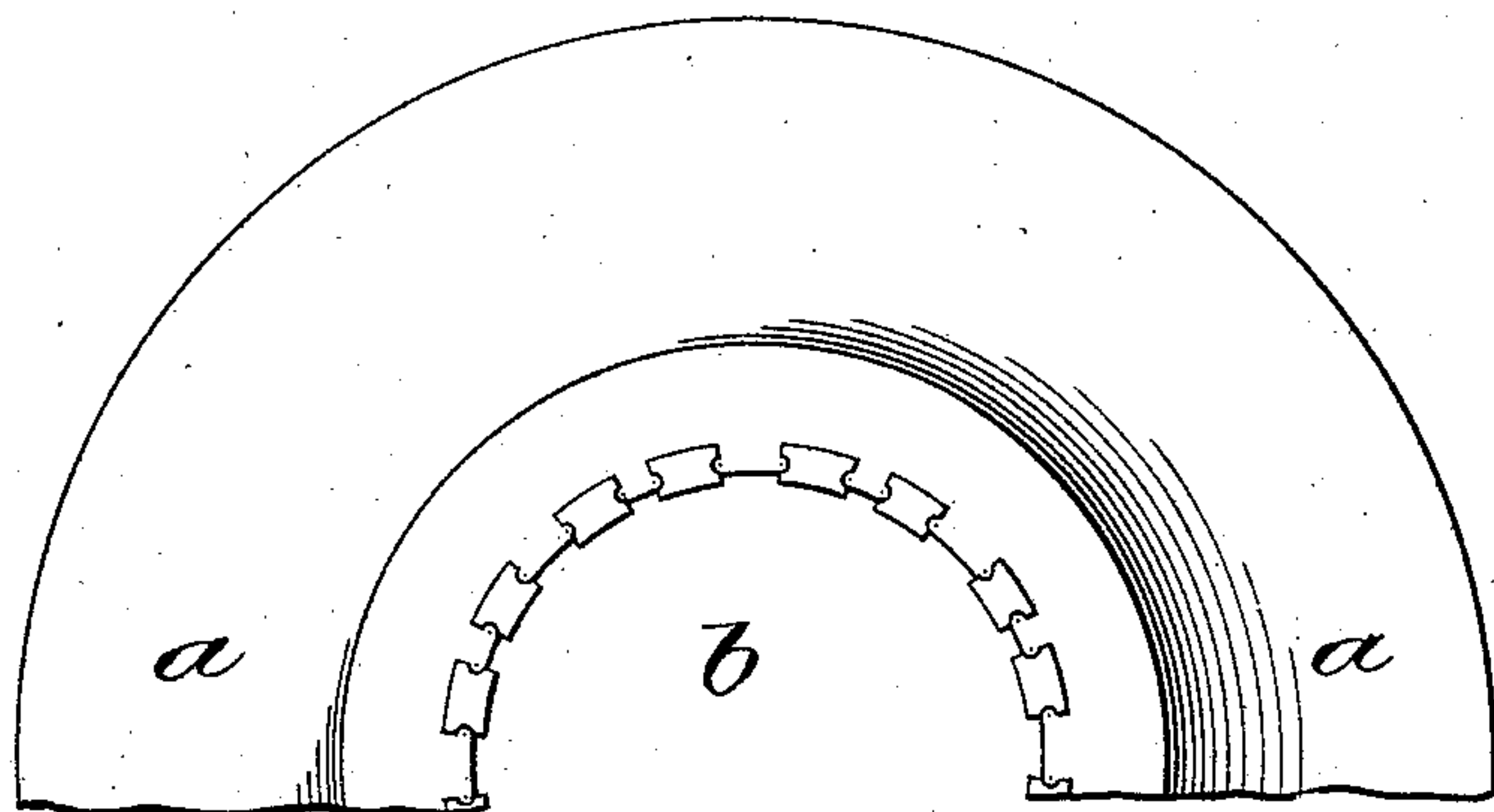


Fig. 3.

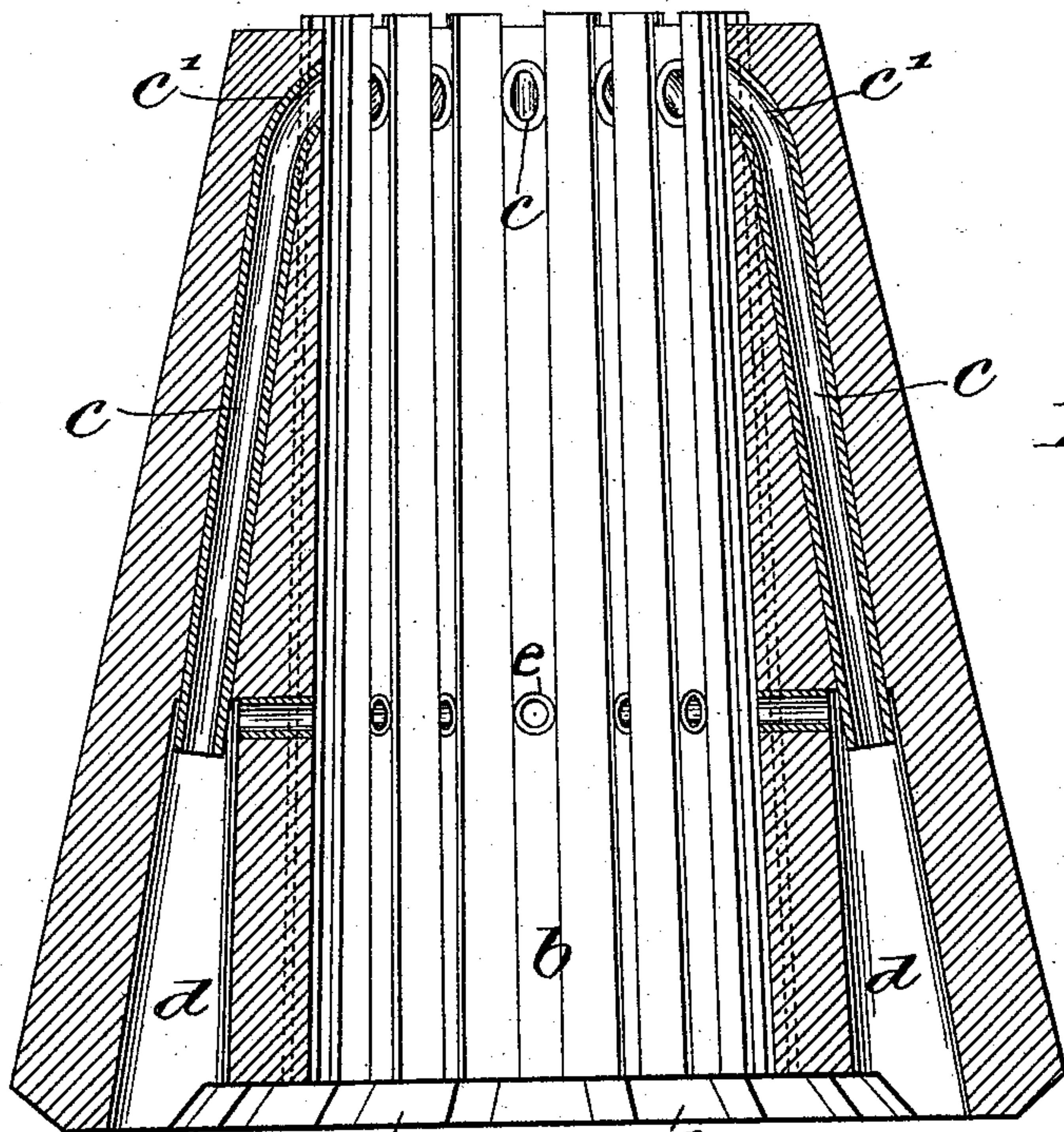


Fig. 2.

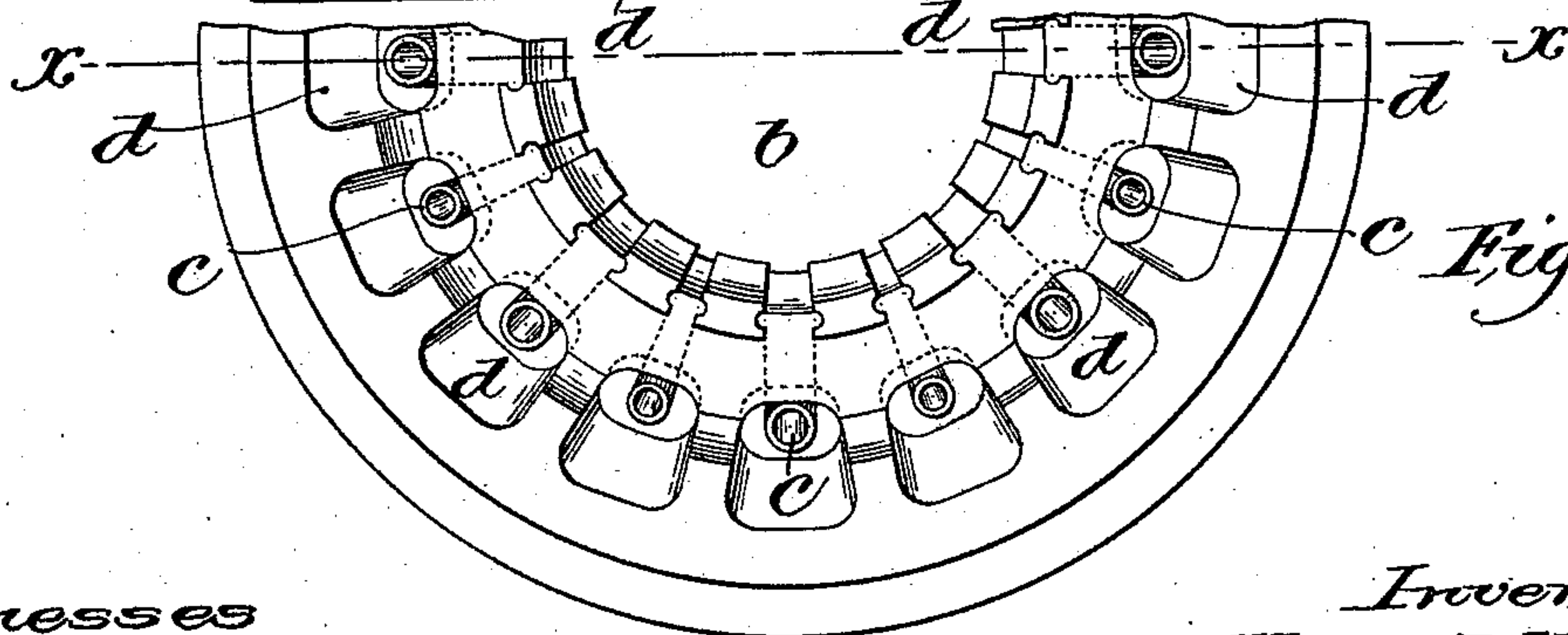


Fig. 1.

Witnesses
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UNITED STATES PATENT OFFICE.

HENRY D. HIBBARD, OF HIGH BRIDGE, NEW JERSEY, ASSIGNOR TO THE
TAYLOR IRON AND STEEL COMPANY, OF SAME PLACE.

CRUSHER-HEAD.

SPECIFICATION forming part of Letters Patent No. 575,549, dated January 19, 1897.

Application filed October 2, 1895. Serial No. 564,400. (No model.)

To all whom it may concern:

Be it known that I, HENRY D. HIBBARD, of High Bridge, county of Hunterdon, State of New Jersey, have invented an Improvement in Crusher-Heads, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Metal castings are subject to serious objections, due to the different rates of cooling and contraction of different parts when the castings are of irregular cross-section or when they are thick, as in the latter case the middle cools much more slowly than the exterior.

Castings which are moderately thin throughout and approximately of uniform thickness cool uniformly as compared with those castings which vary considerably in thickness or which are thick throughout.

The formation of "pipes" in castings of irregularly-cooling shape often proves very objectionable, and a "riser" or "sink-head" is sometimes used to supply liquid metal to fill the space in a casting which would otherwise be left in the form of a "pipe;" but the mass of metal in the riser must be comparatively great to be effective.

When an irregularly-cooling piece is cooled, either from above the melting-point or merely from the temperature to which it has been previously heated, as in water-quenching, irregularity in the rate of cooling and contraction exists, and as the different parts of the casting cannot accommodate themselves to their rates of cooling severe internal stresses arise which may cause the piece to crack.

Manganese steel is very much tougher when suddenly cooled than when slowly cooled, and to give an article of manganese steel great toughness as a whole uniformity of cooling is highly desirable.

The sudden cooling, or heating plus sudden cooling, of manganese steel is a specific variety of "heat treatment," such term including methods of so subjecting metals to special desired temperature and special rapid changes of temperature as to induce in them special desired properties.

This invention has for its object the production of a novel cast-metal article which

shall be free from the hereinbefore-mentioned objections.

Figure 1 is a partial bottom view of a cone or crusher-head embodying my invention. Fig. 2 is a vertical section thereof, taken on the line xx ; and Fig. 3 is a top view of one-half of the crusher-head.

The cone or crusher-head shown in the drawings is for the well-known Gates gyratory crusher for stone and other refractory material, the head a being frusto-conical in shape externally and having a tapered central opening or cavity b therethrough, the top and under side views of the head showing only one-half thereof. These crusher-heads are very massive, and it has been found that manganese steel toughened is particularly adapted for their construction; but prior to my invention it has been found that in cooling the rates of contraction were so different in different parts of the head that the objections hereinbefore referred to were present.

In order to render the casting uniformly cooling, I cast it with one or more holes therein, so disposed as to make the piece of practically uniform thickness, so far as cooling or subsequent heating is concerned.

In the article herein illustrated I make at the lower end of the head large openings d , which are formed by suitable sand cores, these openings having their inner and outer sides substantially parallel with the inner and outer surfaces, respectively, of the head, as clearly shown in Fig. 2, and located at about midway of the thickness of the base, and the distance between adjacent openings d is such that a casting of sufficiently uniform thickness is attained so far as cooling and contraction are concerned.

In the upper portion of the mold I place a series of cores, which may be iron pipes c , Fig. 2, of suitable diameter, disposed regularly about the longitudinal axis of the head, and for convenience in supporting them in casting I bend the upper ends of the pipe c inward, as at c' , to the bore b of the head.

If desired, short horizontal pipes e may be cast in the head, leading from the bore b to the upper ends of the cores d , to support these pipes and cores in casting and further facili-

tate the circulation of the cooling medium in heat treatment.

The holes and openings in the casting, by eliminating so much solid metal therefrom, tend to prevent strains from being set up when the casting is heat-treated, and in the cooling they serve to equalize the rate of contraction throughout the casting by admitting the cooling medium to its interior.

It is unnecessary to extend the holes entirely through the casting, if for any reason it would be impracticable. For instance, in making smaller sizes of crusher-heads I cut off the alternate pipes at about two-thirds the height of the head, allowing the hole formed to terminate in the mass of the metal.

By my invention I hasten solidification in the interior of a thick part of the casting, partially removing the tendency to pipe, thereby reducing the size of sink-head required or entirely obviating the need of one.

My invention is not restricted to the exact location, number, or size of holes to be cast in the article.

The holes formed in the casting, if objectionable, may be, after the cooling or heat

treatment, filled up by metal riveted therein or otherwise suitably secured.

I claim—

1. A water-toughened manganese-steel crushing-head for gyratory stone-crushers, having a central cavity, and a circular row of holes extending from about midway of the thickness of the metal at the base of the cone or head to its central cavity, substantially as described.

2. A water-toughened manganese-steel crushing-head for gyratory stone-crushers, having a central cavity, and a circular row of holes within the wall of the head formed wholly or in part by metallic pipes, said holes extending from about midway of the thickness of the metal at the base of the cone or head to the central cavity thereof, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY D. HIBBARD.

Witnesses:

B. E. YOUNG,
SAML. L. VOORHEES.