

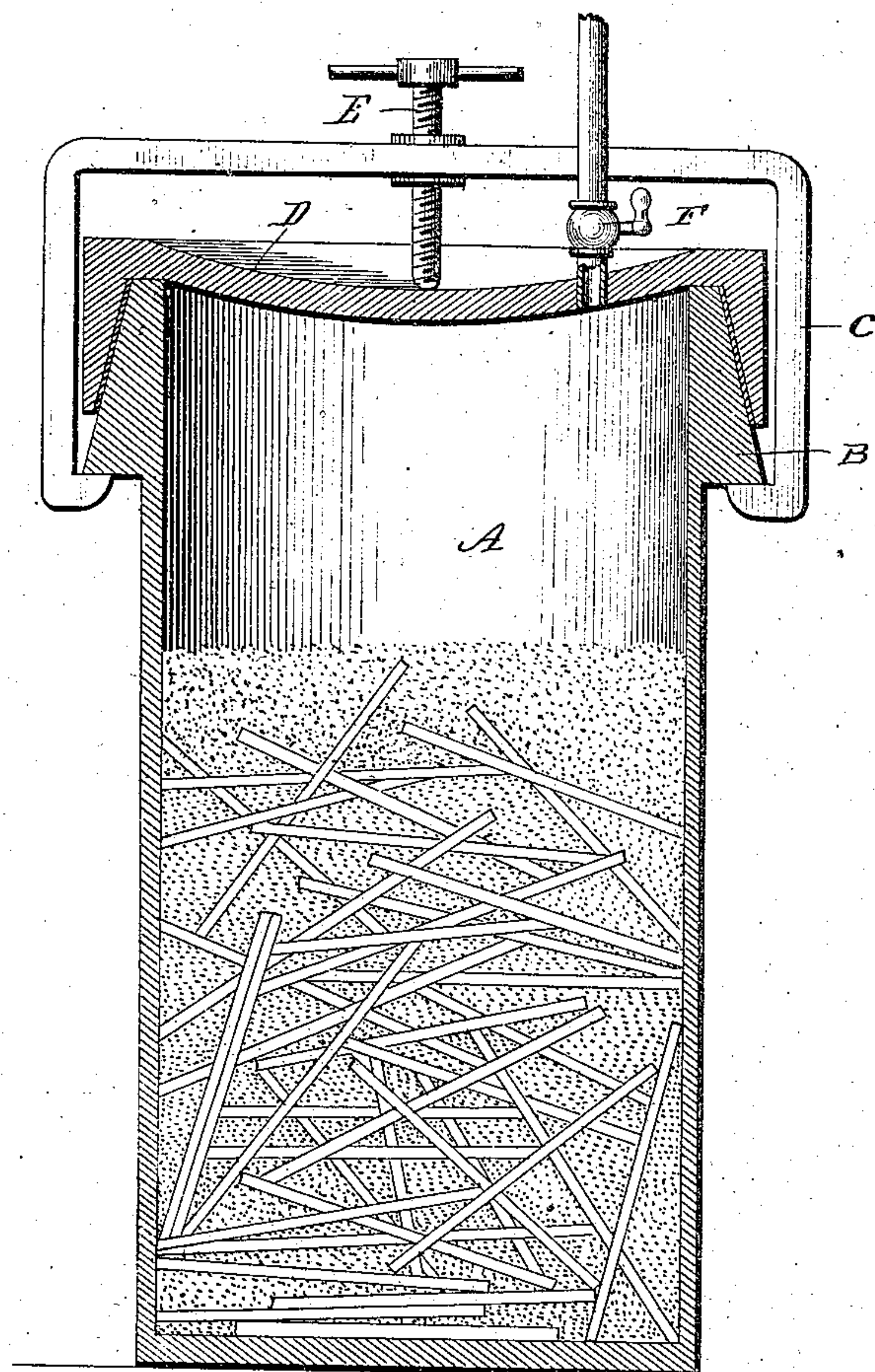
(No Model.)

J. A. TATRO.

PROCESS OF ANNEALING METALS.

No. 353,094.

Patented Nov. 23, 1886.



WITNESSES

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JOSEPH A. TATRO, OF BEAVER FALLS, PENNSYLVANIA.

PROCESS OF ANNEALING METALS.

SPECIFICATION forming part of Letters Patent No. 353,094, dated November 23, 1886.

Application filed January 20, 1886. Serial No. 189,126. (No specimens.)

To all whom it may concern:

Be it known that I, JOSEPH A. TATRO, a citizen of the United States, residing at Beaver Falls, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Annealing Metals, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to certain improvements in the process of annealing articles of iron and steel—such as file-blanks and the like; and it has for its objects to provide a new method of annealing the articles, whereby they are heated and cooled in an air-tight vessel in the absence of oxygen or oxidizing agents, as more fully hereinafter specified. These objects I accomplish by the method hereinafter described and the apparatus illustrated in the accompanying drawing, in which latter is represented a vertical sectional view of an air-tight flask or retort in which the annealing is effected.

My invention consists in subjecting the articles to heat when embedded in charcoal or other pure carbon, in the absence of atmospheric air or oxidizing gases, as more fully hereinafter specified, and cooling the articles under the same conditions as more fully hereinafter set forth.

In the drawing, the letter A indicates a retort, constructed of cast metal or other suitable material, of any convenient form, in the present instance being represented in the shape of a cylinder in cross-section. The upper edge of the vessel or flask, around its mouth, is provided with a beveled flange, B, forming shoulders under which the inwardly-bent ends of the yoke C are adapted to fit and engage.

D indicates a concavo-convex cover, which is provided with a downwardly-extended flange beveled inwardly to fit over the outer surface of the beveled flange B. The yoke C, about midway between its ends, is provided with a screw-threaded aperture, through which passes a binding-screw, E, the inner end of which bears against the center of the cover, so as to bind it to its seat and form a gas-tight joint around its edges between its inwardly-beveled flange and the outwardly-beveled flange of the flask.

The letter F indicates a petcock or vent-

cock, which extends upwardly from the top of the flask, or from any other convenient portion of the same, through which the air and incipient gases may be allowed to escape in heating the flask and its contents in the first instance, and any influx of air having free oxygen may be prevented during the final stages of the annealing process.

In carrying my process into effect, the articles, which may be file-blanks or other similar articles of unannealed iron or steel, are placed in the flask and surrounded by charcoal or other form of solid carbon, as indicated in the drawing. The cover being then properly secured, the petcock or vent-valve being open, the flask is placed in a regenerative or other heating-furnace and heated to the usual temperature. After such temperature has been reached and the contents have been thoroughly heated the petcock is closed, so that no influx of air may take place in cooling. The whole is then removed from the furnace and slowly cooled.

By this method it will be seen that the articles are both heated and cooled in an atmosphere entirely free from free oxygen, and without the use of gases generated in extraneous apparatus, as heretofore practiced, thus preventing the oxidation of the articles and the consequent injury to the same, as upon first applying the heat to the flask or vessel the air contained therein is expelled to a certain extent, and the remaining air as the heat is increased is decomposed, its oxygen combining with the incandescent carbon, producing carbonaceous gases having a trace of nitrogen, but consisting principally of carbonic oxide, which is a deoxidizing gas, and prevents any possible oxidation of the articles. In fact, should the articles be oxidized to any extent when placed in the flask, the developed carbonic oxide at the final heating would deoxidize the same.

In this process the charcoal or carbon is not consumed, as is the case where air or oxygen is admitted to the flask; but the carbon is preserved intact, and can be used over and over again.

I am aware that articles have been embedded and heated in charcoal in vessels or flasks which are covered, but not air-tight; but in

such cases the air necessarily enters to a greater or less extent, which oxidizes the articles and injures the same.

Having thus described my invention, what
5 I claim, and desire to secure by Letters Patent, is—

The method herein described of annealing metals, the same consisting in heating the articles packed in charcoal or other pure carbon in an air-tight vessel provided with a
10 petcock, through which the contained air is

allowed to pass during the initial heating, and subsequently cooling the articles in the same vessel, after closing the petcock to prevent the admission of air, substantially as specified. 15

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH A. TATRO.

Witnesses:

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H. H. BENFORD.