

No. 626,281.

Patented June 6, 1899.

J. T. HUTSON.
ATTACHMENT FOR ORE ROASTING FURNACES.

(Application filed Jan. 27, 1899.)

(No Model.)

Fig. 1.

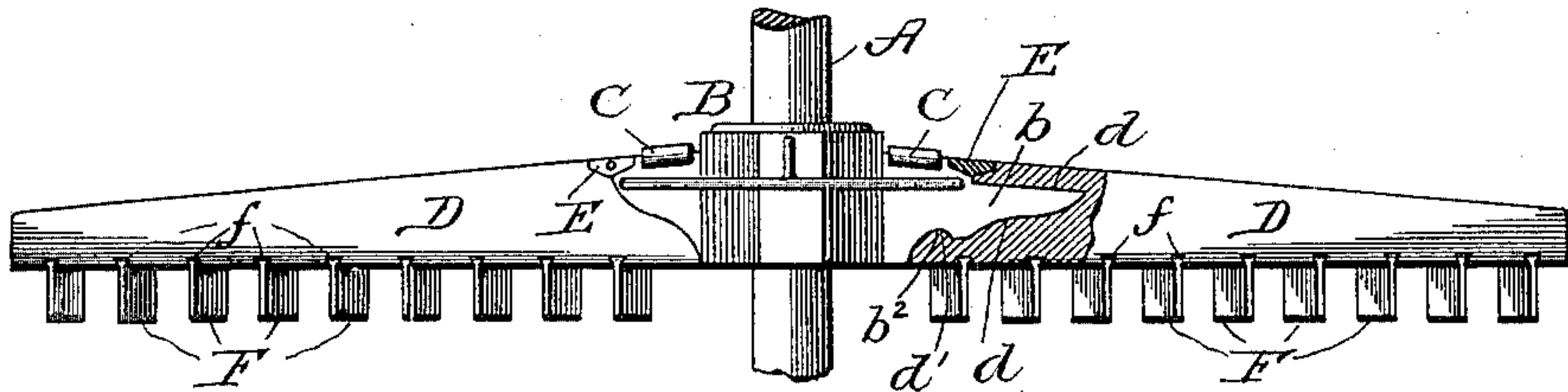


Fig. 2.

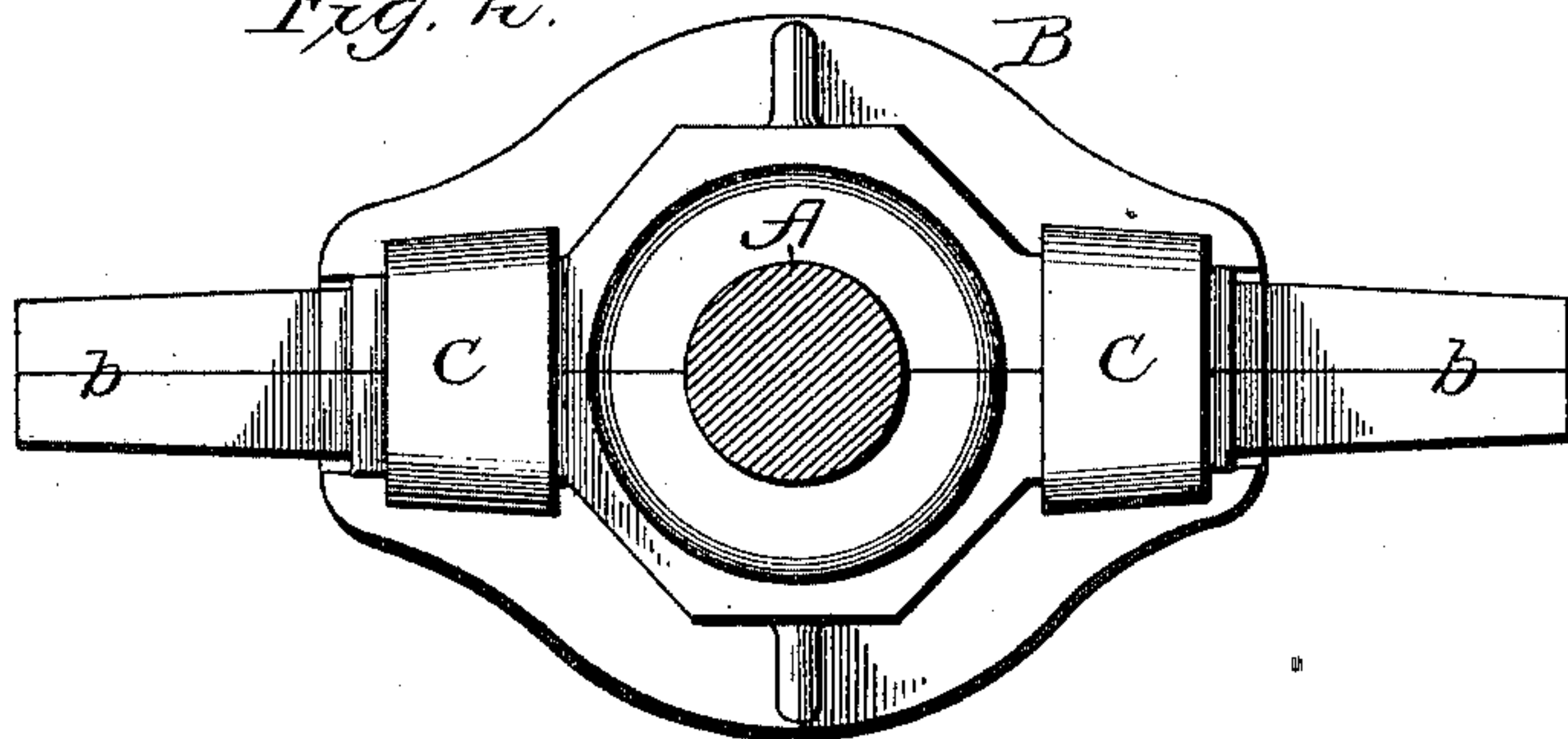


Fig. 3.

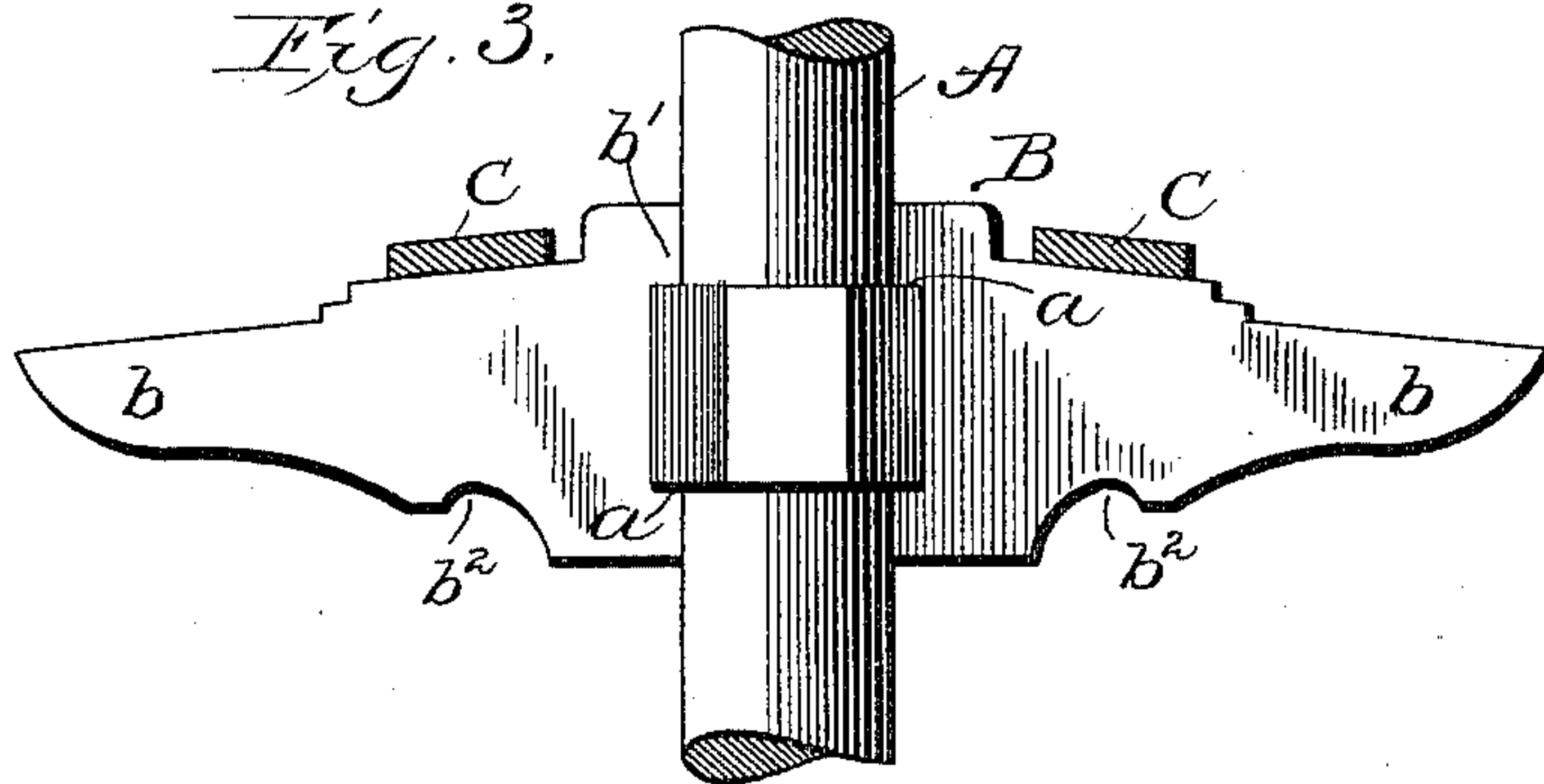


Fig. 4.

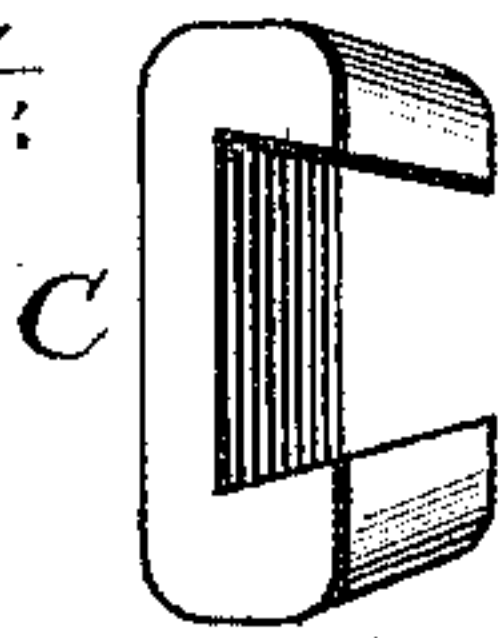
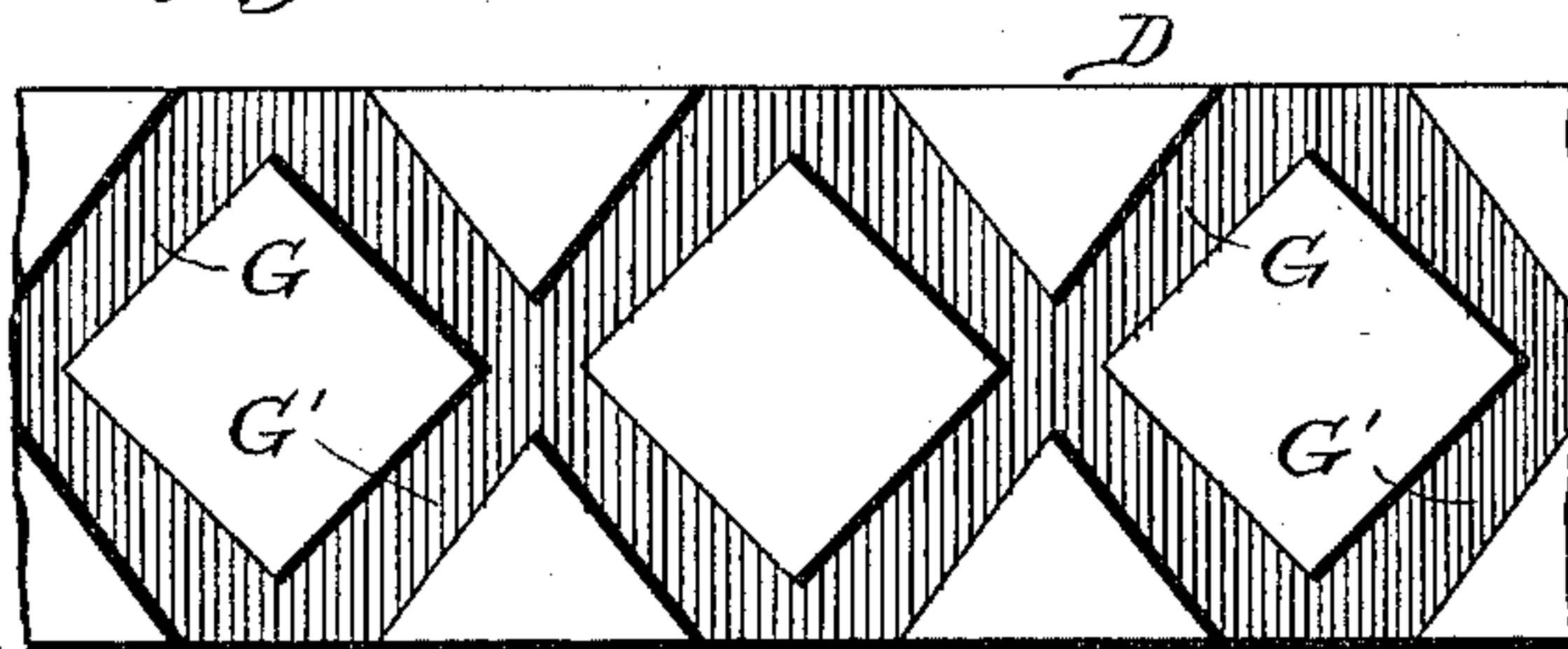


Fig. 5.



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ATTACHMENT FOR ORE-ROASTING FURNACES.

SPECIFICATION forming part of Letters Patent No. 626,281, dated June 6, 1899.

Application filed January 27, 1899. Serial No. 703,545. (No model.)

To all whom it may concern:

Be it known that I, JOHN TIMOTHY HUTSON, a citizen of the United States, residing at Columbia, in the county of Richland and State of South Carolina, have invented certain new and useful Improvements in Attachments for Ore-Roasting Furnaces; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My present invention relates to improvements in ore-roasting furnaces, and particularly to the means provided for stirring or agitating and feeding the ore over the hearths or ore-supporting surfaces in such an apparatus.

One of the objects of the invention is to provide such an ore-stirring device or rake that will be simple and durable in construction and which can be easily secured to or detached from the power-shaft.

Another object is to provide such an ore stirring and conveying rake with detachable teeth any one of which can be readily removed from the body of the rake-arm without adjusting or in any manner affecting any other of the series of teeth.

With these and other ends in view the invention consists in the peculiar construction and arrangement of parts that will be hereinafter fully pointed out and described.

In the accompanying drawings, Figure 1 is a side elevation of an ore-roasting-furnace agitator or rake embodying my improvements, a portion of one member of such arm being broken away to illustrate the manner of connecting said member to the hub on the power-shaft. Fig. 2 is a top plan view of the said hub, the rake-arms being detached and the power-shaft shown in section. Fig. 3 is an elevation of a portion of the power-shaft and one of the hub-sections thereon, the connecting-clips being shown in section. Fig. 4 is a detail view of one of the clamps or securing devices for holding the hub-sections together and in position on the shaft. Fig. 5 illustrates a portion of one of the members of the stirring-arm in bottom plan view and

shows the form of connection between said arm and the teeth thereof.

Like letters of reference denote corresponding parts in the several figures of the drawings, referring to which—

A designates the power-shaft, upon which are mounted or to which are secured the desired number of ore agitating and feeding arms, said shaft being commonly arranged in a vertical position centrally within the furnace. To said shaft A is secured the collar-like hub B of the stirring and feeding arm, said stirring device in the embodiment of my invention herein illustrated comprising two members or sections which are detachably connected to and extend in diametrically opposite directions outward from said hub.

The hub B is composed or formed of two sections, each consisting of an intermediate body portion having its inner face or surface formed to fit close against and conform to the shape or contour of the adjacent surface of that portion of the shaft A which is embraced by said hub. This body portion, which is made of such size as to extend half-round the shaft A, is provided at its ends with or terminates in two oppositely-extending ears b, which are adapted to enter suitable sockets or passages opening through the inner ends of the bodies of the rake-arms and engage with said bodies to securely connect said rakes and hub. Said ears b, it will be seen, are of slightly longitudinally tapering form—that is, they decrease in width or thickness both horizontally and vertically from their inner toward their outer ends, and the hub-sections are connected and held securely together by means of detachable clips C, that are each provided with dovetail passages in their lower sides, through which one ear of each hub-section extends.

A hub constructed of two sections, each of which has a member or portion extending beyond the body of the power-shaft at diametrically opposite points, is superior to one in which each section extends from the shaft in but one direction. A hub of the type last referred to is shown in my earlier patent, No. 599,843, dated March 1, 1898; but the construction illustrated in the present application and above described differs and possesses advantages over that disclosed in said patent.

By giving each section such a form as to cause it to be centrally engaged by the shaft and project in opposite directions therefrom I am enabled to dispense with the bolts required to secure the sections of my earlier hub together, and also by my present construction the weight of each rake-arm is applied directly to and taken by both of the hub-sections.

Preferably the portion of the shaft A that is engaged by the hub B is made polygonal in cross-section and of somewhat greater thickness, so that an annular laterally-projecting flange or surface is formed about the shaft, as at *a*. With this surface *a* engages an inwardly-extending flange *b'*, formed about the upper end of the shaft passage or way in the hub.

The lower portion of the hub B may also be so shaped as to engage with the lower end of that portion of the shaft A that is polygonal in cross-section, and thus movement of the hub in either direction vertically or longitudinally of the shaft is prevented.

Each of the arm-sections in the embodiment of my invention herein illustrated consists of a body D, formed from a single piece of metal and provided at one end with a socket or longitudinally-extending passage *d*, adapted to receive the ears *b*, that project from one side of the hub B. In the lower edge of each of said ears, near its point of connection with the body-section of the hub, is formed a notch or recess *b²*, and when said ears are properly inserted in the said socket *d* an integral ridge or rib *d'*, that extends transversely across said socket, is received in said notches or recesses *b²*, as shown in Fig. 1, and the socket *d* is of such form relative to the ears *b* that when said rib *d'* is thus engaged the arm D will be securely connected with the hub B. The ends of the side walls of the said socket *d* are of such shape as to bear close against the adjacent surface of the body of the hub, and thus assist in holding the arm in proper position relative to the hub.

In order to apply the arm to the ears *b'*, it is held in an upwardly-inclined position relative to said ears and it can then be easily moved downwardly and inwardly toward the hub to cause said ears *b* to properly enter its socket *d*, and to disengage or detach the arm from the hub it is necessary to elevate its outer end sufficiently to disconnect the rib *d'* from the notches *b²*, after which the arm can be withdrawn from the ears *b*; and to allow such movement of the arm the upper wall of the socket or passage *d* is cut away somewhat at its rear end. When the arm has been engaged with the ears *b* and arranged in proper working position, a separately-formed cover or cap-piece E is applied to take the place of the portion of the socket-wall that is removed, as and for the purpose above stated.

As shown, each body-section D is made of a single piece, and the socket *d* may be extended a greater or less distance or through

more or less of the said body, according to the weight it is desired to have in said body.

As hereinbefore mentioned, one of the important objects of the present invention is to provide means for securing the teeth F to the rake-arm in such a manner that any one thereof can be removed and replaced without varying the position of any other tooth in the series. It is well known that the teeth of these rakes frequently become so encrusted as to prevent the proper operation of the device or broken, while the body of the rake is still in good condition. Where the teeth are formed integral with the body of the rake, it is often necessary to remove and discard the entire rake merely because a few of the teeth thereon have become unserviceable.

I am aware that it has been proposed to make the teeth separate from the rake-body and detachably engage them with the said body, each tooth acting or assisting to hold the next adjacent or preceding tooth in the series in position and the outer one of the series of teeth being retained by a removable fastening device; but considerable time is required to remove and replace any tooth of a series arranged in this manner.

I am also aware that it has been proposed to secure each of the teeth of such a rake to the body of the device by independent fastening means; but with all of such constructions that I am acquainted with prior to my invention the fastening devices extended beyond exposed faces of the rake-arm and therefore after a short period of use become so encrusted as to make impossible the accomplishment of the purpose for which they were intended—that is, the exposed portions of the fastening bolts, clips, or other fastening means will be so encrusted or affected by the heat as to be incapable of movement or adjustment relative to the body of the arm.

One of the principal objects of my present invention is to provide a rake for the purpose described with a series of teeth every one of which can be easily detached without affecting the others of the series and in which there will be no necessity of using bolts or clips and in which the connection between the teeth and arm will be protected by the body of the arm from having any ore lodge thereon. This desirable object I accomplish by the construction now to be described.

Referring to the drawings, in this case it will be seen that I form in the under surface or face of each arm-section two series of parallel diagonally-extending grooves or ways G G', each of said grooves opening through both sides of the body or extending entirely across said lower face and each being of greater width at its upper than at its lower side. The teeth F are provided with enlarged upper ends or heads *f*, which in cross-section conform to the transverse shape of the grooves G G'. When the heads of the desired number of teeth have been inserted in the proper

set of grooves G or G', all of said teeth will be supported by the body D and held in parallel positions, with their vertical faces so inclined to the length of the said body as to cause the ore engaged thereby to move toward the shaft A as the rake is revolved thereby or away from said shaft, according to the set of grooves in which said teeth are secured, and it will be seen that any tooth F can be easily removed and replaced by another when desired without trouble and without in any manner affecting or adjusting any of the other teeth.

While I have above described and in the drawings have illustrated my improvements as embodied in a rake having a centrally-arranged hub and two arms or sections extending in opposite directions from said hub, it will be seen that many of the features of my invention are not limited to use with a rake of this form, but can be applied to an arm extending in only one direction from the shaft and having its supporting-hub at its inner end instead of at its middle.

By reference to Fig. 5 it will also be seen that the grooves or ways G G' are also of longitudinally-tapering form—that is, the portions of said grooves adjacent to the sides of the arm are wider than those at the central portion transversely of the arm. By this arrangement it will be seen that the engagement of the front edge or face of the tooth with the ore tends to force the tooth more firmly into its seat or way in the arm.

What I claim is—

1. In a rake or stirring device for an ore-roasting furnace, the combination of a body having formed therein a series of transversely-extending grooves which open through the lower face of the arm and decrease in width inwardly from the forward side of the rake, and a series of teeth each adapted to be fitted into one of said grooves, substantially as set forth.

2. The herein-described rake or stirrer for an ore-roasting furnace having formed in its lower surface two series of diagonally oppositely extending grooves, and a series of teeth each adapted to be secured within any one of said grooves, substantially as set forth.

3. The herein-described rake or stirrer for an ore-roasting furnace having in its lower surface two series of diagonally oppositely extending and intersecting grooves or seats, and a series of teeth each adapted to be detachably secured within any one of said grooves or seats, substantially as set forth.

4. In a device for stirring or agitating ore in a roasting-furnace, the combination of a hub consisting of two sections adapted to be clamped together and about a shaft and each having a member which when the sections are connected together forms part of an ear that extends laterally from said shaft, and a rake

having a socket formed at the inner end of its body portion and adapted to receive said ear on the hub and be thereby secured to the shaft, substantially as set forth.

5. In an ore-roasting furnace, the combination with a vertical power-shaft having an intermediate, relatively short, section polygonal in cross-section, and of greater diameter than the body of the shaft, of a rake-arm provided with a sectional hub adapted to be clamped about said polygonal section of the shaft and to be supported vertically by engagement with the upper end of the projecting portion of said shaft-section, substantially as set forth.

6. In an ore-roasting furnace, the combination with a vertical power-shaft, of a rake or stirring device having a hub composed of two sections each adapted to partially surround the shaft and extend radially beyond one side thereof, means for connecting together the radially-extending portions of said hub-sections, and thereby form an ear extending outwardly from the shaft, and an arm carrying a series of teeth and adapted to have its inner end secured about said radially-extending ear on the hub, substantially as set forth.

7. In an ore-roasting furnace, the combination of a power-shaft, a hub consisting of two similar sections each having a body adapted to partially surround the power-shaft and an ear or member adapted to extend radially from said shaft, said ears being in contact when the sections are placed together about the shaft, clamps for extending across the upper surfaces of said ears and binding the hub-sections together, and a rake or stirrer having a body adapted to be detachably engaged with said ears on the hub, substantially as set forth.

8. In an ore-roasting furnace, the combination of a power-shaft, a hub consisting of two similar sections each having an intermediate body portion, the inner face of which conforms to and is adapted to partly surround the power-shaft, two diametrically oppositely extending lugs or ears, the ears of one section being in contact with the corresponding ears on the other section when said sections are assembled about the shaft, means for securing said hub-sections together, and two arms each provided with a series of depending teeth and adapted to surround and be detachably engaged with the similarly-extending lugs of each hub-section, substantially as set forth.

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

JOHN TIMOTHY HUTSON.

Witnesses:

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B. ELKIN.