

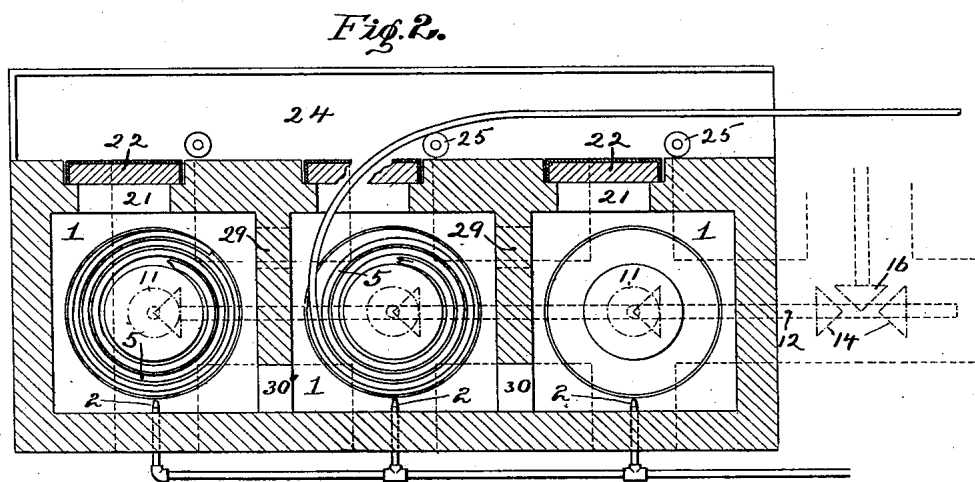
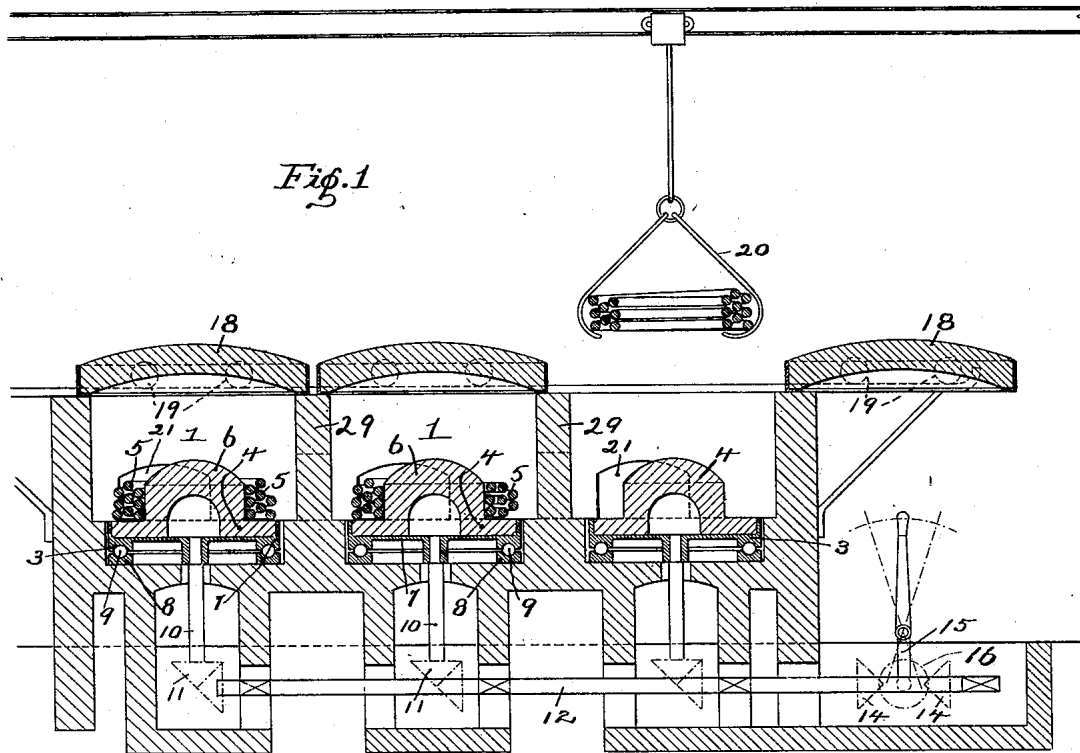
No. 734,114.

PATENTED JULY 21, 1903.

R. G. BEKER.  
COIL HEATING FURNACE.  
APPLICATION FILED FEB. 13, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES

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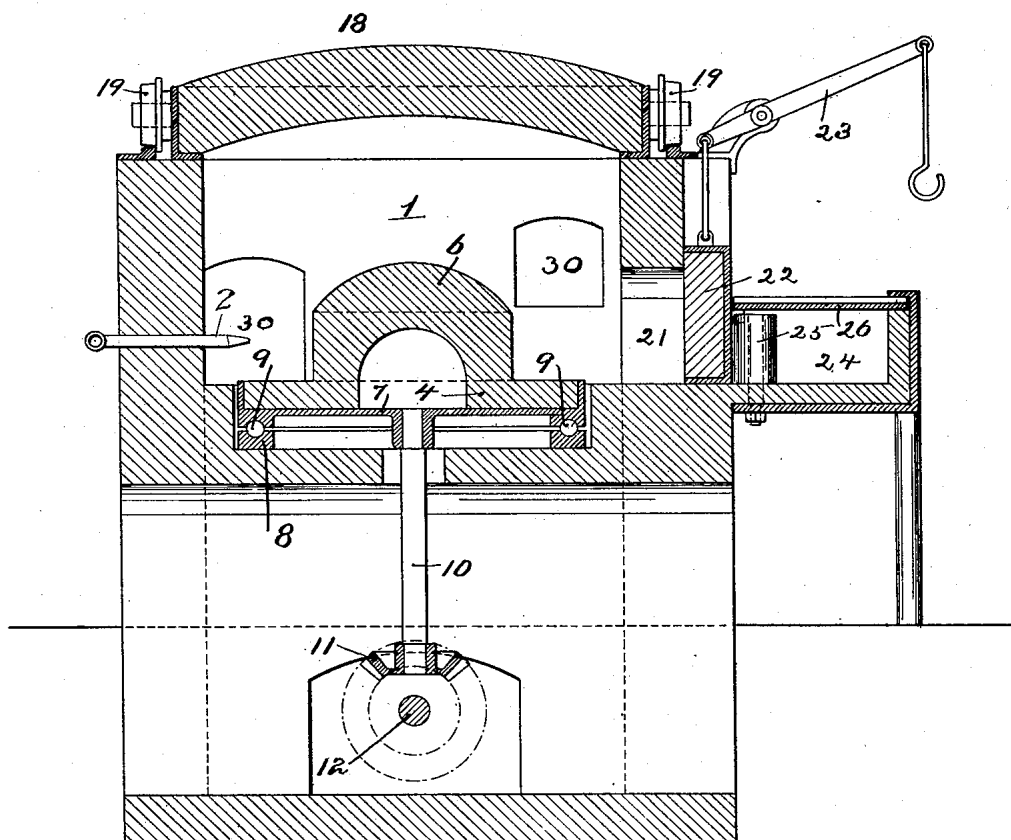
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2 SHEETS—SHEET 2.

*Fig. 3.*



WITNESSES

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# UNITED STATES PATENT OFFICE.

RUDOLPH G. BEKER, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS TO FREDERICK H. KINDL, OF PITTSBURG, PENNSYLVANIA.

## COIL-HEATING FURNACE.

SPECIFICATION forming part of Letters Patent No. 734,114, dated July 21, 1903.

Application filed February 13, 1902. Serial No. 93,912. (No model.)

*To all whom it may concern:*

Be it known that I, RUDOLPH G. BEKER, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Coil-Heating Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to heating-furnaces, and more especially to furnaces for heating rods and bars preparatory to cutting them into short lengths for forming blanks of various kinds.

The object of my invention is to provide a furnace of this kind whereby the rod or other blank can be uniformly heated throughout and whereby the static inertia of a long or heavy rod in feeding to the blank cutting or producing machine is overcome.

In the making of rivets, bolt-blanks, spike-blanks, and similar articles it is the practice to take a long bar of the proper cross-section, heat three or four feet of the end thereof in a suitable furnace, and then feed the hot end to an upsetting or other machine, which cuts successive pieces from the hot bar and upsets or otherwise shapes the same, the operator feeding forward the bar as the sections are cut therefrom. When the hot portion of the bar has been consumed; the remainder must be returned to the furnace for heating another portion thereof, which is worked up in the same way, and so on until the entire bar is consumed. This practice not only diminishes the output of the machine in that it cannot be kept in continuous operation, but difficulty is also experienced in handling the hot bar, especially when it gets short. It has been proposed to vary this practice, so as to increase the output of the machine, by heating the entire length of a long bar—say thirty feet long—and then feeding it uninterruptedly to the machine. The difficulty with this is that it requires a very long furnace, which is expensive to heat to the proper degree, and, furthermore, the static inertia of the long and heavy bar lying in the furnace is such that it is liable to cause the feeding mechanism of the machine to slip, and as a consequence the blanks or other articles will not be of a uniform length.

One of the objects of my invention is to overcome the foregoing difficulties; and to this end it comprises a furnace having therein a rotatable support, upon which the bar is to be supported in the form of a coil, and means for positively rotating said support as the bar is being fed to the machine, in that manner not leaving any static inertia for feeding mechanism of the machine to overcome.

In blank-heating furnaces it is not possible to have a uniform heat in all parts of the heating-chamber, so that the bars or blanks therein will not be heated uniformly, but will become hotter in one portion than in another, so that the product is liable not to be uniform.

Another object of my invention is to overcome this defect and to provide a heating-furnace wherein all parts of the rod or other blank will be heated uniformly and irrespective of differences of heat in different portions of the heating-chamber; and to this end the invention comprises the furnace having a rotatable support or bottom, on which the rod or other blanks rest while heating.

In the accompanying drawings, Figure 1 is a longitudinal vertical section through my improved furnace. Fig. 2 is a horizontal section of the same, and Fig. 3 is a transverse section of the same.

The furnace may be of various constructions and types, but preferably it will be heated by fuel, oil, or gas. The shape and size of the furnace-chamber will of course vary according to the kind of blanks to be heated therein, and in the furnace shown the heating-chamber 1 is practically square in shape. This chamber is inclosed by suitable masonry walls, as shown, and the heat may be supplied thereto in any approved manner, and I have shown for this purpose gas or oil burners 2, projecting into the chamber. In this chamber will be a rotatable support for the coil or other blank, which support will vary in size, shape, and location, according to the blanks to be heated; but preferably it will comprise a rotatable bottom 3, which will be covered with refractory material, such as the fire clay or brick 4 and which when adapted for heating the coiled rod (shown at 5) will be provided with the central projection or boss

6, about which the coil is placed. This rotatable bottom will be supported in such a manner as to reduce the friction to a minimum, and, as shown, the said bottom is provided with a cast-iron plate 7, having therein an annular groove which corresponds to a similar groove in a ring or plate 8, resting on the masonry, and in the grooves will be placed suitable balls or other antifriction devices 9.

10 This bottom will preferably be positively rotated by any suitable gearing, that shown comprising a shaft 10, secured to the bottom and extending downwardly and having at its lower end a bevel-gear 11, which meshes with

15 a similar gear on the horizontal shaft 12. This shaft may be driven by any suitable mechanism, and I have shown for this purpose a pair of bevel-gears 14 on said shaft, which will be splined thereto and one or the other of which is adapted to be moved by a

20 suitable lever 15 into mesh with a driven bevel-gear 16, so that the shaft 12 can be driven in either direction.

The furnace will be provided with a suitable door or opening through which the coil or other blank can be introduced, and in the particular furnace illustrated this opening is at the top and is closed by the sliding cover 18, which preferably will be mounted on

30 wheels or other antifriction devices 19, so that it can be the more easily moved. A crane or grapple 20 will preferably be located so as to deposit the coil in the furnace. The blanks after being heated may be withdrawn

35 from the furnace through the opening at the top thereof; but when the furnace is designed for heating coiled rods which are to be fed to an upsetting or similar machine I prefer to provide an opening 21 in the side

40 of the furnace, which is closed by a sliding door 22, to which is connected a lever 23, whereby it may be raised, as will be readily understood. To shield the hot bar and prevent too rapid cooling as it is being drawn to

45 the upsetting or other machine, I prefer to place in front of the opening 21 a covered trough or passage 24, in which will be located a vertical roller 25 or other guide, around

50 which the bar will pass. The cover 26 of this trough is removable or displaceable, so that tongs or like tool can be inserted in the furnace to grip the end of the rod or other blank and draw it out, and preferably the said cover

55 will be mounted so that it can be slid endwise, as shown in Fig. 3.

The description so far has been limited to a furnace comprising a single chamber or compartment; but for bolt or rivet upsetting or the like in order to keep the machine

60 in continuous operation it is necessary to have one or more coils heating in the furnace while a previously-heated coil is being worked up. The furnace, therefore, will be built large enough to accommodate two or

65 more coils, three being shown in the drawings, and as a previously-heated coil is liable

to be chilled by having a cold coil placed next to it the heating-chamber will be divided by walls or partitions 29, which will shield the heated coil. Each chamber will be provided with its own burners; but in order to secure uniformity of heat suitable communicating openings 30 are formed in the walls of partitions 29, which openings, however, are at the sides, so that no chilling effect from a

70 cold coil can be communicated to a hot coil. In this case also the trough 24 will extend the full length of the three or more chambers, as shown.

In the operation of my improved furnace the coils or other blanks will be deposited upon the rotatable support in the furnace and said support will be kept in practically constant rotation at any desired or allowable speed, so that the position of the coil or other

80 blank in the furnace will be constantly changing and all parts thereof exposed to the zones of greatest heat, thereby insuring the uniform heating of said coil or blank. When the blank is a coiled rod which is to be fed to

85 an upsetting or similar machine, as soon as it is properly heated the cover 26 of the trough 24 will be slid aside, the door 22 will be raised, and the end of the coil seized by means of tongs or other implement, drawn

90 out of the furnace under the door 22 and along the trough 24 to the upsetting-machine, by means of which it will be worked up into blanks. During this working up of the rod the support for the coil will be rotated

95 slowly at the desired speed, so that there will be practically no drag on the feeding mechanism of the upsetting-machine, and as a consequence said machine will produce blanks of uniform length or size. Should for any

100 reason the machine become blocked or injured, so that a delay will occur, the hot rod will be released therefrom, and by suitably shifting the lever 15 the support will be rotated in the opposite direction, thereby again

105 coiling the rod up in the furnace, so that it will be maintained at the proper heat until the machine is again started.

While my furnace is especially designed for heating coiled rods and feeding the same to an upsetting or similar machine, still it is not limited thereto, as the rotatable support or bottom in the furnace is equally as well adapted for holding blanks of any kind, so that by the rotation of the bottom the blanks

110 will be heated uniformly throughout.

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

1. A furnace having a heating-chamber, a rotatable coil-support in said chamber, and

115 mechanism for rotating said coil-support, said mechanism comprising driving means, two separate connecting devices between the driving means and coil-support, one of said devices being arranged to rotate said coil-sup-

120 port in one direction and the other of said devices being arranged to rotate the coil-sup-

125

130

port in the opposite direction, and means for connecting either of said devices to the coil-support and driving means.

2. A furnace having a heating-chamber, a rotatable coil-support in said chamber, an opening in the side of the chamber, and a covered passage or trough adjacent to said opening.

3. A furnace provided with a chamber, partitions extending across said chamber and dividing the same into a series of compartments, and a single rotatable coil-support in each of said compartments, whereby each of said compartments will contain but a single coil.

4. A furnace having a plurality of heating-chambers, the walls of said chambers having intercommunicating openings, and a coil-support for each of said chambers.

5. A furnace having a plurality of coil-supports therein, walls or partitions between said supports and dividing the furnace into com-

partments, said walls being provided with an opening or openings, and means for heating each of said compartments.

6. A furnace having a plurality of coil-supports therein, openings into the furnace adjacent to each coil-support, and a covered passage or trough extending along the furnace and communicating with each of said openings.

7. A furnace having a plurality of heating-chambers, the walls of said chambers having intercommunicating openings, a coil-support in each of said chambers, openings into the furnace adjacent to each coil-support, and a covered passage or trough communicating with each of said openings.

In testimony whereof I, the said RUDOLPH G. BEKER, have hereunto set my hand.

RUDOLPH G. BEKER.

Witnesses:

F. W. WINTER,

ROBERT C. TOTTEN.