

No. 678,423.

Patented July 16, 1901.

W. S. ROCKWELL.
FURNACE.

(Application filed Nov. 6, 1900.)

(No Model.)

3 Sheets—Sheet 1.

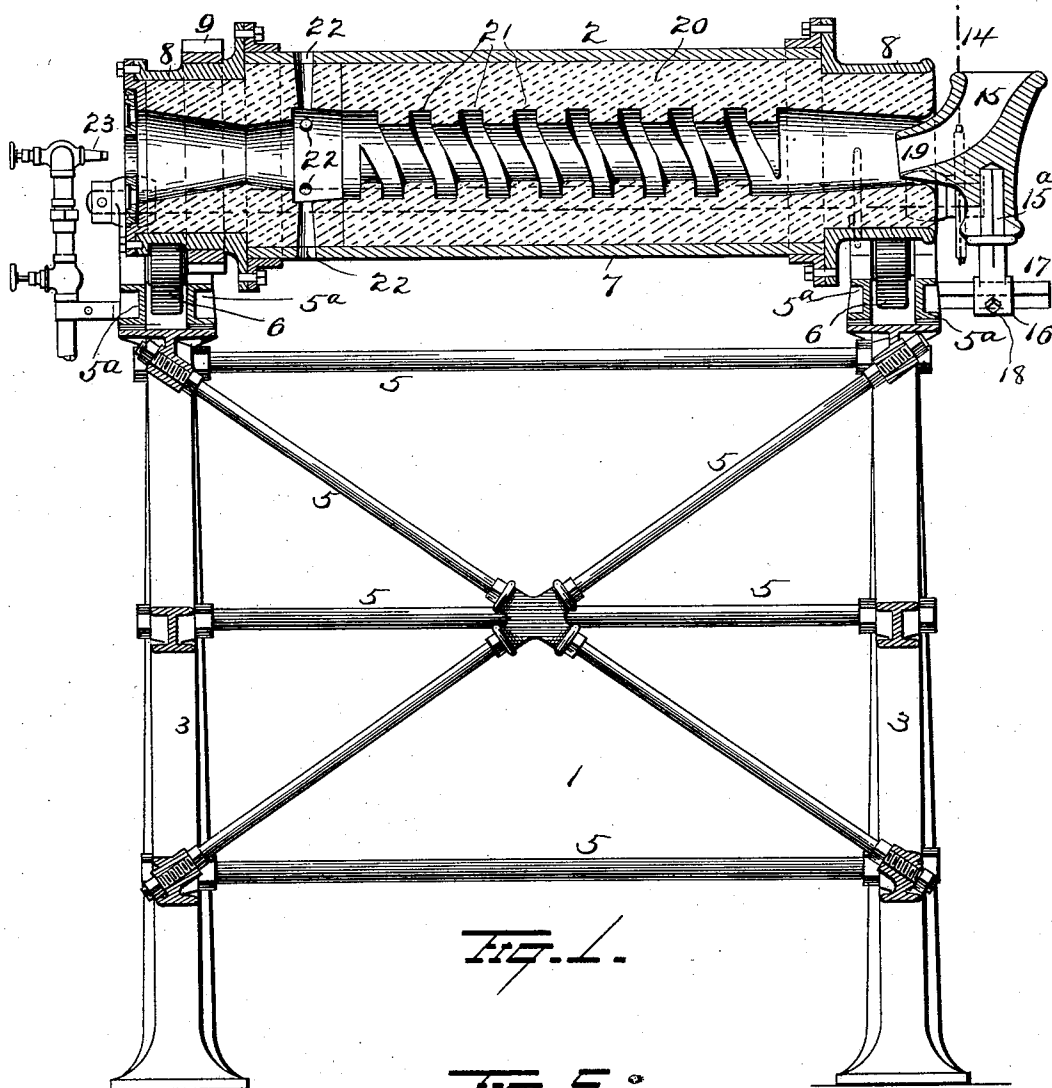


Fig. 1.

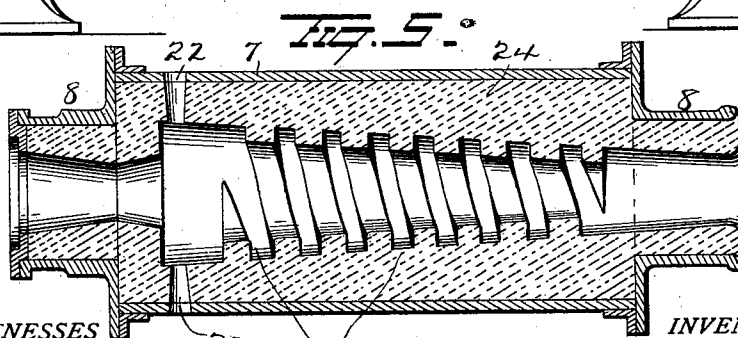


Fig. 5.

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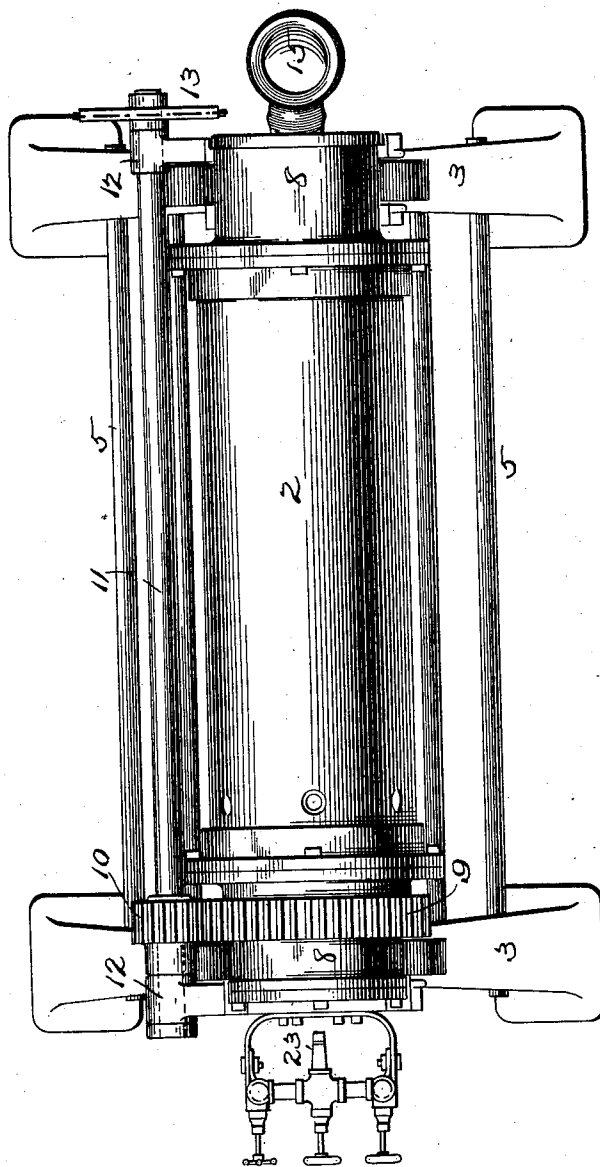
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3 Sheets—Sheet 2.



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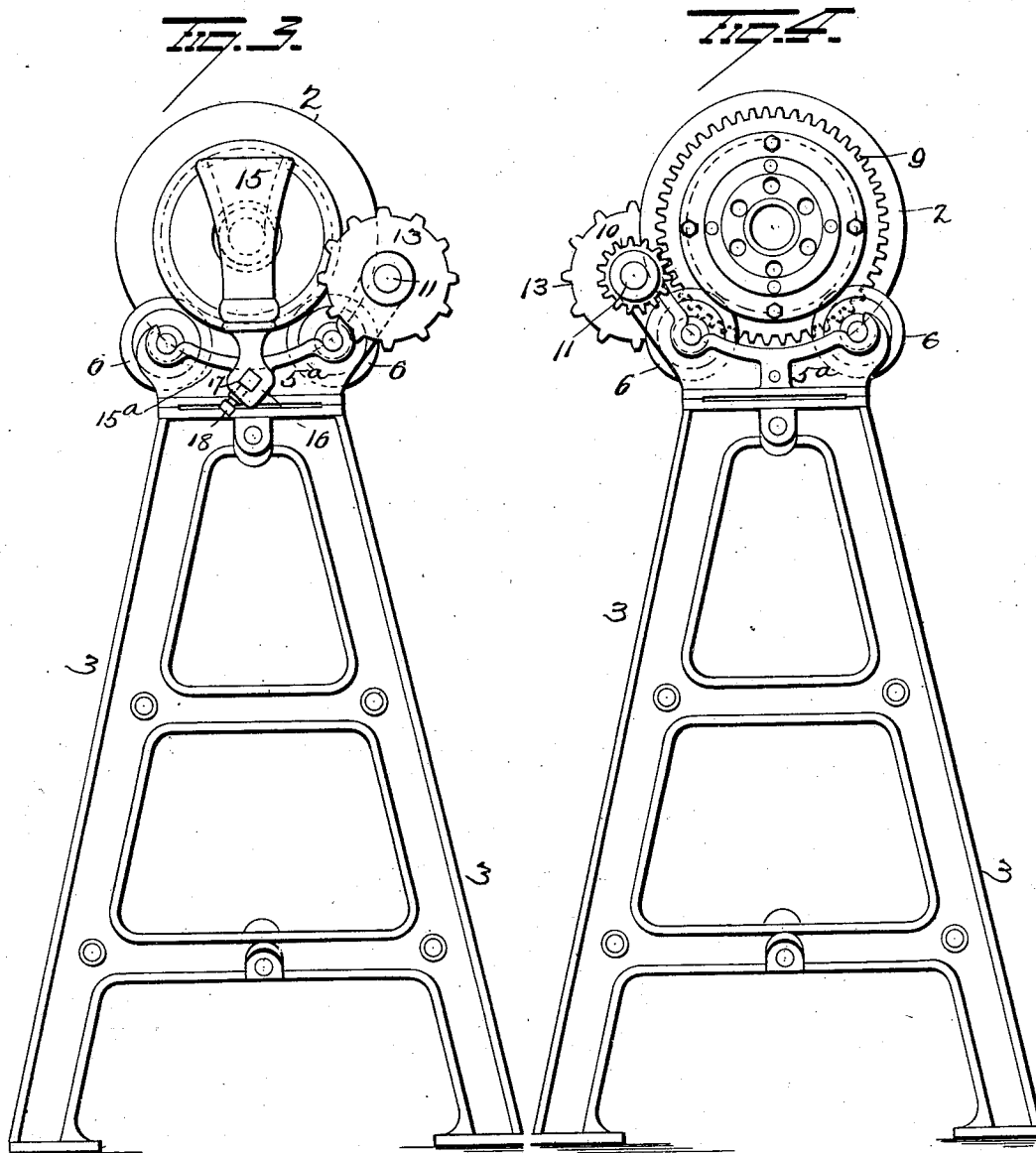
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

WALTER S. ROCKWELL, OF NEW YORK, N. Y.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 678,423, dated July 16, 1901.

Application filed November 6, 1900. Serial No. 35,692. (No model.)

To all whom it may concern:

Be it known that I, WALTER S. ROCKWELL, a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Furnaces; and I do hereby 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.

My invention relates to an improved furnace, and more particularly to a furnace for heating blanks for balls for ball-bearings, the object of the invention being to provide a furnace which will subject the blanks to a gradually-increasing temperature until the maximum is reached, when the blanks will be automatically discharged, thus resulting in a uniform and gradually-increasing temperature to all the blanks alike.

A further object is to provide a rotary furnace with an internal spiral groove or runway through which the blanks travel.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in longitudinal section illustrating my improvements. Fig. 2 is a top view. Fig. 3 is a view of the entrance end of the furnace for blanks. Fig. 4 is a view of the other end of the furnace, and Fig. 5 is a view in longitudinal section of a modified form of my invention.

1 represents a supporting-frame for my improved furnace 2, and said frame comprises standards 3 at each end, suitably braced by diagonal and horizontal braces 5, as clearly shown in Fig. 1. The upper ends of the end portions of the frame are provided with pillow-blocks 5^a, spaced apart and provided at their respective ends with semicircular bearings for the trunnions of rollers 6, disposed between the pillow-blocks 5 and on which my improved furnace 2 is mounted at its respective ends.

The furnace 2 comprises an elongated cylindrical casing 7, having contracted end portions 8 secured at its respective ends and mounted upon the rollers 6, and the firing

end of the furnace has secured thereon a gear 9, with which a smaller gear 10 meshes, the latter being secured on a shaft 11, extending along one side of the furnace and mounted in suitable bearings 12 on frame 1. A sprocket-wheel 13 is secured on shaft 11 at the charging or feeding end of the furnace and is connected by a sprocket-chain 14 with any approved engine (not shown) for revolving the furnace.

A funnel 15 for feeding the blanks to the furnace is located at the feed or charging end thereof and is made with an angular socket, into which an angular supporting-rod 15^a projects, and said rod is made with an angular sleeve 16, adjustably secured on an angular rod 17, projecting at right angles to the end of frame 1, by means of a set-screw 18, and the funnel is provided with a conical discharge-spout 19, preferably of refractory material, projecting into the feed end of the furnace, so as to direct the blanks therein and also to regulate the size of the opening for the escape of the burned and spent gases and products of combustion, as it will be seen that by moving the spout in and out of the end of the furnace the space around it will be increased or diminished and the draft through the furnace regulated to suit any condition.

The furnace is provided throughout with an internal thick lining 20, of fire-clay or other refractory material, which latter is made with a spiral groove 21, which extends from a point near the feed end to near the firing end, where a series of holes 22 are provided in the lining 20, alining with holes in the casing 7 to permit the heated blanks to fall into a suitable conveyer (not shown) and carried to a point for further treatment.

Any suitable nozzle or burner 23 for discharging vapor or gas is located at the firing end of the furnace and is adapted to direct a flame into the furnace, the current of air and gases passing entirely through the furnace and out the feed end thereof.

The operation of my improvements is as follows: Blanks are fed into the funnel 15 and fed thereby through spout 19 into the furnace, where they will find their way into the groove 21, and as the furnace is revolved by the mechanism above explained the blanks will

move forward in the groove toward the intense heat until they reach the discharge-ports 22, where they will be discharged, and it will be seen that as it will take each and every blank the same length of time to pass through the furnace and as each is subjected to a gradually-increasing heat they will be uniformly heated and be ready for the next step in the process of making balls for ball-bearings.

Instead of constructing the furnace-lining as above explained I might make the same as shown in Fig. 5. In this form of my invention the fire-clay or other refractory lining 24 is made with a conical or tapering bore, or, in other words, the interior diameter thereof is smallest near the feed end and gradually increases to the point of discharge of the blanks, and the spiral groove 25 is formed in the lining for the passage of blanks. With this form of furnace the groove is not only spiral, but in effect conical or tapering, so that the incline of the grooved runway is increased to facilitate the passage of the blanks through the furnace.

Various other slight changes might be resorted to in the general form and arrangement of the several parts described without departing from the spirit and scope of my invention, and hence I would have it understood that I do not wish to limit myself to the precise details set forth, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention as claimed.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a revoluble furnace having an opening therethrough from end to end, means for feeding blanks into one end of said furnace, and means for projecting heat into the other end of the furnace, said furnace provided therein with a spiral runway for blanks, having its discharge end spaced from the end of the furnace into which heat is projected, and means at the discharge end of the runway for permitting the escape of heated blanks therefrom.

2. The combination of a revoluble furnace

provided interiorly with an unobstructed spiral runway and provided with radial discharge-ports removed inwardly from one end of the furnace and communicating with the runway so as to receive blanks therefrom means for feeding blanks into the other end of the furnace and means for projecting heat into the end of the furnace nearest the discharge-ports.

3. The combination of a revoluble furnace having a working chamber and means for projecting heat directly into one end thereof, said working chamber having an unobstructed spiral groove or runway communicating with lateral discharge-ports for blanks at a point removed inwardly from the end of said chamber into which the heat is projected.

4. In a furnace, the combination with a supporting-frame, rollers on said frame, a furnace revolubly supported on the rollers, and means for revolving the furnace, of a fire-clay lining in the furnace having a spiral groove therein for the passage of blanks, a funnel connected to the frame, a spout on the funnel projecting into one end of the furnace to direct the blanks into the groove means for adjusting the funnel to regulate the draft through the furnace and means at the other end of the furnace for directing a flame therein.

5. In a furnace, the combination with a rotary cylinder, of means for directing a flame into one end of the cylinder, and an adjustable device for feeding blanks to the other end of the furnace, said adjustable device also constituting means for regulating the draft through the furnace.

6. The combination with a revoluble furnace open at its inlet end, of a feeding device projecting into said open end of the furnace, and means for adjusting said feeding device relatively to the open inlet end of the furnace for regulating the draft through the furnace.

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

WALTER S. ROCKWELL.

Witnesses:

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E. H. P. SQUIRE.