

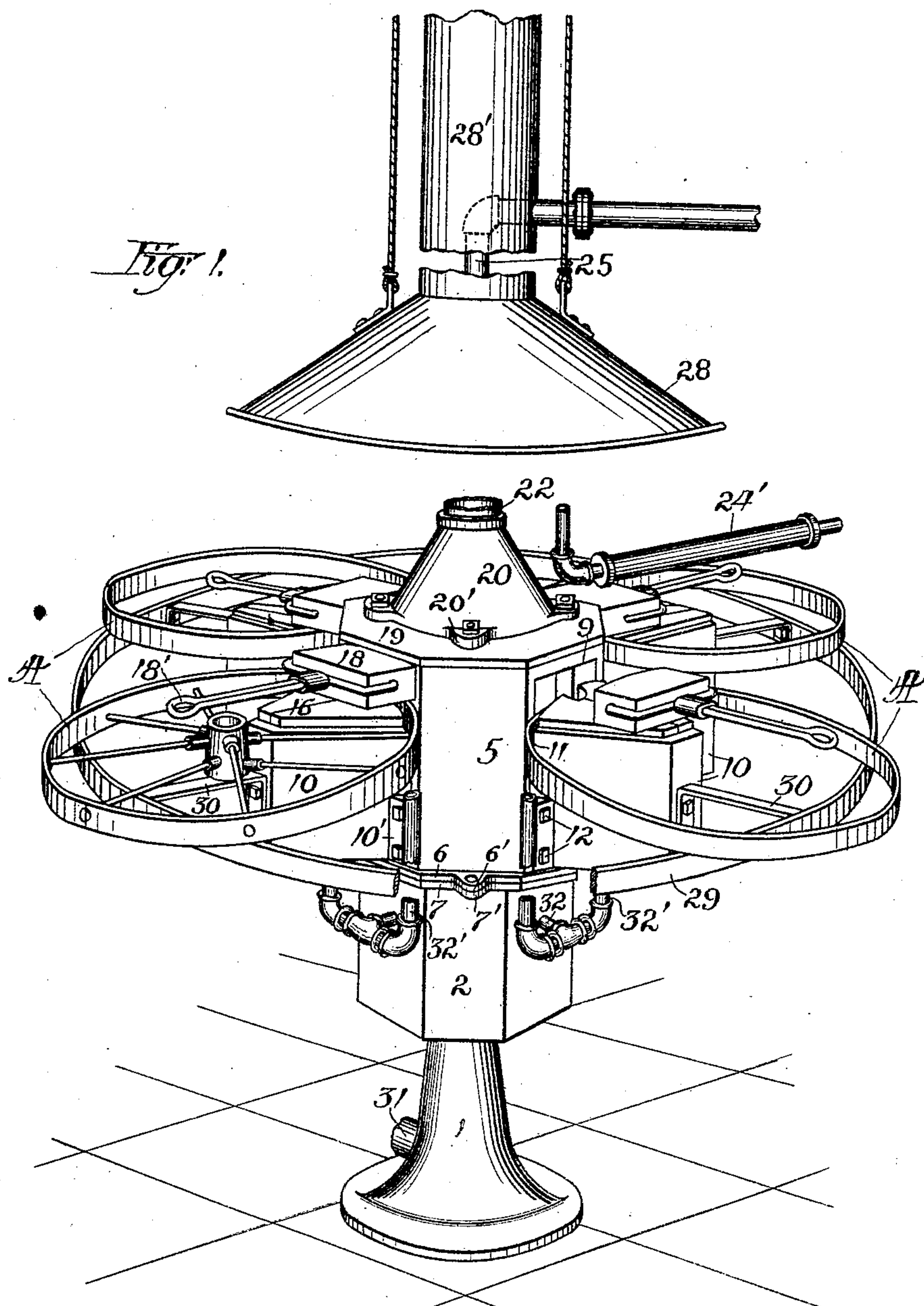
No. 814,397.

PATENTED MAR. 6, 1906.

J. R. RUSSELL.
FURNACE.

APPLICATION FILED JUNE 3, 1905.

3 SHEETS—SHEET 1.



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No. 814,397.

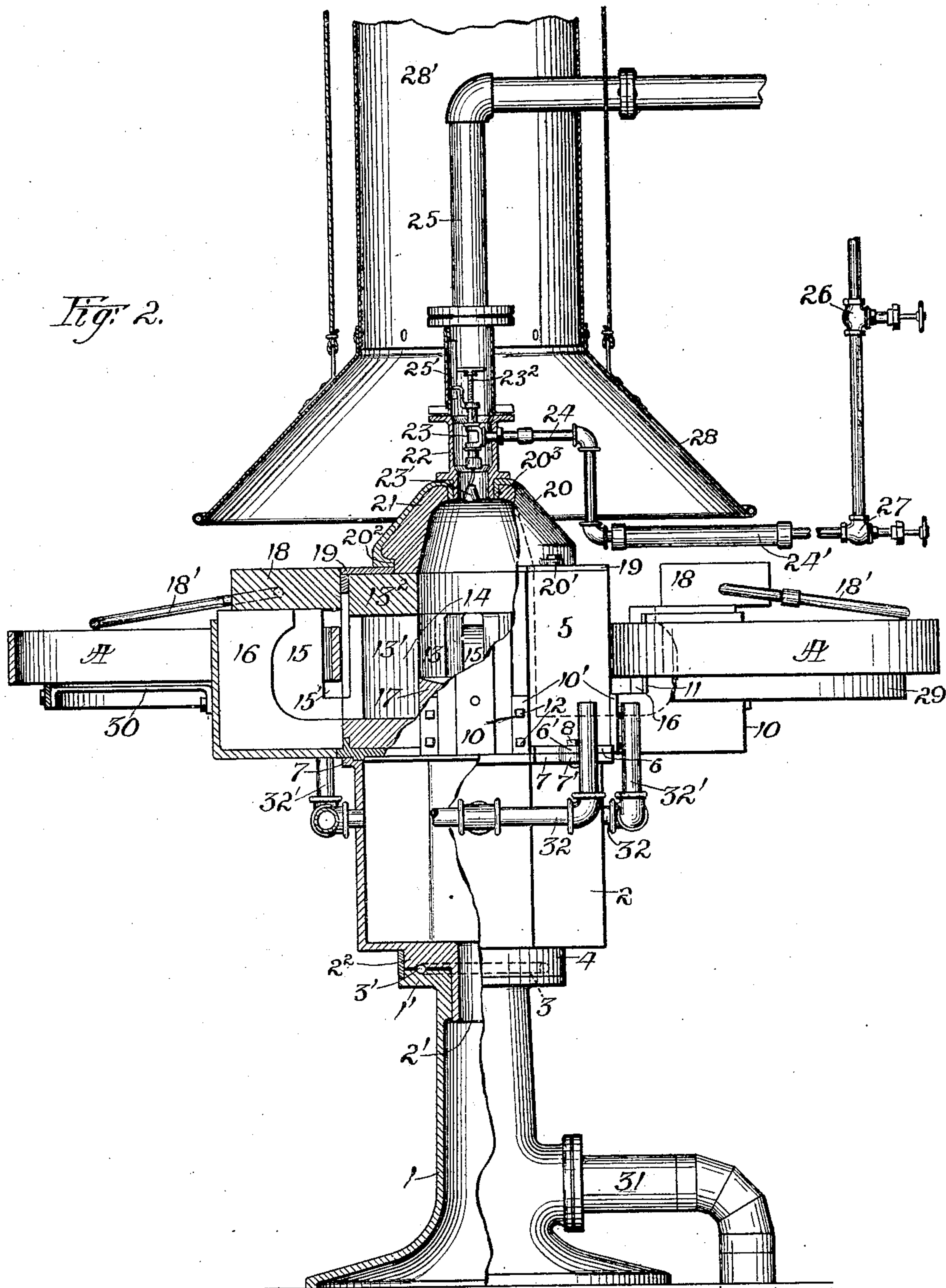
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3 SHEETS—SHEET 2.

Fig. 2.



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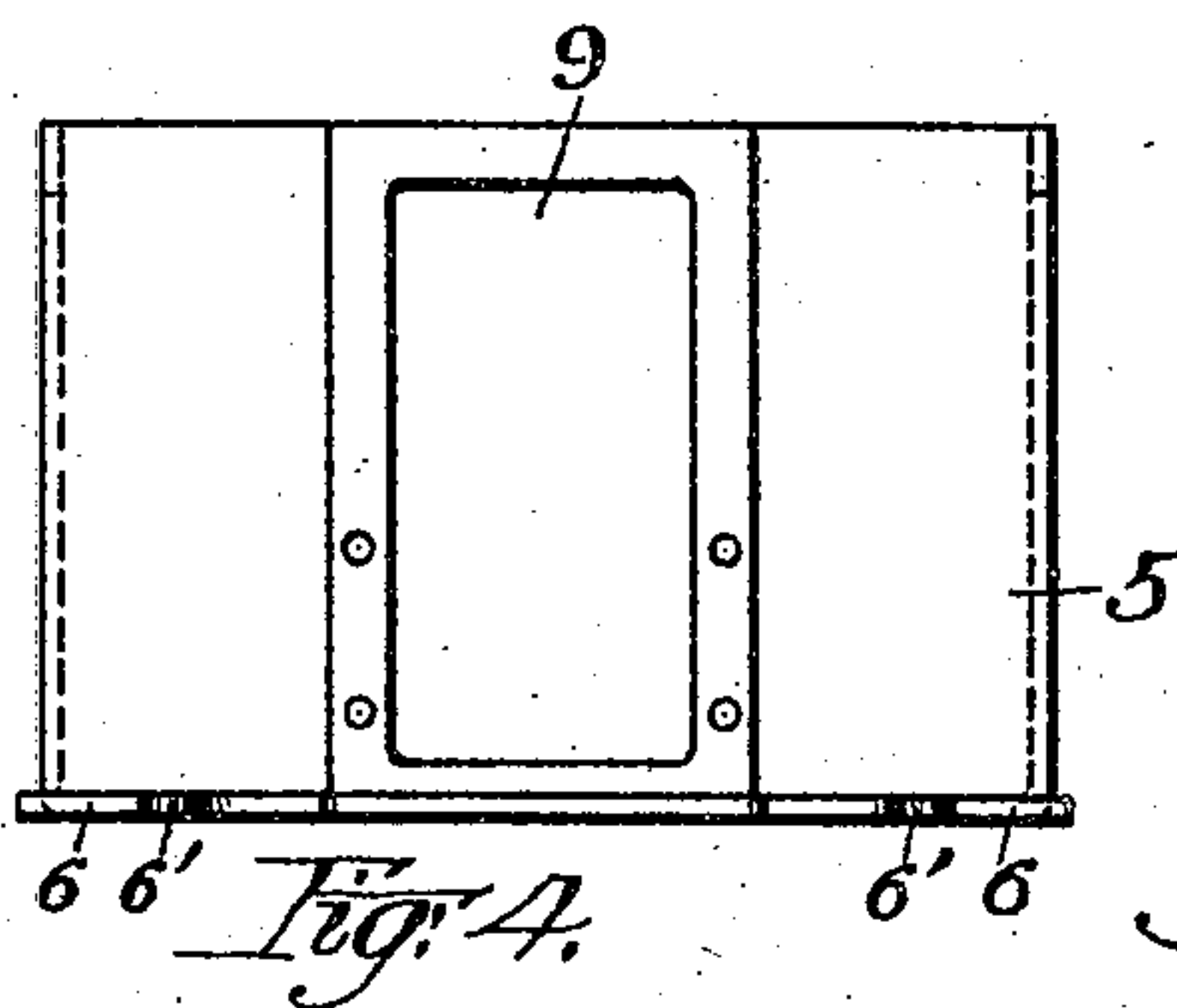
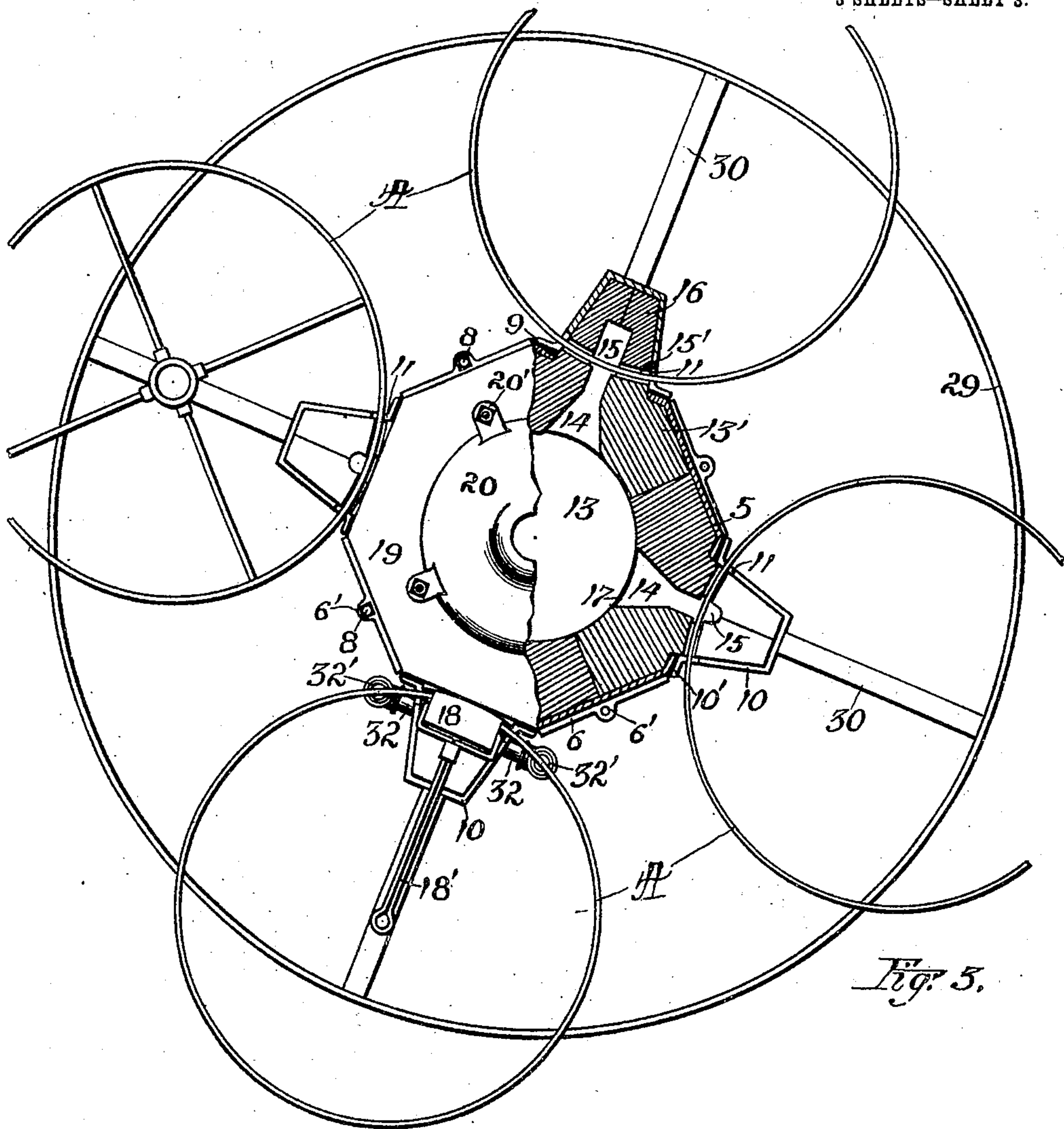
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JOSEPH R. RUSSELL, OF CHICAGO, ILLINOIS.

FURNACE.

No. 814,397.

Specification of Letters Patent.

Patented March 6, 1906.

Application filed June 3, 1905. Serial No. 263,554.

To all whom it may concern:

Be it known that I, JOSEPH R. RUSSELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Furnaces, of which the following is a complete specification.

This invention relates to that class of furnaces which are used for heating metal for forging, welding, brazing, and other similar purposes. The application of the improvement is herein shown as having been made to the type of rotary furnaces which are employed in welding the rims of wheels and are termed "tire-heating furnaces." Its application may be extended, however, as will hereinafter be made apparent, to various types of furnaces, the particular requirement of the work determining the necessary modifications therein.

The object in view is to improve and simplify the construction of furnaces, looking more particularly to the attainment of a greater economy in fuel and an increased capacity for work.

Referring to the accompanying drawings, Figure 1 is a perspective of a furnace embodying my invention, the hood over the fire-box being shown detached and slightly raised in order to more clearly disclose the parts. Fig. 2 represents a front elevation, partly in section, of the same furnace. Fig. 3 is a plan, partly in section, of the fire-box, the adjacent pockets, and other associated elements; and Fig. 4 is a side elevation of the fire-box case, showing the pocket-openings therein.

In the several figures like characters designate corresponding parts.

While the furnace illustrated is shown to be rotatable, the invention is equally applicable to stationary furnaces.

In the drawings, 1 designates the hollow cylindrical base, the upper end of which terminates in the flange projection 1'. On this base is supported the blast-receiving chamber 2, which is preferably of octagonal cross-section, as shown in Figs. 1 and 2. The lower end of the blast-receiving chamber 2 is provided with the hollow cylindrical journal or neck portion 2', which forms a tight bearing in the upper end of the base 1. A ball-race 3 is formed in the shoulder 2² on the lower end of the blast-chamber 2, in which is received suitable balls 3'. A band 4 rests upon the flange projection 1' and extends up-

wardly about the shoulder 2³, thus keeping the bearing free from dirt and dust. The upper end of the blast-receiving chamber 2 is closed by the bottom of the fire-box case 5, a tight joint between the two members being effected by a flange connection, as shown in Fig. 2. The flange 6 on the fire-box case engages with a corresponding flange 7 on the said blast-receiving chamber, while the lugs 6' and 7' thereon respectively receive the bolts 8 for holding the members together. The fire-box case 5 is also made, preferably, of octagonal cross-section, open at the top, of a somewhat larger diameter than the blast-receiving chamber 2 and with the pocket-openings 9 in the alternate faces thereof. The shape of the fire-box case will be determined usually by the number of pockets employed. In the tire-furnace herein described four pockets have been found sufficient to keep a single operator busy. If a three-pocket furnace is desired, a triangular-shaped fire-box may be used, which with the corners cut off to make a more compact body would give a hexagonal outline.

On the faces of the fire-box case 5, which are provided with the openings 9, are secured the pocket-casings 10, made preferably independent of the said fire-box case and bolted thereto, as shown. These pocket-casings 10 are secured over the openings 9, taper outwardly in order to pass between the spokes of the wheel, and, as will appear from Figs. 1 and 2, do not extend flush with the top of the fire-box case, but stop some distance below. A tire-receiving slot 11 is formed at the upper side of each pocket-casing 10 between said casing and fire-box 5 by cutting away a portion of the pocket-casing. The flanges 10' of the pocket-casings 10, which receive the bolts 12 for securing same in position, terminate at this slot 11. The interior of the fire-box and pocket-casings just described are lined with fire-brick, the shape of which is clearly shown in Figs. 2 and 3. The bricks are so shaped that when in place a centrally-located circular fire-box 13, with outwardly-tapering channels 14 leading therefrom, is formed within the fire-box casing by the bricks 13', while in the pocket-casings the pockets 15 are formed to register with the said channels, the channels, in effect, constituting a portion of said pockets. In the brick linings 16, which form the several pockets 15, tire-receiving slots or openings 15' are made to register with the slots 11 in the

pocket-casing 10, these slots corresponding in curvature with that of the tires which they receive and are somewhat larger in order to readily receive the tires therein.

5 In the bottom of the fire-box 13 and centrally arranged with respect thereto is the deflector 17, which is formed of a cylindrical fire-brick projecting upwardly from the bottom of the fire-box 13 some distance and having its upper surface cupped out, as shown in
10 Fig. 2. The flame striking the concave surface of this deflector is turned outwardly into the channels 14 and pockets 15. The fire-bricks 16 in the pocket-casings 10 extend upwardly slightly above the upper margins
15 thereof, as shown in Fig. 1, and to cover the upper opening of the pockets each is provided with a loose brick or pocket cover 18, which is moved with the handle 18'.

20 On top of the bricks 13', which form the walls of the fire-box 13, is placed the brick cover 13², its upper surface terminating flush with the upper margin of the fire-box casing 5. An annular plate or casting 19 is placed
25 over the brick cover 13², (see Figs. 1 and 2,) and to this annular plate is bolted the fire-box cap 20. This cap is conical in shape, with the lugs 20' for bolting to the plate 19 and the inwardly-projecting flange 20² for retaining in position the brick lining 21 of said
30 cap. The opening in the cap-lining registers with that in the cover 13² and forms with it the upper end of the fire-box 13.

The crown of the cap 20 is provided with a
35 flanged opening 20³, in which fits the burner-casing 22, a rotatable connection being formed therebetween. The burner as a whole, which is located within this burner-casing, is designated by the numeral 23 and the fuel-pipe
40 leading thereto by 24.

For a detailed description of the burner herein shown reference is made to the application filed by me May 22, 1905, Serial No. 261,520, liquid-fuel burners. It will be sufficient to state herein that 23' is the eccentrically-arranged feed-cone and 23² the stem
45 for controlling same, which is reached through the slide-covered hand-hole 25' in the blast-pipe 25.

50 As more perfect vaporization can be secured with heated than unheated oils, a preheater is provided for the oil as follows: The feed-pipe 24 is made to drop down and normally lie above the opening in one of the
55 pockets 15, thus bringing this portion of the pipe to a position in which it will be impinged by the flames escaping from said pocket. This portion 24' of the feed-pipe is enlarged, as shown, to increase the heat-receiving capacity thereof. It should be remembered in
60 this connection that the furnace is rotatable and the feed-pipe fixed. Hence the operator should so station himself that in turning the furnace the pockets will be made to stop directly beneath the enlarged pipe 24'. The

oil is admitted through the feed-valve 26 and is regulated by means of the needle-valve 27. A hood 28 surrounds the upper portion of the furnace, its function being to collect the heat and burned gases that they may be conducted through the hood-pipe 28' outside the
70 building. The fan-blast pipe 25 is placed inside this hood and hood-pipe, thus subjecting the air which passes to the burner to a preheating by the hot gases from the furnace before it mixes with the oil in the burner 23. The preheating of the oil and air in connection with the improved burner and furnace gives
75 a highly efficient result.

The rims or tires A, which are shown in position in the several pockets of the furnace, are held at their outer sides by the ring-support 29, the construction of which is clearly
80 shown in Fig. 3. The said ring 29 is supported by the arms 30, the inner ends of which are bolted to the pocket-casing 10.

Leading to the hollow trunk of the base 1 is a second fan-blast pipe 31, which supplies a light air-pressure to the blast-receiving chamber 2. The rotatable connections between
90 the chamber 2 and base 1, which has already been described, is practically air-tight, as is also the fixed joint between said chamber and fire-box case 5. Pipes 32 lead out from the blast-receiving chamber 2 beneath the
95 pockets 10, each pipe branching off, the branches 32' extending upwardly and terminating directly below the tires A near the slots 11 in said pockets. These pipes 32 conduct an air-blast against the tires, which acts
100 as a flame-retarder and keeps the portion of said tire outside the pocket cool and also confines the heat in the pockets.

I do not wish to limit myself to the exact construction set forth, for it is evident modifications in the minor details thereof or in the
105 shape of the various parts could be made as heretofore intimated and still come within the spirit and scope of the invention.

The operation of the device is as follows:
110 Oil is admitted to the burner through the valve 26 and regulated by the needle-valve 27. In flowing through the preheater 24' the oil becomes heated, and thus more readily volatilized, while the air-blast is preheated, as
115 already described. The mixture of the oil and air is effected by the burner 23 in the manner set forth in the application before cited. The flame from the burner 23 strikes
120 against the cup-shaped deflector 17 and is directed outwardly into the pockets 15, the tapering channels 14 leading thereto operating to concentrate the flames and intensify the combustion in the pockets and about the
125 rim or tire placed therein. A tire is placed within each pocket either before or after the spokes are secured thereto. In Fig. 1 three blank rims and an eight-spoke wheel are shown in place, while in Fig. 3 three rims and
130 four-spoke wheel are shown. The pocket-

covers are withdrawn to place the rims in the pockets and then returned to position. When sufficiently heated, the rim is taken out and another one introduced, after which
 5 the furnace is given a quarter-turn in order to bring the next heated rim before the operator. A new rim is put in the furnace as fast as a heated one is removed for welding and the succeeding one brought to the operator
 10 by giving the furnace another quarter-turn, as before.

If it is desired to heat articles other than wheel-tires or to heat large-sized wheel-tires, the shape of the pockets would necessarily be
 15 of a modified form. For instance, bars would require only a straight opening through the pocket instead of a curved slot open at the top, while other forms would require like modifications in shape or number of the pock-
 20 ets or in both.

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

1. In a furnace, in combination, a fire-box, a plurality of laterally and radially disposed
 25 pockets leading therefrom, a single burner centrally arranged above said fire-box, and an upwardly-concave deflector located in the bottom of said fire-box and beneath said burner for deflecting the flames into said
 30 pockets.

2. In a furnace, in combination, a fire-box, a plurality of radially-disposed pockets leading therefrom, a burner arranged above said
 35 fire-box, and a feed-pipe for conducting the oil to the said burner, said feed-pipe leading directly above and closely adjacent to one of said pockets.

3. In a furnace, in combination, a fire-box, a plurality of radially-disposed pockets lead-
 40 ing therefrom, a burner arranged above said fire-box, a feed-pipe for conducting the oil to said burner, said feed-pipe being provided with an enlarged portion in the run thereof which is located directly above and closely
 45 adjacent to one of said pockets.

4. In a furnace, in combination, a fire-box,

a plurality of radially-disposed pockets lead-
 ing therefrom, a burner arranged above said fire-box, an oil-feed pipe, a hood and pipe leading upwardly therefrom for conducting
 50 the waste gases from the furnace, and an air-blast pipe located within said hood and hood-pipe for supplying air to said burner.

5. In a furnace, in combination, a fire-box, a plurality of radially-disposed pockets lead-
 55 ing therefrom, a burner arranged above said fire-box, an oil-feed pipe for conducting oil to said burner, said feed-pipe leading directly above and closely adjacent to one of said pockets, a hood and pipe for conducting the
 60 waste gases from the furnace, and an air-blast pipe located within said hood and hood-pipe for supplying air to said burner.

6. In a furnace, in combination, a hollow base, a blast-receiving chamber rotatably
 65 mounted thereon its interior communicating with said hollow base, a fire-box casing having laterally-arranged pocket-casings, in connection therewith, suitable linings for said
 70 fire-box and fire-box casing, pipes leading from said blast-receiving chamber upwardly and terminating adjacent to said pockets for conducting a flame-retarding blast, and a single burner arranged above said fire-box casing.

7. In a furnace, in combination, a hollow
 75 base, a blast-receiving chamber rotatably mounted thereon its interior communicating with said hollow base, a fire-box casing mounted on said blast-receiving chamber, a plurality of independently - constructed
 80 pocket-casings secured to the sides of the said fire-box casings, suitable lining for said fire-box and pocket casings and tire-receiving openings therebetween, pipes leading from said blast-receiving chamber upwardly and
 85 terminating adjacent to said pockets for conducting a flame-retarding blast, and a single burner arranged above said fire-box casing.

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