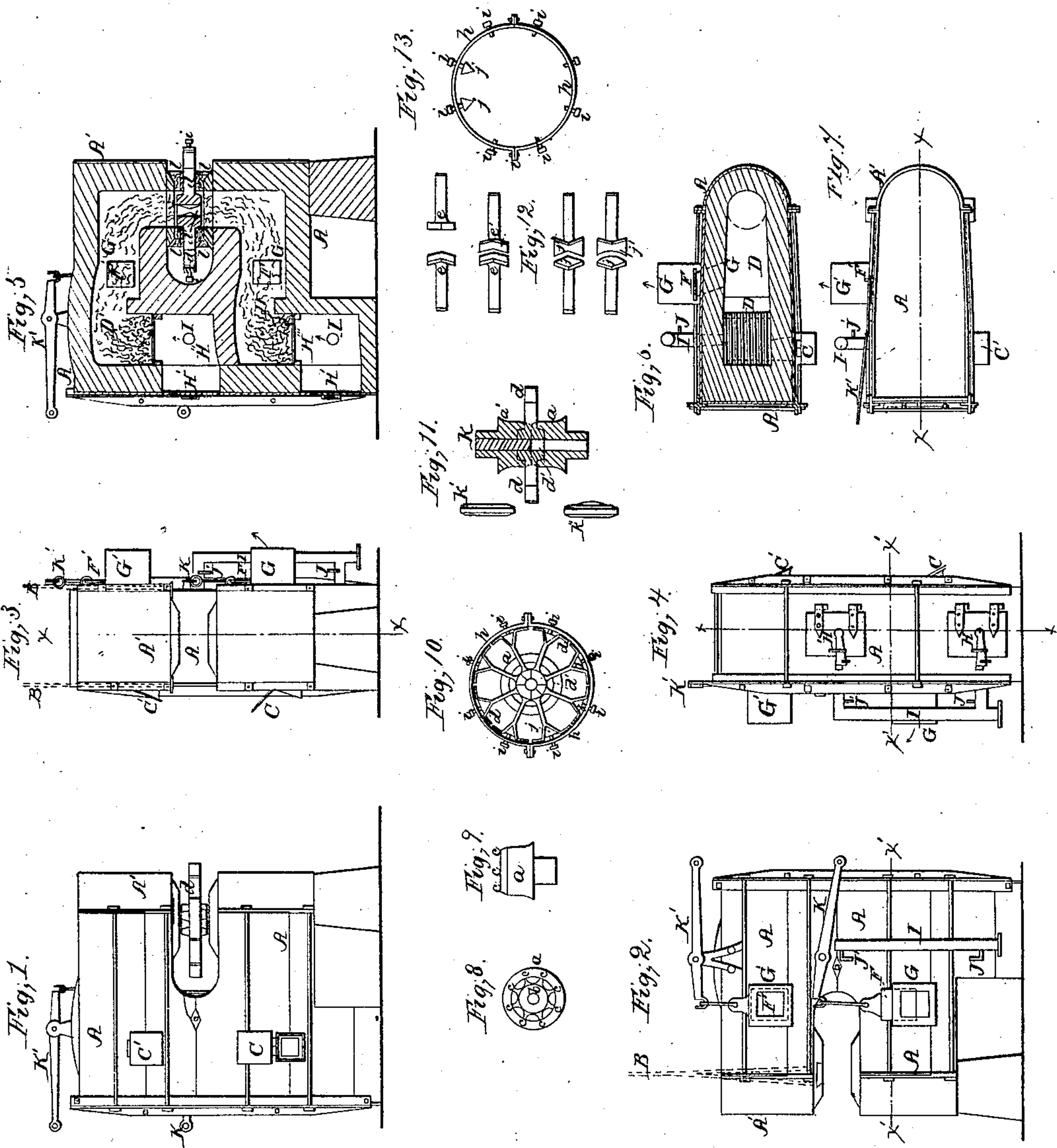


W. R. THOMSON.
HEATING WROUGHT IRON WHEELS FOR FORGING.



UNITED STATES PATENT OFFICE.

WM. R. THOMSON, OF CLEVELAND, OHIO.

HEATING WROUGHT-IRON WHEELS FOR FORGING.

Specification of Letters Patent No. 13,053, dated June 12, 1855.

To all whom it may concern:

Be it known that I, W. R. THOMSON, of Cleveland, in the county Cuyahoga and State of Ohio, have invented certain new and useful Improvements in the Method of Manufacturing the Hubs of Wrought-Iron Wheels; and I do hereby declare that the following is a full and exact description thereof, reference being had to the annexed drawings, making part of this specification.

The nature of my invention consists in the method of heating for forging the hubs of wrought iron wheels. The butts which form the hub are made in sections having angular and curved sides so that when put together and being forged into a solid hub they cannot slip apart or out of place. The sections or hub are heated by a peculiar arranged furnace, which causes the heat to pass around and through the center of the hub from above and below alternately as may be required, and when heated to a sufficient degree the sections are welded into a solid hub, by the compressing and swaging action of dies conforming to the shape of the hub and spokes.

Figure 1, is a side elevation of the furnace; Fig. 2, is a side view opposite of Fig. 1; Fig. 3 is an end elevation; Fig. 4, is a view of the opposite side of Fig. 3; Fig. 5 is a vertical section in the direction of the lines $x x$ in Figs. 3, 4, and 7; Fig. 6, a horizontal section in the direction of the lines $x' x'$ in Figs. 2 and 4; Fig. 7, a top view. The other figures will be referred to in description.

Like letters designate like parts in the several figures.

The furnace A A, is built of fire brick or other suitable material and sheathed on the sides, and ends with iron plates and secured by bolts, and nuts, and for the purpose of supporting the upper projecting end A', it is secured by bolts B, B, on each side to a frame work above.

C, C', Fig. 1, are the fuel doors to the upper and lower furnace places D, D', as seen in Fig. 5.

F, F', are the dampers of the flues G, G', connecting the chimney with the furnace at G, G', in Figs. 3 and 4.

H, H', Figs. 4 and 5, are the ash pit doors; I, a wind pipe which enters the ash pits H'', H''', under the furnace as seen at I, I, in Fig. 5. In the wind pipe are valves having a handle on the outside as shown at J, J', for the purpose of cutting off the air, and

blowing either of the furnaces as may be required. The levers K, K', Fig. 2, are connected to the dampers for the purpose of opening and closing them.

The dies for swaging and hammering the hub when at a welding heat are alike, the lower one being secured to an anvil, and the other arranged above it and acting as a vertical trip hammer.

Fig. 8, is a plan view of the dies, and Fig. 9, a side view. In the dies are chambers corresponding to b , Fig. 8, for the reception of the hub, and radiating from it are grooves c , to receive the arms of the wheel.

d , Fig. 10, represents the wheel in the die. As the upper die forms the hammer, or head, of a vertical acting trip hammer, by its action in concert with the lower die the hub is perfectly swaged, and hammered together.

a , a' , Fig. 11, represents the upper and lower dies, with the hub in the chambers of the dies, and the spokes extending from the hub through the grooves in the dies.

The wheel is first made in sections according to the number of spokes, the butt and spoke forming one section e , Fig. 12. The butts of the hub are of a curved, and angular form, corresponding to e , e' , or f , f' , or g , g' , Fig. 12. The sections e , e' , will fit together so as to form the entire hub, which is the case with the sections f , f' and g , g' and as the sections f , f' , may be made to fit with the curved g , g' , sections or sections e , e' , it follows that these different sections may be combined one with the other so as to make the wheel. When the wheel is thus put together it is secured by a circular band, or clamp, h , Fig. 13, provided with set screws i , in number according to the spokes. These screws set into the angular blocks placed between the arms at f' , Fig. 10, by which means the sections are held together for welding.

h , represents the clamp around the wheel.

It will be noted that the wheel thus made up and secured by the clamp and screws that there can be no lateral movement of one section independent of the others. There is an important advantage as in the ordinary mode the sides of the butts are straight, and as they are welded together by hand hammering they slip laterally from each other, consequently the hub is imperfectly welded, and rough which requires much extra labor in trimming up.

After the hub is put together and secured

by the clamp and screws it is ready for welding which is accomplished by placing the wheel so that the hub will be between the nozzles of the furnace as seen at *d*, and *d'*, Fig. 5. In this position the wheel is supported and the hub surrounded temporarily with fire brick, or other material as represented at *l*, *l*, for the purpose of confining the heat to the hub. In this position it remains until sufficiently heated for the dies.

By opening the damper *F'*, and closing the damper *F*, and shutting off the blast from the furnace *D'*, by closing the valve *J'*, and opening the valves *J*, so as to blow the furnace *D*, the fire will then pass through the furnace *D*, to the under side of the hub *d'*, and surrounds it upon all sides as it ascends to the furnace *D'*, and passes out to the chimney through the flue *G'*. When the hub is sufficiently heated on the under side, the damper *F''*, is closed and the damper *F*, opened, and by shutting off the blast from the furnace *D*, and opening the valve *J'*, so as to blow the furnace *D'*, by this means the fire from the furnace *D*, is stopped and the fire from the furnace *D'*, passes to the top of the hub and surrounds the hub on all sides as it descends to the furnace *D*, and passes out through the flue *G*, to the chimney. Thus alternately the fire from the furnaces *D*, and *D'*, is directed to the upper and lower sides of the hub as may be required to thoroughly heat it. When the hub is at a welding heat it is taken out and placed on the lower die *a*, so that the spokes or arms will enter the grooves *c*, and the hub in the chamber of the die. In Fig. 11, *a*, represents the lower die, and *a'*, the upper, with hub *d'* between in the chambers.

To the upper die *a'*, is secured the punch *h*, which enters into the eye of the hub and prevents the sides from compressing into the eye by the force of the dies. It will be observed that by the form and action of the dies and punch, that the hub is swaged and compressed into shape on all sides, and is soundly welded together in the die chambers. The wheel is turned from time to time so that both sides of the hub may be subject to the blows of the upper die *a'*. The punch *h*, is driven through the eye of the hub by the die *a'*, to aid in cleaning the eye and shaping the hub. The punch *h''*, has a feather, or rib, on its side which cuts

a key seat in the hub when the punch is driven through by the die *a'*, after the hub is welded together. This punch may be omitted and the seat cut in the ordinary way. When the sections are thus welded together the tire may be secured to the arms in any desirable manner.

In the ordinary mode of making wrought iron rail road wheels, the butts have straight sides and are thus put together. Consequently they slip out of place when being welded together, which is not the case with my improvement. Also in the usual mode the hub is heated in a common forge fire and only one side at a time of the hub is heated and welded together, as follows: As soon as the hub is sufficiently heated on one side it is removed to the anvil and a washer or ring which has been heated in another forge is welded to the end of the hub as it is being hammered together by hand. Both sides or ends of the hub are treated in this manner. There is much labor required to trim the hub into shape when thus welded together and as it is difficult to hammer the hub between the spokes, the hub is consequently unsound and not as well formed as with the dies. With my improvement the difficulties attending the present mode of making rail road wheels do not occur, as the butts forming the hub by their peculiar shape cannot slip out of place at any time while being welded and forged into the entire hub, and further the hub is not welded and hammered on one side at a time, but is heated by the furnace entirely through before it is swaged or hammered together. The wheel or hub is not moved while it is in the furnace until the hub is at a welding heat then it is removed to be compressed, swaged, and welded together on all sides at once, into shape by the action of the dies as before described.

The same principle of operation as set forth may be employed in making hubs of various forms, and without reference to the number of spokes in the wheel.

What I claim herein as new and for which I desire to secure Letters Patent is—

The method of heating hubs for wrought iron wheels as herein described, the same being then forged and swaged as set forth.

WILLIAM R. THOMSON.

Witnesses:

ERASTUS SMITH,
LAMERT WHITE.