W. Brooke,

Casting Car Wheels.

No. 39,316. Patented July 21, 1863.

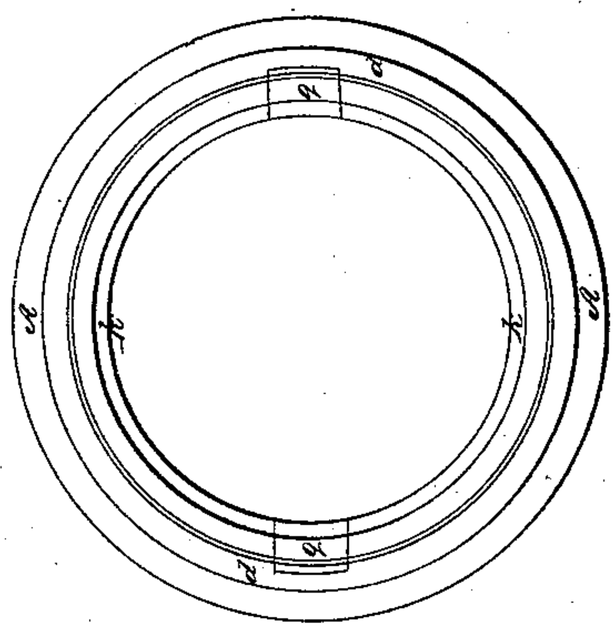

Fig. 4

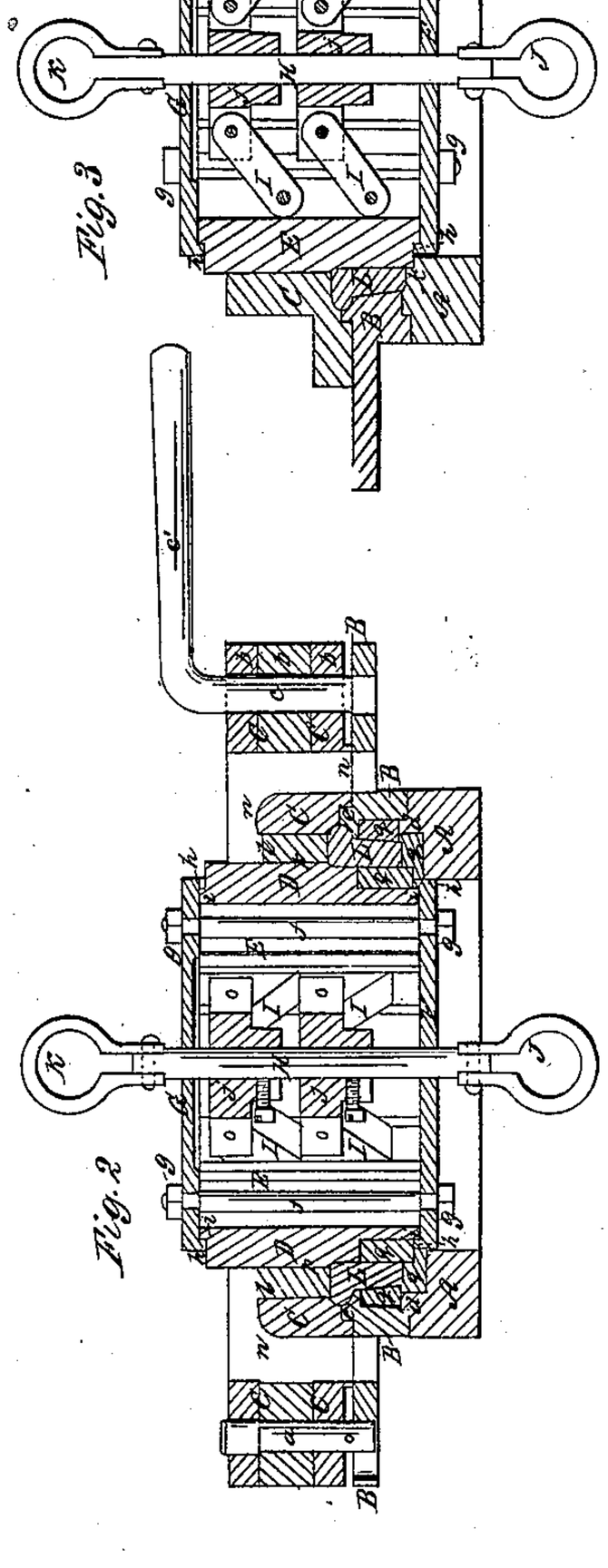

Fig. 3

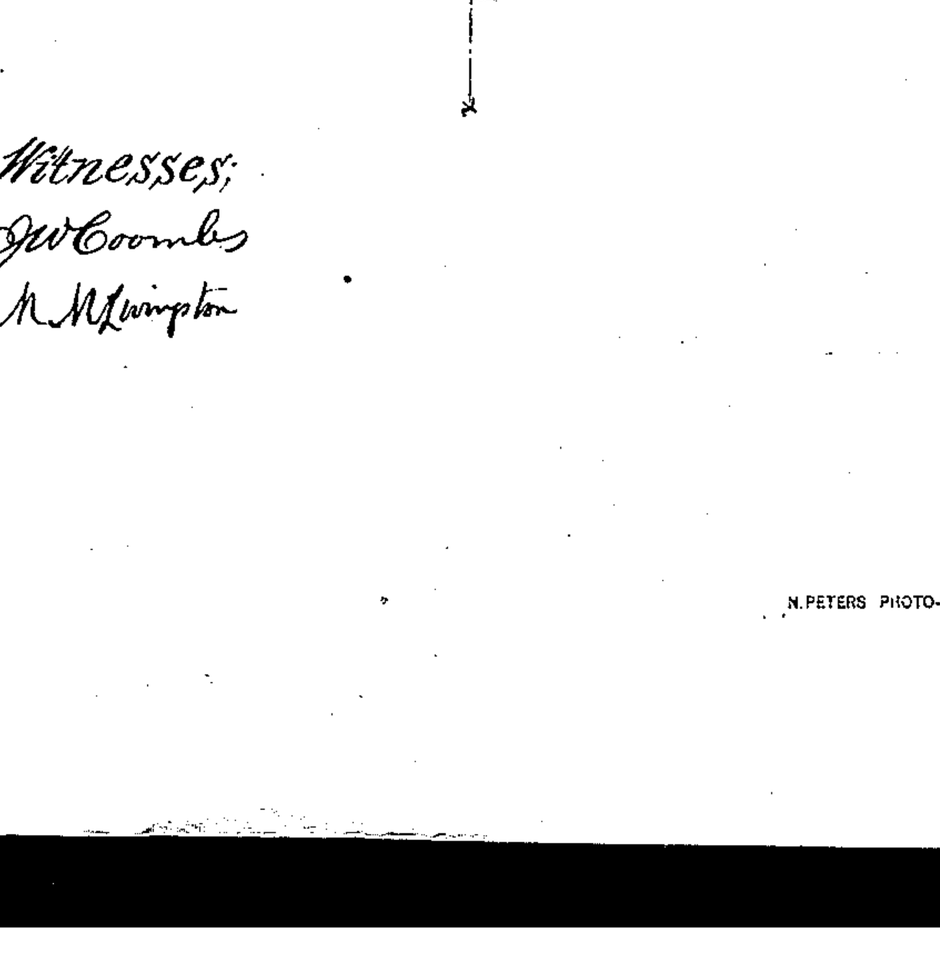

Fig. 1

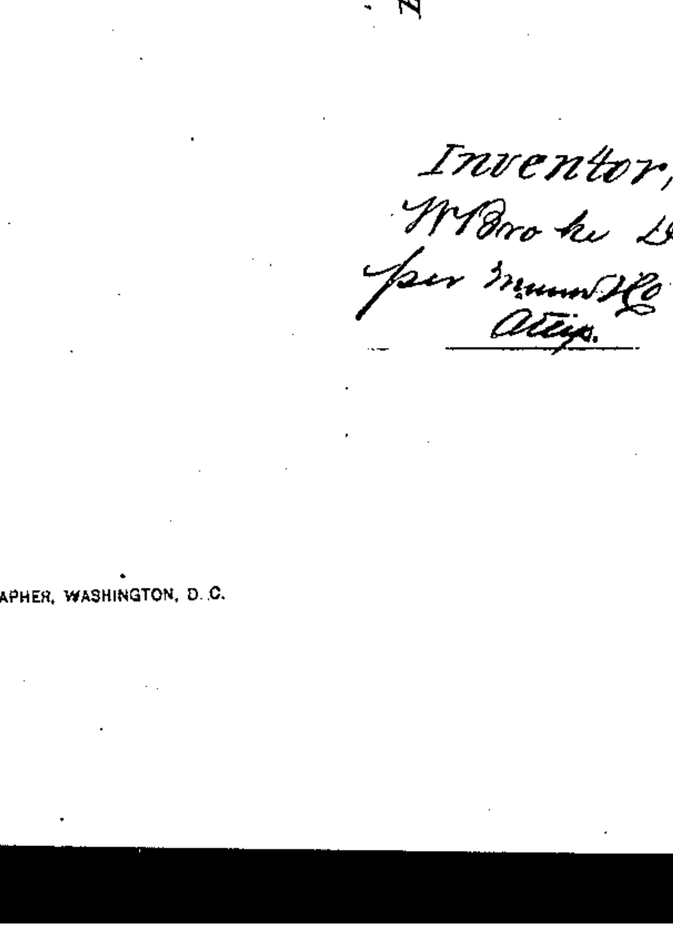

Fig. 2

Witnesses;
J. W. Coombs
N. M. Livingston

Inventor;
W. Brooke Dec'd
per Munn & Co
Attys.

UNITED STATES PATENT OFFICE.

JANE BROOKE, OF JERSEY CITY, NEW JERSEY, ADMINISTRATRIX OF WILLIAM BROOKE, DECEASED.

IMPROVEMENT IN MOLDS FOR CASTING TIRES.

Specification forming part of Letters Patent No. **39,316**, dated July 21, 1863.

To all whom it may concern:

Be it known that WILLIAM BROOKE, deceased, late of Jersey City, in the county of Hudson and State of New Jersey, was the inventor of a new and useful Improvement in Molds for Casting Tires and Rings of Steel, Iron, or other Metal; and I, JANE BROOKE, of the same city, county, and State, administratrix of the estate of the said WILLIAM BROOKE, do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan of a mold for casting locomotive-tires, having the cap of the core removed to show the interior. Fig. 2 is a central vertical section of the mold in the plane indicated by the line *x x* of Fig. 1. Fig. 3 is a central vertical section of the same in the plane indicated by the line *y y* in Fig. 1. Fig. 4 is a plan of the bottom plate of the mold.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists, first, in fitting a mold for casting tires, rings, or bands of steel or iron or other metal with a metal core so constructed as to be capable of contraction automatically, as required, to permit the natural contraction of the casting in cooling, and in so constructing such core that it may be loosened in the casting by the force applied to lift it to withdraw it therefrom.

It also consists in so constructing the gates of the mold, both those for pouring and those for the escape of air, open to the core, or so that the core constitutes one side of each gate, by which means the metal left in the gates is prevented from interfering with the contraction of the casting.

It further consists in providing for an overflow from the pouring-gates at a level lower than the mouths of the air-gates, for the purpose of preventing the metal in the pouring-gates from cutting into the core, and of permitting the cover or cope of the mold to be drawn without difficulty.

To enable others skilled in the art to make and use the invention, I will proceed to describe its construction and operation.

A is a horizontally-arranged ring or annular plate, of cast-iron or other metal, forming the bottom of the mold. B is a second ring of the same material, forming the sides of the same, and C a third ring of the same material, forming the cover or cope of the same. The cope C is divided across the center into two parts, which are hinged together at *a* to enable it to be opened, and it is furnished opposite to the hinge *a* with lugs *b b*, on each half fitted together and drilled for the reception of a pin, *c*, by which to secure the ring in a closed condition. The holes in the said lugs may be so arranged that by making the pin *c* elliptical in its transverse section, as shown in Fig. 1, the turning of the said pin in the holes may be caused to produce a slight contraction and expansion of the ring, and to enable the pin to be thus used it is furnished with a lever, *c'*. The ring B is fitted to an annular projection, *d*, on the ring *a*, and the cope C to an annular projection, *e*, on the ring B, and in this way the several rings are kept concentric with each other and the proper form of the mold is preserved. The rings are fitted with steady-pins to prevent them from turning on each other.

The contracting core is composed of any suitable number of segments, D D, of cast-iron or other metal, and a corresponding number of interposed wedges, E E, of the same material, the whole combining to form a hollow cylinder, and fitted with a base-plate, F, and cap-plate G, which are secured together by shouldered screw-bolts *f f* and nuts *g g* at such distances apart as to just permit the segments and wedges to work freely toward and from the center to produce the contraction and expansion of the core. The inner faces of the said base and cap plates F and G are recessed, as shown at *h h* in Figs. 2 and 3, to receive projections *i i* on the bottom and top of the segments and wedges, and prevent the said segments and wedges from falling out of the core or expanding more than is necessary. The plates F and G are bored centrally for the reception of a mandrel or shaft, H, which is fitted to work easily within the said holes, and passes directly through the core, and this shaft has firmly secured to it within the core two cross-heads *j j*, which are severally connected with the wedges by means of links I I,

arranged in such manner (shown in Fig. 3) as to act like toggles and to force out the wedges from the center of the core by the downward movement of the shaft, and draw them toward the center by the upward movement of the same. The outward movement of the wedges forces apart the segments, and so produces the expansion of the core in all directions, and the inward movement of the wedges permits the segments to approach each other again and produce the contraction of the core. The shaft H is furnished at the top with a shackle, K, by which to suspend or lift it by a derrick or other means, and at the bottom with a shackle, J, from which to suspend weights to produce and maintain the expansion of the core. The core thus constructed is fitted into a shallow seat, *k k*, provided for its reception in the bottom piece, A, of the mold, and its upper part fits into the cope C above the cavity of the mold in which the casting L (shown in red color in Figs. 1 and 2) is produced.

To place the core in the mold it is suspended by the shackle K, and the weight of the core causes it to slip down the shaft H, which is equivalent to moving the shaft upward in the core, and the links are thereby caused to draw the wedges inward up to the arms of the cross-head *j*, and leave the segments loose and free to move inward. When the core has been deposited in the mold, which is placed over a pit, the shaft H is left free, and a weight is suspended from the lower shackle, J, to draw the shaft H downward, and thereby cause the wedges to be forced outward and the core to be expanded to its full size—that is to say, till it fits tightly into the portion of the interior of the cope C above the mold-cavity.

When the metal of which the tire or ring is to be cast has been poured, and as the casting cools, its natural contraction produces sufficient pressure around the whole circumference of the core to overcome the pressure of the weight suspended from the shackle J, and so cause the contraction of the core with the casting. The resistance to contraction is graduated by the amount of weight suspended from the shaft, and this should be sufficient to insure the uniform contraction all around the core. When the core is to be removed from the casting, it is lifted by the shackle K, and the shaft H, being first drawn upward within it, draws in the wedges, and so loosens the core in the casting.

l l are the pouring-gates, and *m m* the air-gates, as many as may be desirable, each consisting of a groove formed in the upper part of the inner periphery of the cope C, and all open to the core, so that one side of each gate is formed by the core itself, as will be seen by reference to Figs. 1 and 2. It will be readily understood that as the casting contracts, the portions of metal left in the gates will move with the body of the casting—that is to say, follow the surface of the core—and so offer no obstacle to the contraction of the casting.

n n are the overflow-channels from the pouring-gates *l l*, arranged at a lower level than the mouths of the air-gates, which are at the top of the cope C.

In order to prevent the inner sides of the portions of metal left in the gates from being flush with the inner face of the casting, and thereby likely to cause the said face to be injured in breaking off the said portions, the core is made somewhat larger above the part around which the casting L is performed, as shown at *p* in Figs. 2 and 3. This brings the gates away from the inner face of the mold formed by the portion of the core which is within the mold.

q q q, Figs. 2 and 4, are pieces of plumbago, soapstone, or other refractory material fitted into the mold and core opposite the pouring-gates, where the molten metal is first received, to prevent the mold from being defaced or the casting from sticking to it at those points.

In order to insure the pieces *q q* in the core being opposite the pouring-gates, a steady-pin, *r*, Fig. 1, is secured in the core, and a notch, *s*, provided in the cope C for its reception.

A strong spring or springs might be applied within the core as a substitute for the toggles, and made to produce the same results.

What I claim as the invention of WILLIAM BROOKE, deceased, and desire to secure by Letters Patent, is—

1. Fitting a mold for casting tires, rings, or bands of steel or iron or other metal with a metal core which is so constructed as to be capable of contracting automatically, as required, to permit the natural contraction of the casting in cooling, substantially as herein specified.

2. So constructing the metallic core that it may be loosened in the casting by the force applied to lift and withdraw it from the casting, substantially as herein described.

3. The arrangement of the pouring-gates and air-gates of the mold between the core and the body of the mold, so that one side of each gate is formed by the surface of the core, substantially as and for the purpose herein specified.

4. Providing an overflow from the pouring-gates at a level lower than the mouths of the air-gates, substantially as and for the purpose herein specified.

JANE BROOKE,
Administratrix of the estate of William Brocke, deceased.

Witnesses:
M. S. PARTRIDGE,
R. H. LOUDEN.