(No Model.)

2 Sheets—Sheet 1.

A. K. BARKER.

APPARATUS FOR MAKING CHILLED IRON CASTINGS.

No. 602,714. Patented Apr. 19, 1898.

Fig. 1.

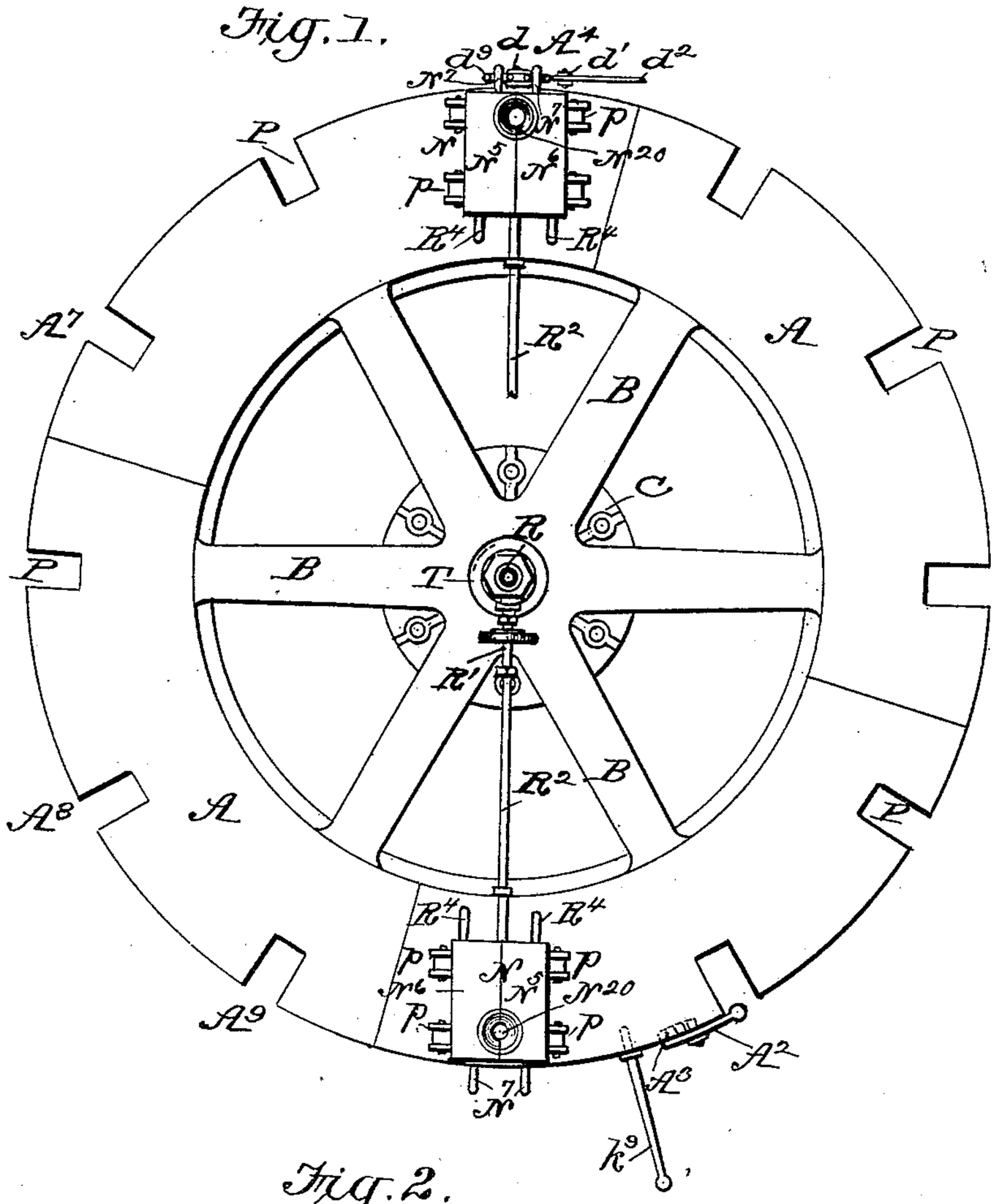
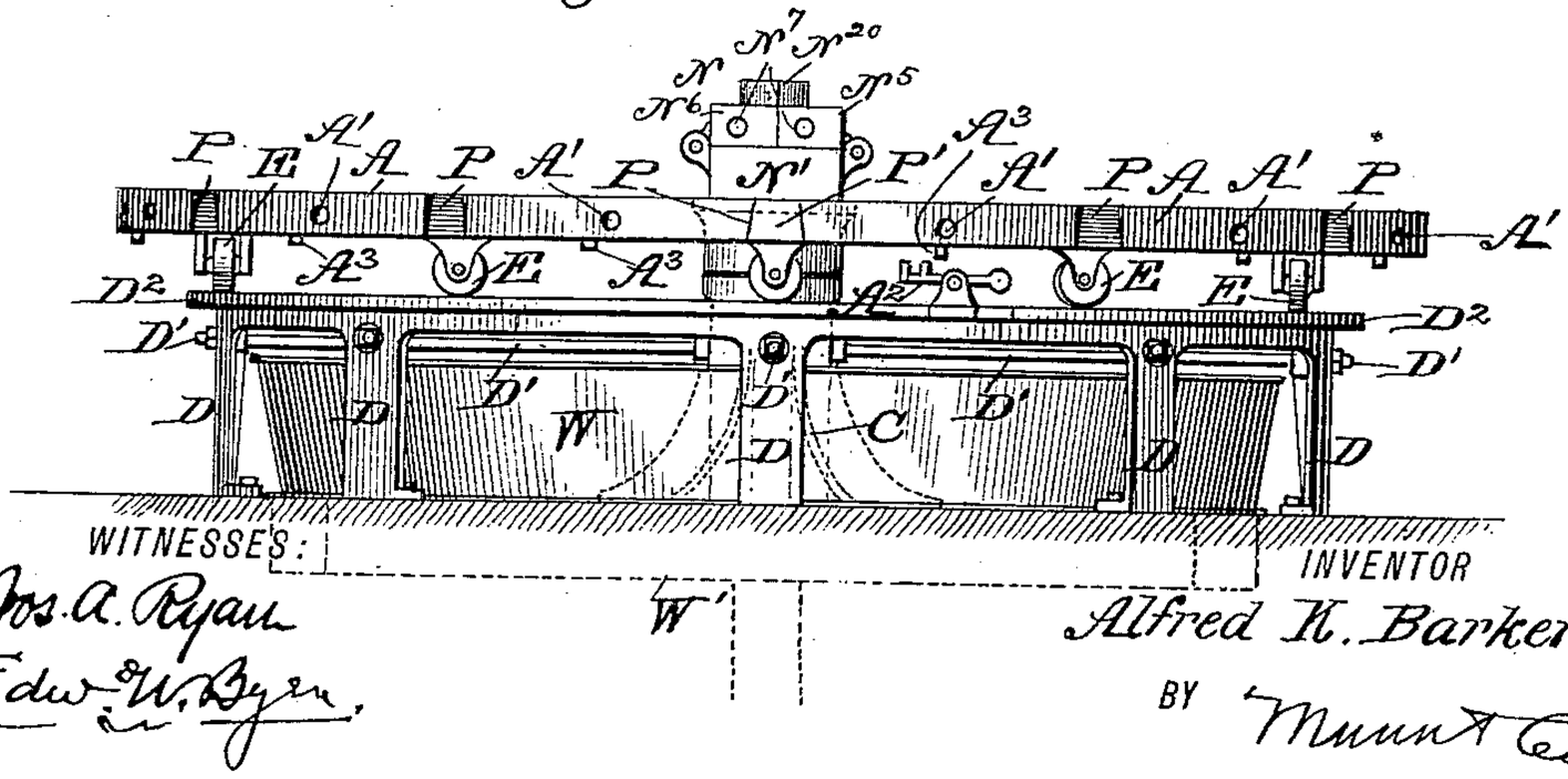


Fig. 2.



WITNESSES:

Jos. A. Ryan

Edw. W. Byrn.

INVENTOR

Alfred K. Barker.

BY Munn & Co.

ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

A. K. BARKER.

APPARATUS FOR MAKING CHILLED IRON CASTINGS.

No. 602,714. Patented Apr. 19, 1898.

Fig. 3.

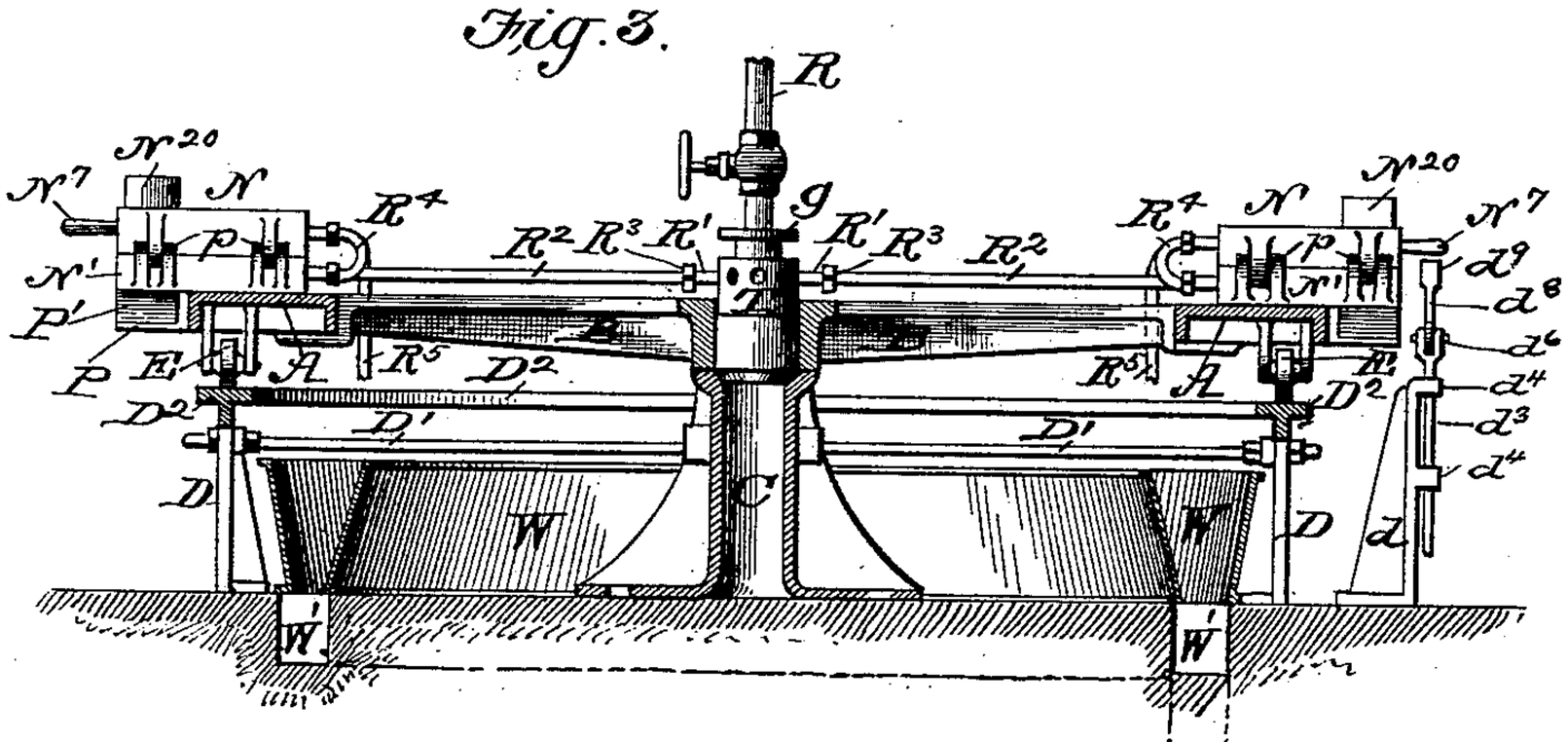


Fig. 4.

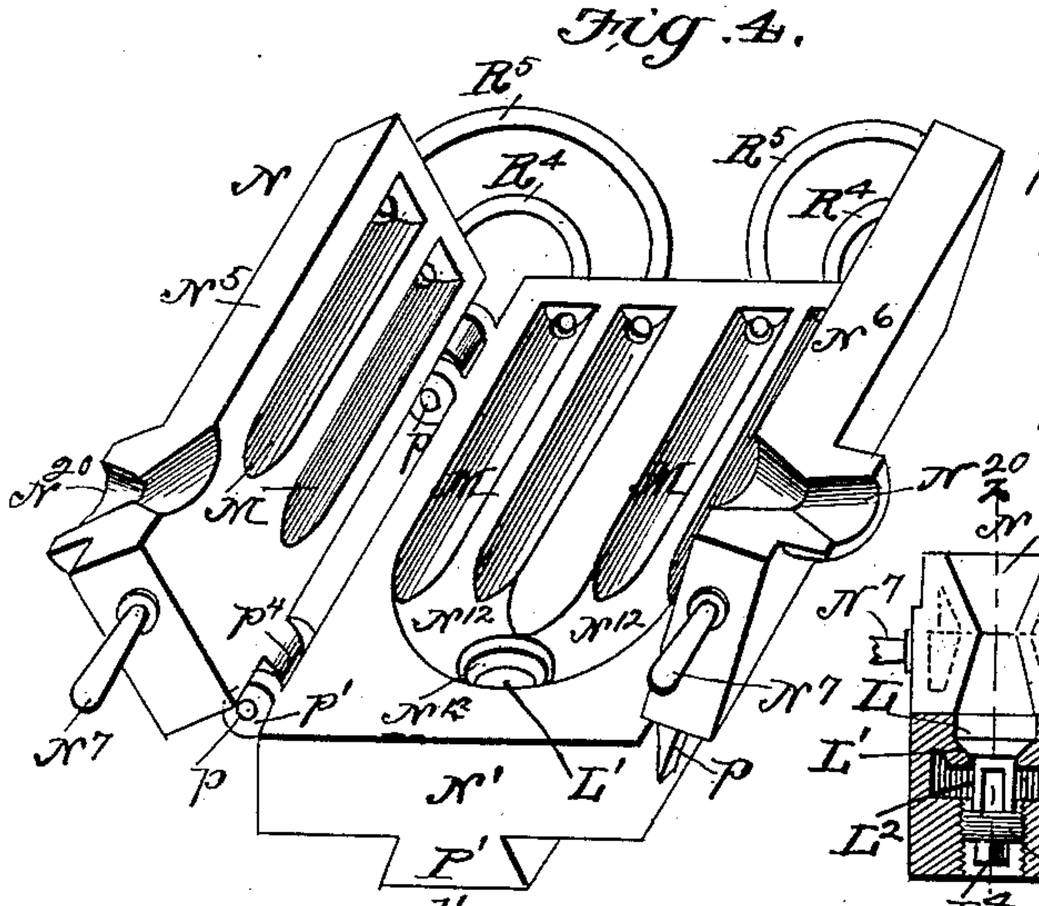


Fig. 6.

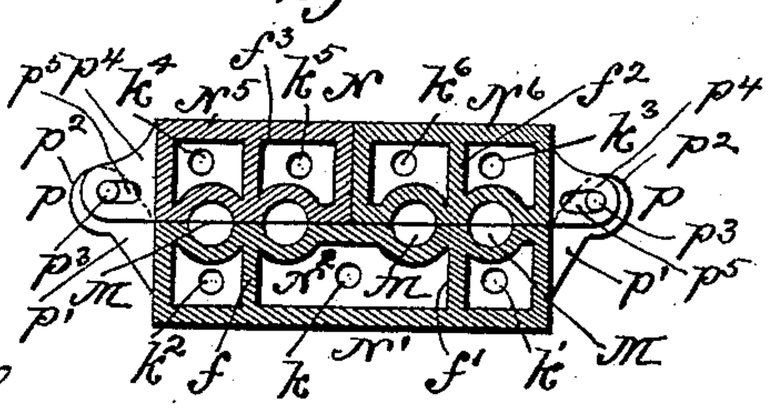


Fig. 7.

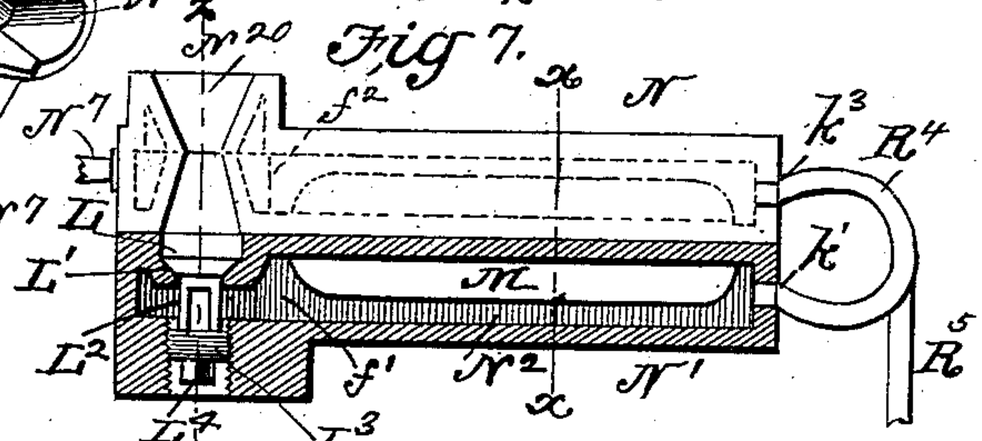


Fig. 5.

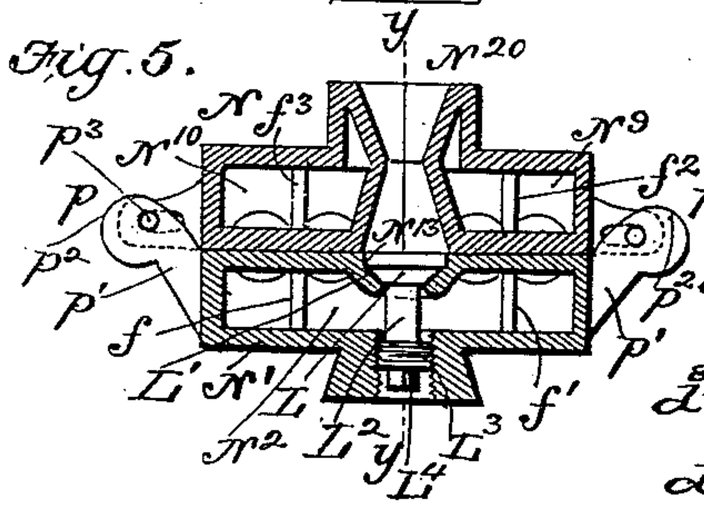
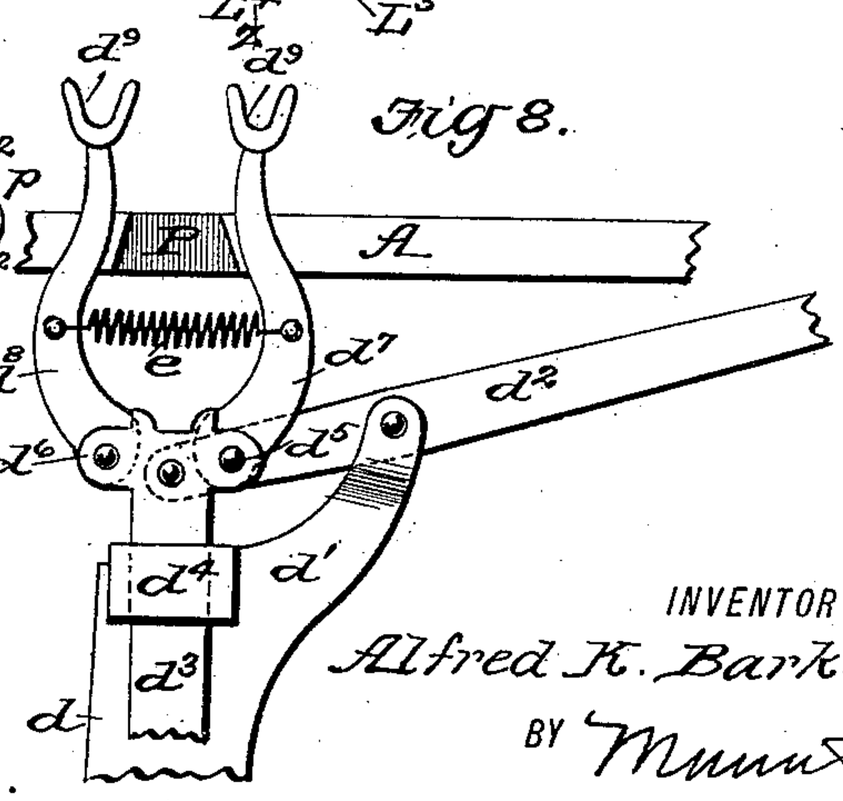


Fig. 8.



WITNESSES:

Jos. A. Ryan

Edw. W. Byrn

INVENTOR

Alfred K. Barker

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALFRED K. BARKER, OF BOONTON, NEW JERSEY.

APPARATUS FOR MAKING CHILLED IRON CASTINGS.

SPECIFICATION forming part of Letters Patent No. 602,714, dated April 19, 1898.

Application filed August 21, 1896. Serial No. 603,552. (No model.)

To all whom it may concern:

Be it known that I, ALFRED K. BARKER, a citizen of the United States, residing at Boonton, in the county of Morris and State of New Jersey, have invented a new and useful Improvement in Machinery for Making Chilled Iron Castings, of which the following is a specification.

The object of my invention is the rapid production of castings of a similar character, either chilled or partly chilled, and at a very low cost.

My invention relates to that form of apparatus for making chilled castings in which the mold-boxes are mounted upon a rotating frame and are cooled by water-jackets; and it consists in the peculiar construction and arrangement of parts, as will be hereinafter described, reference being had to the accompanying drawings, in which all letters of reference refer to similar parts in all the figures.

Figure 1 is a plan view of the table with a box in position to be filled and one ready to be opened. Fig. 2 is a vertical elevation of the table with one box in position. Fig. 3 is a vertical cross-section of the table and water-supply for chills and means for draining the same. Fig. 4 is a perspective view of a chill-box opened and showing its construction. Fig. 5 is a cross-section of a box on line Z Z of Fig. 7. Fig. 6 is a cross-section of the box on line X X of Fig. 7. Fig. 7 is a longitudinal section of the box on line Y Y of Fig. 5. Fig. 8 is a detail view of the mechanism for raising and opening the upper halves of the boxes.

A, Fig. 1, represents a circular horizontal table in four or more equal sections, bolted together and secured to a central spider B. The spider B, Fig. 3, has a conical seat formed on the lower part of its hub, which enters into and loosely engages a conical cavity formed in the upper part of the central stand C, and the stand C being secured to a foundation forms a pivot or step for the table A to revolve upon in a horizontal plane. A frame D, Figs. 2 and 3, composed of a number of sections bolted together, surrounds the central stand C and is kept together in true alinement and concentric position by a number of radial rods D′, tapped into the central stand C and adjustably secured by double nuts to the legs of the frame, which is also secured to a foundation by suitable bolts.

On the upper part of the circular frame D a table D^2, Fig. 3, is formed, upon which a number of bearing-rollers E run and which support the outer part of the table A and the chill molds or boxes N. The rollers E are pivoted in brackets on the under side of the table A. Formed on the outer circumference of the table are a number of recesses P, Fig. 1, the sides of which are beveled and wider at the bottom than at the top, Fig. 2, to receive and engage similar beveled projections P′, formed on the under side of the box N, Fig. 4.

Holes A′, Fig. 2, are provided on the outer edge of the table A for capstan-bars k^9, Fig. 1, used to move the table when required. A stop-pawl A^2, Fig. 2, engaging a catch A^3, locks the table in certain positions when pouring the different boxes. There is a series of these catches A^3, one for each mold-box. A central water-main R, Fig. 3, provided with a stop-valve and secured to a central hub T by a packed gland *g*, supplies water to the radiating-tubes R′ and rubber hose-pipes R^2, with unions R^3, which hose-pipes R^2 extend to the water-spaces N^2, Figs. 4 to 7, of the lower mold N′ and also to upper molds N^5 N^6. A circular trough W, Fig. 3, located inside the framing D and concentric with the stand C, receives and conducts the water to the circular drain W′.

At A^4, Fig. 1, there is located a stand *d*, Figs. 3 and 8, secured to a foundation in the usual manner. Stand *d* is provided with an arm *d′*, on which is pivoted the lever d^2, the shorter end of which is pivoted to a vertical lifting-bar d^3, which slides adjustably in the straps d^4, secured to the frame or stand *d*. The upper part of the lifting-bar d^3 is provided with the joints d^5 d^6, to which the arms d^7 d^8 are pivotally secured, as shown in Fig. 8. A tension-spring *e* by its ends is secured to the arms d^7 d^8, near their lower ends, said arms being bowed to allow room for the spring to work. The upper ends of each of the arms d^7 d^8 are forked at d^9 to engage the handle N^7, Figs. 3 and 4, of the upper halves N^5 N^6 of the chill-mold N. The chill-mold is formed in three parts, Figs. 4, 5, 6 and 7, the lower consisting of a hollow box N′, N^2 representing the

water-space, and M the cavity to receive the object to be cast, formed on its upper surface. Internal diverting-ribs $f\,f'$ are located in the water-space N^2 and, extending nearly to the front, Figs. 5 and 7, form a prolonged or tortuous circulation through the box. The upper halves N^5 N^6 are also hollow, the water-spaces N^9 N^{10} being also divided by the ribs $f^2\,f^3$ for prolonged circulation. An inlet for water k, Fig. 6, is provided in the lower box N', as are also two outlets k' k^2, which by suitable nipples and flexible rubber tubes R^4, Figs. 3 and 7, connect the water-supply by similar nipples to the inlets k^3 k^4, Fig. 6, of the upper halves N^5 N^6. Outlets k^5 k^6 on the opposite side of the partitions $f^2\,f^3$ by similar nipples and rubber tube R^5, Fig. 3, conduct the spent water into the circular trough W.

The under surfaces of the half-boxes N^5 N^6 are formed with half-cavities corresponding to the form of the object to be cast and registering with those of the lower box N'. The parts N^5 N^6 are hinged to the box N' by the hinges p, Fig. 4, the lugs p' on the box N', Fig. 5, having their upper edges p^2 formed like a cam and having a pivot-pin p^3 inserted in suitable holes. The lugs p^4 on the upper halves N^5 N^6, Fig. 6, are provided each with an elongated hole p^5 to loosely receive the pivot-pin p^3, for a purpose that I will describe more fully hereinafter.

The upper halves N^5 N^6 each are provided with half of a water-jacket pouring-passage N^{20}, Fig. 5, forming when the box is closed a circular and double conical inlet opening downward into the body of the mold N' to the gates N^{12}, Fig. 4. In the bottom mold-box N' in the cavity N^{13}, Fig. 4, of the gates N^{12} a conical plug L, Figs. 5 and 7, is inserted, fitting in the hole L', Fig. 4, in said cavity. The plug L is provided with a hollow stem L^2, Fig. 7, having at its lower end a threaded portion L^3, which screws into a threaded portion of the lower box N', as shown in Figs. 5 and 7, being turned by its square end L^4. I would mention this detachable plug L is for the purpose of renewal, as the molten metal falling directly into the cavity N^{13} is liable to soon destroy that part of the box and render the whole mold valueless.

I have preferably shown in the drawings a mold for sash-weights provided with the usual prints for cores and the number or weight of the article; but other forms may be substituted—such as brake-shoes, stove-lids, &c.

I will now proceed to describe the operation of my improved apparatus. The surface of the table A being supplied with the requisite number of boxes located in their several recesses P and secured thereby, water is turned on and flows through the central hub T and through the tubes and rubber hose R^2 into the lower box N', circulating through the same, and then out by the tube and rubber hose R^4 into the upper halves N^5 N^6, where it circulates and discharges itself, heated and spent, by the outlets k^5 k^6 and rubber hose R^5 into the trough W, and thence into the drain W'. The table being locked by its pawl and catch A^2 A^3, molten metal from a ladle is poured in until the gate in the mold is filled, the metal being taken from a nearby cupola. An assistant, by a capstan-bar k^9, inserted into the holes A', moves the table round on its center and friction-wheels until an empty box is opposite him. The assistant then locks the pawl and catch and pours another casting, and so continues pouring one after the other boxes as the table is rotated or as box after box comes before him. When a sufficient number of boxes have been filled for the first one filled to arrive at A^4, Fig. 1, an assistant raises the upper halves N^5 N^6, thereby lifting the solidified casting out of its bed by the conical form of the gate and also by the back edge of the upper halves N^5 N^6 of the box sliding upward on the cams p^2, formed on the lugs of the lower box, the slot formed in the lugs of the upper boxes permitting the pin p^3 to accommodate itself to a different alinement. This allows the upper halves N^5 N^6 to lift for some space nearly vertical and prevents the edges of the mold-cavity from being injured. In this operation, which is performed while the opposite box is being poured, a man at this station depresses the lever d^2 by its handle and forces upward the bar d^3, carrying the two arms d^7 d^8, which, by their forked ends engaging the handle N^7, raise the upper halves and spread them outwardly as the box opens, putting the spring e in tension. When the casting is lifted and the box opens, the bar d^3 is lowered by the lever d^2, and the spring e brings the two forked arms into alinement with the handles of the next box as it comes round. At A^7, Fig. 1, another man is stationed, who throws the box fully open and takes out the hot casting with tongs. At A^8 a boy is stationed, who cleans and sweeps the surfaces of the faced parts of the box and mold. At A^9 another man examines and closes up the box ready for pouring when it arrives at the pouring-station. It will thus be seen that the operation is nearly continuous, and the time allowed for lifting the casting, taking out, cleaning the box, examining, and closing is only that given when the metal is being poured into another box, and the assistant then moves the table. It may also be seen that by means of the flexible rubber tubes conveying the water to the interior of the boxes the movement of the upper halves N^5 N^6 in opening and closing does not affect the continuity of the water circulations and that the rotation of the table is provided for by the pipe R swiveling in the packed gland of the central hub T.

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

1. A machine for making chilled castings, consisting of a horizontal rotating table carrying chill-molds, a central water-supply with

branches leading to said molds, and a subjacent annular trough receiving the discharge-water from all of the chill-molds substantially as and for the purpose described.

2. In a machine for making chilled castings, the combination of a horizontal rotating table, a series of chill-molds mounted thereon and made in sections and having water-jacketed mold-cavities, radiating water-pipes leading to the several boxes and having a central hub, a main supply-pipe swiveling within said hub, flexible discharge-pipes from the several boxes, and an annular trough or water-receptacle arranged beneath the table and extending around its center and beneath all the drainage ends of the discharge-pipes from the boxes substantially as and for the purpose described.

3. In a chill-mold, the combination of the lower half-box provided with a water-chamber having inlet and outlet openings, and having in its upper surface a mold-cavity with a gate as described, lugs on each side of said box having cams formed on the upper edges, upper box-sections having mold-cavities in their under surfaces, said sections being formed in two halves and hinged to the sides of the lower box by lugs having elongated holes for receiving the pivot-pin of said hinges, and water-jacketed projections upon the adjacent edges of each upper box-section conical in form, one half in each box, and arranged when closed to form a water-cooled runner-opening, and a detachable water-protected shield to receive the first contact of the metal poured, said shield being fitted into the gate-cavity formed in the lower box and secured by screw-threads substantially as shown and described.

4. In a machine for making chilled castings, the combination with a horizontal rotary table, a series of mold-boxes fixed upon its periphery and having each its upper portion made in two hinged sections with lifting pins or handles projecting therefrom, and forked lifting-arms, and a lever operating the same to act upon the pins or handles of the mold-boxes and open the same substantially as and for the purpose described.

5. The combination with the horizontal rotating table, and its series of mold-boxes having a two-part hinged upper section provided with lifting pins or handles, the forked arms d^7 d^8 connected by spring e, the vertical slide-rod d^3, stand d and lever d^2, substantially as and for the purpose described.

6. A machine for making chilled castings, comprising a circular frame D with track on it upper surface, a central pivot-standard C, a horizontal rotating table with central step-bearing, and subjacent rollers running on the track, water-cooled chill-boxes detachably fixed upon the outer periphery of the table, a central vertical water-supply pipe, a rotating hub moving with the table and swiveling about the lower end of the supply-pipe, radiating-pipes connecting said hub to the chill-boxes, and a subjacent annular water-trough to receive the waste water from the chill-boxes, substantially as and for the purpose described.

ALFRED K. BARKER.

Witnesses:
GEORGE W. BLANCHARD,
JAS. H. WOOTTON.