

No. 684,186.

Patented Oct. 8, 1901.

E. O. BUEDEFELDT.

APPARATUS FOR MAKING CHAINS OF MOLTEN METAL.

(Application filed Jan. 23, 1900.)

(No Model.)

Fig. 1

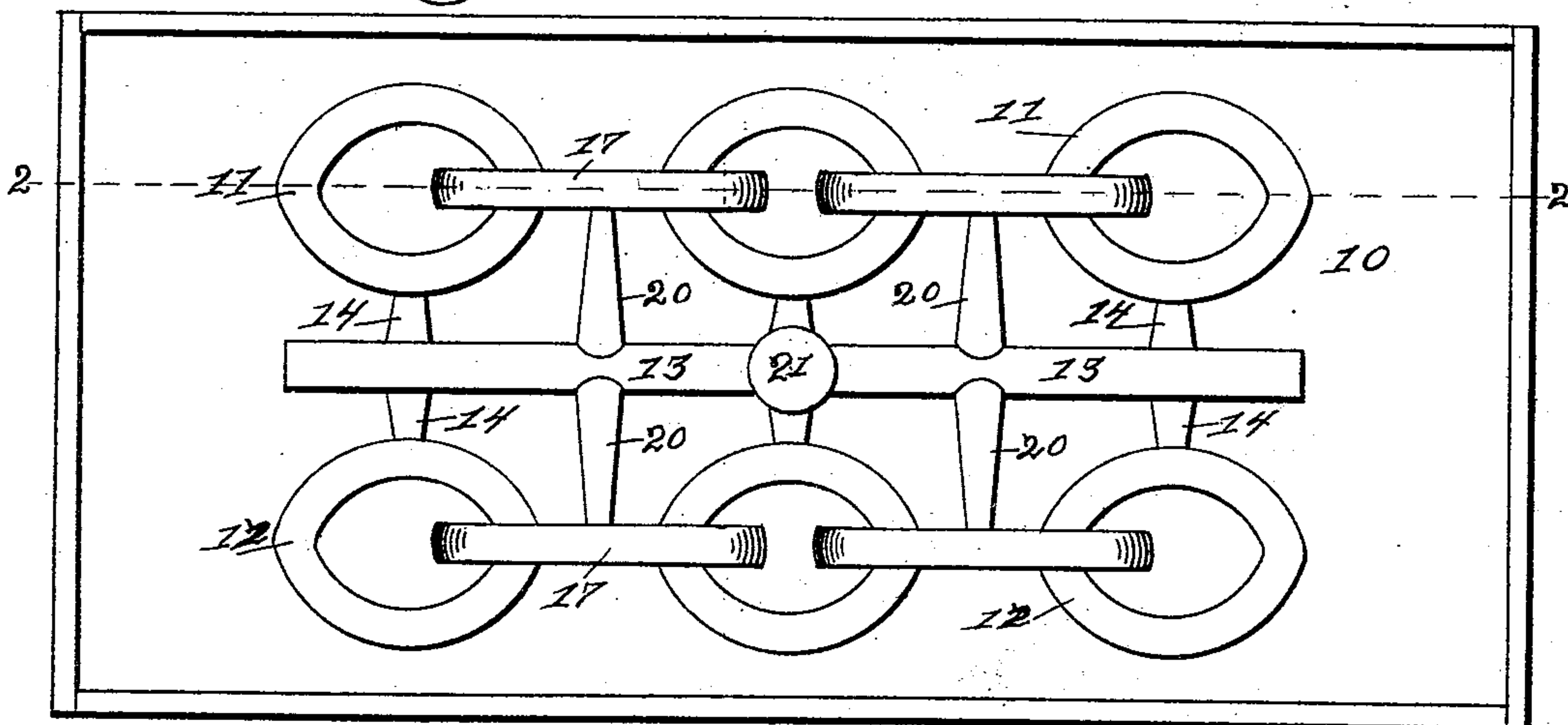


Fig. 2

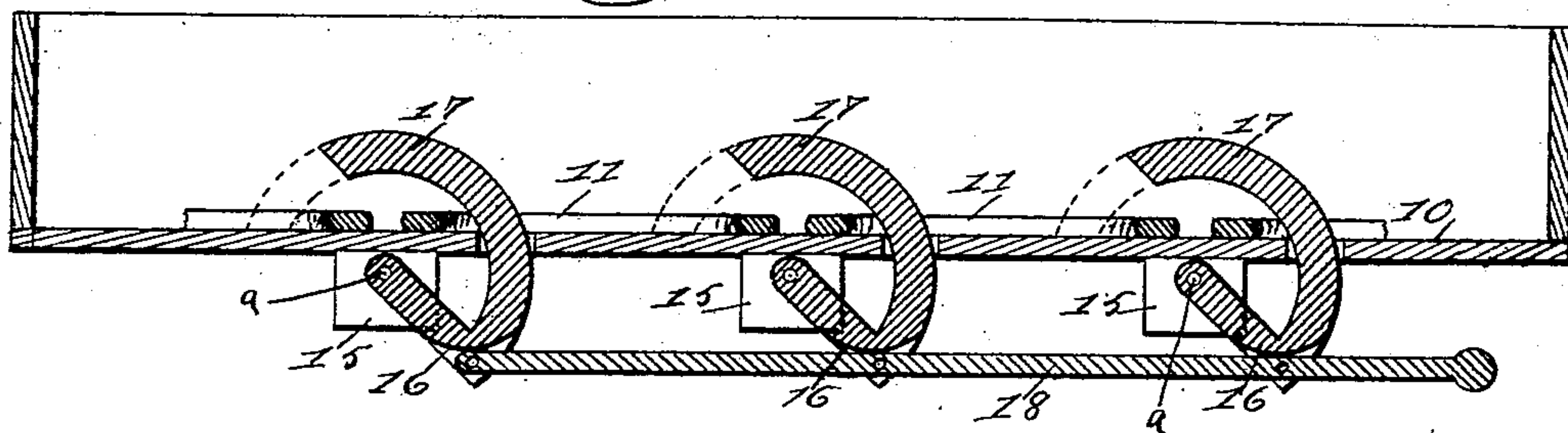
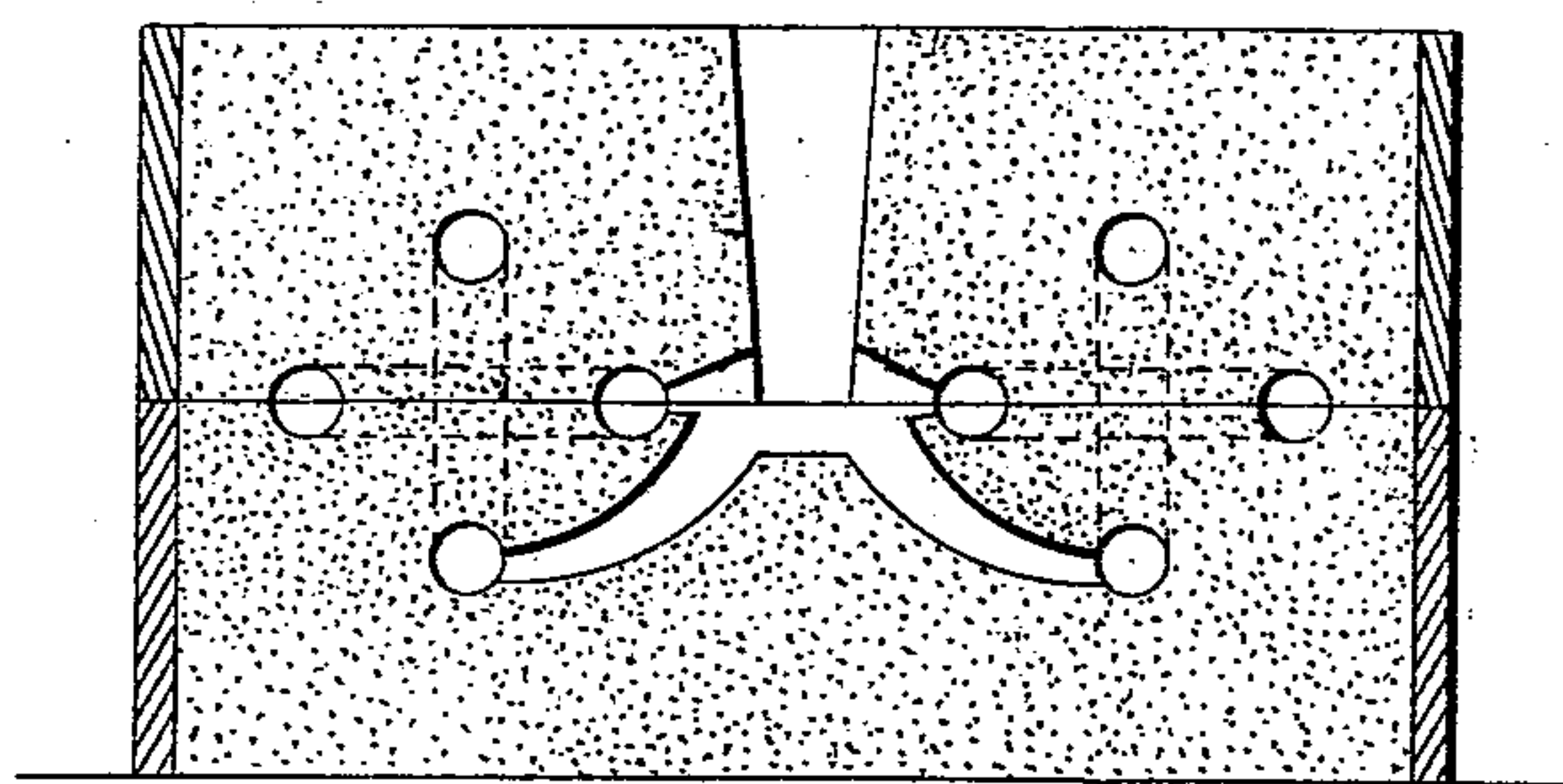


Fig. 3



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UNITED STATES PATENT OFFICE.

ERNEST O. BUEDEFELDT, OF MUNCIE, INDIANA, ASSIGNOR OF THREE-FOURTHS TO THOMAS W. STARR, OF SAME PLACE, AND ARTHUR KRUEGER, OF DES MOINES, IOWA.

APPARATUS FOR MAKING CHAINS OF MOLTEN METAL.

SPECIFICATION forming part of Letters Patent No. 684,186, dated October 8, 1901.

Application filed January 23, 1900. Serial No. 2,446. (No model.)

To all whom it may concern:

Be it known that I, ERNEST O. BUEDEFELDT, a citizen of the United States, residing at Muncie, in the county of Delaware and State of Indiana, have invented a new and useful Apparatus for Making Chains of Molten Metal, of which the following is a specification.

My object is to provide improved means for molding chains.

My invention consists in an apparatus composed of a two-part flask, of a plate having patterns of horizontal links rigidly mounted thereon, and patterns for vertical links pivotally mounted thereon and arranged to be withdrawn therefrom without disturbing the sand formed on the plate, together with means for leading the molten metal to the mold formed by the pivoted patterns.

My invention consists, further, in the plate having alternate links horizontally disposed thereon and rigidly connected thereto and intervening links hinged or pivoted to the plate, overlapping and embracing the fixed links and arranged to be withdrawn in a circular path through said plate.

My invention consists, further, in the provision of means for connecting the movable patterns in such manner that they may be withdrawn simultaneously through the plate.

My invention consists, further, in the construction, arrangement, and combination of elements hereinafter set forth, pointed out in my claims, and illustrated by the accompanying drawings, in which—

Figure 1 is a plan of the plate of patterns employed to mold chains and shows the positions of the link-patterns relative to each other and the runners and leader. Fig. 2 is a vertical longitudinal sectional view on the dotted line in Fig. 1 and shows how the link-patterns in vertical position are pivotally connected with the plate and with a rod for the purpose of simultaneously withdrawing them from the sand. Fig. 3 is a cross-section of a mold produced by means of my invention.

In the construction of the apparatus as shown the numeral 10 designates a plate, on which are mounted at regular intervals of separation a plurality of halves of links 11 to form the patterns for molding halves of the horizontal links of a chain. These halves 11 of the links are oval or elliptical in form and are spaced apart slightly. The halves 11 of

the links are arranged in a row end to end at one side of the center of the plate 10, and a row of similar patterns 12 is arranged on the opposite side of the center of said plate. A leader 13 is formed on the plate 10 midway between the rows of patterns 11 12, and runners 14 lead from said leader to the patterns of the horizontal links. The plate 10 is formed with a plurality of apertures formed on an arc within the patterns 11 12 of the halves of horizontal links, and guide brackets or ears 15 are fixed to and extend downwardly from said plate adjacent to said apertures. The brackets or ears 15 are bifurcated, and arms 16 are pivoted by one each of their ends in and to said brackets or ears by means of pivots *a*. Patterns 17, of the size and shape of halves of the vertical links of the chain to be cast, but of greater length than one-half the length of one of said links, are mounted on the outer ends of the arms 16 and extend through the apertures of the plate. Each of the patterns 17 is one-half of a circle and the radius of the circle within which it moves is the length of the arm 16 carrying said pattern, the center of the circle being the axis of oscillation of the arm. The several arms 16, carrying the patterns 17, traversing the patterns 11, are connected by a rod 18, and the arms carrying the patterns traversing the patterns 12 are designed to be connected in the same way. The movable patterns are held in their desired positions by the connecting-rods 18, retaining the arms 16 stationary. By these means a plate of patterns is constructed that may be employed as a form in a flask of any desired character and be molded in sand—that is to say, molders' sand may be rammed and tamped upon said plate over, within, and around the patterns 11 12 and the leader 13 and runners 14 and under, around, and over the movable patterns 17. When the sand has been tamped and rammed and pounded to a sufficient degree to set the same properly, the movable patterns 17 of the plate are removed by oscillating the arms 16 through the medium of the rods connecting said arms, thus withdrawing said movable patterns on the arc of the circle through the plate 10 and leaving the form and configuration thereof molded in the sand as an arch from the plate over adjacent ends of the horizontal links to

the plate again. In molding or tamping the sand on the plate of patterns a plurality of horngates 20 are positioned with their larger lower ends in contact with the leader-pattern 5 13 and their smaller upper ends in contact with the center portions of the movable patterns 17. The horngates 20 taper slightly from end to end. In molding or tamping the sand about the plate of patterns a sprue 21 10 is formed in and leads vertically from the center portion of the leader 13. Upon removing the movable patterns 17 the plate may be lifted or drawn from the sand and then the horngates 20 should be withdrawn 15 by movement in a curved path, the removal of the horngates leaving passage-ways for the flow of the metal from the leader 13 to the forms made by the movable patterns 17 in the sand. Thus is formed one-half of a 20 mold or flask within which to cast two sections of chains, each section composed of several interlooping links. The opposite half of the flask or mold is formed by tamping, ramming, and molding the sand upon the 25 plate without the use of horngates or sprue-plug, and when the halves of the mold are combined and connected the metal may be poured therein through the sprue and will fill and occupy the forms produced in the 30 sand by the patterns, as described. Upon opening the flask after pouring there will be found two sections of chains, each composed of several interlooping endless links of oval or elliptical form such as is common and well 35 known. I now mold other sections of the chains, and upon associating the halves of the flask I introduce the terminal links at one end at each of sections of chains previously cast into terminal horizontal molds just formed 40 and pour the metal as before, thus adding to or building up the sections of chains first made indefinitely and to any desired extent. The patterns 17 would mold circular links 45 of said patterns is contained within its aperture of the plate 10, and the thickness of the plate 10 deducted from the length of said pattern leaves the length of one-half of an oval link to be formed in the sand.

50 It is obvious the movable link-patterns cannot be used simultaneously in the upper and lower and separable parts of the flask and that the same patterns and means of placing and using them must be used successively in 55 the parts of the flask and the two flasks then placed together, as shown in Fig. 3, in order to accomplish the results contemplated.

I claim as my invention—

60 1. In a machine for making molds for chains, the combination with a plate, of a row of horizontal link-patterns on the plate having their adjacent ends spaced apart, a series of movable vertical link-patterns, and means for moving the vertical link-patterns up through 65 the horizontal link-patterns and the end of the vertical link-patterns into the adjacent horizontal link-patterns.

2. In a machine for making molds for chains, the combination with a plate, of a row of horizontal link-patterns on the plate having their 70 adjacent ends spaced apart, a series of movable vertical link-patterns semicircular in form hinged beneath the plate and means for moving the vertical link-patterns up through the horizontal link-patterns and the end of 75 the vertical link-patterns into the adjacent horizontal link-patterns.

3. In a machine for making molds for chains, the combination with a plate, of a row of horizontal link-patterns on the plate having their 80 adjacent ends spaced apart, a series of transverse shafts journaled beneath the plate, a vertical link-pattern secured to each shaft, and mechanism for rotating the shafts simultaneously and moving the vertical link-pat- 85 terns into position to form the molds.

4. In a machine for making molds for chains, the combination with a plate, of a row of horizontal link-patterns on the plate having their 90 adjacent ends spaced apart, a series of transverse shafts journaled beneath the plate, a vertical link-pattern secured to each shaft, the vertical link-pattern being semicircular in form and with its end normally below the plate and mechanism for rotating the shafts 95 a sufficient distance to raise the vertical link-patterns so that they will partly protrude through the plate.

5. In an apparatus for molding chains, a flat plate having patterns of links fixed there- 100 on at regular spaces apart, holes through the plate within said fixed patterns and mating patterns having fixed arms pivotally connected with the under side of the plate and by means of the fixed arms adapted to be moved 105 in and out through the holes in the plate and through the fixed patterns on the plate, arranged and combined to operate in the manner set forth for the purposes stated.

6. In an apparatus for molding chains, a 110 plate having a plurality of fixed link-patterns on its top, fixed ears on its under side, holes through the plate within said fixed patterns, movable link-patterns having fixed arms and the ends of the arms pivotally connected with 115 said fixed ears, arranged and combined to operate in the manner set forth for the purposes stated.

7. An apparatus for molding chains comprising a flask, a plate having a plurality of 120 link-patterns fixed on its top at regular spaces apart, a hole through the plate within each fixed link-pattern, projections on the under side of the plate, movable link-patterns having fixed arms and the ends of the arms piv- 125 oted to said projections and a rod pivotally connected with each movable link-pattern, all arranged and combined to operate in the manner set forth, for the purposes stated.

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Witnesses:

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