F. BRUCKMANN.

SHAKER FOR INGOT MOLDS.

APPLICATION FILED MAY 11, 1911.

1,010,851.

Patented Dec. 5, 1911.

3 SHEETS—SHEET 1.

Fig. 1.

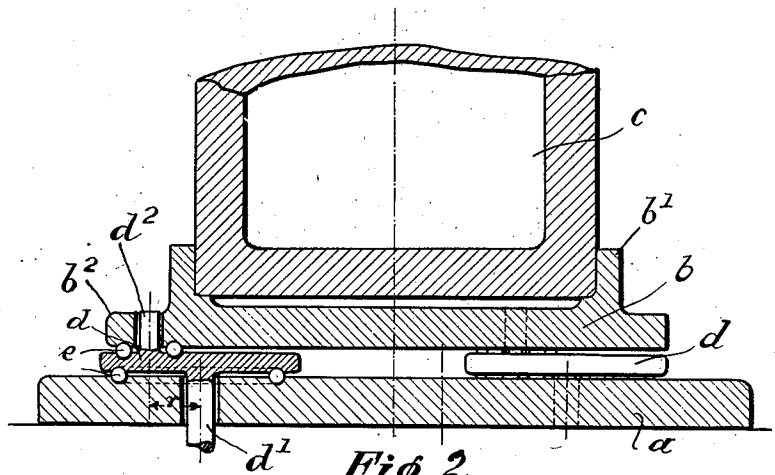
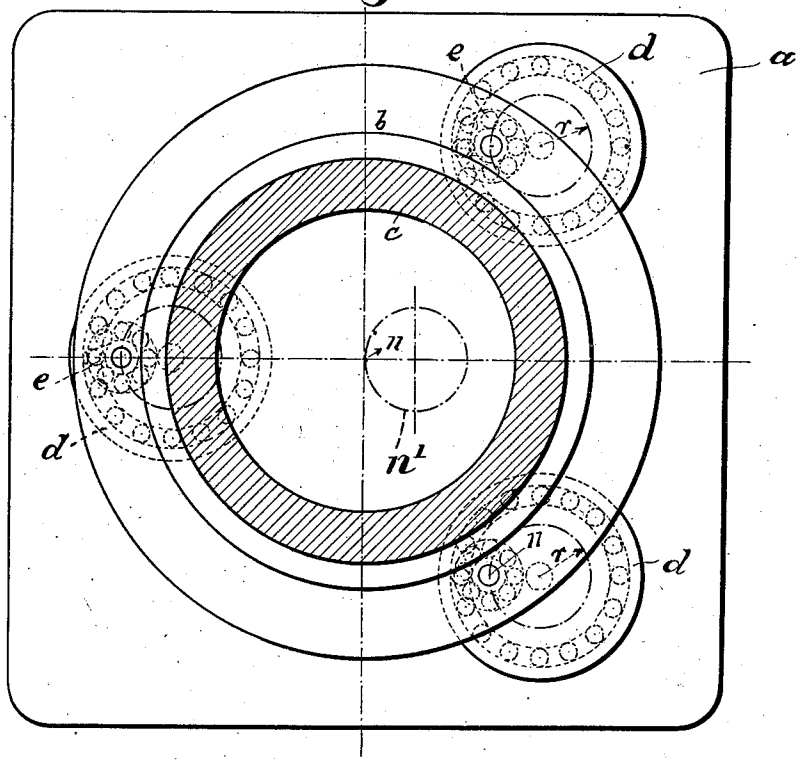


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

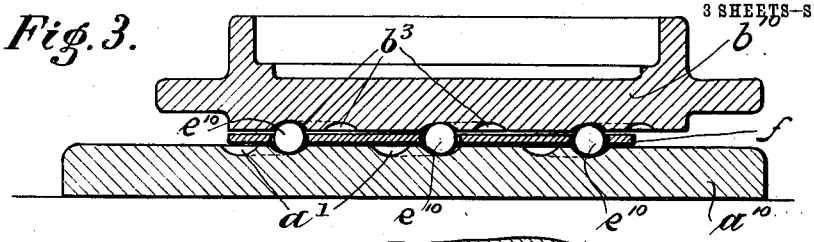


Fig. 4.

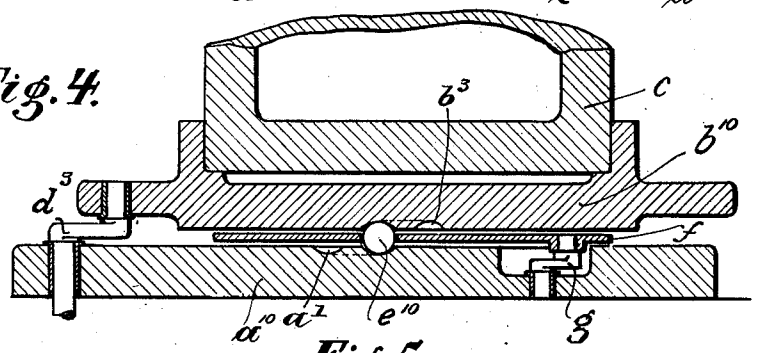
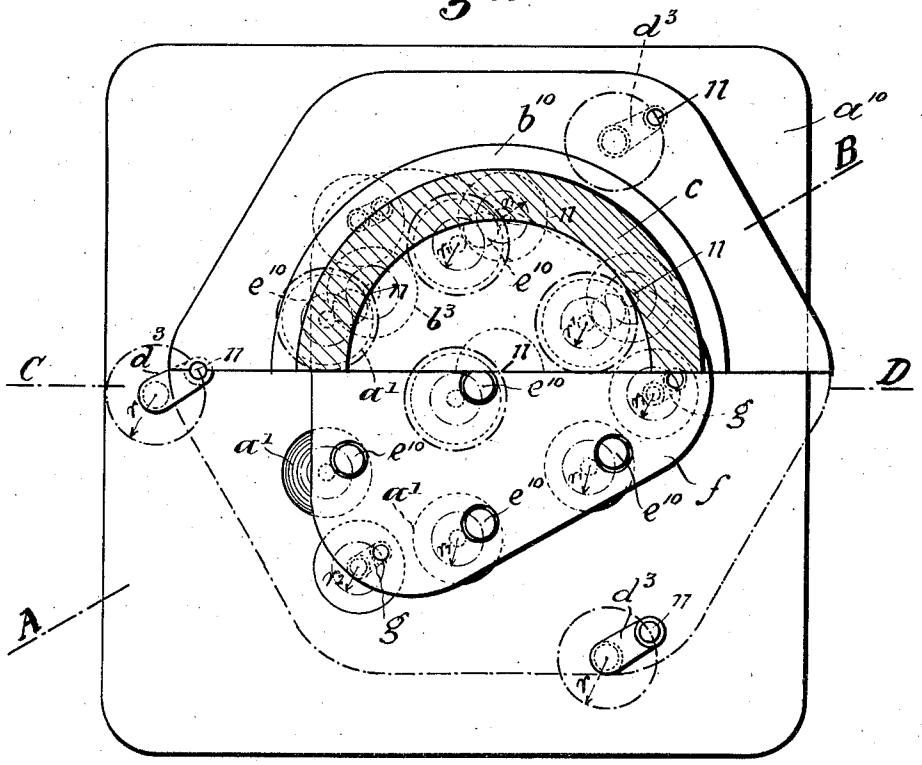


Fig. 5.



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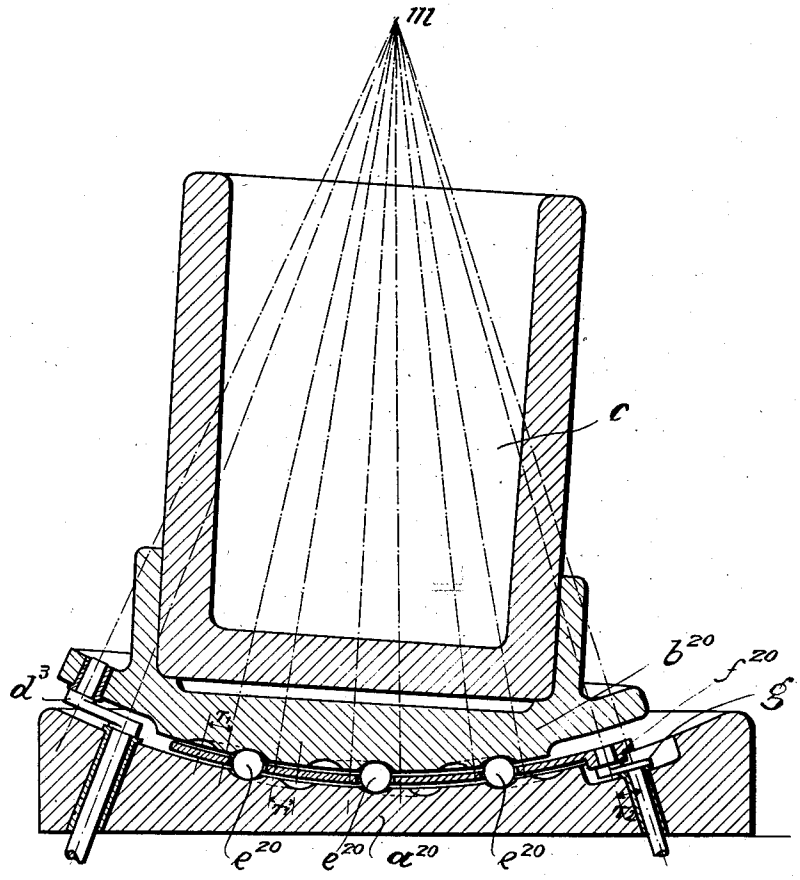
3 SHEETS—SHEET 3.

Fig. 6.



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UNITED STATES PATENT OFFICE.

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SHAKER FOR INGOT-MOLDS.

1,010,851. Specification of Letters Patent. Patented Dec. 5, 1911.

Application filed May 11, 1911. Serial No. 626,431.

To all whom it may concern:

Be it known that I, FRANZ BRUCKMANN, a subject of the German Emperor, and resident of Lüdenscheid, Prussia, Germany, have invented a new and Improved Shaker for Ingot-Molds, of which the following is a specification.

This invention relates to a shaker for ingot molds by which each point of the mold is made to describe a circular path. In this way the molten metal will become so agitated that the air bubbles will readily rise to the surface, while furthermore during the charging operation the freshly added metal will become intimately mixed with the metal previously poured.

In the accompanying drawing: Figure 1 is a vertical section of a mold provided with my improved shaker; Fig. 2 a plan partly in section thereof; Fig. 3 a vertical section of a modification on line A—B, Fig. 5; Fig. 4 a similar section on line C—D, Fig. 5; Fig. 5 a plan partly in section of Figs. 3 and 4, and Fig. 6 a vertical section of a still further modification.

In Figs. 1 and 2, the ingot mold c is fitted upon a horizontally movable base plate b shown to be provided with an upwardly extending arm b^1 that snugly encompasses the lower portion of the mold. At a distance below base plate b there is located a fixed sole plate a and between plates b and a there are interposed a plurality of cranks, three of such cranks being shown. Each crank consists of a disk d having a centrally disposed depending axle d^1 and an upwardly extending eccentric pin d^2. Of these, axle d^1 is accommodated within a corresponding aperture of plate a, while pin d^2 is accommodated within an aperture formed in a laterally extending flange b^2 of plate b. In order to reduce friction, ball races provided with antifriction balls e are formed between disk d and plates a, b respectively. One of the axles d^1 is rotated in suitable manner, to impart a corresponding gyrating movement to mold c, each mold point n describing a circle n^1 the radius of which is equal to the distance r between the centers of axles d^1 and their respective pins d^2. It is obvious that plate b may be dispensed with and that the mold c may be directly supported upon balls e.

In Figs. 3–5, each crank disk d is replaced by a crank arm d^3. The ball races are formed by a plurality of circular grooves b^3 cut into the lower face of plate b^{10} and a plurality of corresponding grooves a^1 cut into the upper face of plate a^{10}. Each groove a^1 is arranged eccentrically to its companion groove b^3, the distance between the groove centers being equal to the radius r of crank d^3, while the radius r^1, of each groove b^3, a^1 is equal to one half the length of radius r. Each pair of coöperating grooves receives an antifriction ball e^{10} the several balls being received within apertures of a plate f interposed between parts, a, b. Plate f is supported by a number of cranks g, the length r^1 of each crank g being equal to one half the length of crank d^3. Cranks g are fulcrumed in plate a and at least one of said cranks is operatively connected by suitable means (not shown) to one of the cranks d^3.

In Fig. 6, the base plate b^{20} has a convex lower side which is fitted into the concavity of sole plate a^{20}. Plate f^{20} encompassing balls e^{20} is retained but is curved in conformity with the parts b^{20}, a^{20}. By this construction each of the lines directed from points of the mold to a common fixed point, say a point m lying within the prolonged axis of the mold will describe a conical path, so that the circular paths described at different levels will not be equal but of different sizes, and that consequently the lower strata of the molten metal will be more vigorously agitated than the upper strata.

I claim:

1. A device of the character described, comprising a sole plate, a mold above said plate, and a plurality of cranks rotatable in the sole plate and operatively connected to the mold.

2. A device of the character described, comprising a sole plate, a mold above said plate, a plurality of cranks having depending axles engaging the sole plate, and upwardly extending eccentric pins operatively connected to the mold.

3. A device of the character described, comprising a sole plate, a base plate, a plurality of interposed cranks operatively engaging both plates, ball races also between the plates, and a mold carried by the base plate.

4. A device of the character described, comprising a sole plate, a base plate, a plurality of interposed cranks operatively en-

gaging both plates, an apertured plate encircling the balls between the base plate and the sole plate, and a mold carried by the base plate.

5. A device of the character described, comprising a sole plate, a base plate, a plurality of interposed cranks operatively engaging both plates, an apertured plate encircling the balls between the base plate and the sole plate, additional cranks engaging the sole plate and apertured plate, and a mold carried by the base plate.

6. A device of the character described, comprising a sole plate, a mold above said plate, and means intermediate the plate and mold for imparting a gyrating movement to said mold, whereby all mold points are caused to describe circles of like radius.

7. A device of the character described, comprising a sole plate having a plurality of circular grooves in its upper face, a superposed gyrating plate having a plurality of circular grooves in its lower face which are arranged eccentrically to the sole plate grooves, and a ball engaging each coöperating groove pair.

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