

No. 721,048.

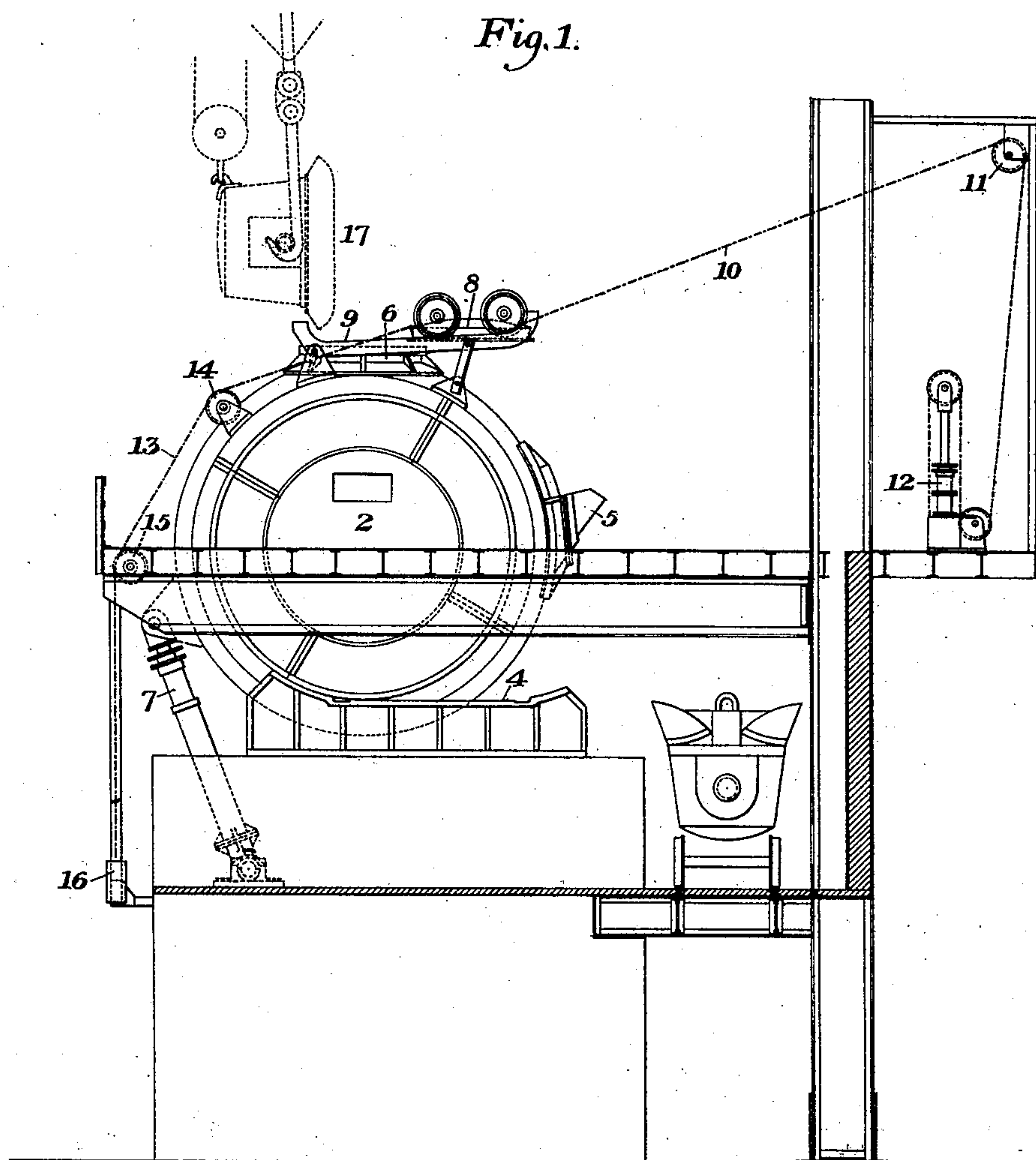
PATENTED FEB. 17, 1903.

J. KENNEDY.
MIXER FOR MOLTEN METAL.

APPLICATION FILED DEC. 10, 1901.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES

Thomas W. Baxendale
Warren W. Swartz

INVENTOR

Julian Kennedy

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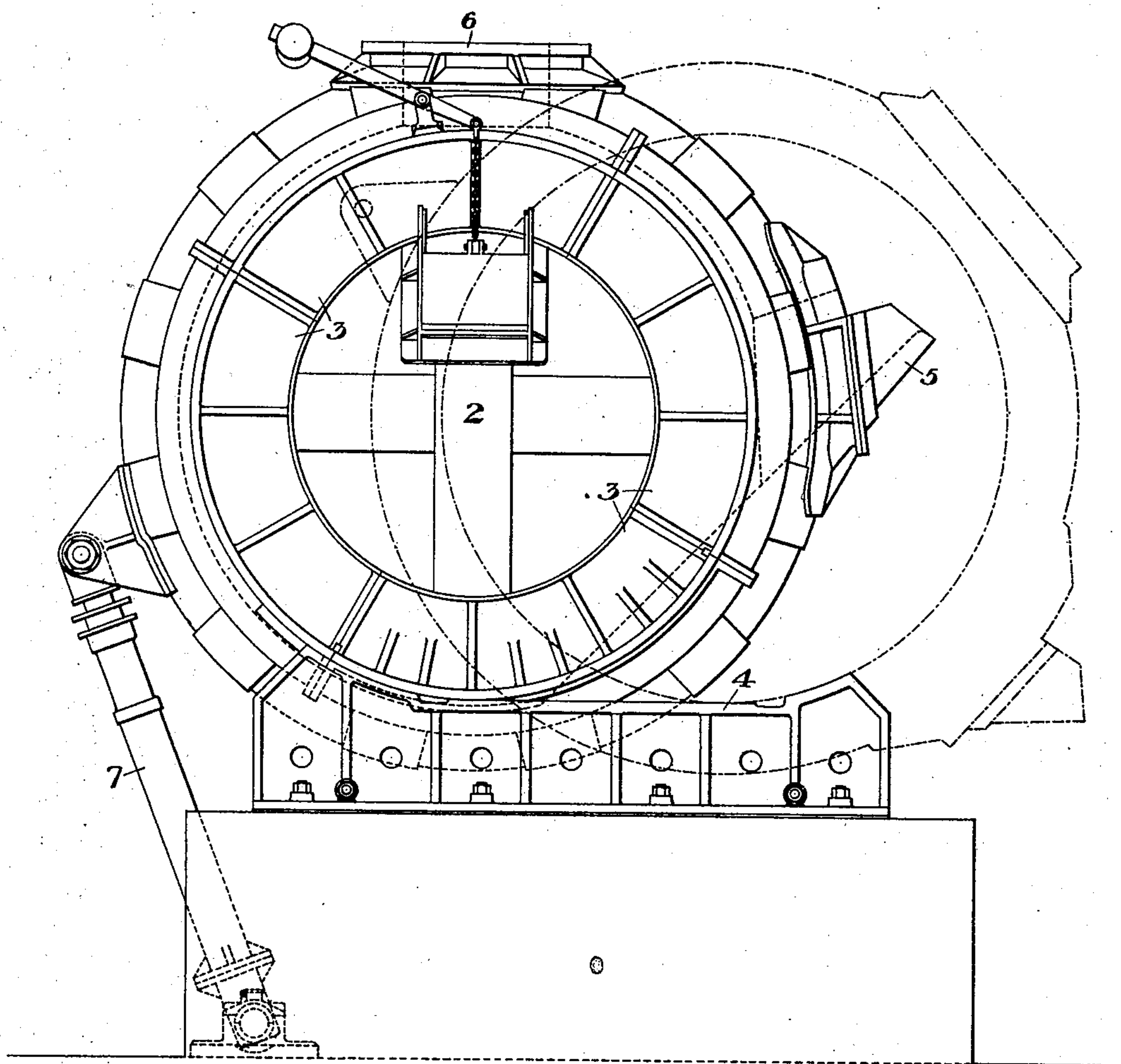
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3 SHEETS—SHEET 2.

Fig. 2.



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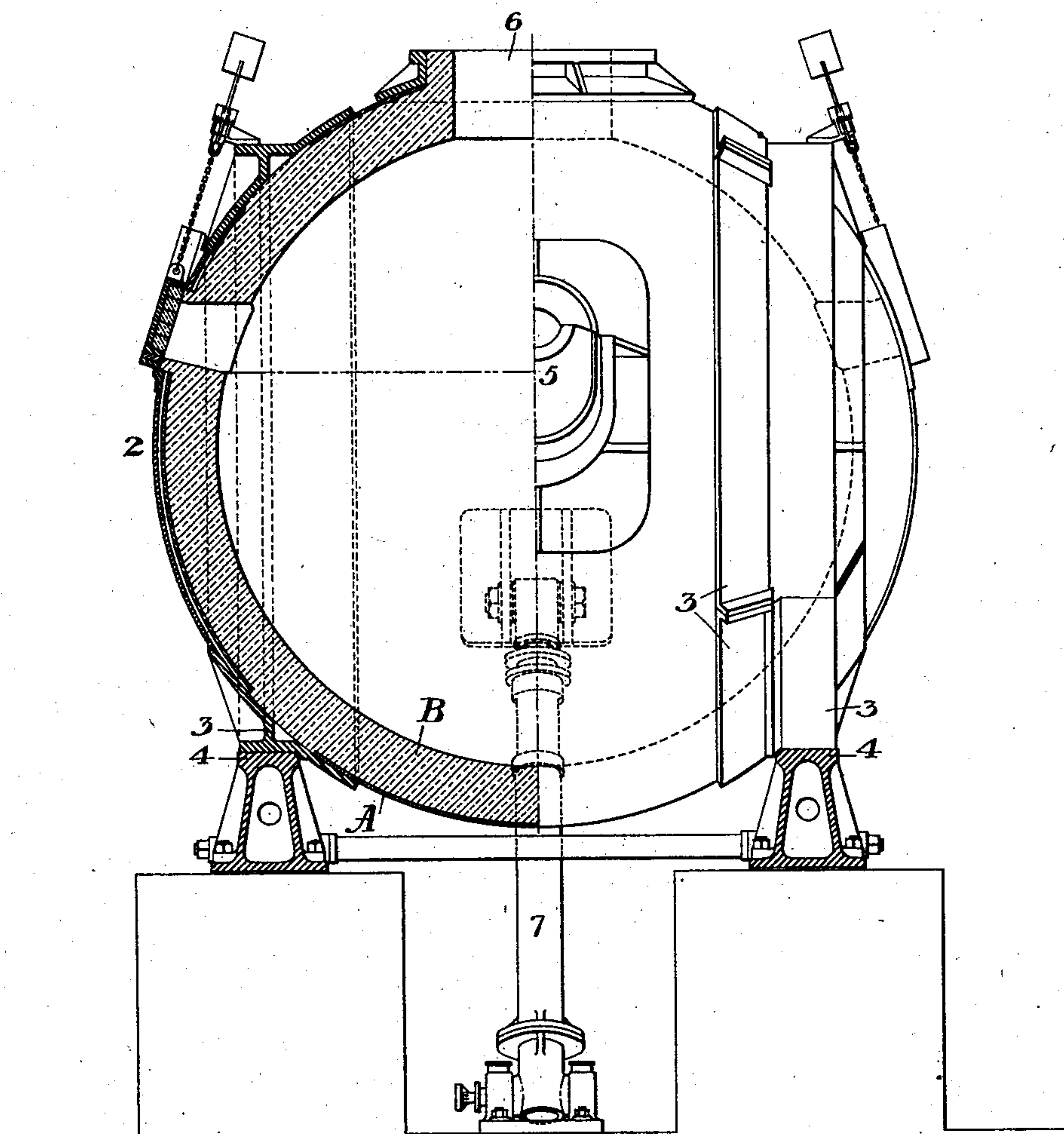
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3 SHEETS—SHEET 3.

Fig. 3.



WITNESSES

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INVENTOR

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Julian Kennedy

UNITED STATES PATENT OFFICE.

JULIAN KENNEDY, OF PITTSBURG, PENNSYLVANIA.

MIXER FOR MOLTEN METAL.

SPECIFICATION forming part of Letters Patent No. 721,048, dated February 17, 1903.

Application filed December 10, 1901. Serial No. 85,327. (No model.)

To all whom it may concern:

Be it known that I, JULIAN KENNEDY, of Pittsburgh, Allegheny county, Pennsylvania, have invented a new and useful Mixer for Molten Metal, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation showing the mixer, the charging-ladle, and the cover-operating mechanism. Fig. 2 is a larger side elevation of the mixer, its tilted or pouring position being shown by dotted lines; and Fig. 3 is a front view, one-half being shown in vertical central section.

My invention relates to a mixer for mixing molten pig-iron preparatory to its use in the Bessemer process or other steel-refining process. Such mixers contain large bodies of metal, generally from one hundred to three hundred tons, and as heretofore constructed serious difficulties have been encountered in practice, which it is the purpose of my invention to overcome. Among these difficulties are liability of the metal to chill and form skulls in the mixer, the difficulty of handling the mixer on account of its great weight when charged with metal, and the difficulty of making it strong enough without using so much material in its construction as to render it expensive and unduly cumbersome.

I make my mixer of substantially spherical form and provide it with parallel circular tracks or flanges on or near its bottom, one on each side, on which it can be rolled for the purpose of bringing its discharging-spout into pouring position. By making it spherical I add greatly to the strength and enable a minimum of structural material to be used.

Another feature of my invention consists in forming the charging-hopper so that the molten metal poured from above shall be delivered substantially in the middle of the pool of metal which the mixer contains. I thus prevent as far as possible splashing of the metal on the sides of the vessel and remove what has been a fruitful source of skulling. The metal when so poured also mixes more readily with the molten pool of metal, and thus provides a more uniform material for the converters.

Other features of my invention relate to the

construction of the mixer and to the construction and arrangement of the cover, and it will be understood that I intend to claim the parts of my invention individually, whether they be used in combination with each other or in other combinations.

In the drawings, 2 represents the mixing vessel, which, as above stated, is of substantially spherical form. It is constituted of an exterior metal shell A and an interior refractory lining B. The exterior shell may conveniently be made of sections which are stamped into the required spherical form, and on each of the sides there is an annular band 3, preferably of cast-steel, which is preferably made in four united sections, though it may be made in a single piece, if desired. These annular bands not only serve as splices for holding the metal plates of the shell together, but their lower sections constitute rockers or rollers which rest upon the support or rolling surfaces 4, on which the vessel is tipped. This construction is simple and cheap, because only the lower sections of the annular bands need to be machined and the others can be used as they are cast.

5 is a pouring-spout at the end of the vessel, and 6 is the charging-opening in the top of the vessel, which, when the vessel is in its normal position, as shown in Fig. 1, is directly above the central portion of the metal-pool. For the purpose of rolling and thus tipping the vessel I prefer to employ a cylinder or motor 7, which is pivotally connected to the vessel, as shown in Fig. 2, and which on being actuated causes the vessel to roll on the surfaces 4. Relatively little power is required for actuating this cylinder. The charging-opening has a lid or cover 8 mounted upon tracks 9, which are fixed to the top of the mixer. It is operated by a chain passing over a pulley 11 and connected with a hydraulic cylinder or other motor 12. At the rear end of the cover is another chain 13, which passes over pulleys 14 on the mixer and over a pulley 15 on a stationary support and is provided with a counterweight 16. When it is desired to charge the mixer with metal from the ladle 17, the cylinder 12 is actuated, thereby drawing on the chain 10 and moving the lid on its track away from the charging-opening. When the water is

exhausted from the cylinder 12 the counterweight 16 restores the lid to its position over the hopper, and during the tilting of the vessel the counterweight will hold the lid in its place in every position of the mixer.

By reason of the substantially spherical shape the mixer is heated uniformly by the molten metal which it contains and undue strains upon its structure are prevented. There are no corners for the formation and lodgment of skulls and the heat of the metal is preserved in the most effective way. The pouring of the metal into the center of the molten pool is also an advantage for the reasons which I have stated above.

By the term "mixer" as employed in the claims I intend to designate a metallurgical vessel adapted to hold at least one hundred tons.

Within the scope of my invention as described in the claims the skilled mechanic will be able to modify the device in various ways, since

What I claim is—

1. A mixer for molten metal preparatory to further treatment, said mixer being of substantially spherical form and mounted to roll on its bottom, and substantially horizontal supports beneath the spherical body on which the mixer rests and on which it may be rolled, said mixer having a pouring-spout on its spherical body directed transversely to its axis of movement; substantially as described.

2. A mixer for molten metal preparatory to further treatment, substantially spherical in form, and provided at or near its bottom with bearing-surfaces, one on each side, and substantially horizontal supports opposite the bearing-surfaces and beneath the spherical body, on which said surfaces rest and on which the mixer may be rolled for the purpose of discharging its contents; substantially as described.

3. A mixer for molten metal preparatory to further treatment, substantially spherical in

form, the shell of the mixer having on or near its bottom and encircling the mixer, one on each side thereof, parallel annular tracks and substantially horizontal supports opposite said annular tracks and beneath the spherical body, on which the mixer may be rolled; substantially as described.

4. A mixer for molten metal preparatory to further treatment, substantially spherical in form, the shell of the mixer having on or near its bottom, one on each side, parallel tracks and substantially horizontal supports opposite said tracks and beneath the spherical body, on which the mixer may be rolled; substantially as described.

5. A mixer for molten metal preparatory to further treatment, substantially spherical in form, the shell of the mixer having on its spherical body and encircling the same parallel annular frames, said frames being in sections and the lower sections being adapted to constitute rolling-surfaces, and supports on which they rest and on which the mixer may be rolled for the purpose of discharging its contents; substantially as described.

6. A mixer for holding molten metal preparatory to further treatment, said mixer being adapted to be tipped to discharge the molten metal, and being provided with a pouring-spout and a charging-opening, said opening being situated over the middle of the mixer; substantially as described.

7. A tilting vessel having a longitudinally-movable cover thereon, said cover being connected with a motor which operates in one direction, and with a retracting device adapted to move with the vessel and operating in the other direction; substantially as described.

In testimony whereof I have hereunto set my hand.

JULIAN KENNEDY.

Witnesses:

GEO. B. BLEMING,
H. M. CORWIN.