

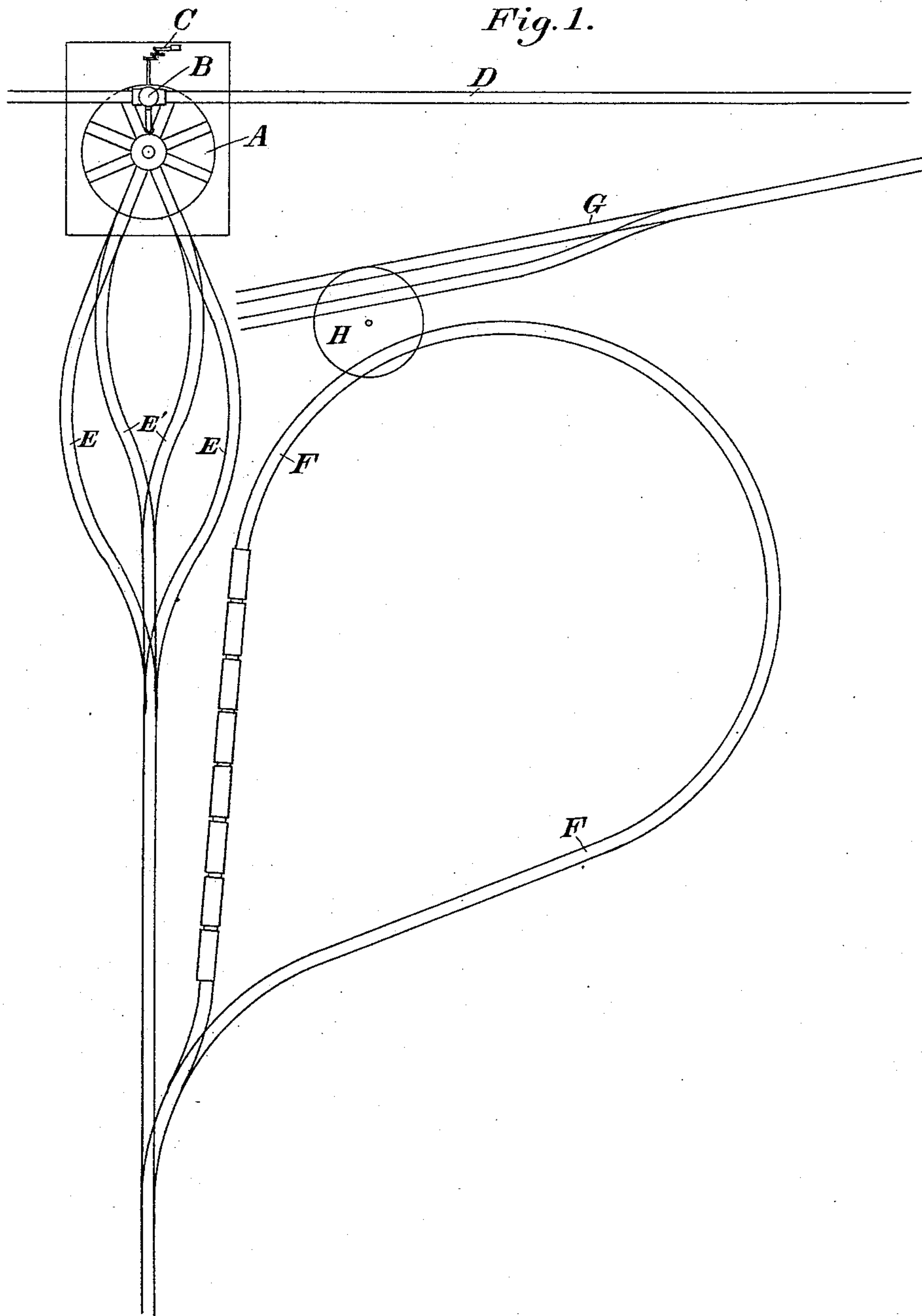
(No Model.)

4 Sheets—Sheet 1.

H. D. HIBBARD.
APPARATUS FOR CASTING PIG IRON.

No. 486,714.

Patented Nov. 22, 1892.



WITNESSES

Thomas W. Cassidell
A. M. Conner

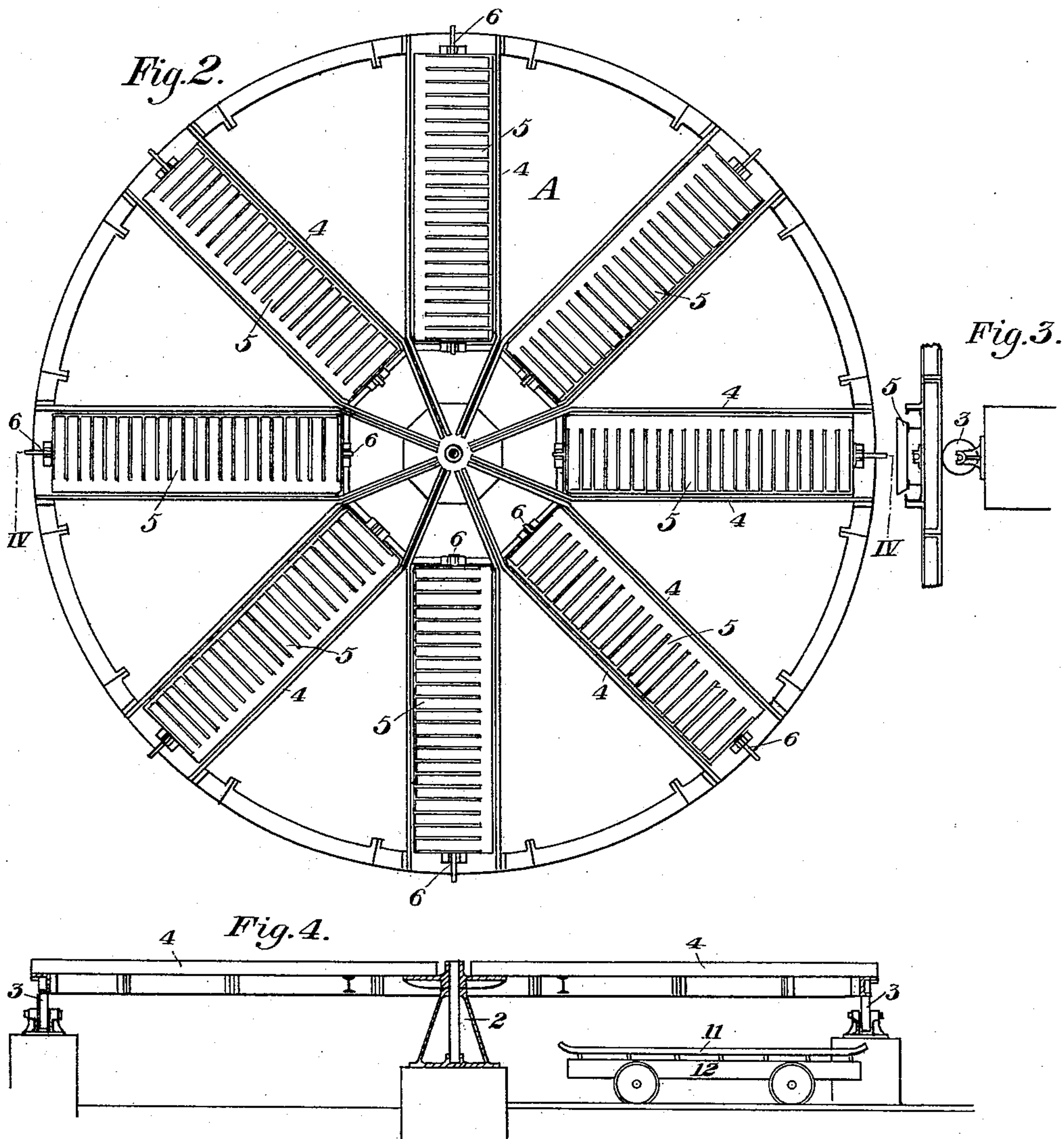
INVENTOR

Henry D. Hibbard

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WITNESSES

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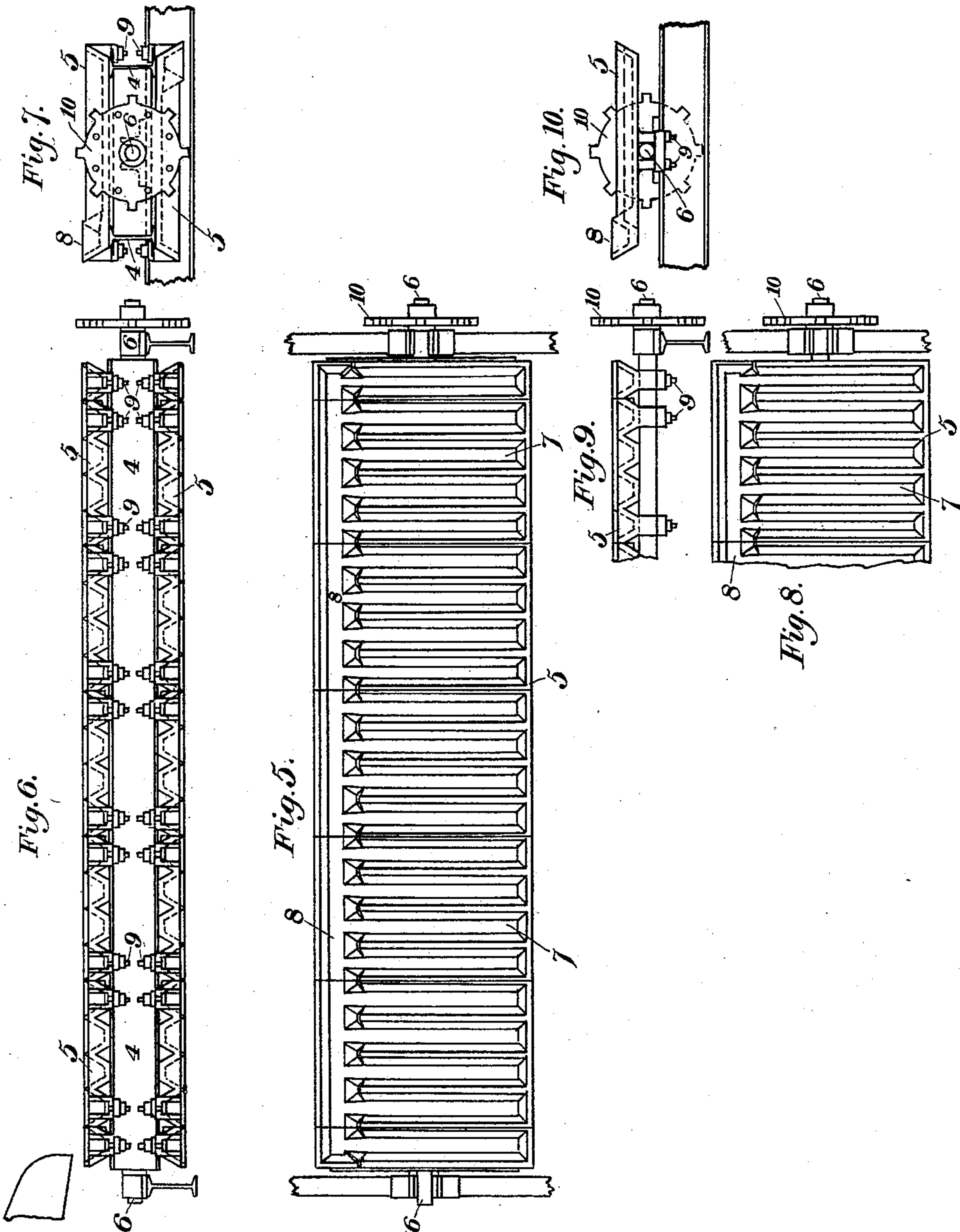
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4 Sheets—Sheet 3.

H. D. HIBBARD.
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WITNESSES

Thomas W. Baxendale
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INVENTOR

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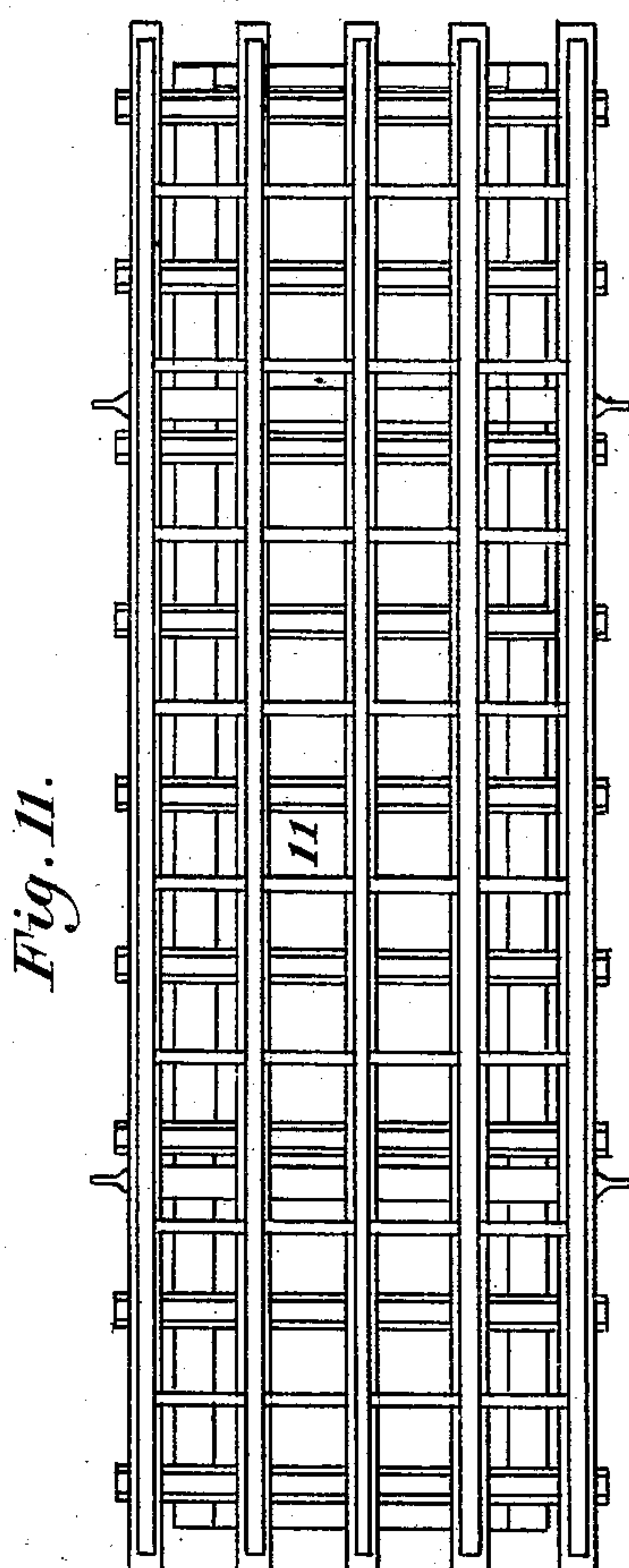
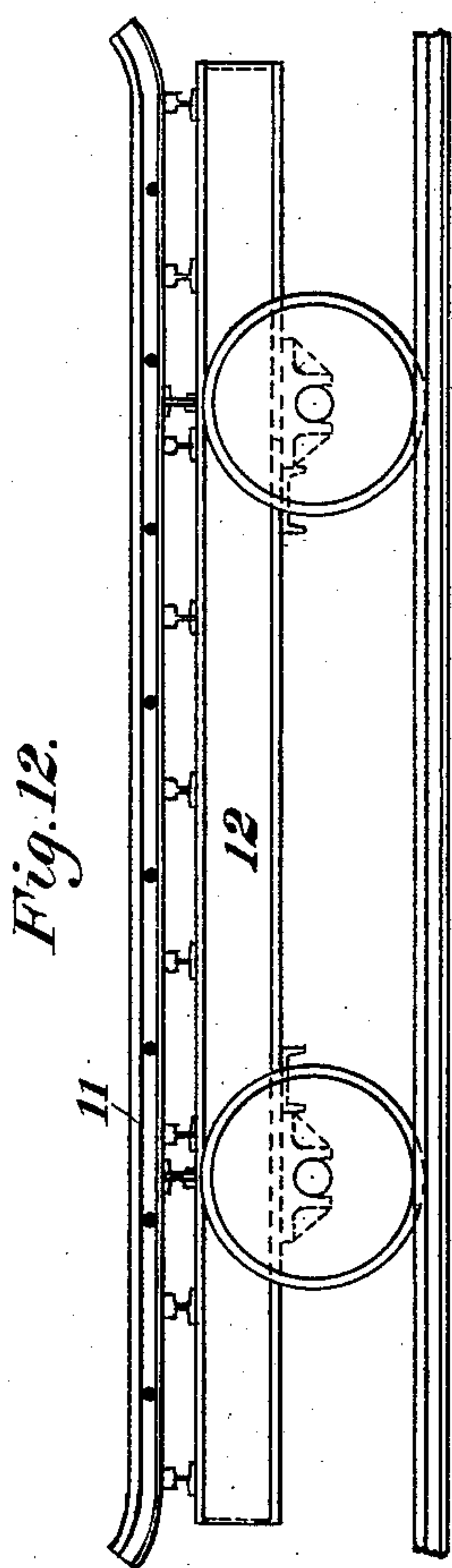
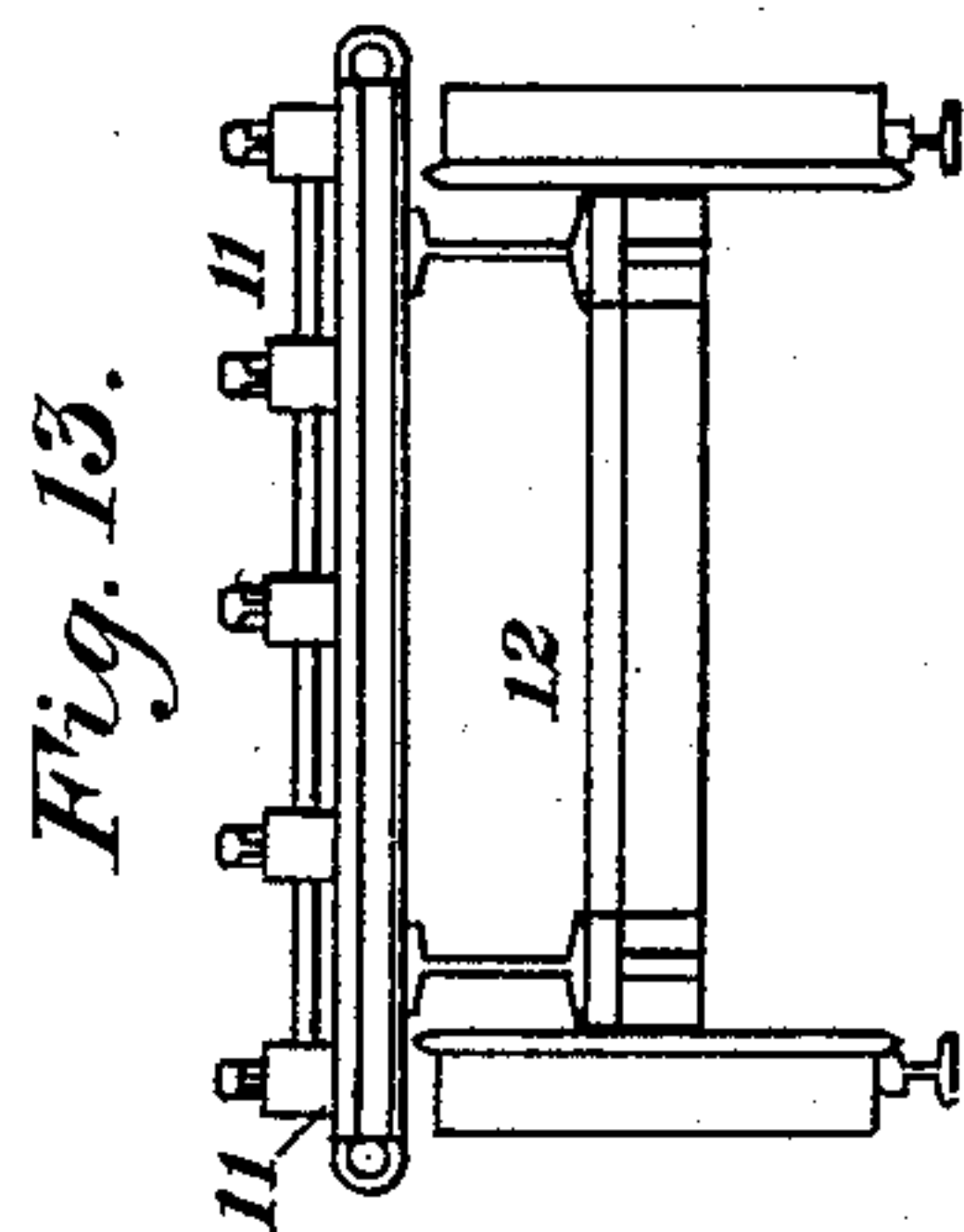
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4 Sheets—Sheet 4.

H. D. HIBBARD.
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Patented Nov. 22, 1892.



WITNESSES

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UNITED STATES PATENT OFFICE.

HENRY D. HIBBARD, OF PITTSBURG, PENNSYLVANIA.

APPARATUS FOR CASTING PIG-IRON.

SPECIFICATION forming part of Letters Patent No. 486,714, dated November 22, 1892.

Application filed February 24, 1891. Serial No. 382,446. (No model.)

To all whom it may concern:

Be it known that I, HENRY D. HIBBARD, of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Casting Pig-Iron, 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 plan view showing my improved metal-casting apparatus in conjunction with a series of tracks and a crane adapted to the easy practical operation of the same. Fig. 2 is a plan view on a larger scale, showing the molds in which the metal is cast and the turn-table by which the molds are carried. Fig. 3 is a partial end view of the turn-table. Fig. 4 is a cross-section on the line IV IV of Fig. 2. Fig. 5 is a plan view of the series of molds and constructed in accordance with my invention. Fig. 6 is a side view thereof. Fig. 7 is an end view of Fig. 6. Fig. 8 is a partial plan view, showing a series of molds of modified construction. Fig. 9 is a side view of Fig. 8, and Fig. 10 is an end view of Fig. 9. Figs. 11, 12, and 13 are views of the car for receiving the metal pigs.

Like symbols of reference indicate like parts in each.

Heretofore the mode of casting metal from blast-furnaces most commonly employed has been to run it into a sand bed, which is grooved or guttered, so as to cause the metal to assume the form of pigs of the desired dimensions. It has also been customary to cast the metal in iron molds or chills. The disadvantages attending the first mode of casting are that it involves considerable labor in forming the pig-bed, and that the sand of the bed adheres to the metal, thus detracting from its value for many purposes, especially for use in basic open-hearth practice where an excess of silica in the furnace is very undesirable. The use of the chill-molds is also objectionable for the same reason, since it is the practice to throw sand upon the iron after each cast, and there is no convenient means by which the sand can all be removed before the metal is next poured into the mold.

My invention is designed to overcome these difficulties and to provide means by which I

am enabled to cast the metal rapidly and to form pigs clean from sand.

Broadly stated the invention consists in a turn-table carrying a radially-arranged series of molds adapted to receive the molten metal either directly from the furnace or from a transfer-ladle, and so constructed and arranged that when the metal has solidified it may be tipped into an inverted position, thus delivering the metal pigs and also clearing itself from all sand or dirt which it may contain, and which would be apt to deteriorate the quality of the succeeding cast.

It also consists in certain preferred constructions of the parts by which they are better adapted to perform the functions for which they are designed.

Referring now to the drawings in Fig. 1, A represents a turn-table carrying a series of my improved molds. B is a ladle, by which the molten pig metal may be delivered to the molds. C is an engine for turning the table A, though it may be turned by hand or other power. D is a track on which the ladle may be carried by cars from the blast-furnace (not shown) to the mold-table. EE' are tracks and switches for the cars into which the pigs are delivered from the molds on the table. F is a track upon which the cars laden with pigs may be run, and on which the cars may stand while the pigs are cooled by water or otherwise. G is a shipping-track, and H is a crane by which the pigs may be removed from the cars on the track F to cars on the shipping-track. The apparatus may be situated in the ordinary cast-house of the blast-furnace; but for convenience I prefer to employ a separate cast-house for casting the product of a whole blast-furnace plant and to convey the metal in ladles from the furnaces to the apparatus. This system of tracks while desirable, and proper to be explained as showing the preferable arrangement of my improvement for practical use, is not an essential feature of the invention.

The figures on the second sheet of the drawings show in detail the preferable construction of the mold-table. It consists of a strong metal frame or wheel mounted on a central vertical pivot 2, and it may be supported at its periphery by antifriction-wheels 3. 4 4

are beams which form part of the table, and are arranged radially therein. Between each pair of these beams is a series of molds 5, which may be cast in a single piece, but preferably in a number of sections bolted together, so that they may be replaced when worn. Each mold series is fixed to suitable beams or rails, forming a supporting-frame, and pivoted to the table by trunnions 6, on the axis of which the molds may be tipped into an inverted position.

Figs. 5, 6, and 7 will serve to illustrate the construction of the mold series. Instead of showing the molds carried by a rotatory table, these figures show them carried by stationary supports; but the construction of the molds and the manner of their pivoting may be the same in both cases. The series of molds is composed of a casting having a number of adjacent flaring cross-cavities 7, which may be connected at the end by a longitudinal cavity 8; or the connecting cavities or channels may be at the middle of the cross-cavities, or the mold-cavities may be connected in other ways. Fig. 6 shows how the mold series may be made in sections, secured together by bolts 9. This figure also shows a desirable construction of the apparatus—namely, that a series of molds is secured to each side of the pivoted supporting-frame, so that the tipping of the frame will simultaneously discharge the pigs from the molds on one side and will bring the other molds into position to receive a cast of metal. A wheel 10 is applied to one of the trunnions 6 to afford convenient means for tipping the molds and for holding them in position.

The operation is as follows: The table having been turned to bring one of the lines or series of molds into position to receive a cast of metal, the metal is conveyed thereto in a ladle or in a runner-trough, and being poured into the series flows into the several connected mold-cavities and forms a series of pigs with a connecting sow. The table may then be turned to bring another of the radial series of molds under the ladle or runner to receive a charge of metal, and as each series of molds reaches a position over the cars for receiving the pigs, and when the metal therein has solidified, it is upturned on its pivot in either direction, thereby discharging the metal upon the car, clearing the mold from any contained impurities and bringing the opposite and cooler series of molds into an upright position for the next cast. This overturning of the molds is easy, because the weight of the pigs in the upper molds makes the series top-heavy and easy to tip, whereas when the molds are empty their frame is balanced by equilibrium of weight above and

below. Instead of discharging the pigs directly upon the body of the car, I may place on each car a removable cradle or frame 11. (See the figures on sheet 4 of the drawings.) The cradle may be provided with suitable projections, so that when the contents of the molds are dropped thereon the sow may be broken by the fall and separated from the pigs. When the cradle has received a load of pigs from the mold, the car may be drawn on the tracks, as before explained, to the crane H, where the cradle may be lifted and its contents discharged as a whole upon the cars on the shipping-track.

In Figs. 8, 9 and 10 I show the molds set on but one side only of a pivoted supporting-axle. This construction is not so good as that illustrated in Figs. 6, 7, and 8, because it lacks the advantages possessed by the latter in respect of convenient balance of the parts and the cooling of one line of molds while the opposite line is in use; but it is within the scope of my invention and is intended to be covered in the claims.

My improved apparatus is capable of modifications in various ways within the scope of my invention. Some of these modifications I have illustrated in the drawings and others will be suggested to the skilled mechanic by the foregoing description. The manner of use of the molds when mounted on stationary supports, as shown in the figures on Sheet 3 will be readily understood. A number of series of molds may be arranged in this manner in line with each other, and, if desired, instead of having their supports stationary, they may be longitudinally movable to carry the molds to a suitable place for dumping. For example, the molds may be carried on cars or may be moved by chains or other mechanism.

I claim—

1. In apparatus for casting pig metal, a turn-table carrying radially-arranged series of molds mounted on pivots in the table and adapted to be overturned, substantially as and for the purposes described.

2. In apparatus for casting pig metal, a turn-table carrying radially-arranged series of molds mounted on pivots in the table and adapted to be overturned, and a car-track extending beneath said turn-table, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 19th day of February, A. D. 1891.

HENRY D. HIBBARD.

Witnesses:

W. B. CORWIN,
H. M. CORWIN.