

No. 773,634.

PATENTED NOV. 1, 1904.

S. FORTER.
FURNACE CHARGING APPARATUS.

APPLICATION FILED SEPT. 22, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

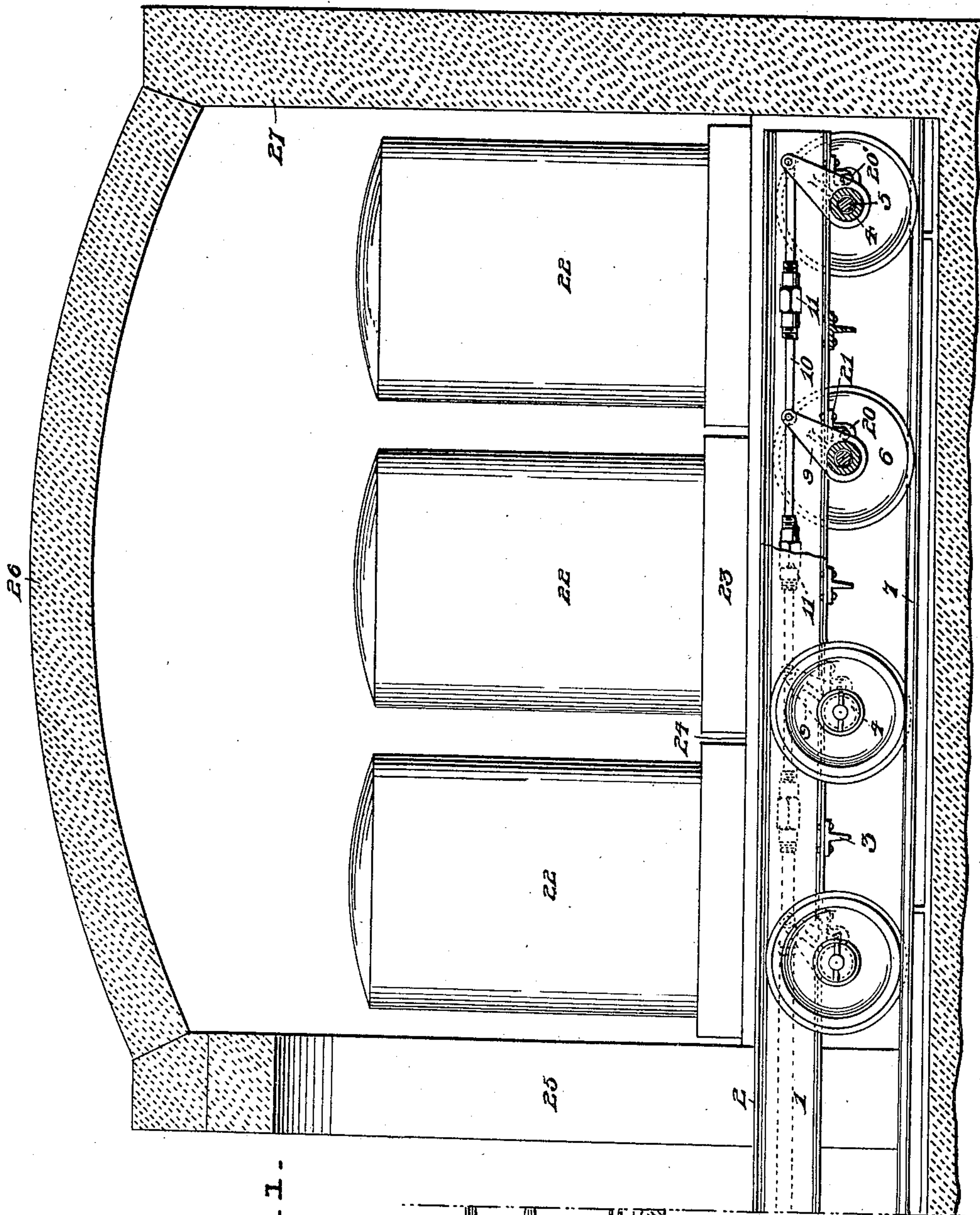
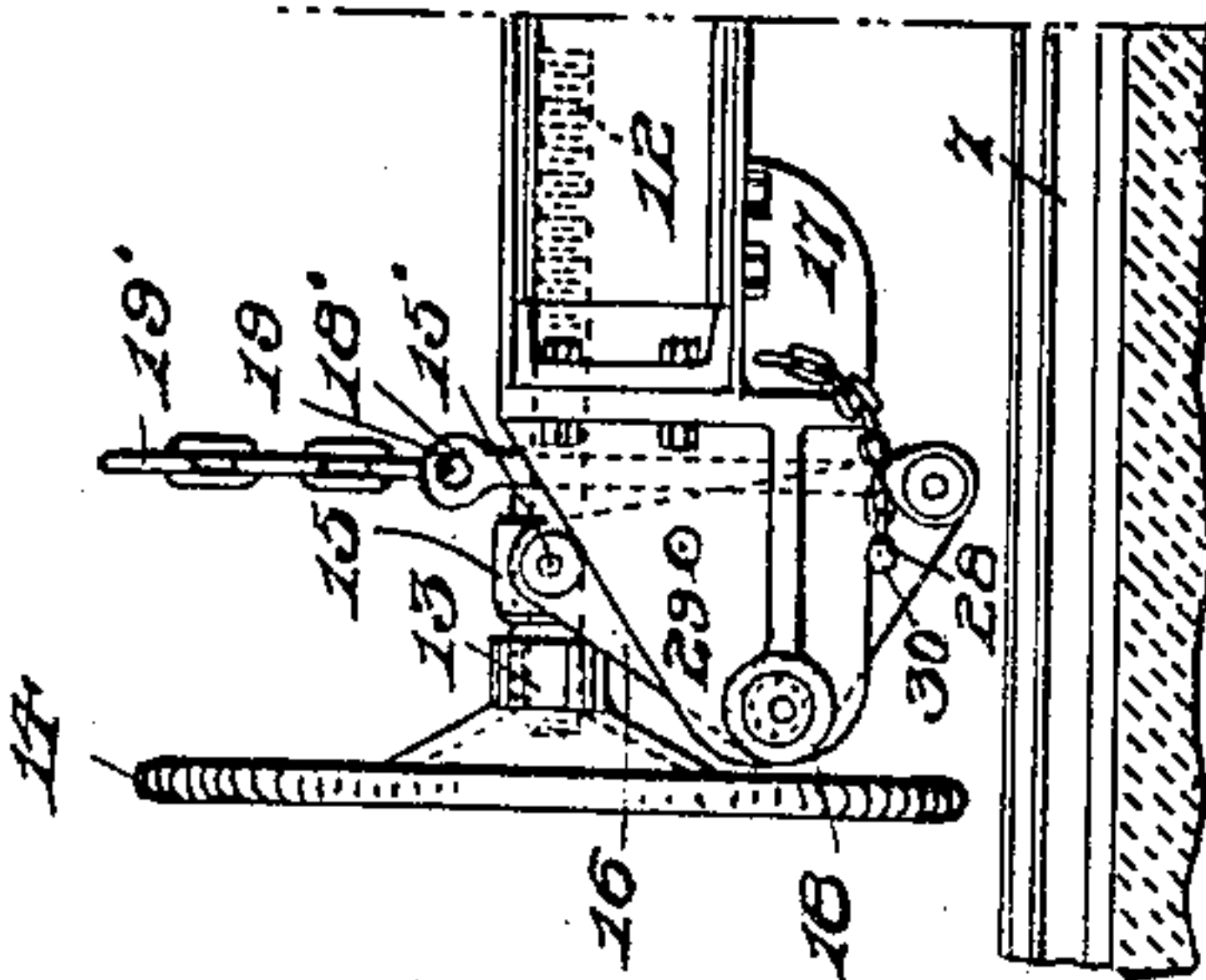


Fig. 1.

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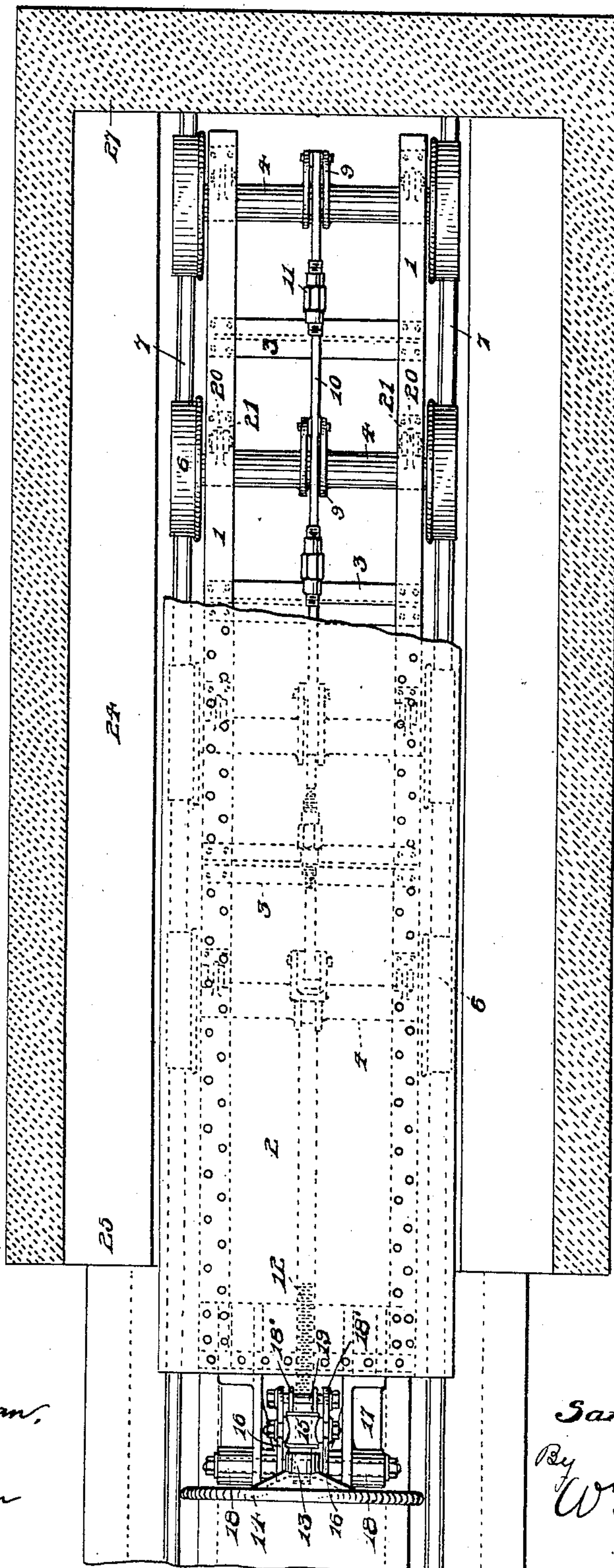
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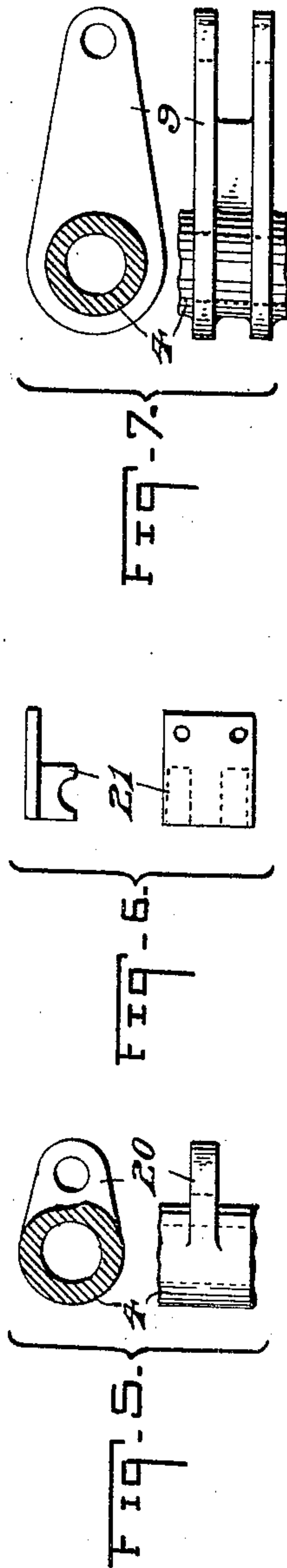
3 SHEETS—SHEET 2.

FIG-2-



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NO MODEL.

3 SHEETS—SHEET 3.

Fig. 4.

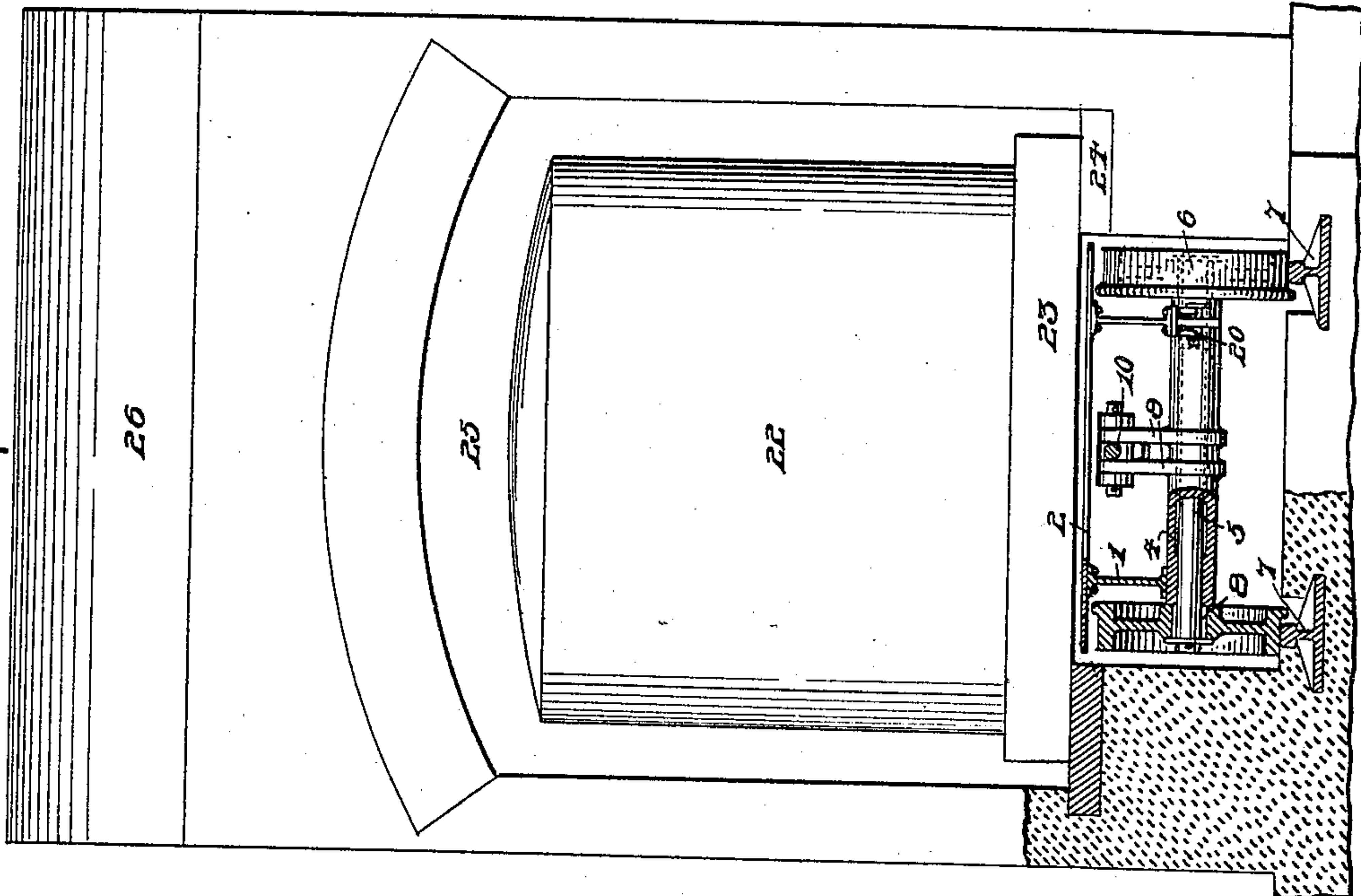
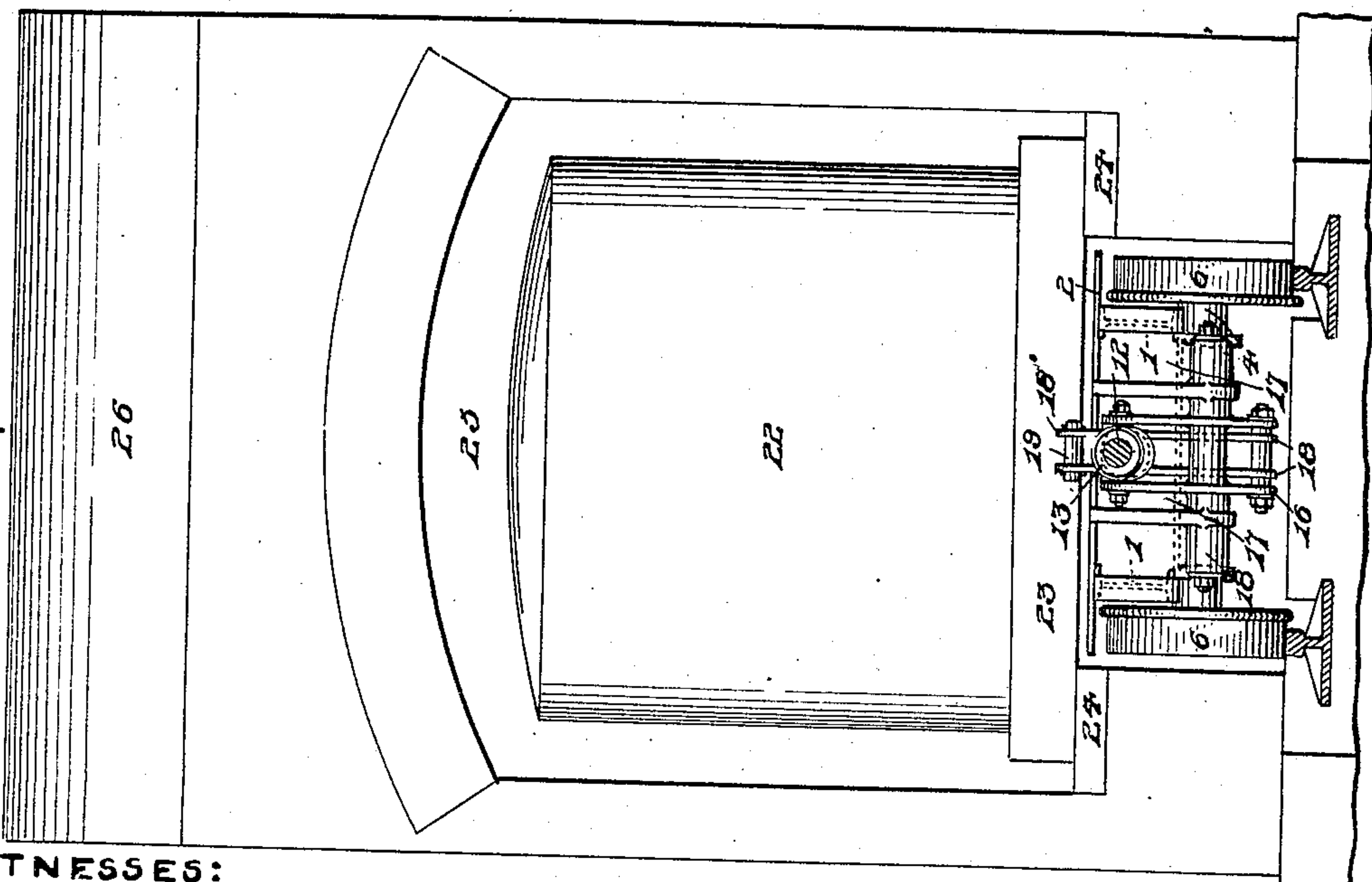


Fig. 3.



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UNITED STATES PATENT OFFICE.

SAMUEL FORTER, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO FORTER-MILLER ENGINEERING COMPANY, A CORPORATION OF PENNSYLVANIA.

FURNACE-CHARGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 773,634, dated November 1, 1904.

Application filed September 22, 1903. Serial No. 174,212. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL FORTER, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered new and useful Improvements in Furnace-Charging Apparatus, of which the following is a specification.

My invention relates to certain improvements in apparatus for charging furnaces, and has for its object to provide a simple apparatus whereby one or more articles, as annealing-pots, may be quickly deposited in a furnace to be heated and the apparatus withdrawn.

In the accompanying drawings, which form part of the specification, Figure 1 is partly a side view and partly a longitudinal section through the center of the furnace, showing the charging apparatus after it has entered the furnace and the articles to be heated have been deposited on suitable supports in the furnace. Fig. 2 is a plan view of the charging apparatus with the top plate omitted. Fig. 3 is an end view looking toward the right on Fig. 1. Fig. 4 is a transverse section of Fig. 1. Fig. 5 is a view in plan and in cross-section of a fragment, showing the sleeve 4 and one of the arms or levers 20 thereon. Fig. 6 is plan and side view of the bearing pieces or journals 21. Fig. 7 is a view similar in character to Fig. 5, showing the sleeve 4 and the arms 9 thereon.

As shown on the drawings, my apparatus consists of a truck formed of two parallel I-beams 1 1, connected on top by a heavy plate 2 and on the bottom by cross-bars 3. When the I-beams are in their lowest position, they rest on sleeves 4, in which are journaled the axles 5 of the wheels 6. The wheels 6 run on rails 7, which are laid in the bottom of the furnace and extend a sufficient distance outside of the same to allow the whole charging apparatus to be completely withdrawn from the furnace. The wheels 6 run, preferably, on friction-rollers 8 in order to reduce the friction and cause the charging apparatus to be moved easily.

Each sleeve 4 has in the middle an arm 9. The arms 9 are all connected together at their upper ends by tie-rods 10, provided with turn-buckles 11. The arm nearest the furnace-door is also pivotally connected to a screw 12. A nut 13, to which the hand-wheel 14 is keyed, turns on the threaded end of screw 12. The nut 13 is journaled in a cross-head or sleeve 15, having two trunnions 15', to which are pivoted the upper ends of the bell-crank levers 16. The angle of the bell-crank levers is connected to the pivots 18, carried by the brackets 17, which are firmly bolted to the rear end of the truck or charging apparatus. Two links 18' are also pivotally connected at their lower end to the remaining end of the bell-crank levers 16 and have at their upper ends a pin 19 for the engagement by the hook of a crane-chain 19'. The cross-head also serves as an abutment against which the nut works when drawing the screw 12 through it.

The sleeves 4 have each two short arms 20, cast on just below the I-beams of the truck, and are each provided with a pin 20' at its end. Bearing pieces or journals 21 are riveted to the under side of the beams 1, in which the pins 20' of the arms 20 rest. Each arm 9, with its connected sleeve 4 and arm 20, constitutes a bell-crank for lifting the truck-body, as is clear.

22 represents annealing-boxes supported on their stools 23, as commonly used in annealing-furnaces.

24 represents supports in the furnace on which the annealing-boxes rest after they have been deposited in the furnace by my apparatus.

25 is the door-opening, 26 the roof, and 27 the back wall, of the furnace.

The manner of charging the articles to be heated into the furnace and drawing them out of the furnace is as follows: Supposing the truck or charging apparatus to be standing outside the furnace on the rails 7 ready to receive the article and the truck-beams 1 to be in their lowest position, as shown on the drawings, the hand-wheel 14, which is keyed to nut 13, is given a sufficient number of revo-

lutions to cause the screw 12 and with it tie-rods 10 and long arms 9 to move to the left far enough to bring the short arms 20 in almost vertical position. The pins in the short arms resting in the journals 21 on the under side of the I-beams 1 will then raise the body of the truck until the top plate 2 is somewhat higher than the top of the supporting-plates 24 in the furnace. The stools 23, with the boxes 22 thereon, which are wide enough to extend beyond the sides of the top plate of the truck, are now deposited on the truck and the apparatus is run into the furnace. When in proper position in the furnace, the body of the truck is lowered by turning the hand-wheel in the opposite direction, allowing the stools 23 to rest on the supports 24. The beams 1 are then lowered still farther until they rest on sleeves 4, in which position a clearance-space is left between the bottom of the stools and the top of the truck-plate 2. The charging apparatus or truck is now withdrawn from the furnace and the furnace closed. When it is desired to take the charge out of the furnace, the truck is run into the same with the truck-body in its lowest position, as shown on the drawings. The truck body is then raised as before until the stools 23 are lifted from their supports 24 and a clearance-space is left between the bottom of the stools and the supports. The truck is then withdrawn from the furnace with the charges resting on it, or they can be taken off the truck by a crane.

The bell-cranks 16 are provided with the links 18' in order that the raising of the truck-body can also be done by a crane instead of by the hand-wheel 14. By simply hooking the crane-chain onto the pin 19 of the links 18' and raising the chain the nut 13, which is in engagement with the cross-head 15, will move to the left, taking the screw 12 and tie-rods 10 with it, and thus raising the truck-body. The bell-cranks will be turned until the hole 28 in the bell-cranks and the hole 29 in the brackets register, when a pin 30 is inserted through the holes, which will prevent the bell-crank from moving back when the chain is taken off. If it is desired to lower the truck, the chain is again hooked to the pin 19, the

pin 30 removed, and the chain lowered until the truck-beams 1 rest again on the sleeves 4.

I have not shown any special way of moving the car in and out of the furnace, as this can be done by hand or any suitable power mechanism.

Having described my invention, I claim—

1. In a furnace-charging apparatus, a truck, arms carried by the same, other arms operated by the said arms to raise the truck-body, links connecting the said first-named arms, and threaded means for operating the links.

2. In a furnace-charging apparatus, a truck, having a body capable of elevation, a means in engagement with the truck-body for elevating said body, means for operating said truck-body-engaging means, a lever to actuate said operating means, and means whereby the lever may be connected to a hoisting device.

3. In a furnace-charging apparatus, a truck having a movable body, a reciprocating rod to move said body, a sleeve on the rod, a nut on said rod capable of working against said sleeve so as to move the rod in the sleeve, a bell-crank lever having one arm connected to the sleeve and the other arm provided with means for attachment to a hoisting device.

4. In a furnace-charging apparatus, a truck having a movable body, sleeves rotatable on the axles thereof, means carried by said sleeves for raising the said body, and means for rotating the sleeves.

5. In a furnace-charging apparatus, a truck, sleeves on the axles thereof, beams resting thereon, arms on said sleeve arranged to lift said beams, other arms on said sleeve, and means for actuating the latter arms.

6. In a furnace-charging apparatus, a truck, a reciprocating rod connected thereto, a lever arranged to actuate said rod, means for moving the lever, and a pin to pass through holes in said lever and truck to maintain the rod in the position to which it has been moved.

Signed at Pittsburg this 21st day of September, 1903.

SAMUEL FORTER.

Witnesses:

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A. M. STEEN.