

No. 735,712.

PATENTED AUG. 11, 1903.

F. E. COOK & W. C. FERGUSON.

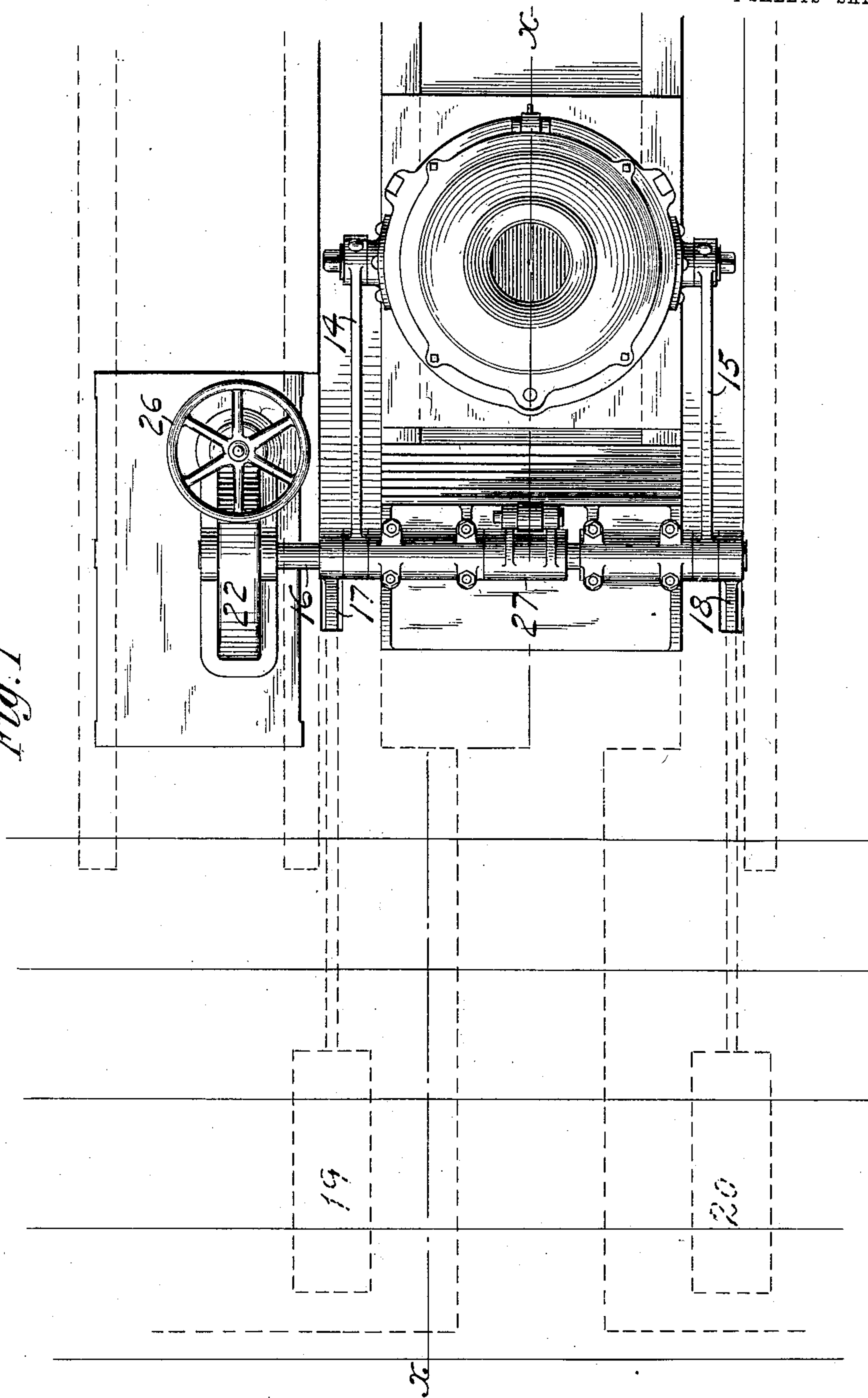
MOVABLE FURNACE.

APPLICATION FILED NOV. 11, 1899.

NO MODEL.

4 SHEETS—SHEET 1.

Fig. 1



WITNESSES:

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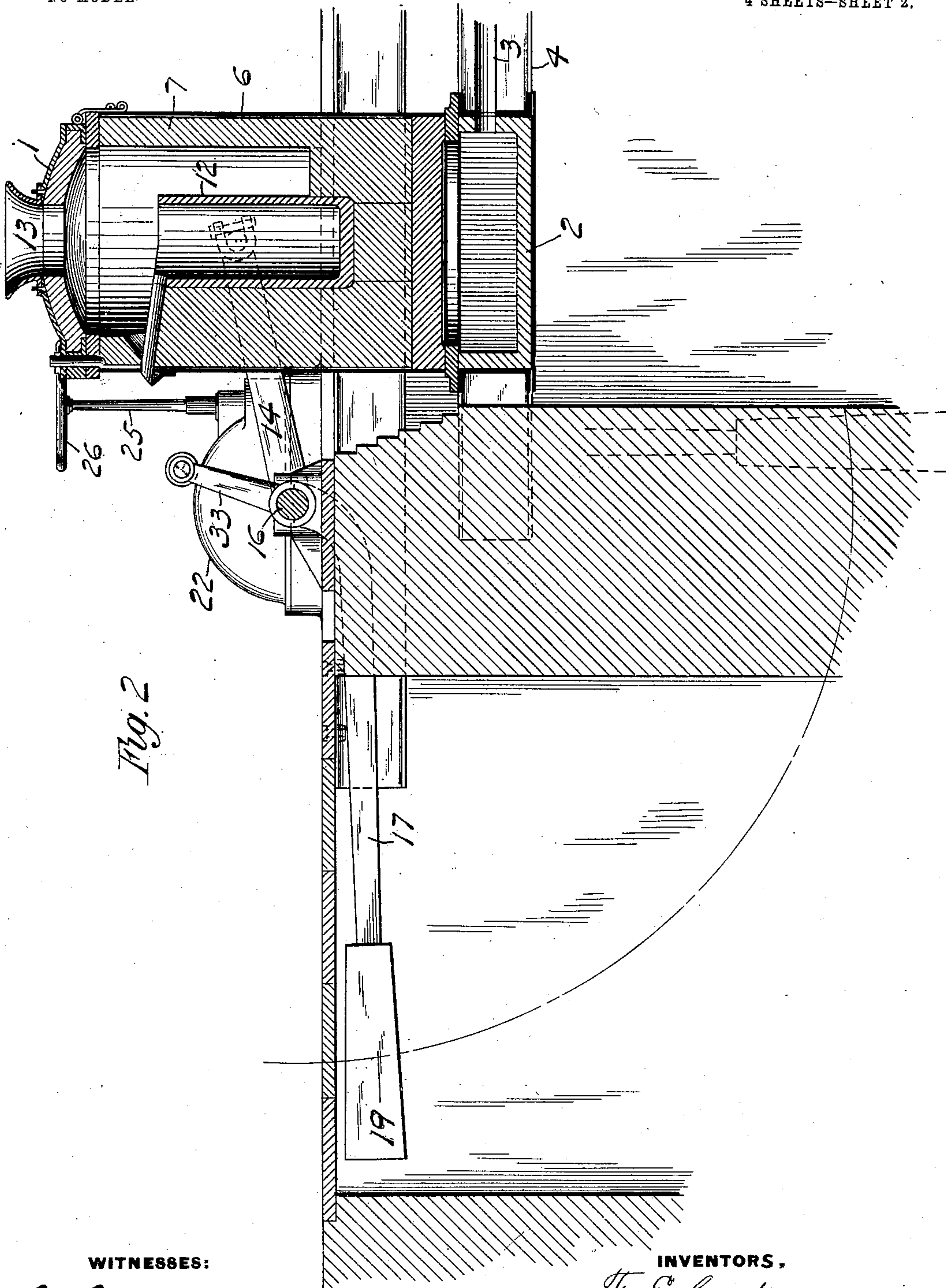
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4 SHEETS—SHEET 2.



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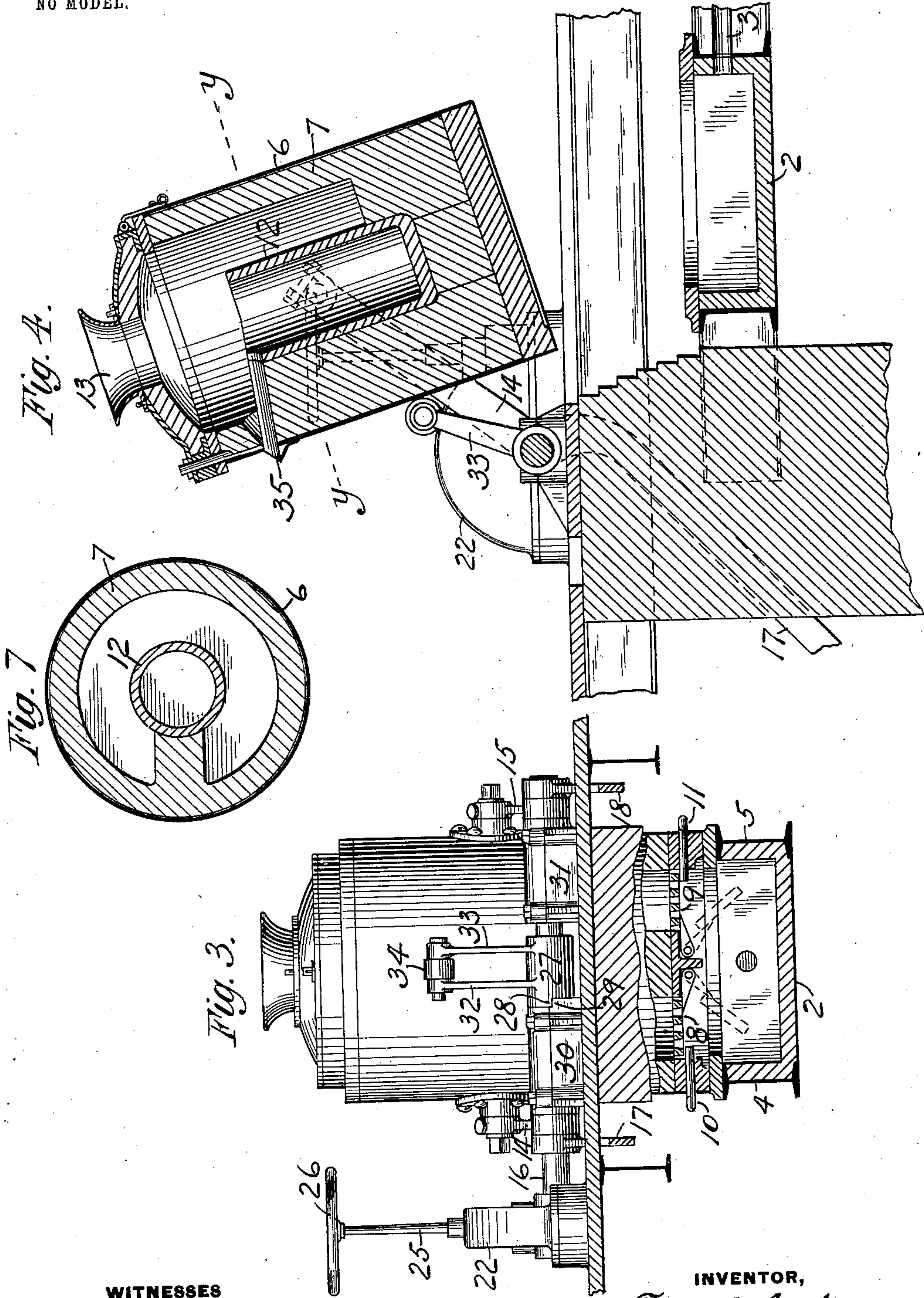
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NO MODEL.

4 SHEETS—SHEET 3.



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Fig. 6.

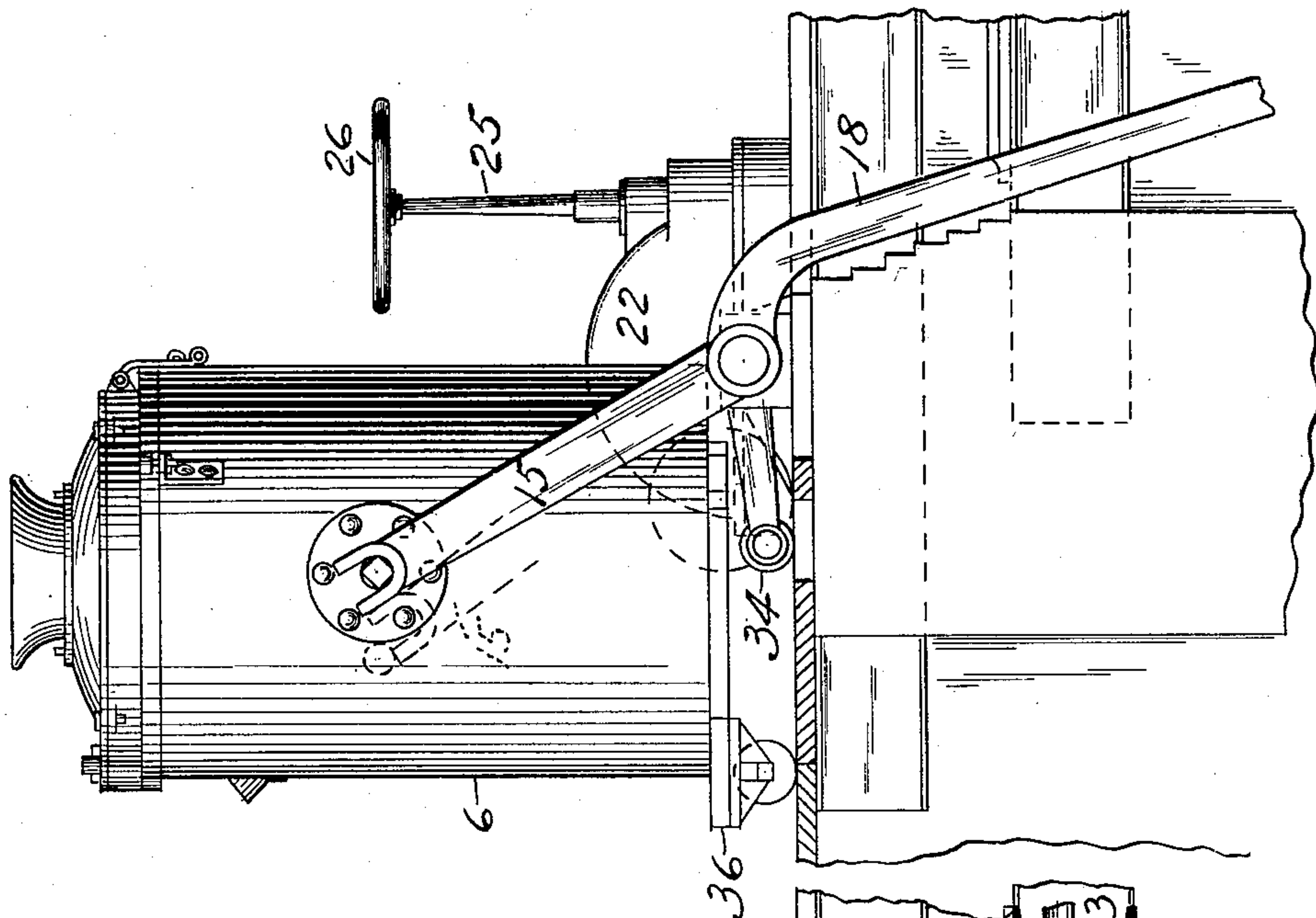
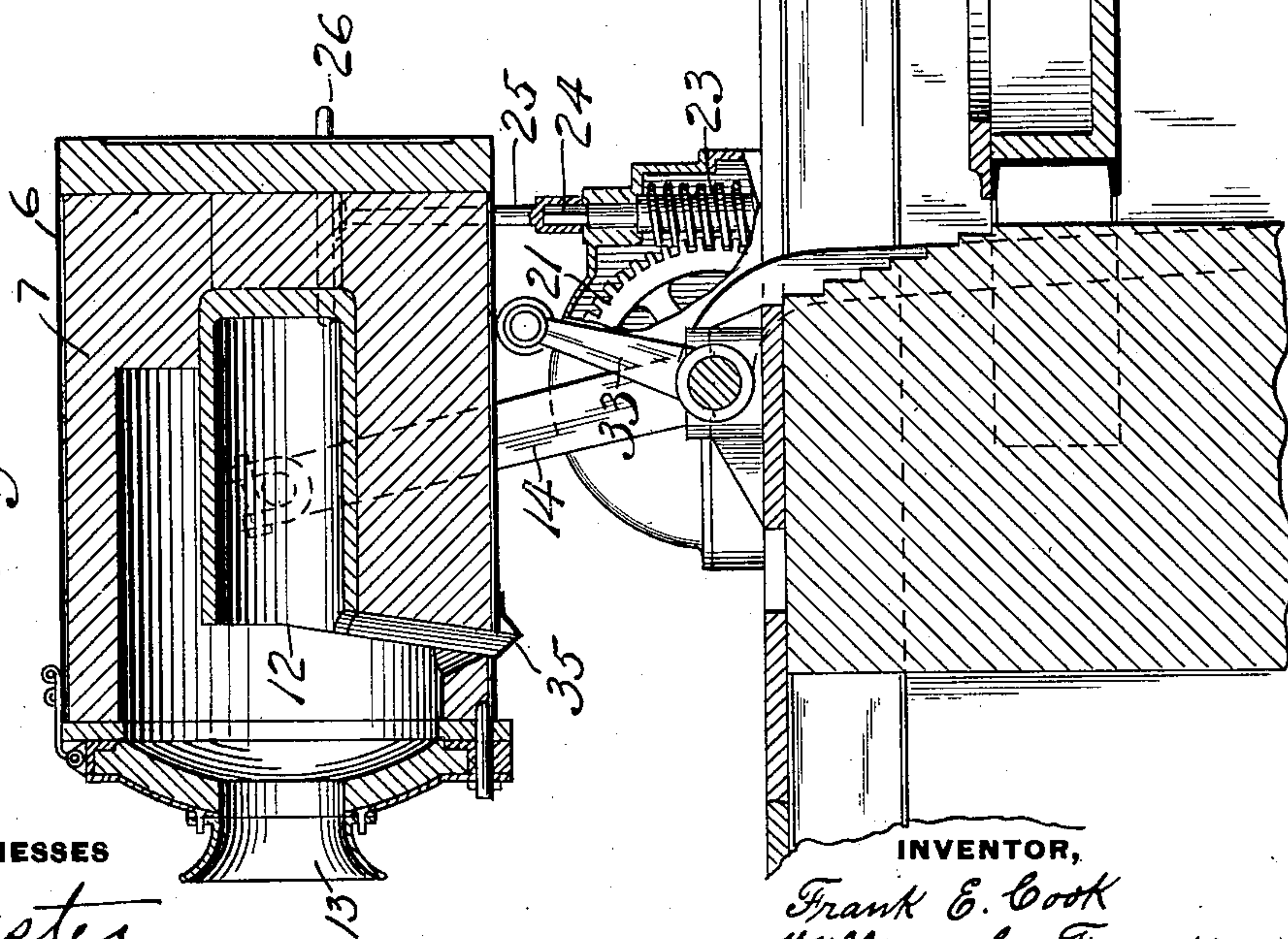


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANK E. COOK, OF WILMERDING, AND WILLIAM C. FERGUSON, OF PITTSBURG, PENNSYLVANIA, ASSIGNORS TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MOVABLE FURNACE.

SPECIFICATION forming part of Letters Patent No. 735,712, dated August 11, 1903.

Application filed November 11, 1899. Serial No. 736,708. (No model.)

To all whom it may concern:

Be it known that we, FRANK E. COOK, residing at Wilmerding, and WILLIAM C. FERGUSON, residing at Pittsburg, in the county of Allegheny, State of Pennsylvania, citizens of the United States, have invented or discovered a certain new and useful Improvement in Movable Furnaces, of which improvement the following is a specification.

The object of our invention is to provide an improvement in movable furnaces; and it consists in new and improved means for operating a movable furnace whereby it may be lifted, tilted, or lowered, and locked in any position to which it may be moved.

In the accompanying drawings, which illustrate an application of our invention, Figure 1 is a plan view of a movable furnace provided with our improvement; Fig. 2, a vertical section on the line *x x* of Fig. 1; Fig. 3, a view, partly in elevation and partly in section, looking from the left of Fig. 2; Fig. 4, a vertical section showing the parts in the positions they will occupy when the furnace has been lifted and tilted far enough to permit the melted metal to begin pouring from the crucible; Fig. 5, a vertical section showing the furnace in the position it will occupy when the crucible is being emptied; Fig. 6, a view showing the tripping-bar turned down and the furnace lifted out of the pit and placed in a vertical position on a truck; and Fig. 7 a section of the furnace taken on the line *y y* of Fig. 4.

Our invention is intended for employment with movable furnaces which occupy one position when the process of melting or reduction is going on within the furnace and which are moved to some other position when the metal is to be discharged, and it is specially adapted for employment with a furnace in which is placed a crucible containing the metal to be melted and from which the metal is poured without removing the crucible.

In the drawings we have shown our improvement applied to a brass-melting furnace

1, which during the process of melting the metal rests on a box 2, to the interior of which air under pressure is supplied through a pipe 3. The air-box is located below the level of the ground or floor and is supported by the beams 4 and 5, which form two of the sides of the box. The furnace is formed of a metal casing 6, having a lining of fire-brick 7, and is provided at its bottom with a grate the two parts 8 and 9 of which are adapted to swing downward or outward when the pins 10 and 11 are withdrawn, as shown in dotted lines in Fig. 3. When the furnace is in operation, air from the box 2 passes up through the spaces in the grate and through a mass of fuel surrounding the crucible 12, and the products of combustion pass off through the opening 13 in the top of the furnace.

On opposite sides of the furnace are provided trunnions, which are fitted in the forked ends of two arms 14 and 15, rigidly secured on a horizontal shaft 16, and on the opposite side of the shaft extend arms 17 and 18, which are also rigidly secured to the shaft and provided at their free ends with counterbalancing-weights 19 and 20. The arms 14 and 15, with the weighted arms 17 and 18, form a pair of levers by which the furnace is counterbalanced and by which it may be raised or lowered when the shaft 16 is rotated.

On the end of the shaft 16 is rigidly secured a worm-wheel 21 in a casing 22, and engaging with the teeth of the worm-wheel is a worm 23, the shaft of which is provided with a squared end 24, fitting in a socket on the end of a shaft 25, provided with a hand-wheel 26. The hand-wheel and its shaft are detachable from the shaft of the worm and may be removed when not required for use. A sleeve 27 is loosely fitted on the shaft 16, so that it may be moved longitudinally thereon to be engaged with or disengaged from the bearing 30 of the shaft 16. As shown in Fig. 3, one end of the sleeve 27 is notched or cut away, so as to form a shoulder 28 on each side, and these shoulders are engaged with shoulders

29 on the bearing 30 when it is desired to lock the sleeve against rotation. Projecting from the sleeve 27 are arms 32 and 33, between the ends of which is carried a bearing-roller 34, which when the sleeve 27 is in the locked position stands in the path of the furnace as it is being raised and acts as a tilting-stop therefor. By shifting the sleeve 27 to the right from the position shown in Fig. 3 the shoulders 28 and 29 may be disengaged, and the sleeve is then free to turn on the shaft.

When it is desired to pour the melted metal from the crucible, the sleeve 27 is placed in the locked position with the arms 32 and 33 projecting upward, so as to bring the bearing-roller 34 into position to act as a tilting-stop for the furnace. The operator then turns the hand-wheel 26 and through the worm-gear operated thereby rotates the shaft 16 and raises the furnace until it is swung by the counterbalancing-levers into a position where it comes in contact with the tilting-stop 34, and as the rotation of the shaft 16 continues the furnace is automatically tilted by the action of the levers and the stop and the melted metal is poured from the crucible through the spout 35. The furnace is shown in Fig. 4 in the position which it will occupy at the beginning of the discharge of the metal from the crucible, and in Fig. 5 it is shown in position for emptying the crucible. When in the latter position, the furnace is supported by the lever-arms 14 and 15 and by the tilting-stop and rests on top of the tilting-stop with its center of gravity in a vertical line between the trunnions and the stop. If it becomes necessary to remove the furnace altogether from its position in connection with the rest of the apparatus for the purpose of repairing or for any other reason, the sleeve 27 may be slid along the shaft 16 far enough to unlock it and to permit the stop 34 to be turned down into the position shown in Fig. 6, and the furnace may then by operating the hand-wheel be lifted from the position shown in Fig. 2 to that shown in Fig. 6 and without being tilted be landed in a vertical position on a truck 36, by which it may be removed to some other point. The dotted lines in Fig. 6 indicate the position of the lever-arm 15 when the trunnion on the side of the furnace is on the point of leaving the forked end of the lever-arm as the truck is being moved away.

It will be seen that by means of our improvement the furnace may be lifted and tilted and lowered by merely turning the hand-wheel 26, which may be operated by a single workman, and the furnace may be held in any desired position by the worm-gear, which acts as a locking device to prevent movement except when the hand-wheel is being turned. It will be obvious that the furnace after being raised to any position

may be lowered and returned to its original position by merely turning the hand-wheel in the reverse direction from that in which it should be turned to lift the furnace.

So far as we are aware furnaces of this character have heretofore been employed in combination with complicated means for lifting them and turning them and the lifting and turning operations were separate and independent of each other and required the employment of several workmen, while with our improvement the lifting and tilting and lowering operations are all performed by one workman, and the furnace may be moved to any position within its range of movement and held there as long as desired.

We claim as our invention and desire to secure by Letters Patent—

1. The combination with a movable furnace and means for lifting the same, of a movable stop and means for adjusting the stop to an operative position or to an inoperative position, whereby the furnace may be automatically tilted while being raised, or may be raised without being tilted.

2. The combination with a movable furnace and means for lifting the same, of a movable stop and means for moving the stop either to a position in the path of the furnace to tilt the same or to a position where it will not be engaged by the furnace in its movement.

3. The combination, with a movable furnace, of a lever for lifting the furnace, and a stop disconnected from the furnace but with which the furnace is adapted to engage, whereby when the furnace is being lifted it will also by the same movement be tilted.

4. The combination, with a movable furnace, of a shaft, a worm-wheel on the shaft, a worm engaging with the worm-wheel and adapted to be operated to turn the shaft, and means connected with the shaft and furnace whereby the furnace may be lifted by the rotation of the shaft and a stop adapted to engage the lower end of the furnace to tilt the same.

5. The combination, with a movable furnace, of a shaft, a worm-gear for operating the shaft, means interposed between the shaft and the furnace for lifting and supporting the furnace, and an adjustable stop for tilting the furnace as it is being lifted.

6. The combination, with a movable furnace, of a shaft, means for operating the shaft to lift the furnace, means extending from the shaft for supporting and counterbalancing the furnace, and a stop disconnected from the furnace but located in the path of its movement for tilting the furnace when it is being lifted.

7. The combination, with a movable furnace, of a shaft, supporting-arms for the furnace, which are secured to the shaft, means

for counterbalancing the weight of the furnace, a worm-gear for operating the shaft, and a stop for tilting the furnace when being lifted, which is loosely mounted on the shaft
5 and adapted to be shifted so as to permit lifting of the furnace without tilting.

8. The combination with a movable furnace having a pivoted arm for lifting and moving laterally the furnace, of an adjustable stop with which the furnace is adapted
10

to engage, whereby the same will be automatically tilted as it is being lifted.

In testimony whereof we have hereunto set our hands.

FRANK E. COOK.

WILLIAM C. FERGUSON.

Witnesses:

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