

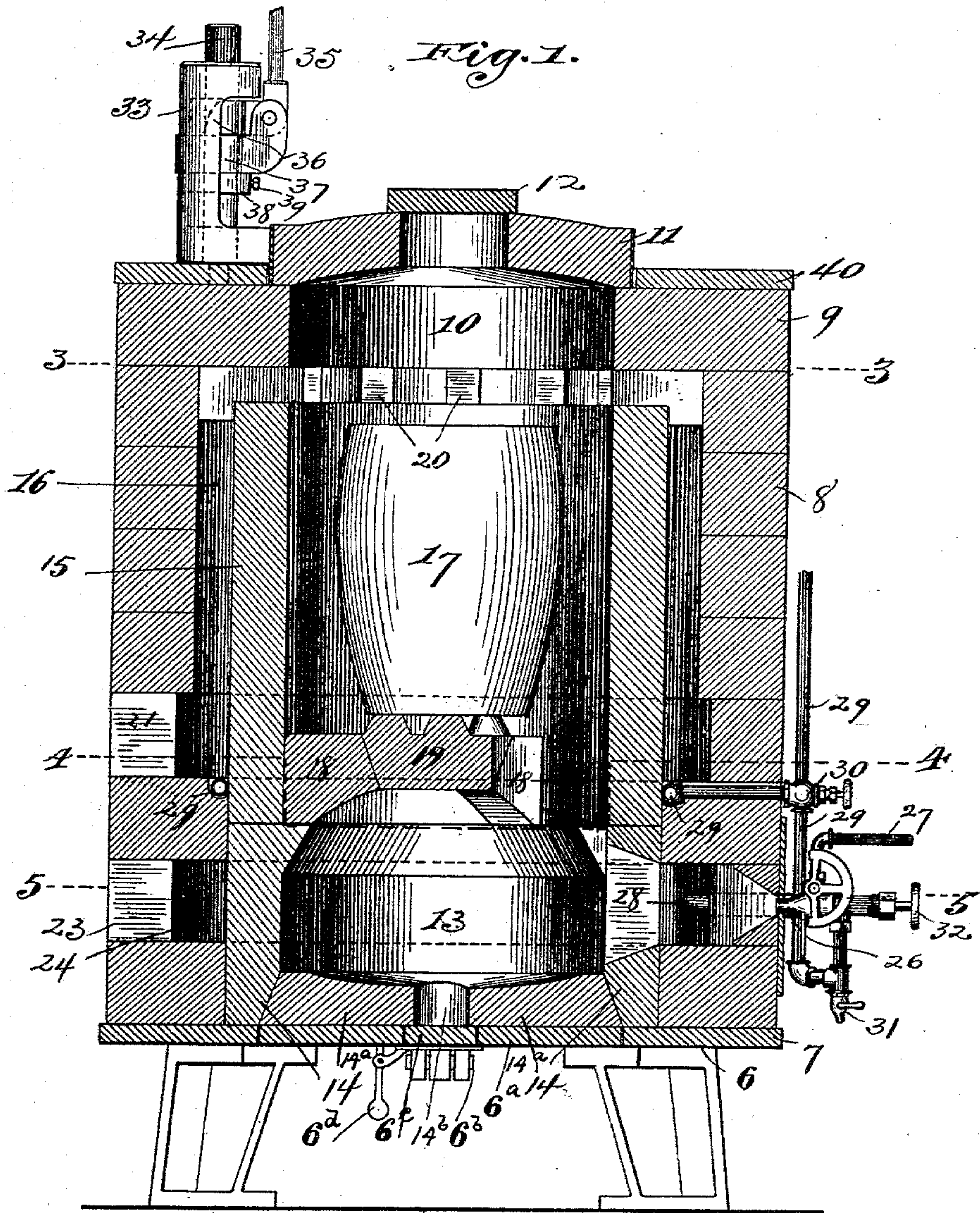
(No Model.)

3 Sheets—Sheet 1.

E. M. SCOVILLE.
CRUCIBLE FURNACE.

No. 559,868.

Patented May 12, 1896.



Witnesses,
J. M. Mann
F. B. Goodwin

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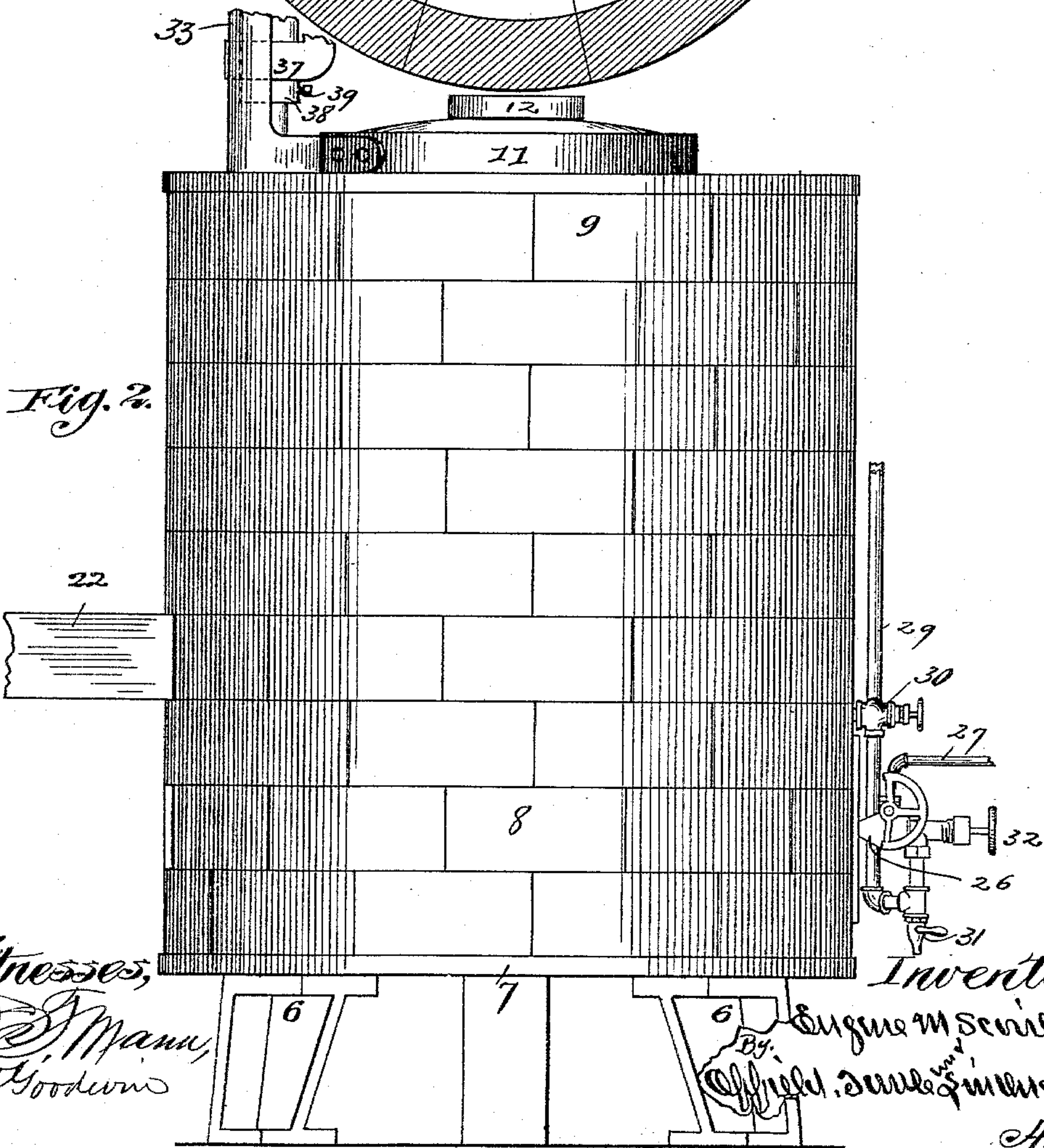
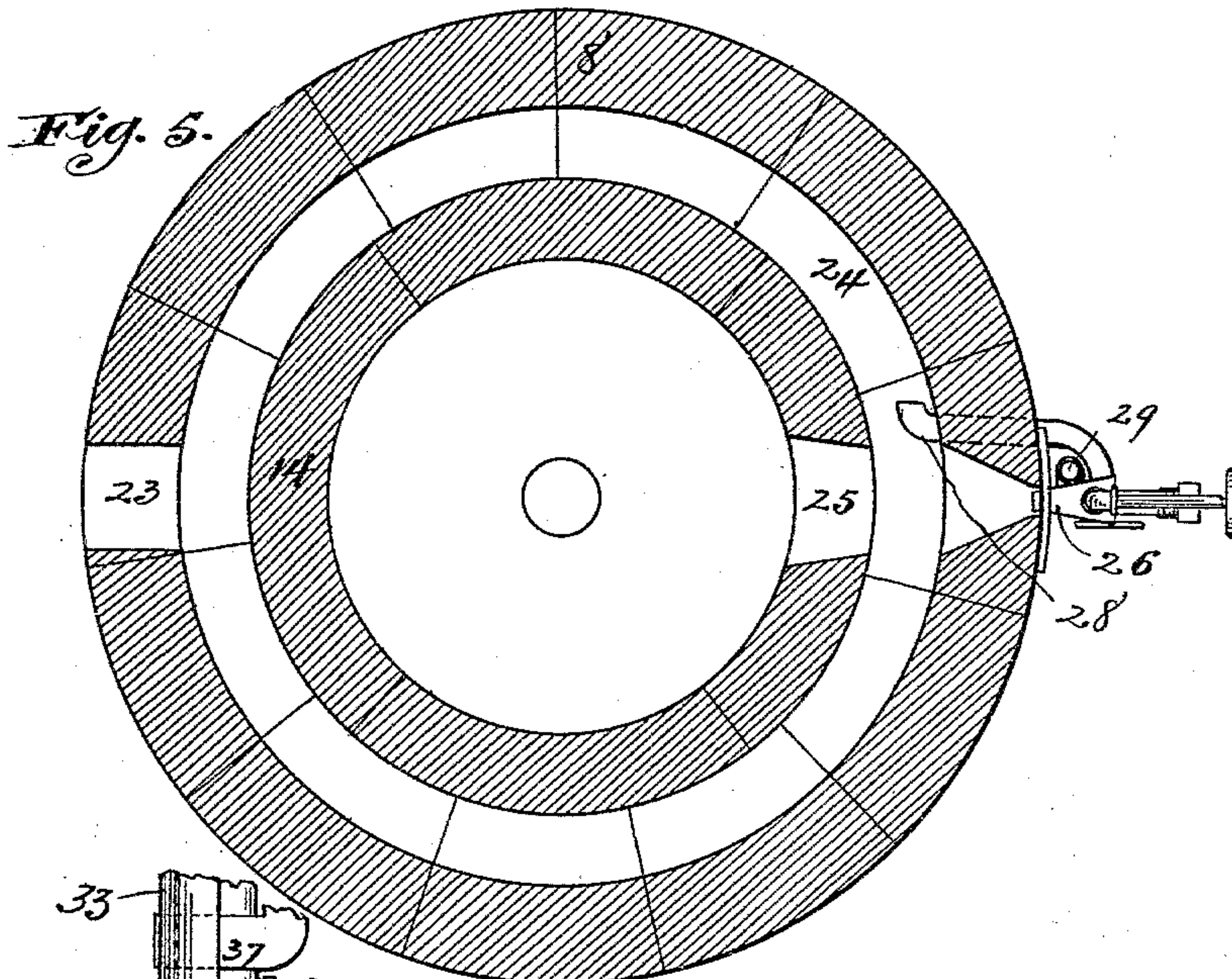
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Fig. 3.

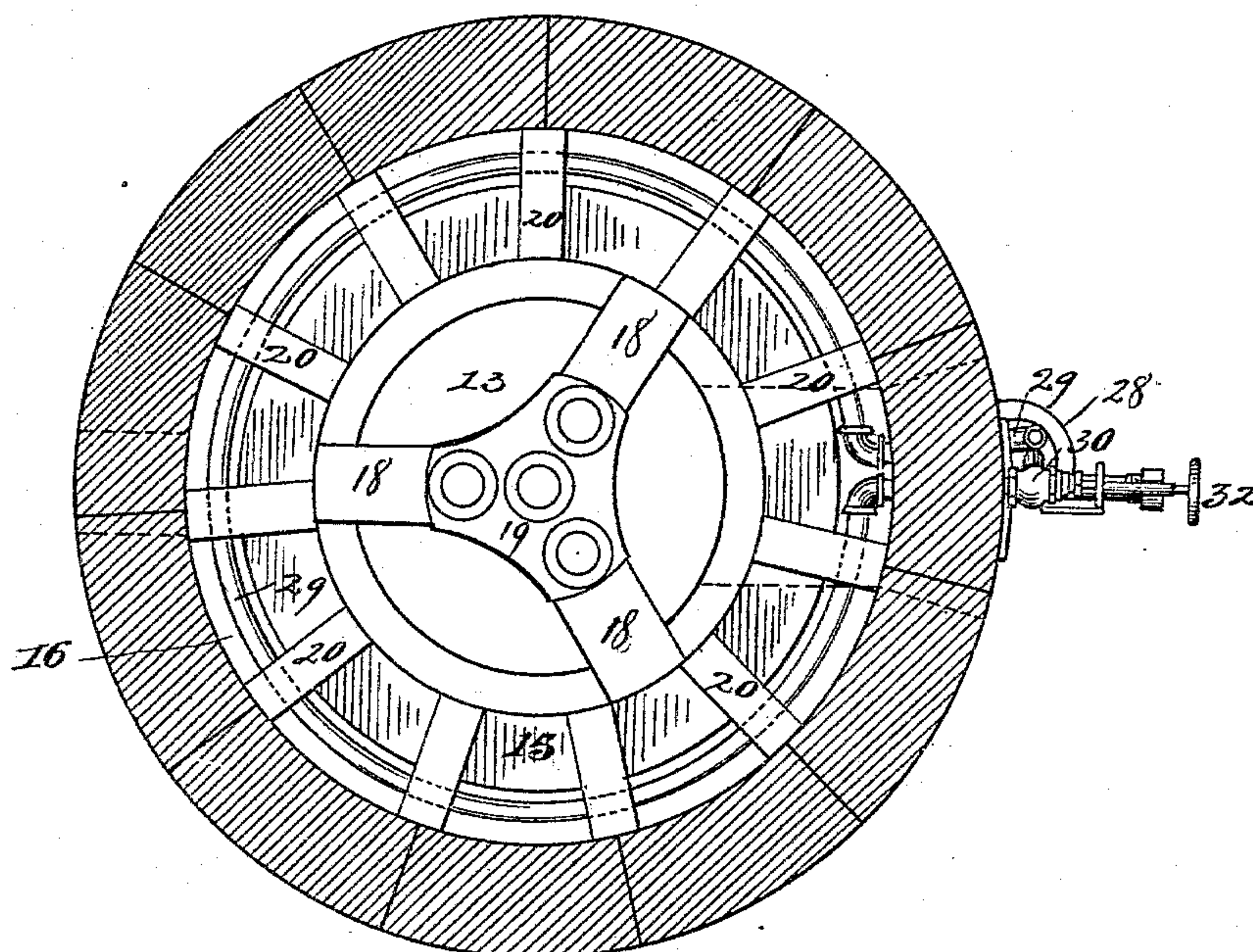
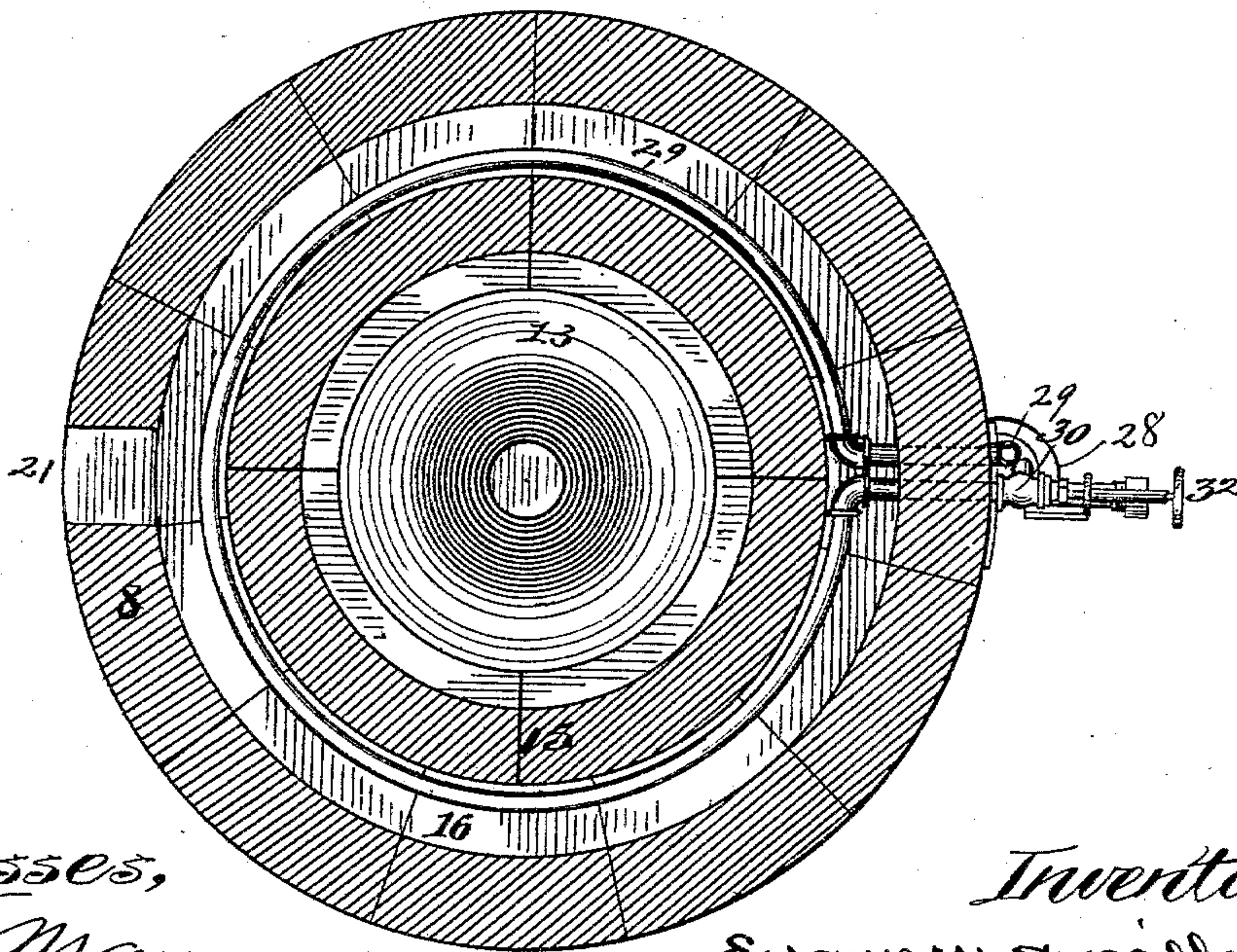


Fig. 4.



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UNITED STATES PATENT OFFICE.

EUGENE M. SCOVILLE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE INTERNATIONAL GAS AND FUEL COMPANY, OF SAME PLACE.

CRUCIBLE-FURNACE.

SPECIFICATION forming part of Letters Patent No. 559,868, dated May 12, 1896.

Application filed September 29, 1894. Serial No. 524,429. (No model.)

To all whom it may concern:

Be it known that I, EUGENE M. SCOVILLE, of Chicago, Illinois, have invented certain new and useful Improvements in Crucible-Furnaces, of which the following is a specification.

This invention relates to a crucible-furnace, and has for its object to provide certain improvements in the construction of such furnaces whereby a saving is effected by the manner in which the heat is applied and certain other desirable objects hereinafter set forth are attained.

In the accompanying drawings, Figure 1 is a vertical sectional elevation through the furnace-crucible, some of the auxiliary parts showing in elevation. Fig. 2 is a side elevation of the furnace, showing a smoke-flue and certain of the other parts broken. Figs. 3, 4, and 5 are sectional plans below the corresponding lines indicated in Fig. 1.

In the drawings, 6 represents a cast-iron base on which the furnace may for convenience be erected, such base having a circular flange 7. The external wall of the furnace is composed of fire-brick 8 or other refractory materials preferably laid up in courses and arranged so as to break joints in the usual manner. As shown, this external casing is circular in form and is surmounted by the cap-ring 9, which contracts or partially closes the chamber at its top, leaving a central opening 10.

11 represents a removable cover centrally apertured, the opening thereof being usually covered by block 12.

13 is the combustion-chamber, which is formed by a vertical lining 14 and hearth-lining 14^a, the exterior surface of the lining 14 fitting against the inner surface of the external casing. The hearth-lining is preferably constructed in a single piece and rests upon the cast-iron bottom plate 6^a, which is hinged, as at 6^b. The hearth-lining 14^a is apertured, as at 14^b, and this aperture is closed by a second hinged plate 6^c, controlled by the weight 6^d.

In the use of these crucible-furnaces the crucible breaks after long-continued use and the molten metal runs down into the fire-chamber. If it be allowed to set, the furnace

is practically destroyed or must be torn down to remove the metal. With this construction if the crucible breaks the metal pours down through the combustion-chamber, opens the hinged plate 6^c against the weight 6^d and escapes. For repairs the hinged plate 14^a is dropped and the hearth-lining removed. Mounted upon the walls of said fire-chamber is a circular wall 15 arranged concentric to the outer casing, but out of contact therewith, so as to provide an annular flue 16. The crucible 17 rests upon a support formed by three blocks, each marked 18, having a bearing on the lining 14 of the fire-chamber and against the inner surface of the wall 15 and supporting a key-shaped central block 19. Apertures are thus formed between the members 18, through which the products of combustion may pass to the crucible-chamber and around the crucible 17. Checker-brick 20 are set on top of the wall 15, such brick being L-shaped in form, one angle thereof projecting into the annular flue 16. An opening 21 is formed in the external wall, to which may be connected a smoke-pipe 22. Below the said smoke-pipe a second opening 23 is formed, delivering into the space between the outer casing and the lining of the fire-chamber, said space constituting an air or draft flue 24, which at the opposite side of the chamber communicates with the fire-chamber 13. The air to support combustion is thus heated on its passage. Opposite said opening 25 the outer casing is perforated for the passage of the nozzle of a hydrocarbon-burner 26.

The burner may be of any approved construction; but I prefer to employ a burner adapted for delivering the combustible gases under blast into the fire-chamber, and for this purpose the burner has provisions for supplying oil, heated air, and steam thereto, the oil entering by the pipe marked 27, the heated air being drawn in from the flue 24 through the short pipe 28, and the steam being supplied through the pipe 29, which is carried through an aperture in the external casing and conducted one or more times around the outside of the cylindrical wall 15, preferably at the bottom of the said flue 16, and, emerging through the external wall, leads

to the burner, having preferably provided therein a valve 30 and at one point a drip-cock 31.

The admission of steam to the burner will be controlled by a valve whose handle is seen at 32, and the action of the burner described is that oil is delivered to the interior of the burner, where it is picked up by the incoming jet of steam and atomized, the finely-divided mixture being delivered at the orifice of the nozzle, at which point ignition is effected and the products of combustion delivered under blast into the fire-chamber 13. The products of combustion pass through the opening in the support of the crucible and upward around the latter and thence escape between the checker-work into the annular flue, and finally, after parting with their heat, escape by way of the smoke-pipe.

It will thus be seen that the full effect of the heat is first applied to the crucible, and that instead of permitting the heat to escape thence at the top of the crucible-chamber it is returned over the upper edge of the cylindrical wall 15 and caused to pass down the outside thereof through the flue 16, thereby causing a downdraft and heating the interior casing 15 by what would otherwise be waste heat, thus effecting a considerable saving of heat which would be wasted by radiation through the walls of the crucible-chamber.

Another advantage which is secured by returning the products of combustion through the down-flue is that the cover may be removed for recharging the furnace without interrupting the fire or danger of burning the workmen, whereas if the smoke-flue led from the top of the crucible-chamber the flames would rush out the opening through the cover-plate when the block 12 was removed, and, further, the overheating of the top of the furnace is by means of this downdraft prevented.

The cover-plate 11 is secured to a sleeve

33, sliding on a post 34, and can be moved by means of a lever 35, having a cam-foot 36, impinging the sleeve 35, said lever being pivoted in a collar 37, rotatably supported on the post 34 by means of the collar 38, having the set-screw 39. When the lever 35 is depressed, the sleeve with the cover-plate 11 will be raised, so as to clear the ring 40, and then it may be swung in a horizontal plane.

I claim—

1. In a crucible-furnace, the combination with a fire-chamber and a crucible-chamber above and communicating therewith, of a crucible-support composed of diverging legs resting on the walls of the fire-chamber and having a central key or arch to support the crucible, substantially as described.

2. A crucible-furnace comprising in combination with a suitable base, a sectional external casing forming the outer wall of said furnace, an interior wall, concentric to the outer wall but separated therefrom and providing a central chamber; the lower portion of which constitutes a fire-chamber and the upper portion a crucible-chamber, an air-flue surrounding the fire-chamber and communicating therewith, an annular flue surrounding the crucible-chamber checker-work arranged in the upper portion of said annular flue, substantially as described.

3. In a crucible-furnace, the combination with a movable cover, of means for moving the same comprising a fixed post or pivot, a sleeve sliding thereon and secured with the cover, a collar rotatably mounted on the sleeve and a lever pivoted to said collar and having a cam adapted to act upon the sleeve, substantially as described.

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Witnesses:

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