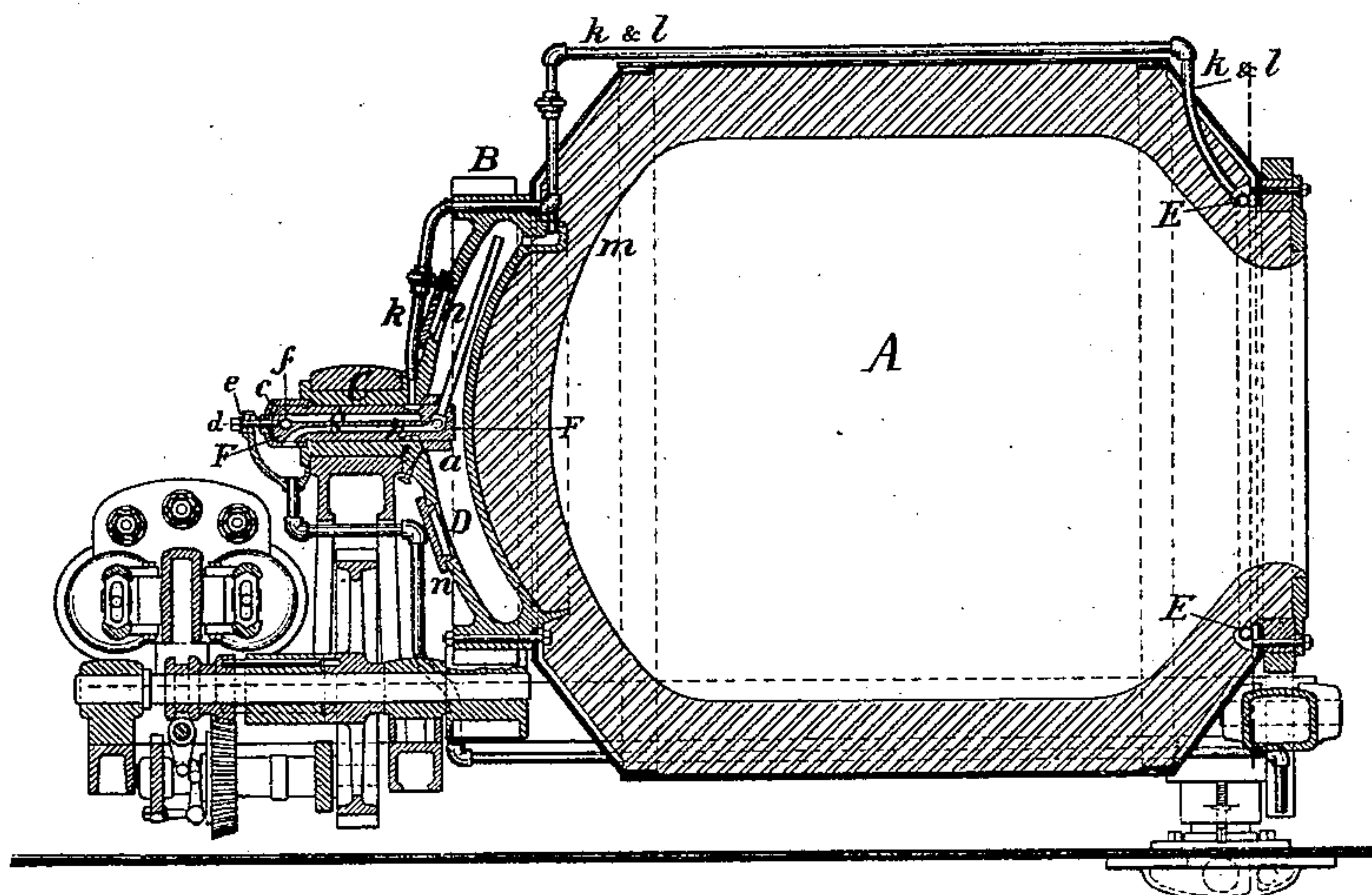


Revolving Puddler.

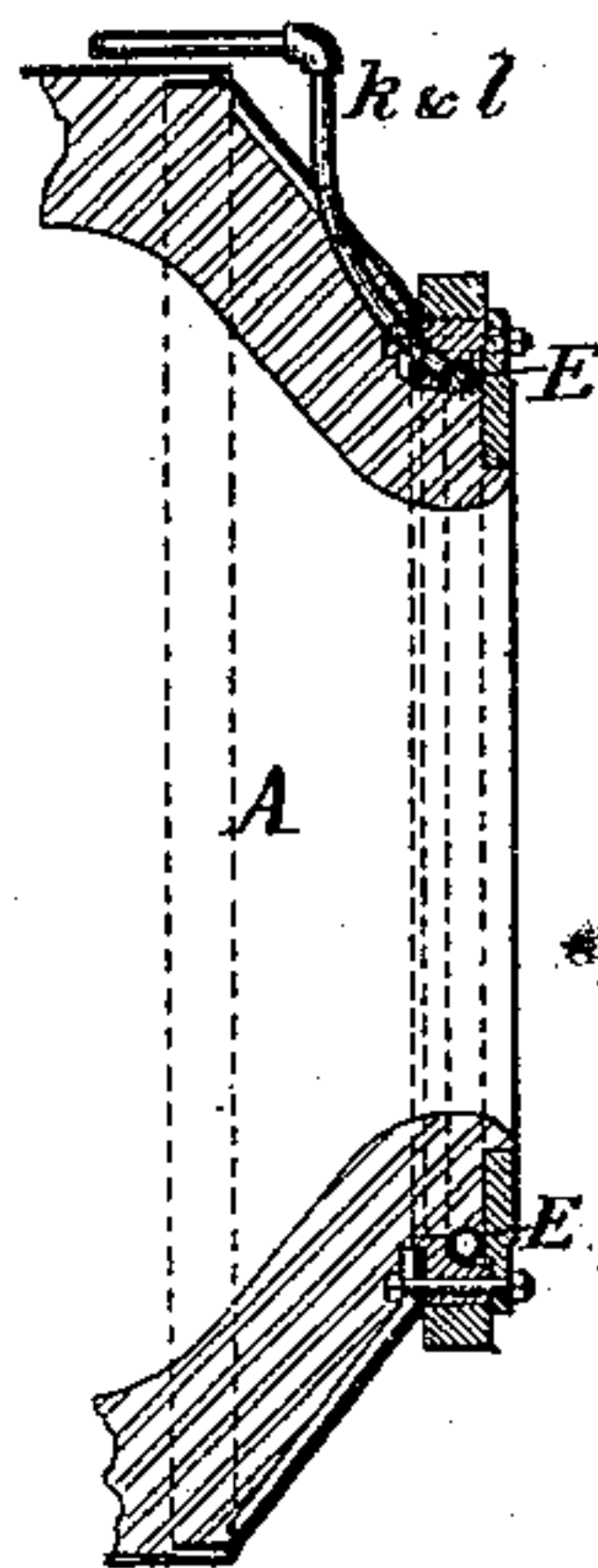
No. 159,849.

Patented Feb. 16, 1875.

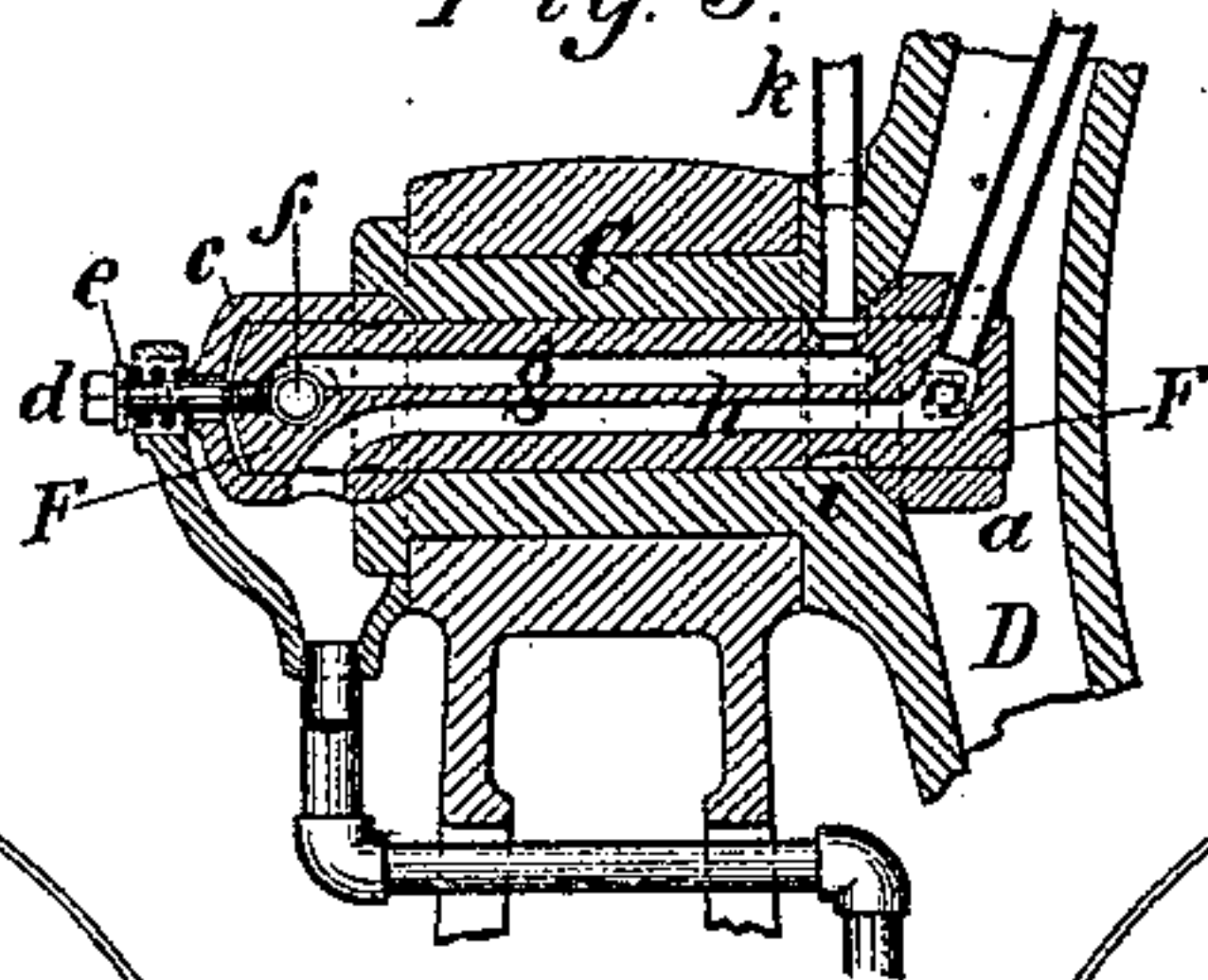
—Fig. 1—



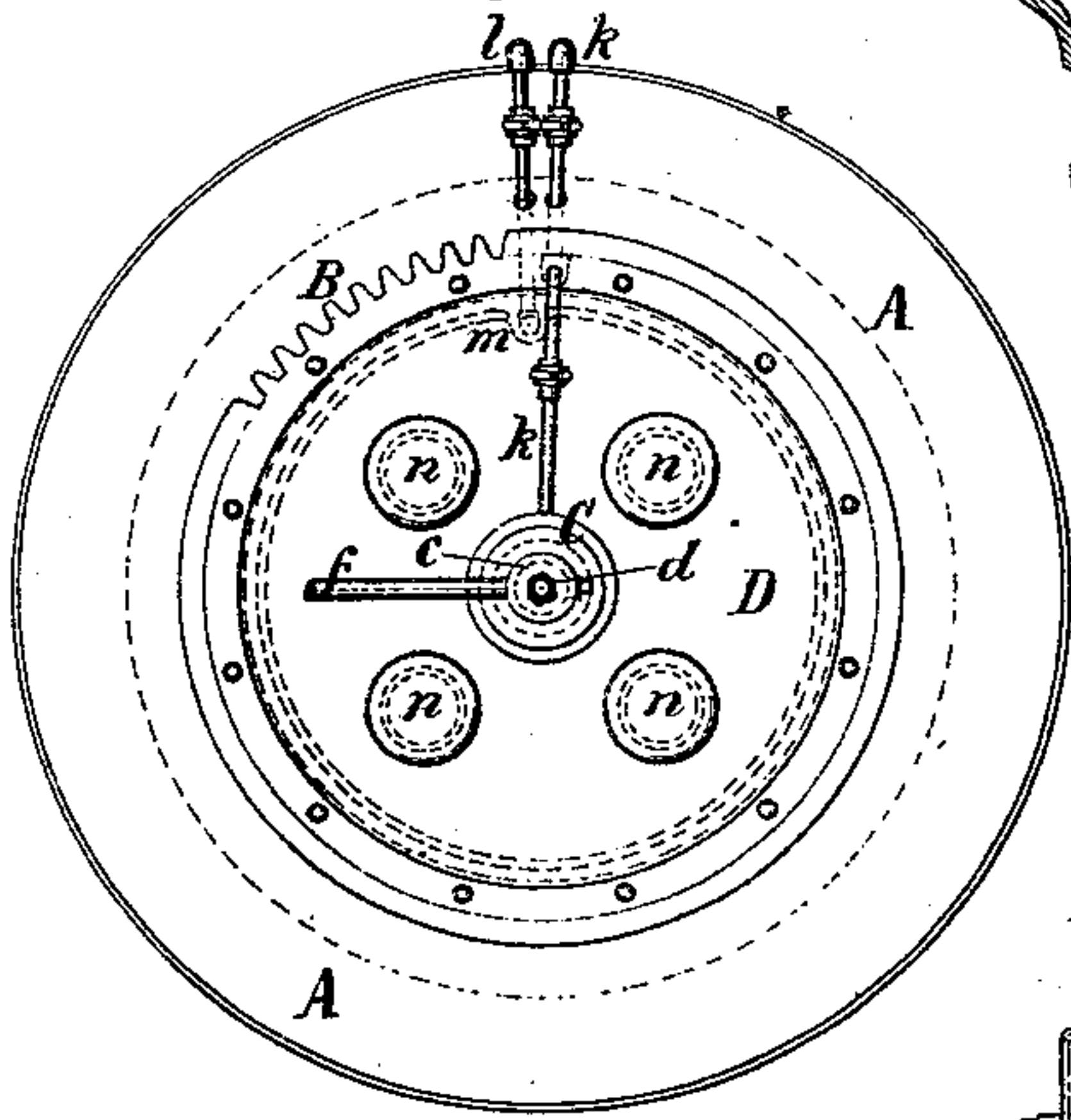
—Fig. 4.—



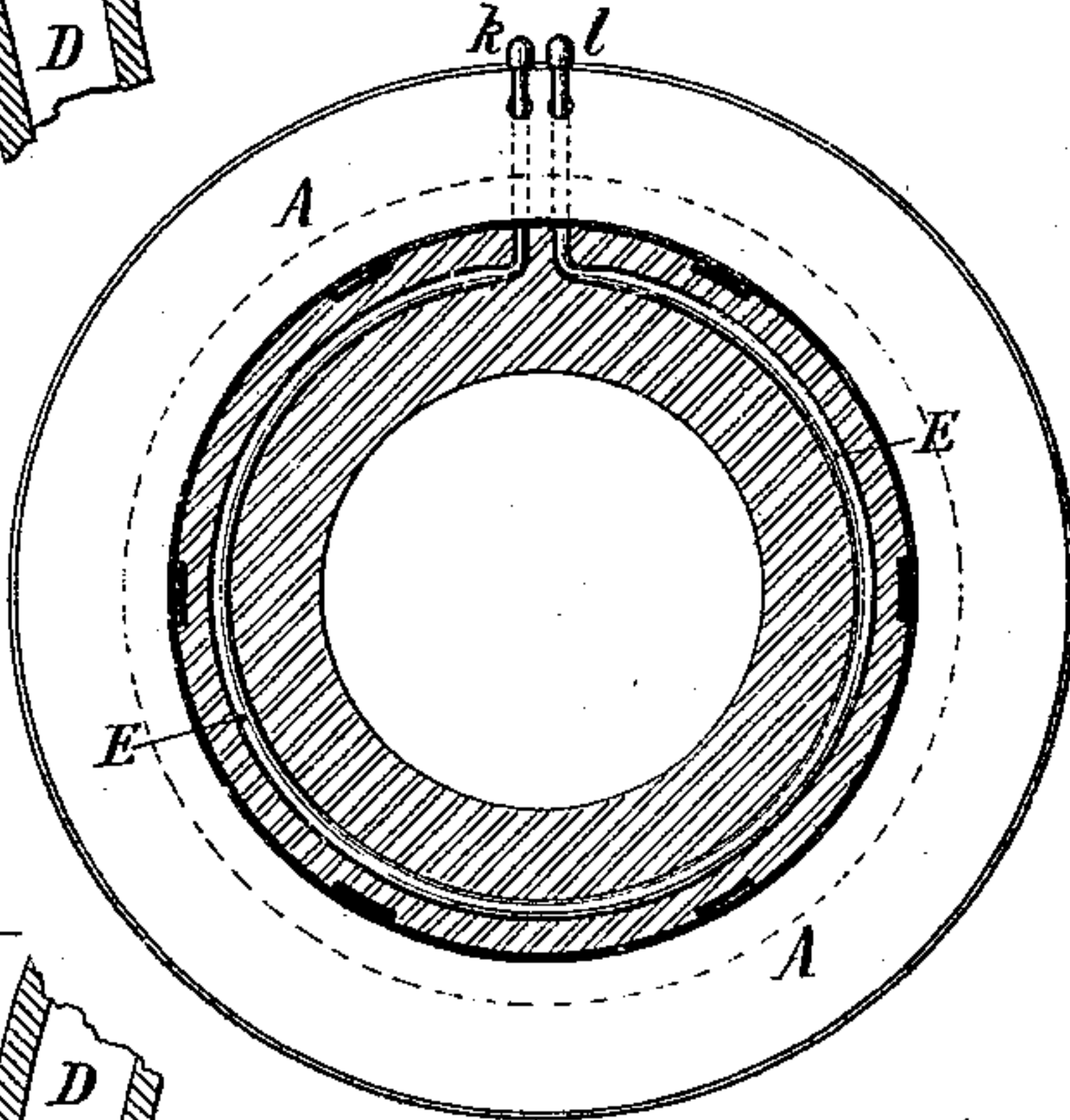
—Fig. 5.—



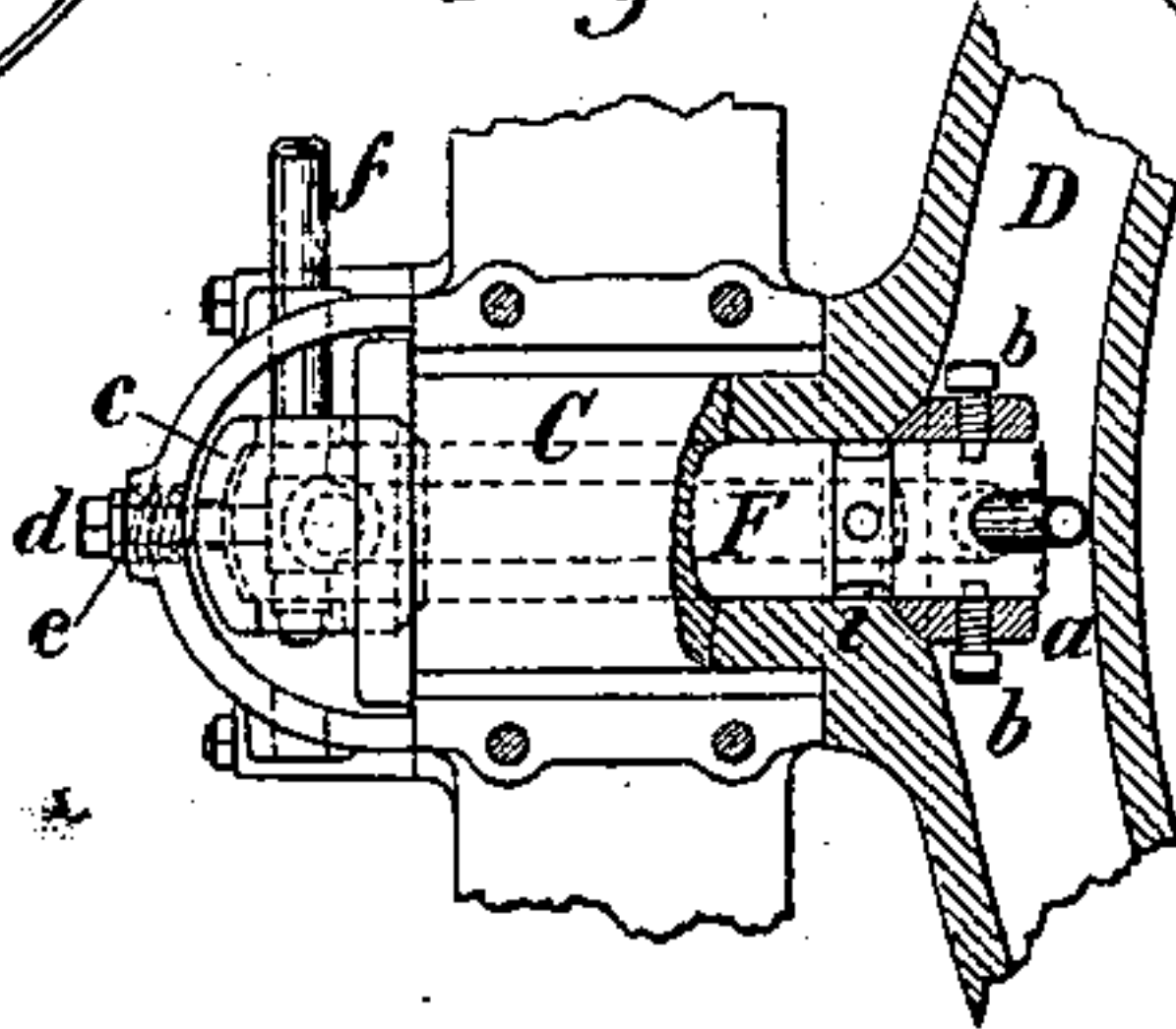
— *Fig. 2.* —



— *Fig. 3.* —



— *Fig. 6.* —



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UNITED STATES PATENT OFFICE.

WILLIAM SELLERS, OF PHILADELPHIA, PENNSYLVANIA, AND GEORGE H. SELLERS, OF WILMINGTON, DELAWARE; SAID GEO. H. SELLERS ASSIGNOR TO JOHN SELLERS, JR., OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN REVOLVING PUDDLERS.

Specification forming part of Letters Patent No. **159,849**, dated February 16, 1875; application filed December 7, 1874.

To all whom it may concern:

Be it known that we, WM. SELLERS, of the city and county of Philadelphia, and State of Pennsylvania, and GEORGE H. SELLERS, of Wilmington, in the county of New Castle and State of Delaware, have jointly invented certain new and useful Improvements in Rotary Puddling-Machines, of which the following is a specification:

In Letters Patent of the United States No. 144,416, granted and issued to us under date of November 11, 1873, will be found, among other improvements in mechanical puddling, certain provisions for a water circulation about the closed end of the rotary pudbler, one of the objects of that circulation being to enable the fix to withstand the action of the flame impinging directly upon it. In the practice of that patented improvement we have found that the fix was entirely protected at the closed end of the puddling-vessel by this water circulation, and throughout the cylindrical part by the fluid cinder, but that in melting the iron in the puddling-vessel the open end, being exposed to the action of the flame at all times, and protected by the cinder only during the boiling process, was deprived of the cinder which cemented it, and was liable to crumble under a too prolonged exposure between its cinder-baths.

It is the object of our present invention to protect the fix at the open end of the puddling-vessel by a water circulation, and, while accomplishing this, to confine the protection to the smallest space, so as to avoid a useless waste of heat and water. To these ends our present invention consists in providing an annular circulation-pipe within the open end of the rotary puddling-vessel, and in maintaining a circulation through this pipe from and to the journal at the closed end of the vessel, through which the water is supplied and discharged.

In the accompanying drawings, which form part of this specification, Figure 1 is a vertical section through the center of the puddling-vessel, exhibiting our circulation-pipes. Fig. 2 is a rear elevation of the same. Fig. 3 is a front elevation of the same, partly in section,

exhibiting our annular circulation-pipe. Fig. 4 is a vertical section through the open end of the puddling-vessel, exhibiting our annular circulation-pipe in a location different from that shown in Fig. 1. Fig. 5 is a vertical section through the center of the journal at the closed end of the puddling-vessel, to exhibit the circulation-pipes upon an enlarged scale. Fig. 6 is a plan, partly in section, of the same.

The puddling-vessel A, gearing B, hollow journal C, and water-back D are described substantially in Patent No. 144,416, before referred to. As therein described the water was delivered directly into the water-back, and discharged therefrom through the hollow journal C. In our present improvement, instead of delivering the water through the hollow journal directly into the water-back, it is first delivered through the hollow journal into an annular pipe, E, through which it passes around the open end of the puddling-vessel, and is thence delivered into the water-back D, from whence it is discharged through the hollow journal, as described in the patent before mentioned. To effect this circulation, the plug F, which passes through the hollow journal C, is provided with a close-fitting collar, *a*, within the water-back D, which is secured to the plug by the two bolts *b b*. The inside of this collar is turned true and beveled, and the corresponding side of the water-back is also turned, so as to fit the same accurately. The other end of the plug F is provided with a close-fitting flanged cover, *c*. The inside of this flange is beveled, and fits accurately against a corresponding surface in the hollow journal C. The plug F is thus provided with two seats, fitted so as to prevent the passage of water between their surfaces and the corresponding surfaces in the hollow journal. A tap-bolt, *d*, is placed in the outer end of the plug F, and passes through the cover *c*, beyond which a spiral spring is provided, which can be compressed against the cover by the nut and washer *e* on the bolt *d*, the effect of which is to maintain the beveled surfaces above mentioned in close contact with the corresponding surfaces of the hollow journal. The inlet-pipe *f* is screwed

into the double-seated plug F, passing through the flange of the cover *c*, preventing this cover from turning on the plug, as also the plug itself from turning with the revolution of the hollow journal. The plug F is divided longitudinally, so as to form an inlet-passage, *g*, and an outlet-passage, *h*. A groove, *i*, is provided around its exterior, next the collar *a*, into which groove the inlet-passage opens, and communicating with this groove a pipe, *k*, passing through the gear-wheel B and outside of the puddling-vessel A, serves to convey the water to the annular pipe E, which surrounds the open end of the puddling-vessel within the casing. (See Figs. 1, 3, and 6.) After passing through the annular pipe E the water is conveyed through the pipe *l* to a hollow projection, *m*, on the side of the water-back, through which it is delivered into the water-back. From this it is discharged, as described in the before-mentioned former Patent No. 144,416. The covers *n n n n* on the outside of the water-back D afford access to its interior, through which the collar *a* can be inserted and secured to the plug F.

In the operation of the machine provided with a water circulation, as described, we have found that the location of the annular pipe is a matter of some importance. In both the positions represented by Figs. 1 and 4 the lining will be prevented from crumbling out by a prolonged exposure to the heat without the application of fresh cinder; but in the position represented by Fig. 4 the cooling is excessive, and the overflow of cinder during the boiling operation causes it to build around the mouth of the vessel, which excess must be removed. This objection is remedied when the pipe is located as represented in Fig. 1. The cylindrical portion of the puddling-chamber being washed with cinder during the whole of the puddling operation, the fix will be so cemented by it in this part as to thoroughly maintain itself without other cooling than that afforded by radiation from the outside of the vessel. Moreover, as cooling involves both a loss of heat and the use of water, we apply the cooling circulation to those portions of the vessel only in which the gain in one respect will more than compensate for the loss in the other.

In the construction of such puddling-vessels it may be desirable to reduce the size of the gear-wheel B, and consequently of the water-back D. The outer portion of the fix in the

back might then waste from exposure to heat without a fresh supply of cinder, in which case an annular pipe should be used to protect this part, the circulation being first through the pipe E, which should discharge into the second annular pipe, and from thence into the water-back; or a circulation from the hollow journal independent of that through the pipe E may be employed; but such modifications being within the skill of the constructor, we deem it unnecessary to further particularize them.

From the foregoing description it is evident the location of the water circulation is intended to be varied with varying circumstances, so that we do not limit our invention to a particular location, nor to specific forms of the cooling-surfaces, so long as the rotating vessel is open at one end only, and the apparatus for securing the water circulation is adapted to rotate with the vessel.

What we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the rotary puddling-vessel open at one end only, of a water-circulation pipe within the rotary vessel at the open end, substantially as and for the purposes set forth.
2. A rotary puddling-vessel open at one end only, and having a water circulation within the rotating vessel at both the open and closed ends, substantially as and for the purposes set forth.
3. The combination of a circulation-pipe at the open end of a rotary puddling-vessel with the hollow journal at the closed end of the vessel, substantially as and for the purposes set forth.
4. The combination of a circulation-pipe at the open end of a rotary puddling-vessel with the hollow journal and water-back at the closed end of the vessel, substantially as and for the purposes set forth.
5. The combination, with the hollow journal, of the double-seated plug, substantially as and for the purposes described.

In testimony whereof we have hereunto subscribed our names.

WM. SELLERS.
GEO. H. SELLERS.

Witnesses:

ANDW. J. BOSWELL,
JAS. H. SCHWACK.