

(No Model.)

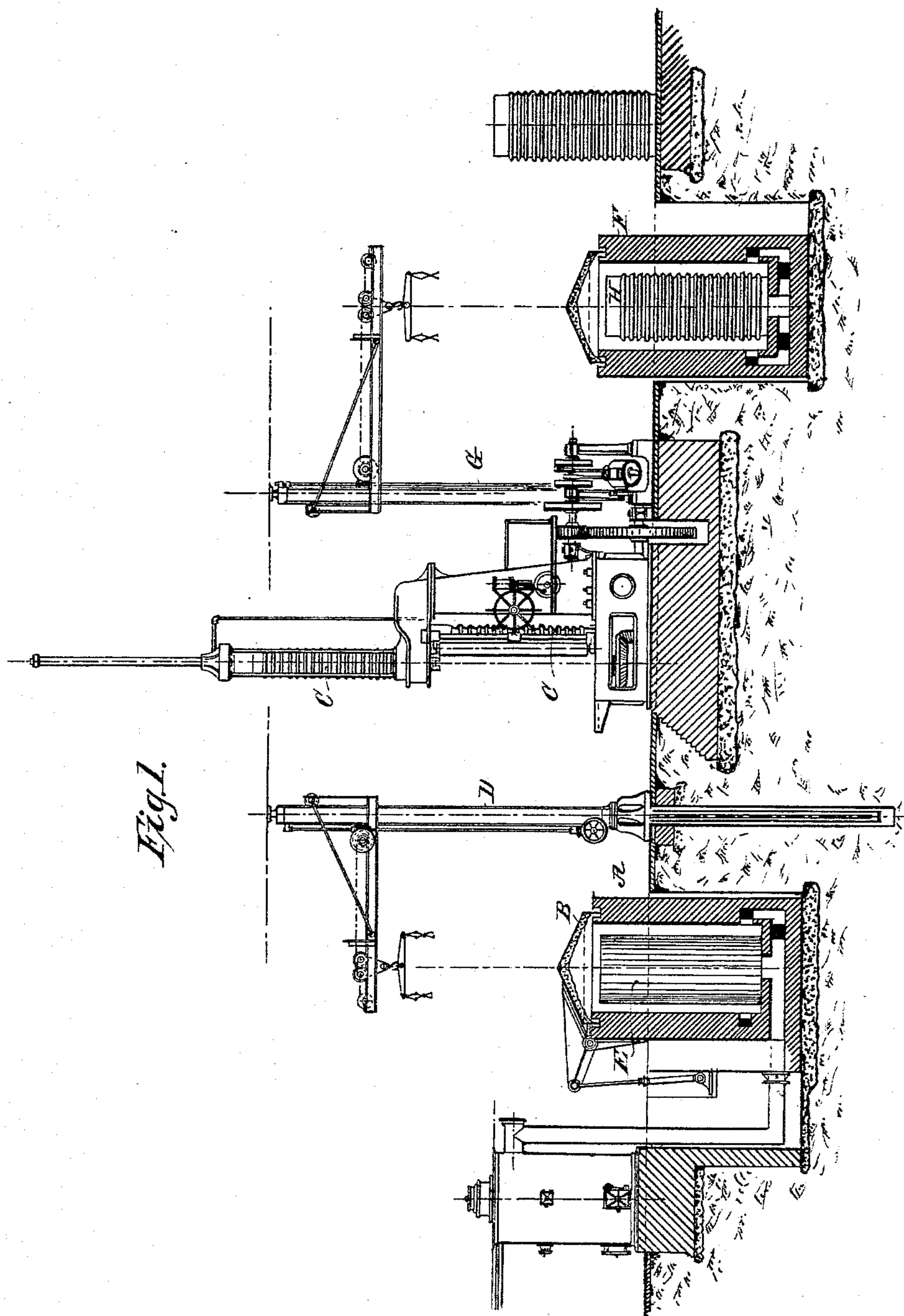
3 Sheets—Sheet 1.

T. F. ROWLAND.

METHOD OF PRODUCING CORRUGATED CYLINDERS.

No. 412,121.

Patented Oct. 1, 1889.



Witnesses:

Robert F. Gaylord
Frank B. Murphy.

Inventor:

Thomas F. Rowland.
By
Duncan Curtis & Co.
Attys.

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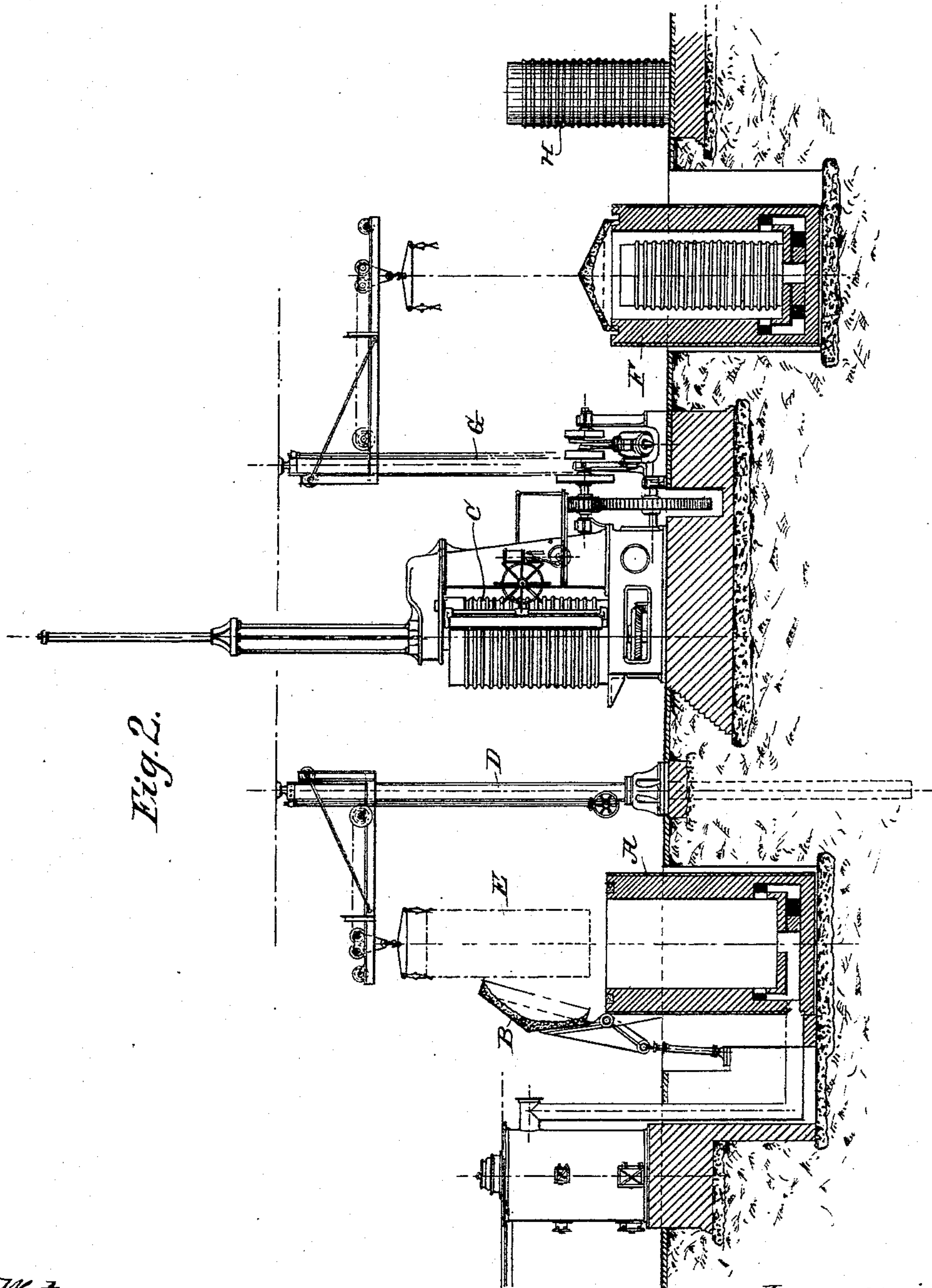


Fig. 2.

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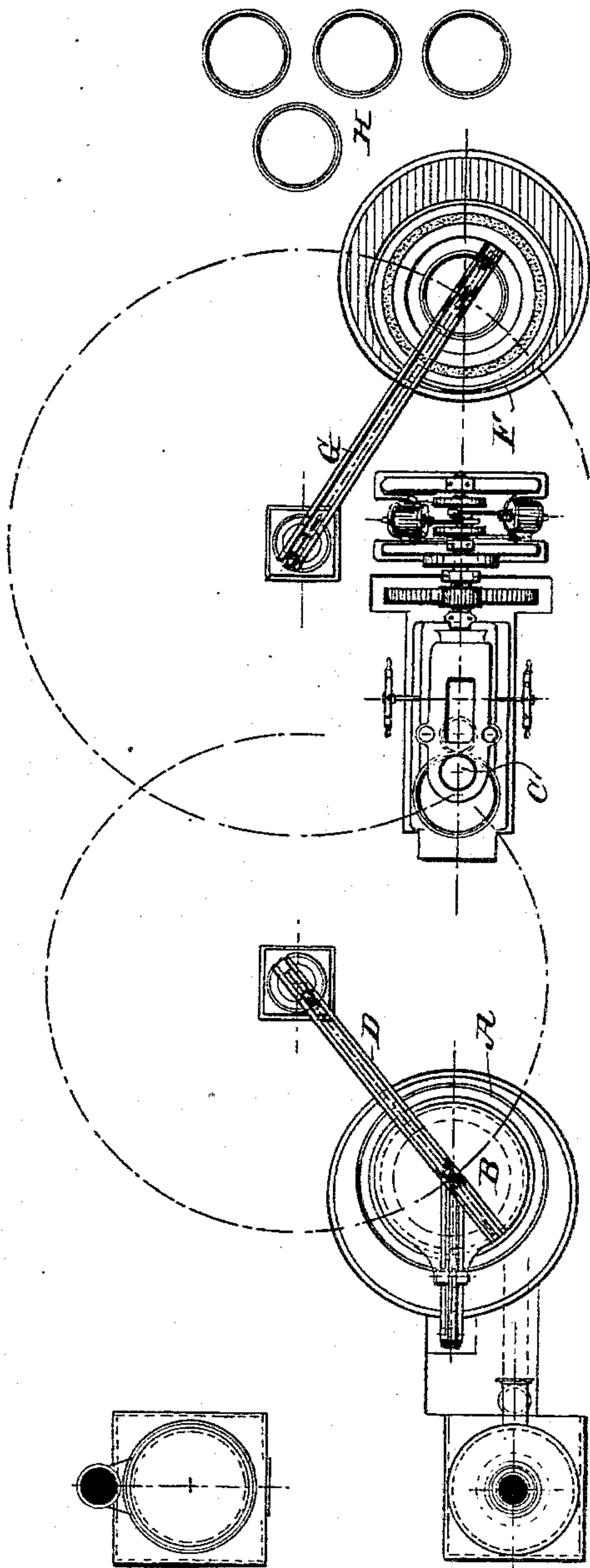
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Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS F. ROWLAND, OF NEW YORK, N. Y.

METHOD OF PRODUCING CORRUGATED CYLINDERS.

SPECIFICATION forming part of Letters Patent No. 412,121, dated October 1, 1889.

Application filed July 3, 1888. Serial No. 278,983. (No model.)

To all whom it may concern:

Be it known that I, THOMAS F. ROWLAND, a citizen of the United States, residing in the city, county, and State of New York, have invented a certain new and useful Method of Producing Corrugated Cylinders, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

10 This invention relates to the manufacture of corrugated cylinders, and particularly to cylinders such as are used as boiler-furnaces—that is, as the exterior or body part of a steam-boiler furnace—which cylinders are usually
15 made in large sizes, and are laterally corrugated. In the manufacture of such cylinders the flat metal blank is first brought to a cylindrical form with its opposite edges adjoining, which edges are then welded together,
20 thus forming a plain cylinder having a longitudinal seam. Such a plain cylinder is then heated throughout, and when brought to the proper temperature is submitted to the action of corrugating-rolls that give it its final corrugated form, after which it is again heated and annealed.

It has heretofore been the practice to heat and corrugate these plain cylinders when they are in a horizontal position. This method,
30 however, I have found to be objectionable in various respects. The cylinder is necessarily heated to a point where the metal is softened sufficiently to be readily worked in the corrugating machinery; but such softening of the
35 metal is also sufficient to permit the cylinder when in a horizontal position to collapse more or less—that is, there is a tendency of these cylinders when heated to become somewhat flattened or to lose their true cylindrical form during the process of heating, as well as during the subsequent steps of their removal from the furnace to the corrugating-rolls, and the corrugating thereof. If the cylinders do lose,
40 even to a slight extent, their cylindrical form, the corrugating thereof cannot be properly accomplished, or at least not without considerable difficulty, and in some cases they may require to be reheated and again submitted to the rolls, all of which obviously adds greatly
50 to the cost of their manufacture, besides tend-

ing to the production of poor work. The reason for the necessity of keeping the cylinders in true cylindrical form is that, since the rolls act upon them at right angles to their axis, any practical deviation of the surface of the
55 cylinder from a true cylindrical form tends to cause the corrugations being formed to take a spiral direction; and if they do take a spiral direction the correction thereof is a matter of great difficulty, which calls for careful re-
60 adjustment of the corrugating machinery and further manipulation of the cylinder, thereby producing a loss of time, during which the metal may cool to a point at which it cannot be worked. So, too, if the finished or corru-
65 gated cylinder be heated and annealed in the horizontal position, it is likely to become bowed on one side or otherwise misshapen.

I have discovered that, if the plain cylinders be kept in an upright or vertical position during the heating and corrugating thereof,
70 as also during the annealing process, the difficulties explained are obviated.

My invention consists, therefore, in the improved mode of producing corrugated cylinders by heating and working the plain cylinders while maintaining them in an upright or vertical position, and also in annealing the corrugated cylinders while they are in a vertical position.
80

In the drawings, Figure 1 is an elevation view showing the heating and annealing furnaces in section and the corrugating machinery. Fig. 2 is a like view, but showing how the plain cylinder is conveyed from the heating-furnace to the corrugating machinery, and showing a cylinder in process of corrugating. Fig. 3 is a plan view of the same parts.

A is a furnace of any suitable form adapted to properly heat the plain cylinder. It will
90 usually be a gas-furnace. The dome of this furnace B is made movable, and the top of the furnace is substantially on the same level as the receiving-bed of the corrugating-rolls C. These rolls are arranged in an upright
95 position, and one of them is adapted to be lifted vertically away, or otherwise removed, from and returned to its operative position, in order that the heated cylinder may be placed between the rolls.
100

D is a crane or other suitable machinery by which the cylinder may be lifted from the furnace and swung to the corrugating-rolls.

5 E is a cylinder shown in position in the furnace.

F is the annealing-furnace, and G is a crane for removing the corrugated cylinder from the corrugating-rolls to this furnace.

H represents a corrugated cylinder.

10 The plain cylinder is put into the furnace in an upright or vertical position, the furnace is closed, and the cylinder brought to the proper temperature. It is then lifted out by the crane machinery, which preserves its ver-
15 tical position, and is swung to the bed of the corrugating-rolls. The removable roll is returned through the cylinder to its bearings, and the corrugating of the cylinder is performed. After the plain cylinder has been
20 thus corrugated it is removed from the corrugating-rolls and transferred to the annealing-furnace, where it is reheated and annealed, this being usually essential to the proper finishing of the cylinder.

25 In lieu of annealing the corrugated cylinder in a special furnace, it may be returned

to the heating-furnace for that purpose; but it is preferred to have two furnaces, as shown and described.

What is claimed as new is—

1. The herein-described method of producing corrugated cylinders, consisting in placing a plain cylinder in an upright position in a furnace, and while in such position bringing it to a working-heat, and then, while still
35 maintaining the cylinder in a vertical position, removing it from the furnace to and corrugating it between suitable rolls, substantially as described.

2. The herein-described method of producing corrugated cylinders, consisting in bringing a plain cylinder to a working-heat while in an upright position, and still maintaining the cylinder in the upright position, corrugating it between suitable rolls, and then re-
45 heating and annealing it, substantially as described.

THOS. F. ROWLAND.

Witnesses:

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