(No Model.) 3 Sheets—Sheet 1.

C. R. BRITTON.

TINPLATING MACHINE.

No. 518,342. Patented Apr. 17, 1894.

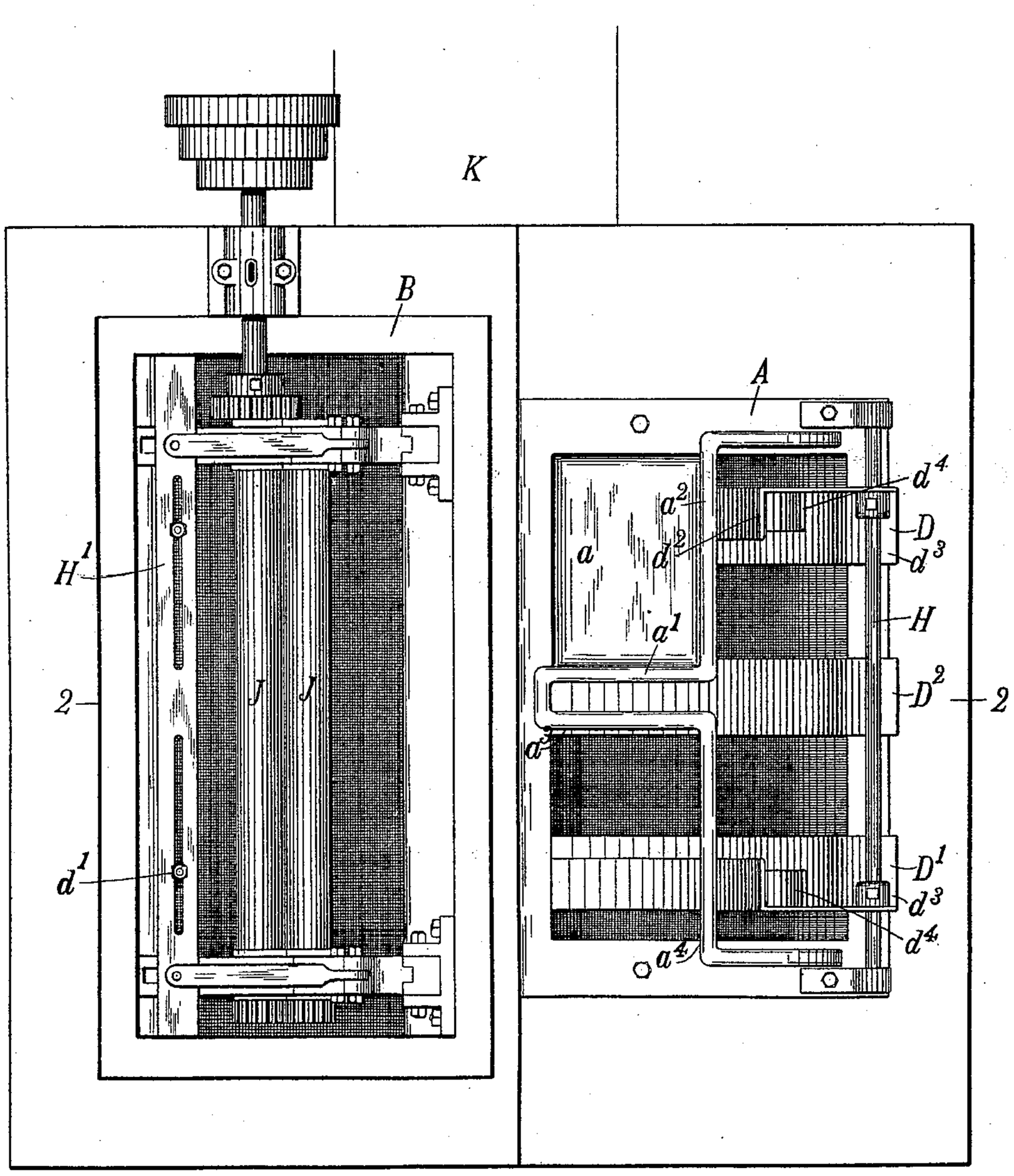


FIG. 1

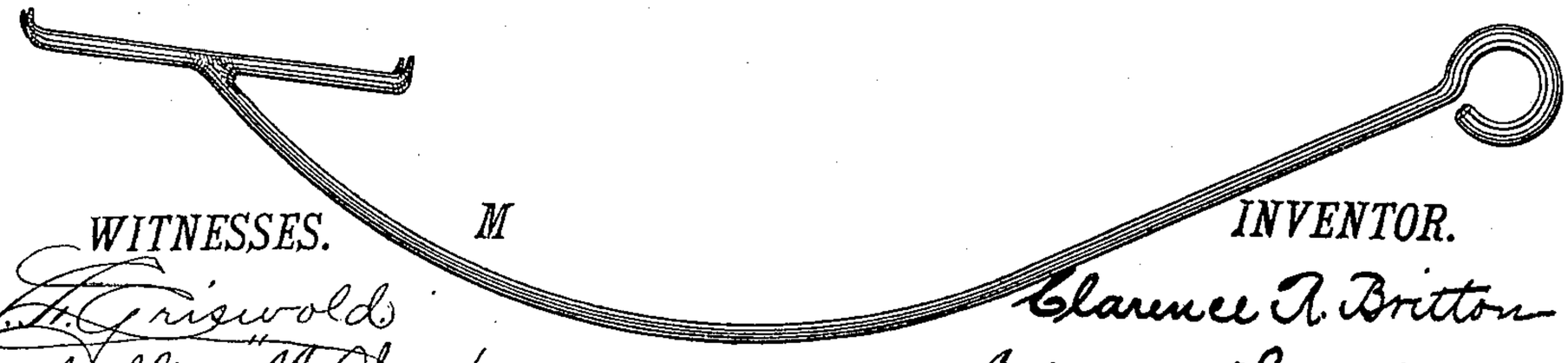


FIG. 6

WITNESSES.

H. Griswold

Nellie M. Wood

INVENTOR.

Clarence R. Britton

By Wing + Thurston

his attys

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

C. R. BRITTON.

TINPLATING MACHINE.

No. 518,342. Patented Apr. 17, 1894.

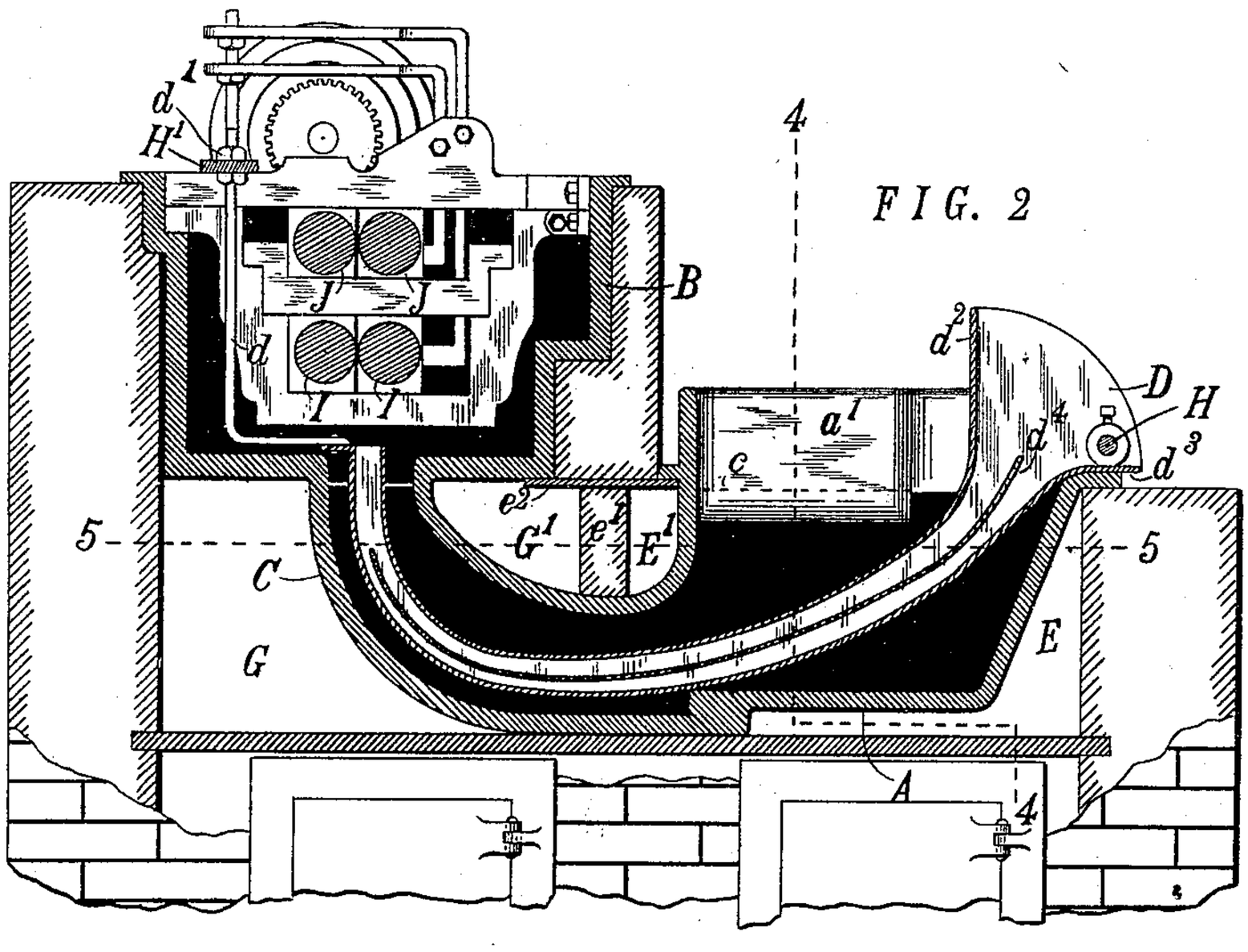


FIG. 2

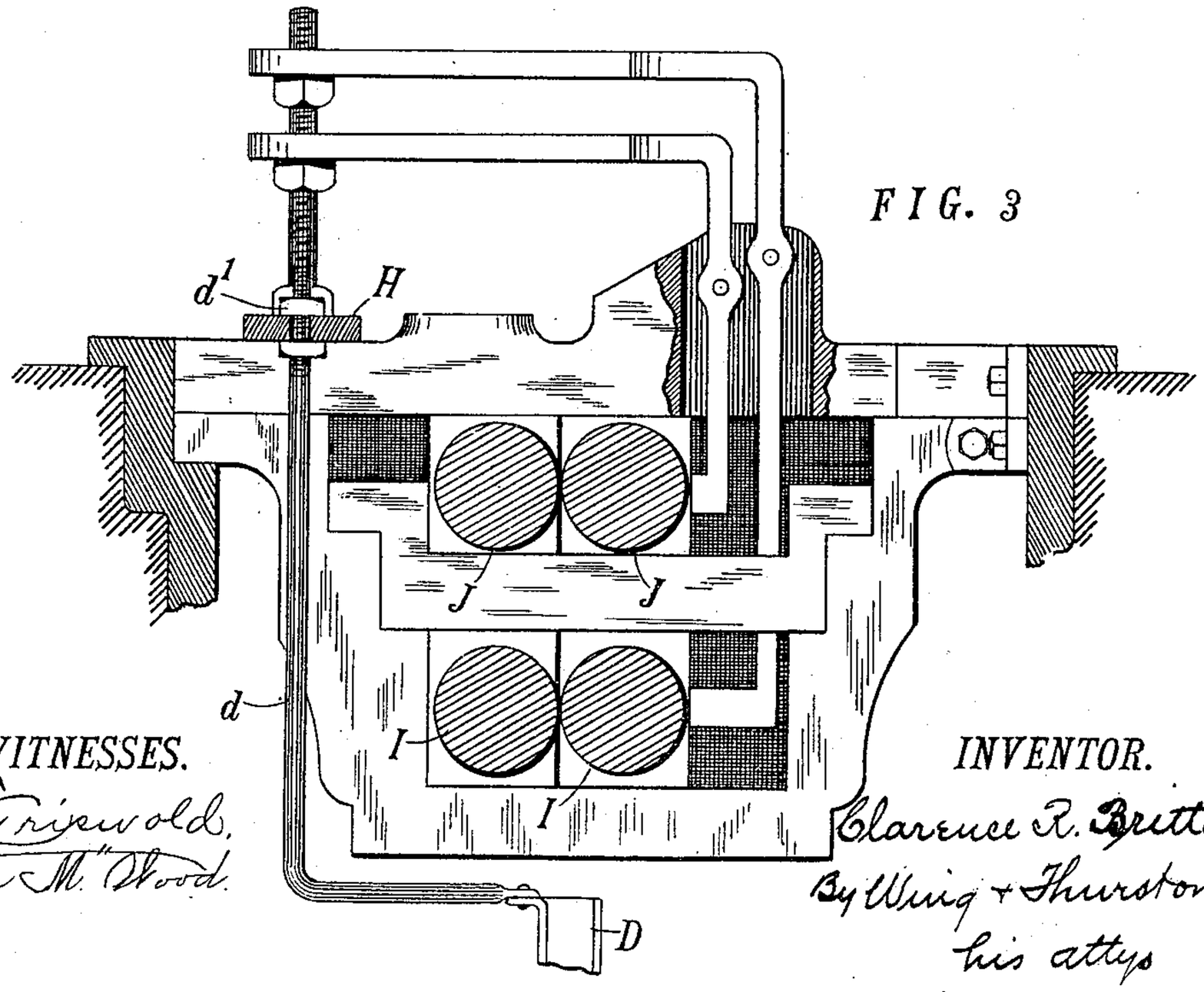


FIG. 3

WITNESSES.

H. Griswold.

Nellie M. Wood.

INVENTOR.

Clarence R. Britton

By Wing & Thurston

his attys

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

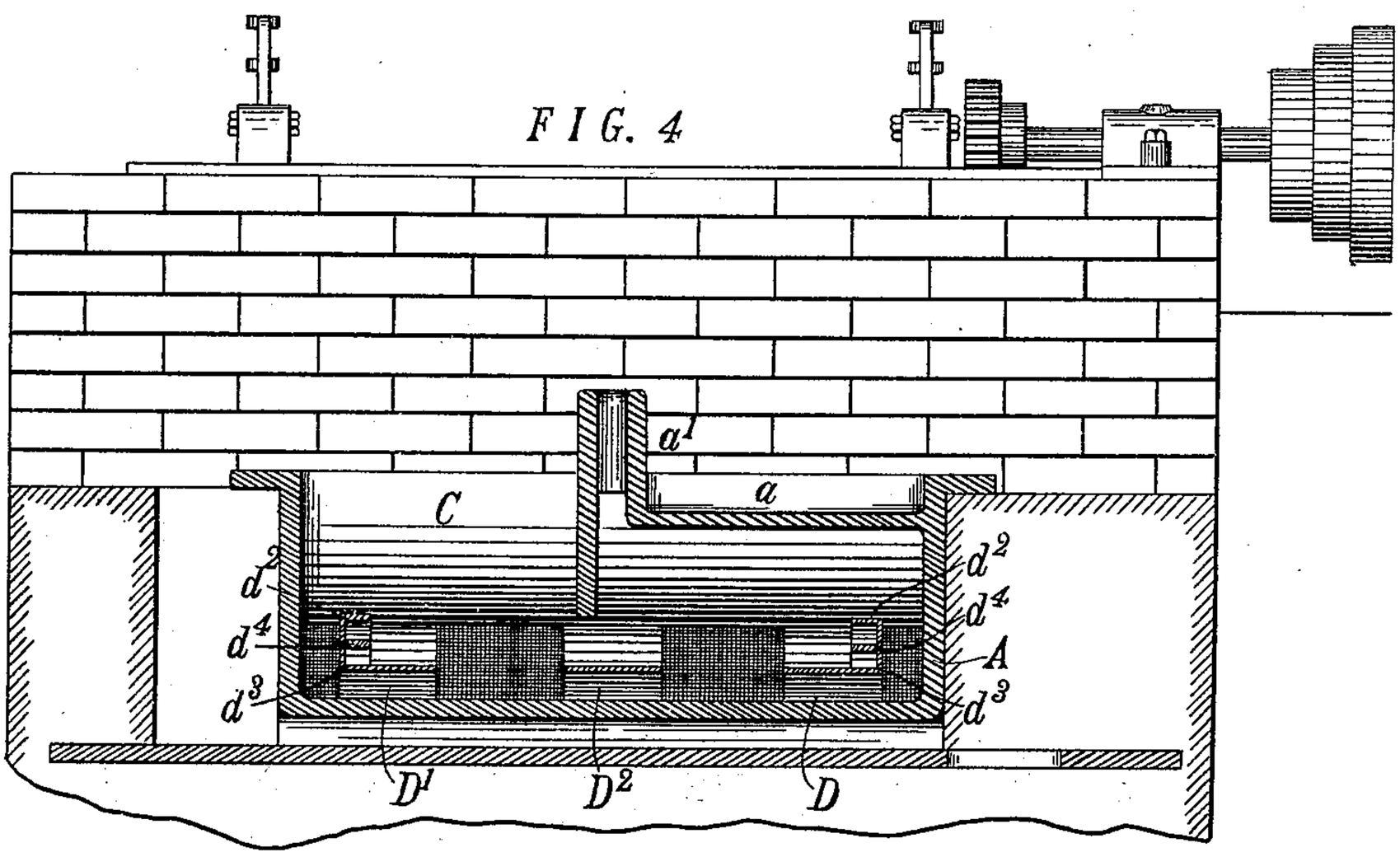
(No Model.) 3 Sheets—Sheet 3.

C. R. BRITTON.

TINPLATING MACHINE.

No. 518,342. Patented Apr. 17, 1894.

FIG. 4



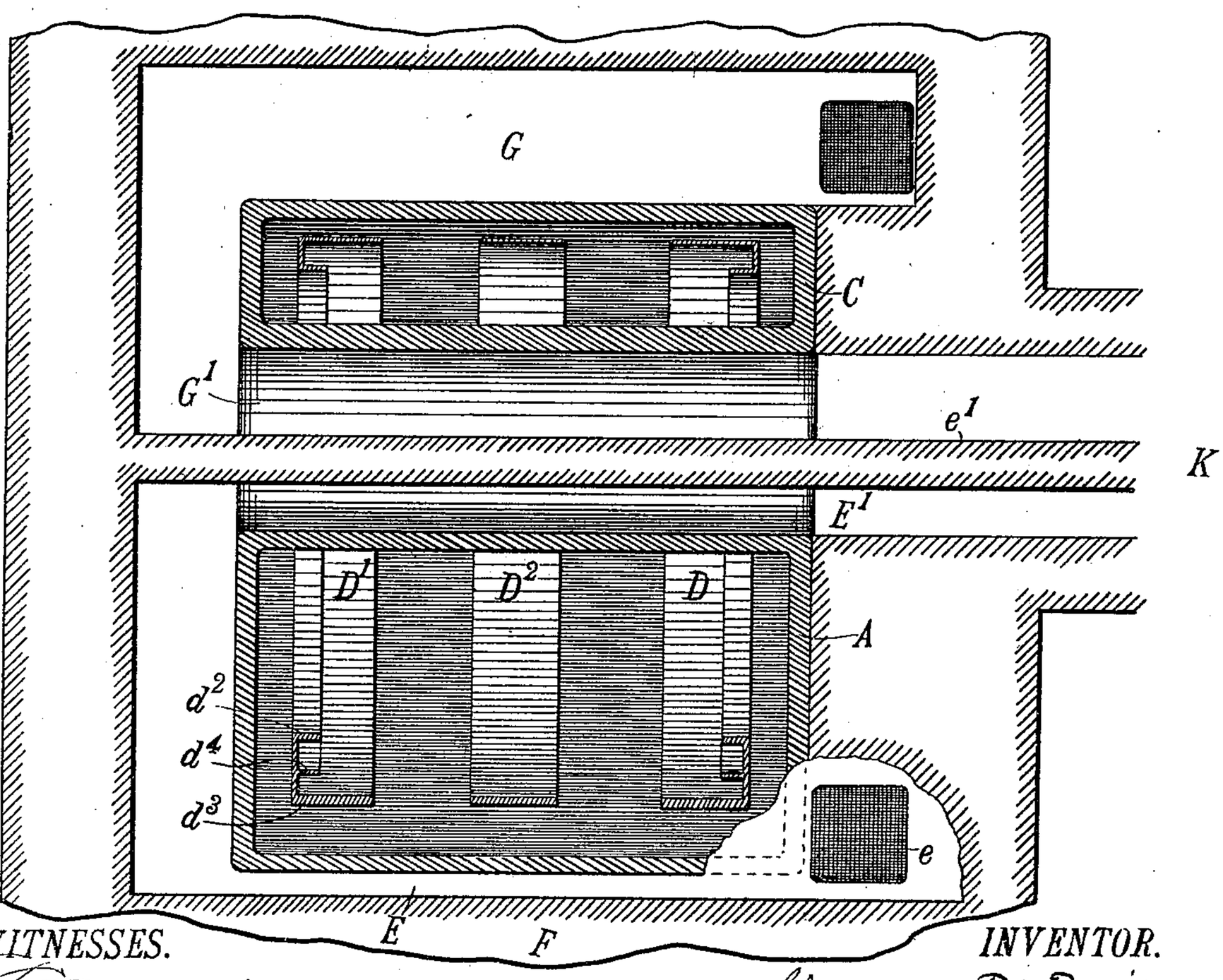


FIG. 5

WITNESSES.

H. Griswold

Nellie M. Wood

INVENTOR.

Clarence R. Britton

By Wing & Thurston

his attys.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CLARENCE R. BRITTON, OF CLEVELAND, OHIO, ASSIGNOR TO CHARLES S. BRITTON, OF SAME PLACE.

TIN-PLATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 518,342, dated April 17, 1894.

Application filed July 3, 1893. Serial No. 479,493. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE R. BRITTON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Tin-Plating Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of my improvements is to provide an apparatus, adapted to coat metal plates with tin, terne or other metals, which shall be cheap and simple in construction, and inexpensive to operate for these principal reasons (first) a comparatively small quantity of tin is necessary to set it in operation, and (second) comparatively small surfaces of the tin are exposed to oxidizing influences, whereby there is little loss of material.

The improvements relate to the construction and relative position of the tin pot, the grease pot and the connecting neck; to the construction and arrangement of heating flues with respect to the two pots and the neck whereby the contents of the two pots may be kept at different temperatures,—a condition essential to secure the best results.

In the drawings, Figure 1 is a plan view of the apparatus. Fig. 2 is a longitudinal vertical section on line 2—2 of Fig. 1. Fig. 3 is an enlarged vertical section through the rolls. Fig. 4 is a transverse vertical section on line 4—4 of Fig. 2. Fig. 5 is a horizontal section on line 5—5 of Fig. 2; and Fig. 6 is an enlarged perspective view of the push rod employed to push the metal plates through the apparatus.

Referring now to the parts by letters, A represents the tinning pot; B the grease pot; and C a curved neck which is connected, at its front end, with the rear side of the pot A, and at its rear end with the bottom of the grease pot B, directly beneath the transverse rolls contained therein. The pot B is elevated by comparison with the pot A; and, preferably, its bottom is a little higher than the top of the pot A. I prefer to so place the pots because it will then be impossible for a careless operator to put so much molten metal into the pot A and neck C as will cause said metal to rise into and above the level of the floor of the pot B. Whether or not the floor of pot B is actually above the top of pot A, the pot B should be sufficiently elevated with respect to the pot A to make it possible to put enough metal into the pot A and neck C to suffice for properly tinning the plates without having said metal rise into the pot B, and without the necessity of making the neck very long. The dimensions of the neck are such as will permit the plates to pass freely through it; and at the point therein where the surface of the molten metal will be, (indicated in Fig. 2 by the line *c*) the horizontal sectional area of said neck should be as small as it can be made while still permitting the plates to pass freely through. One purpose of making this part of the neck small, and of preventing the metal from flowing into and spreading over the bottom of pot B, is so that as small a surface of molten metal shall be exposed to oxidizing influences as possible. For, if exposed to the air, molten tin oxidizes rapidly, and even when protected by a covering of grease (usually palm oil) a scruff or dross forms on the surface; and of course it follows that the smaller the surface exposed the less will be the loss of tin due to this cause.

Another advantage which arises from connecting the neck with the bottom of the grease pot and of preventing the metal from rising into the said grease pot, is that thereby the bottom of the grease pot serves as a shelf or shelves on both sides of the mouth of the neck onto which the impurities in the oil may settle. The location of the rolls above the mouth of the neck effectually prevents said impurities from settling into said neck; and since the bottom of the grease pot is not covered by the molten metal, these impurities can easily be removed whenever desired.

In order to make the exposed surface of molten metal in the tinning pot A as small as possible, I form, in one rear corner of the pot, (preferably the right corner) a box which projects into the molten metal. This box is formed by the two vertical walls a' a^2 and the horizontal plate a, all of which are preferably formed integral with each other and with the

walls of the pot. This pot has no other function than to reduce the surface exposure of the molten metal.

In the opposite rear corner of the pot A, a bottomless box is formed by the two vertical partitions a^3 a^4, which are preferably formed integral with each other and with the walls of the pot. The bottom of these partitions project down into the molten metal, and thus a portion of the surface of the metal in pot A is separated from the remaining portion. To protect the molten metal from oxidation, grease, usually palm oil, is put into both pots resting on the surface of the metal. In pot B enough of the oil is placed to completely submerge one pair of rolls and to partially submerge the other pair. In pot A, the portion of the surface in the bottomless box above described is not covered by the oil, because it is necessary to frequently pour onto the rolls some of the molten tin, and the metal for this purpose is taken from the bottomless box.

All of the parts of the apparatus heretofore described may be and preferably are made of cast iron in one piece. It is supported by suitable masonry above the furnace. It is necessary in order to produce the best results to have different parts of the molten metal and oil of difierent temperatures,—the metal in pot A being the hottest. To produce this result the tinning pot on the one hand and the neck and grease pot on the other, are heated by independent flues formed as shown; that is to say a flue E is formed between the front side of the tin pot and the masonry F; and, behind the pot A, is a second flue E′ which is formed by a brick wall e' which rests on the neck, a plate e^2 which rests on said wall, and the rear side of the pot A; and the two flues E E′ communicate with each other at one end of the pot A. The heat is admitted to flue E from a furnace through the opening e. In like manner heat is admitted (from an independent furnace if desired) to a flue G, formed between the back of the neck, the bottom of the pot B and the masonry on which these parts rest. At one side of the neck this flue connects with a flue G′ formed between the neck, the bottom of pot B and the wall C. The flues E′ and G′ both discharge into the chimney K.

The metal plates which are being tinned are conducted through the tin pot and the neck by means of the guides D D′, having top and bottom flanges d^2 d^3. These guides extend down through the pot A and through and out of the neck into the grease pot. The front ends of the guides are adjustably secured to a transverse bar H, whereby they may be moved toward or from each other and thus be adapted to guide plates of different widths. The rear ends of said guides are connected to rods d, and these rods pass through slots in a fixed transverse bar H′. The rods are connected with said bar by the nuts d'. A curved guide plate D^2 passes down through the pot A and neck C near the middle thereof, and upon this guide plate the front end of a push rod (shown in Fig. 6) may rest while said rod is pushing a plate through the neck and into the grease pot and between the first pair of rolls. I may, however, dispense with the push rod and push each plate through by means of the succeeding plate or plates. To operate the apparatus in this manner a flange d^4 is formed on the guides between the two flanges d^2 d^3; and this flange d^4 extends from the front ends of said guides to within a foot, more or less, of their rear ends. This forms, in each guide, two grooves in which the edges of the plates may move. In putting the plates into the apparatus, the right hand edge of one plate will be placed in the upper groove (between flanges d^4 and d^2) while the left edge will be placed in the lower groove (between the flanges d^4 and d^3). The next plate will have its right edge placed in the lower groove and the left edge in the upper groove. By this arrangement the advancing edge of the last plate will strike the rear edge of the first plate, and thus each plate will push to the rolls, the plate before it.

In the grease pot two pairs of driven rolls I I, J J are journaled in adjustable blocks which are supported in a well known manner. The line of separation between the rolls of each pair is directly over the rear end of the neck and in such a position that a plate as it is pushed out of said neck will enter between the rolls.

It will be noticed, that by comparison with prior apparatuses for the same purpose, that hereinbefore described is smaller, simpler, and less expensive; only two pairs of rolls are employed as against four or more pairs which have necessarily been used in prior devices, because of the construction and relative arrangement of the parts and of the distance between the tinning pot and grease pot. It will also be noticed by comparison with the older devices, the surface of metal exposed to oxidizing influence is very small. It is also true that a very much smaller quantity of tin, than heretofore has been used, is necessary to charge the apparatus, although each plate will be in the molten tin a sufficiently long time to be properly coated. It also requires less time to heat the pots and less heat to keep them at the proper temperature, because of the smaller quantity of material employed and because of the shape of the pots and the arrangement of flues as described.

Having described my invention, I claim—

1. In a tin plating apparatus, the combination of a tinning pot A, and a grease pot B,—the bottom of which lies above the intended surface level of the molten metal in the tinning pot and has through it a transverse slot through which communication is established between the grease pot and neck,—with a curved hollow neck connected at its rear end to the bottom of the grease pot and extending

therefrom downward and then forward to the tinning pot to which its forward end is connected, and feed rolls mounted in said grease pot over the said slot, substantially as and for the purpose specified.

2. In a tin plating apparatus, the combination of a grease pot, a tinning pot and a connecting hollow neck, the said tinning pot being provided with vertical walls a^3 a^4 which are connected with each other and with the walls of the pot and extend into and below the surface of the molten metal, whereby said surface is divided into two parts one of which may be protected by a covering of oil without at the same time covering the other part of the surface, substantially as and for the purpose specified.

3. In a tin plating apparatus, the combination of a grease pot, a tinning pot and a connecting hollow neck, with a box formed in one rear corner of the tinning pot by the partitions a' a^2 and plate a, and a bottomless box formed in the other corner by the partitions a^3 a^4, all of said parts being integral with each other, substantially as and for the purpose specified.

4. In a tin plating apparatus, the combination of a tinning pot, a grease pot, and a curved hollow neck connecting said two pots, with supporting masonry in which are formed two flues E and G the former extending in front of the tinning pot, the latter behind the neck and under the grease pot, and a wall which divides the space above the neck into two flues E′, G, the former being connected with flue E, the latter with flue G, whereby the tinning pot on the one hand and the rear part of the neck and the grease pot on the other hand may be independently heated, substantially as and for the purpose specified.

5. In a tin plating apparatus, the combination of a tinning pot, a grease pot, and a connecting neck, with two guides D D′ each having three flanges d^2 d^3 d^4, thereby forming, on each guide, two grooves which are arranged with respect to each other, substantially as described, whereby either edge of a plate may be placed in the upper groove on one guide, while the other edge is placed in the lower groove on the other guide, for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

CLARENCE R. BRITTON.

Witnesses:
E. L. THURSTON,
L. F. GRISWOLD.