(No Model.)

2 Sheets—Sheet 1.

W. W. McCARROLL.

ELECTROTYPE LEVELING MACHINE.

No. 582,364. Patented May 11, 1897.

Fig. 1.

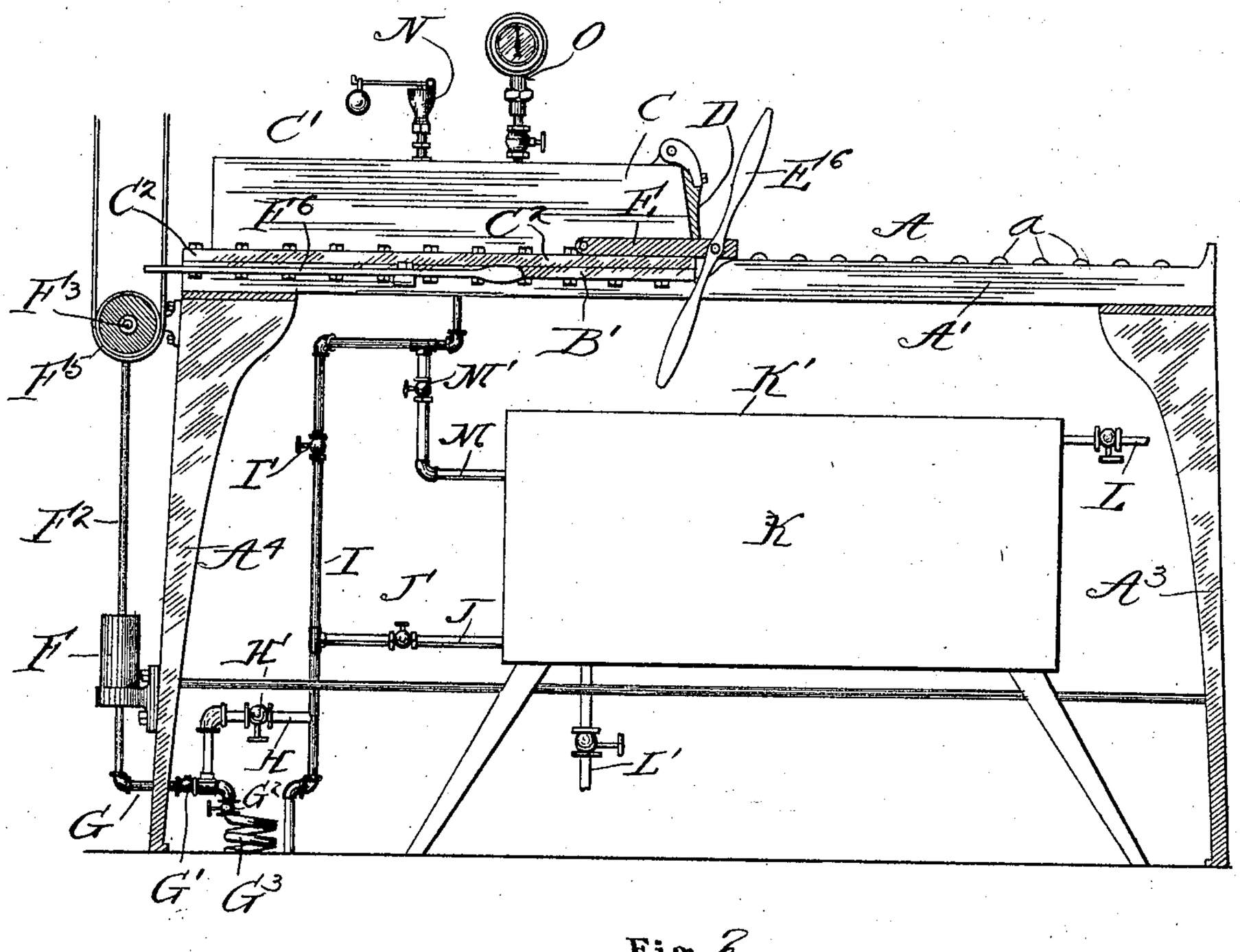
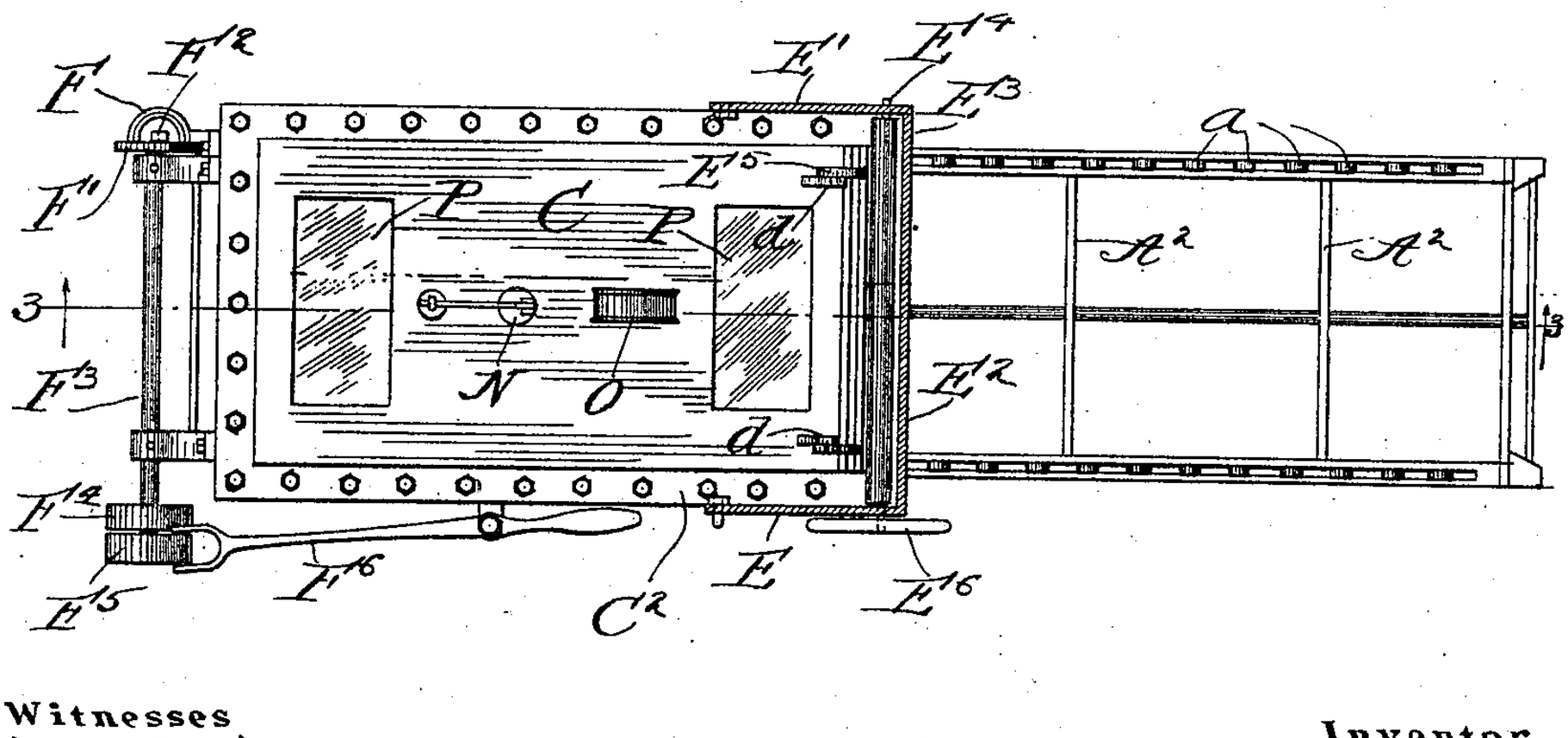


Fig. 2.



Witnesses
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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

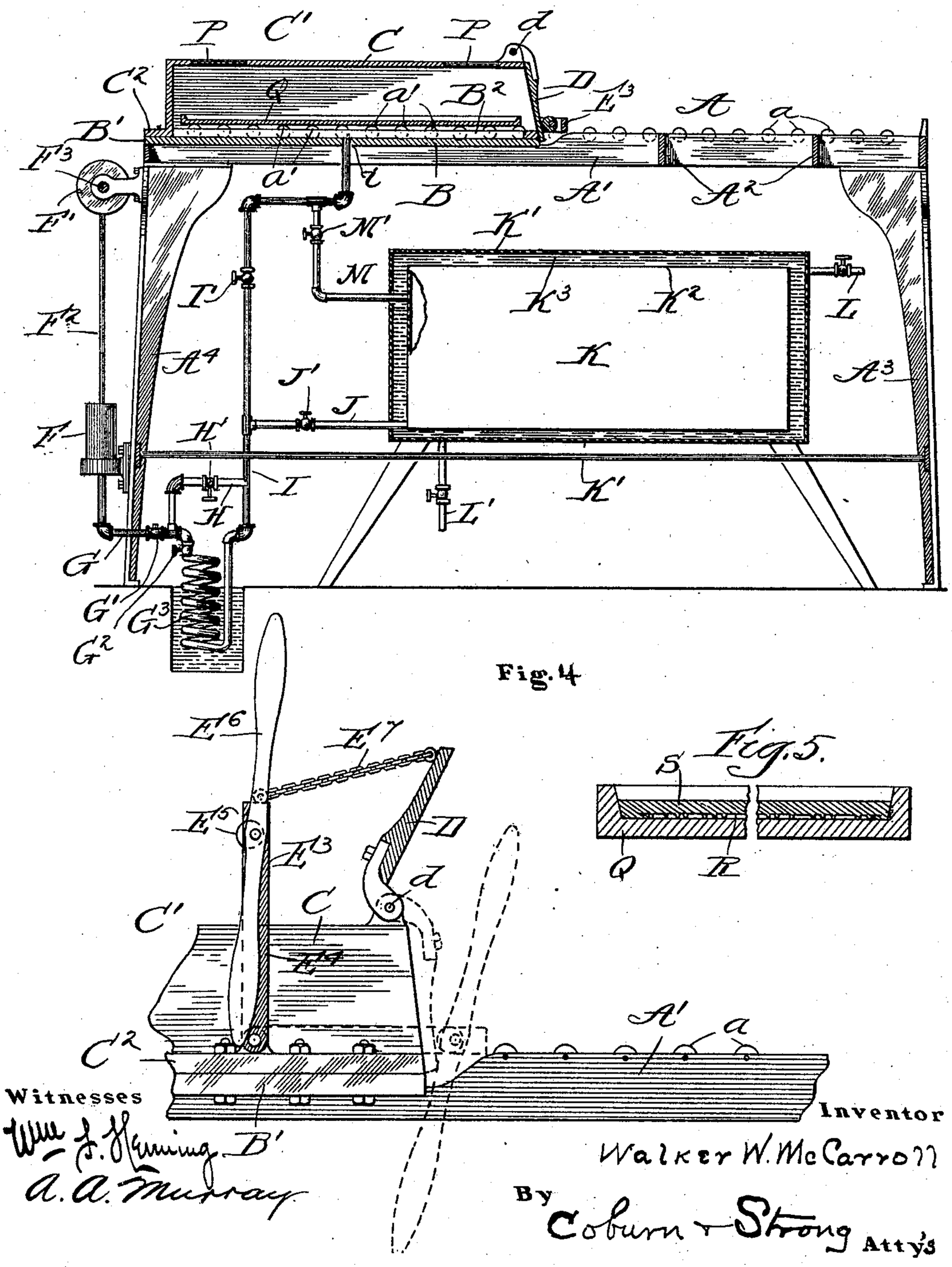

Fig. 4

Fig. 5.

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UNITED STATES PATENT OFFICE.

WALKER W. McCARROLL, OF CHICAGO, ILLINOIS.

ELECTROTYPE-LEVELING MACHINE.

SPECIFICATION forming part of Letters Patent No. 582,364, dated May 11, 1897.

Application filed June 6, 1896. Serial No. 594,473. (No model.)

To all whom it may concern:

Be it known that I, WALKER W. McCARROLL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Electrotype-Leveling Machines, which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a machine adapted to carry out my process. Fig. 2 is a plan view thereof. Fig. 3 is a vertical section on the line 3 3 of Fig. 2. Fig. 4 is a detail view of the hinged lids and devices for clamping the same. Fig. 5 is a detail vertical section of a backing-pan, shell, and backing.

The ordinary process of making electrotype, as is well known, consists in forming an impression in wax or other suitable material from the original type, of coating such wax impression with powdered graphite, of immersing the coated impression in an electroplating-bath, and depositing thereon a film of copper. The wax impression being then removed leaves the copper as a thin shell which requires a backing of metal before being capaple of use as electrotype. This backing is poured over the shell, as the said shell lies in a backing-pan, in a fluid state. When the backing is sufficiently hard to be handled, the whole electrotype, both backing and shell, has to undergo some leveling process in order to bring the face of the type into an absolutely uniform plane. This operation has hitherto usually been performed either by placing the electrotype upon a leveling steel bed and leveling it thereon by rollers or other instruments operated by hand or by placing the electrotype in a screw-press, which also is commonly worked by hand. The last method is less laborious, but is disadvantageous in that it is impossible to get an equal pressure over the whole surface of the electrotype, and the results are frequently defective.

My invention consists of a method of effecting such leveling while the backing is still in a molten state by means of pneumatic pressure, by which method I am also enabled to cool off the heated backing while it is being leveled, and of a machine adapted to carry out this method or process.

Referring to the drawings by letter, A represents the framework of my machine, comprising the longitudinal bars A′, connected by cross-pieces A^2, the whole supported by legs A^3 and A^4. The bars A′ are provided each with a longitudinal slot or groove in which are mounted the rolls *a*, forming a double antifriction-track. Upon one end of the framework A, I form a bed-plate B, provided with a horizontal flange B′. Upon this bed-plate B, I bolt the upper portion or hood C, closed on three sides, of my receiver C′ by a flange C^2, registering with the flange B′, this junction being made air-tight throughout. Within the receiver C′, I construct two antifriction-tracks, consisting of the slotted bars B^2 and the rollers *a*′, mounted therein, in prolongation of the similar tracks upon the outside framework.

The open end of the receiver is adapted to be hermetically closed by a door D, hinged to the upper part of the hood, as at *d*. On each side of the hood and near the open end thereof I pivot an arm E E′, the free ends of which are connected by the cross-piece E^2, the whole forming a yoke E^3. In the said arms E E′, near their free ends, is mounted a rock-shaft E^4, upon which is formed a long eccentric roller or cam E^5. To one end of the rock-shaft is secured a suitable pair of handles, or, if desired, a wheel, E^6. The lid D is connected to the cross-piece E^2 by the chain E^7. In connection with this receiver and its supporting-frame I employ an air-pump, cooling and reservoir apparatus, which may preferably be constructed as follows: Upon one of the legs A^4 of the framework I mount an air-pump F, operated by a driving-wheel F′, connected to the pump by the pitman F^2. The driving-wheel F′ is mounted upon one end of a shaft F^3, journaled in brackets carried by the legs A^4. The other end of the said shaft carries a driving-pulley F^4 and a loose pulley F^5. The fork-lever F^6 is adapted to throw the belt from one to the other.

The pipe G leads from the compression-chamber of the air-pump and is provided with a check-valve G′. I may cause the compressed air to pass through a worm G^3, immersed in

a cool mixture, or to pass directly through the branch pipe H by manipulation of the valves G^2 and H'. In each case the compressed air passes through the pipe I, and, if the valve I' be left open, into the receiver C' at the point *i* in the bottom of the said receiver.

Instead of passing the air directly through the pipe I, I may shut the valve I' and cause the air to pass through the pipe J, the valve J' of which is opened for this purpose, and so into a reservoir K. The reservoir K comprises an outer shell K', provided with an inlet and outlet L and L', respectively, and an inner shell K^2, separated from the outer by the space K^3. The inner shell is in communication with the pipe J and also with the pipe M, which is provided with a valve M'. The space K^3 may be kept full of cool water, or of some refrigerating liquid, by means of the pipes L and L'.

Upon the top of the receiver C', I mount a safety-valve N, communicating with the interior thereof, and also a pressure-register O. I may also provide the said top of the receiver with one or more glass plates P.

The backing-pan Q is of the usual construction, adapted to receive the shell R and to be partially filled with the superimposed metal backing S.

The operation of this apparatus may now be explained.

A backing-pan Q, containing a shell R, covered by the molten metal S, the said backing-pan resting upon the rollers *a*, is rolled forward into the receiver C', the door D of which is left open in the position shown in full lines in Fig. 4. The operative then grasps the handles E^6 and throws the free end of the yoke E^3 from left to right, as in Fig. 4, allowing the lid D to swing down into the position shown in dotted lines therein. The yoke E^3 is still farther depressed until it occupies the position shown in Fig. 4, the handles E^6, by the same movement, serving to clamp the cam or roller E^5 against the said door and so hermetically to close the same. The air-pump, in case no reservoir is used, is now started into operation, and the air is either pumped directly into the reservoir C' or first passes through the cooling-worm G^3. The latter method is preferable, as the air then passes into the receiver cool instead of heated by its compression. By a variation of this method I may employ such a reservoir, as K, either alone or in conjunction with the cooling-worm G^3, serving either to cool or to keep cool the already cooled air, and serving also as a reservoir for storing the air when not thrown into connection with the receiver. The pressure of the air in the receiver bears downward upon the metal backing S, and so onto the shell R, which it forces downward against the level surface of the backing-pan, bringing the faces of all the type into a uniform level plane and applying an equal pressure over the whole shell. By the time the backing is cooled off it will hold the shell rigidly in such a form. The pressure-gage O serves to indicate the pneumatic pressure inside of the receiver, and the pressure can be regulated by the setting of the safety-valve N and by the valves controlling the admission of air below. The glass plates P permit observation of the interior of the receiver during the whole proceeding and determination of the condition of the work.

In order to get the best cooling effect in combination with the leveling process and so expedite the proceeding, I set the safety-valve at the requisite pressure-point and force in the cool air at a somewhat higher pressure, so that it constantly passes out through the said safety-valve and is as constantly resupplied in the receiver from below. By graduating the pressure, the temperature of the compressed air, and the quantity of inflow I am able to adapt my process and apparatus to all variations in the character of the work to be done and to securing the best results in all cases.

Having thus described my process and one form of apparatus by which the same may be carried out, I do not limit myself to the said form of apparatus, but what I claim, and desire to secure by Letters Patent, is—

1. In the art of making electrotype, the process which consists of placing the shell in a backing-pan; of flowing a molten backing over the shell; of introducing the backing-pan and its contents into an air-tight chamber; of forcing air into the said chamber to level the electrotype by pneumatic pressure.

2. In the art of making electrotype, the process which consists of placing the shell in a backing-pan; of flowing a molten backing over the shell; of introducing the backing-pan and its contents into an air-tight chamber provided with a safety-valve; and of forcing air into the said chamber to a pressure above the resistance of the safety-valve, in order both to level and to cool the electrotype.

3. In the art of making electrotype, the process which consists of placing the shell in a backing-pan; of flowing a molten backing over the shell; of introducing the backing-pan and its contents into an air-tight chamber provided with a safety-valve; and of forcing artificially-cooled air into the said chamber to a pressure above the resistance of the safety-valve, in order to level and to cool the electrotype.

4. In an electrotype-leveling machine, the frame A; pneumatic chamber C; means for closing the said chamber comprising the hinged lid D, the yoke *e*, the eccentric roll E^5, mounted on said yoke, and the lever E^6, adapted to rotate the said roll; the air-pump F; and connections between the said pump and said chamber.

5. In an electrotype-leveling machine, the frame A; the pneumatic chamber C; means for opening and sealing the said chamber; the roller-tracks *a a'*, entering the said chamber;

the air-pump F; and connections between the said pump and said chamber.

6. In an electrotype-leveling machine, the frame A; pneumatic chamber C; provided with an adjustable safety-valve N; and with a gage O; means for opening and hermetically sealing the said chamber; the air-pump F; and connections between said pump and said chamber.

7. In an electrotype-leveling machine, the frame A; the pneumatic chamber C; means for opening and hermetically sealing the said chamber; the air-pump F; the air-reservoir K comprising a receptacle K^2, surrounded by a water-jacket; and connections between said pump, said reservoir, and said pneumatic chamber.

8. In an electrotype-leveling machine, the frame A; the pneumatic chamber C; provided with a safety-valve N; means for opening and hermetically sealing the said chamber; the air-pump F; the cooling-worm G^3; the air-reservoir K; and connections between said pump, worm, reservoir, and pneumatic chamber.

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