

No. 620,627.

Patented Mar. 7, 1899.

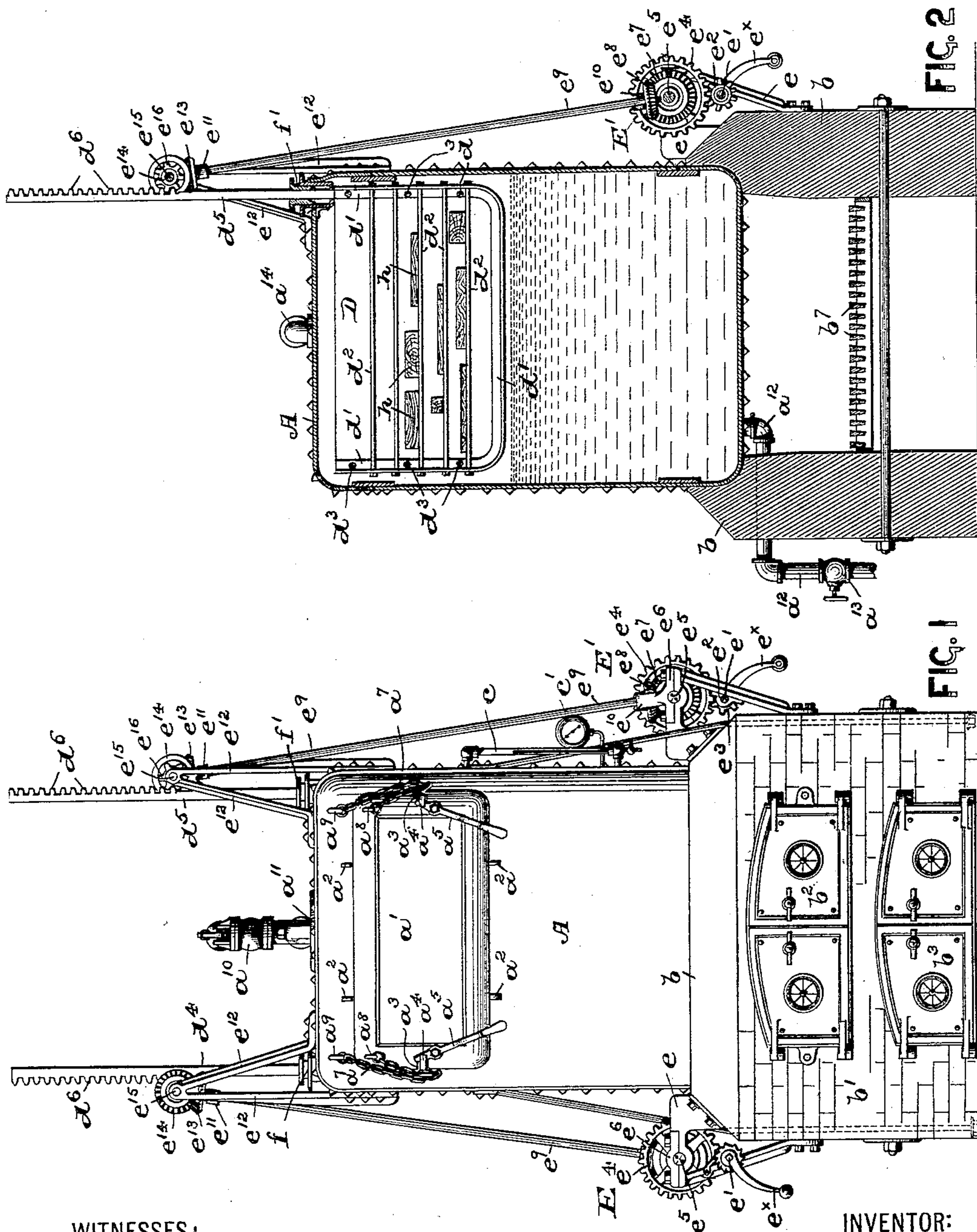
S. WILLNER.

APPARATUS FOR IMPREGNATING WOOD.

(Application filed Jan. 14, 1898. Renewed Nov. 30, 1898.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES:

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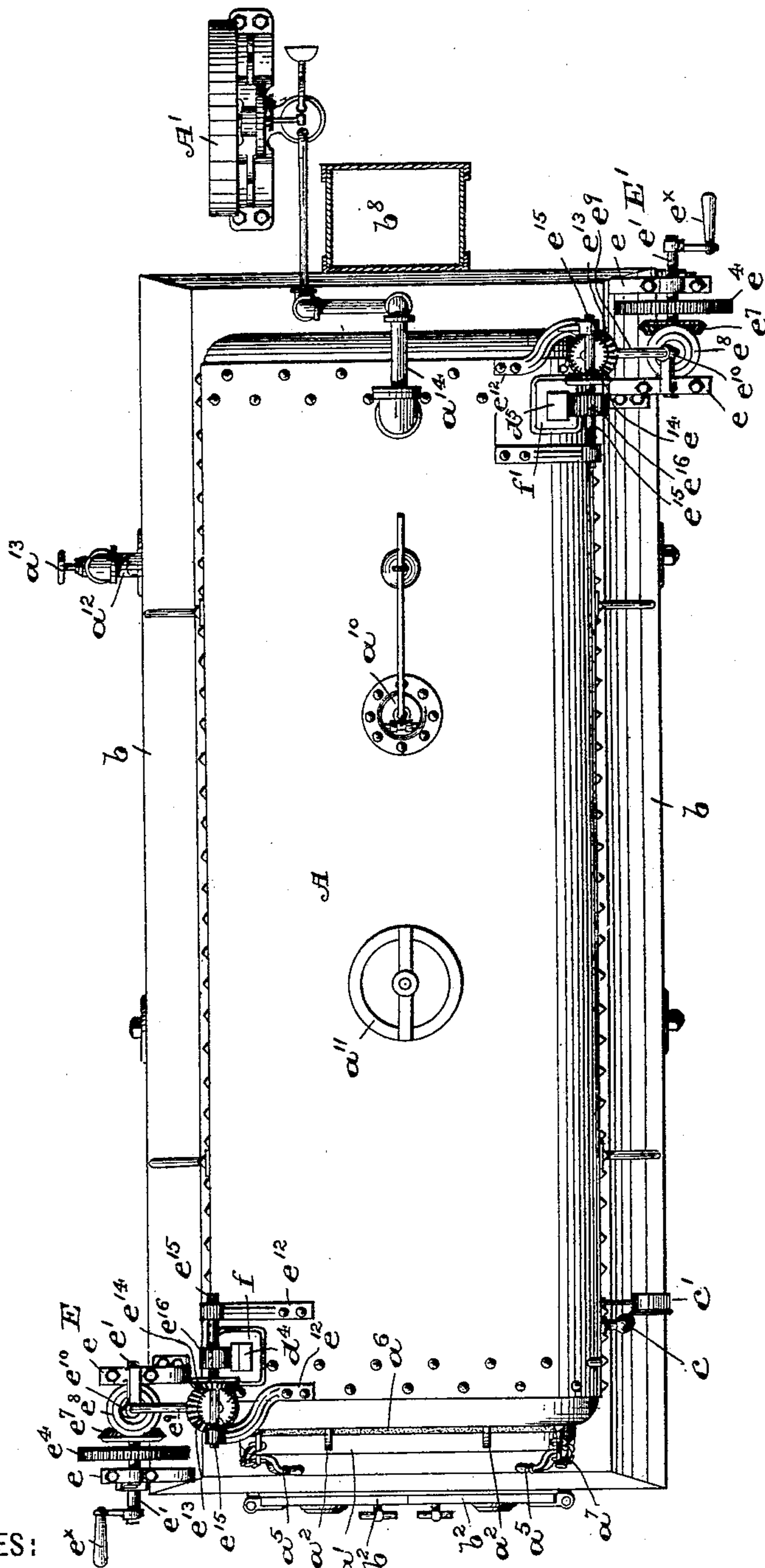


FIG. 3

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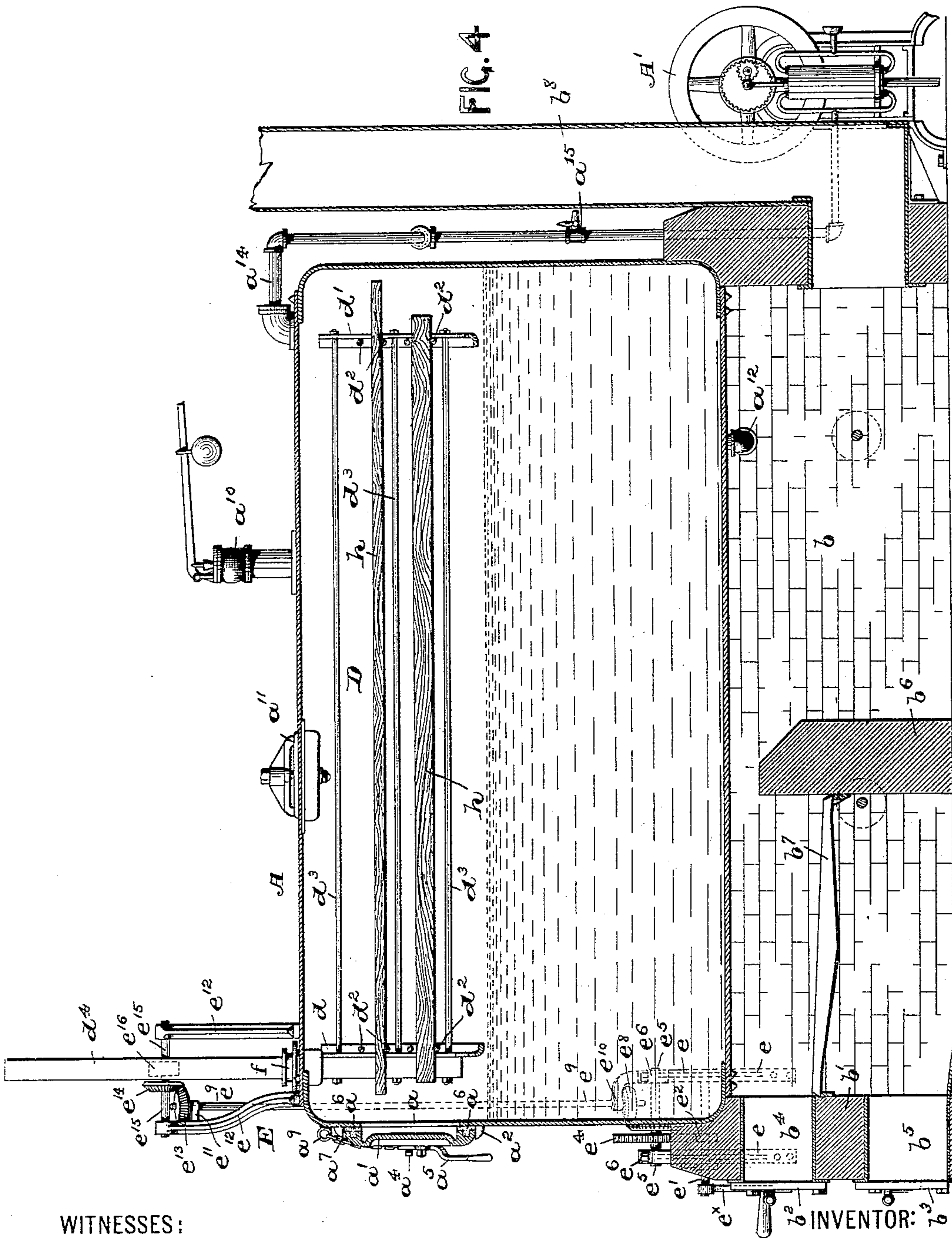
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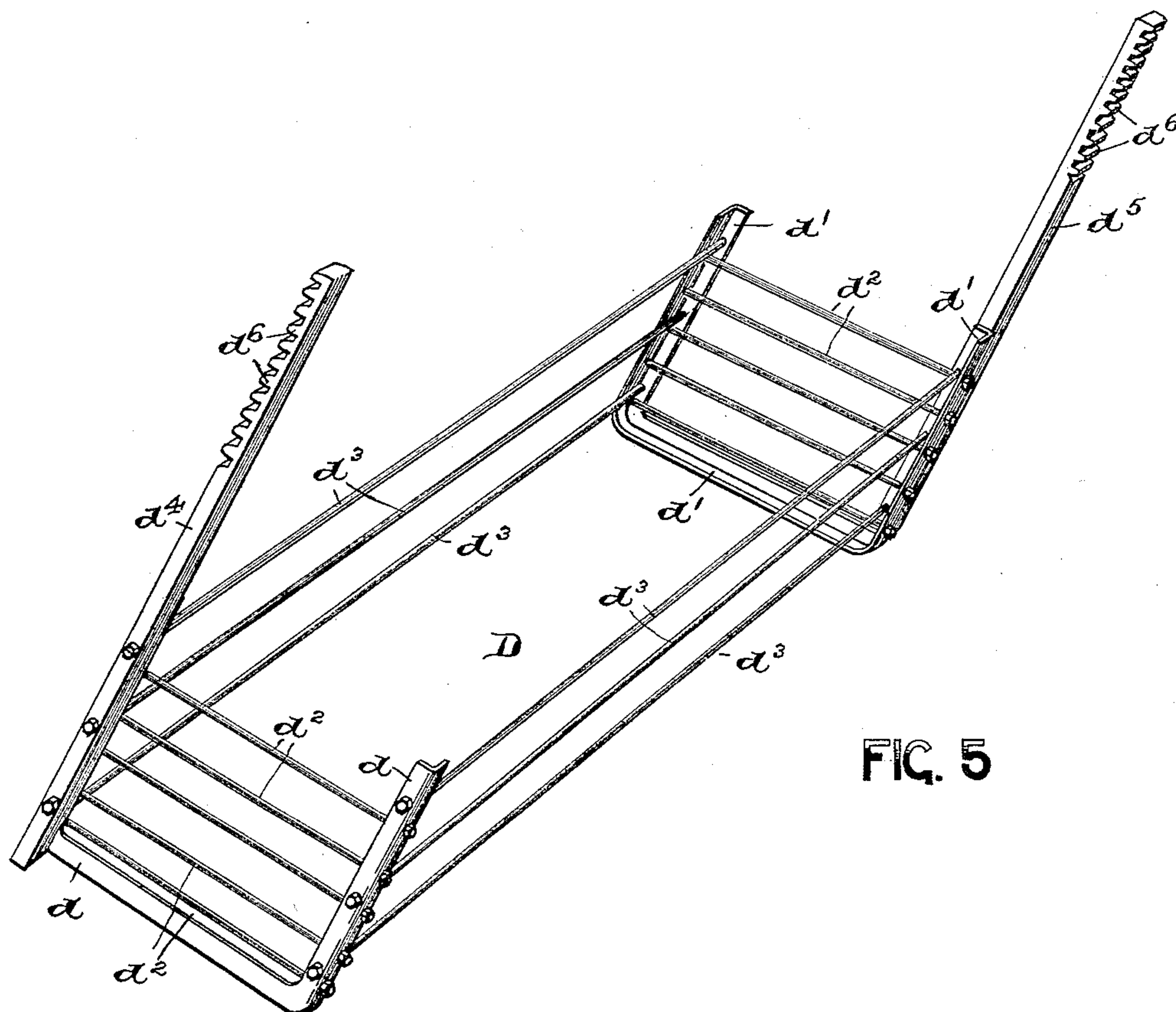


FIG. 5

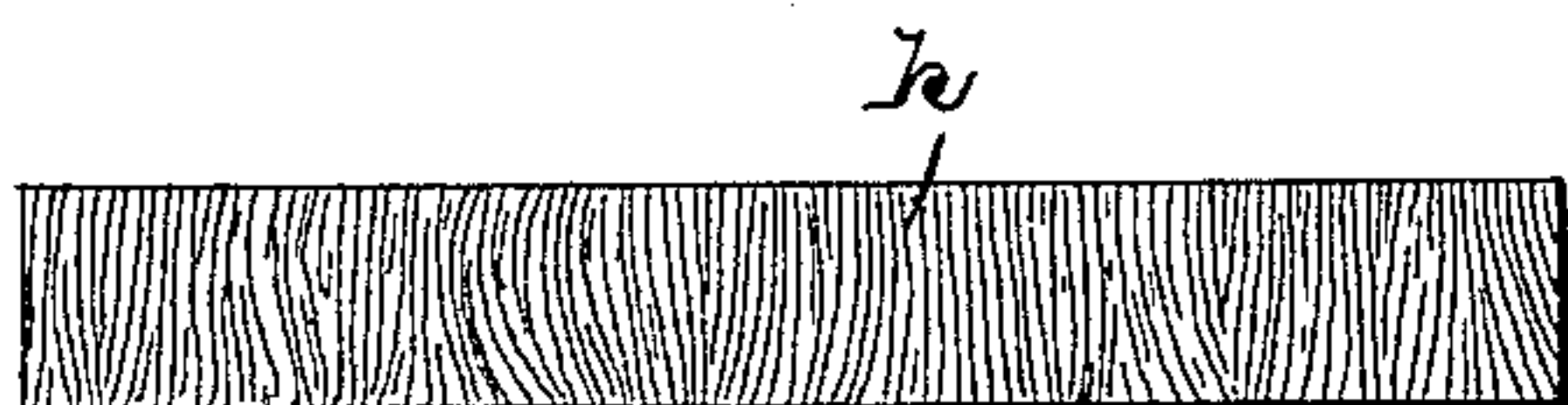


FIG. 6

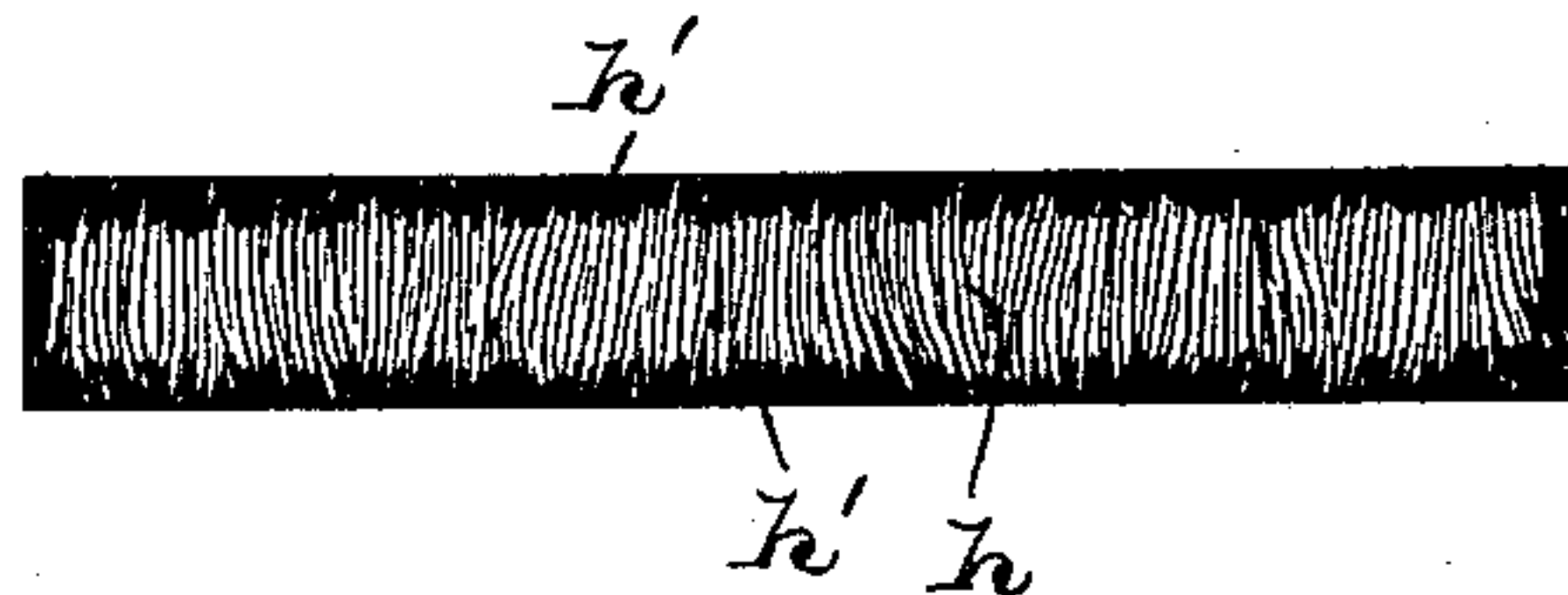


FIG. 7



FIG. 8

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# UNITED STATES PATENT OFFICE.

SIGMUND WILLNER, OF LONDON, ENGLAND, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE WILLNER WOOD COMPANY, OF NEW JERSEY.

## APPARATUS FOR IMPREGNATING WOOD.

SPECIFICATION forming part of Letters Patent No. 620,627, dated March 7, 1899.

Application filed January 14, 1898. Renewed November 30, 1898. Serial No. 697,926. (No model.)

*To all whom it may concern:*

Be it known that I, SIGMUND WILLNER, a subject of the Emperor of Germany, and a resident of Nos. 10 and 12 Walbrook, London, England, have invented certain new and useful Improvements in Apparatus for Impregnating Wood with a Mixture or Solution to Render the Wood Tenacious or Resistible to Pressure, of which the following is 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, reference being had to the accompanying drawings, and to letters of reference thereon, which form part of this specification.

This invention has reference to a novel form of apparatus for impregnating wood with a mixture or solution which upon drying within the wood renders a portion of the wood at or near the surface tenacious and resistible to pressure, whereby the wood can be subjected to the action of a die or dies bearing a design and under proper pressure can be provided with an ornamentation in perfect imitation of hand-carving without any danger of distorting or tearing the fiber of the wood no matter whether the pressure is applied across or longitudinally with the grain of the wood.

This invention therefore has for its primary objects to provide a novel construction of apparatus of treating the wood in such apparatus for the purposes stated and to provide a simple and operative device whereby considerable time and expense will be saved during the treatment of the wood to render it tenacious and resistible to pressure and whereby sharper, deeper, and more clearly-defined ornamentations can be produced in the wood than by the methods and apparatus heretofore employed.

The invention therefore consists in the novel apparatus for impregnating the wood with a mixture or solution to render the wood at or near its surface tenacious and resistible to pressure.

The invention further consists in the several arrangements and combinations of parts of the apparatus and mechanism connected therewith, and also in the minor details of

the construction thereof, all of which will be fully described in the accompanying specification and finally embodied in the clauses of the claim hereto appended.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a front view of the apparatus for treating the wood, and Fig. 2 is a vertical cross-section of the apparatus. Fig. 3 is a plan or top view of the apparatus, and Fig. 4 is a longitudinal vertical section of the same. Fig. 5 is a perspective view of one form of supporting cradle or frame on which the blocks, slabs, or pieces of wood are placed for treatment. Fig. 6 is a cross-section of a piece of wood before treatment, and Fig. 7 is a similar view of the piece of wood after treatment. Fig. 8 is a cross-section of the treated wood after it has been subjected to the pressure of a die or dies bearing a design.

Similar letters of reference are employed in all of the above-described views to indicate corresponding parts.

In order to render the wood, which may be of any kind, tenacious or resistible to pressure from a die or dies without distorting or tearing the fiber of the wood, the mixture, usually consisting of water and a tough cementitious matter, such as glue, or consisting of water, bichromate of potash, and mica, or consisting of water, formic aldehyde, and gelatin, either with or without mica, as set forth in an application for Letters Patent filed by myself January 14, 1898, Serial No. 666,613, is placed in a suitable boiler forming a part of the apparatus, such as will be hereinafter more fully described, which boiler I fill to about the middle with one of the liquors or mixtures hereinabove set forth, and I bring the same up to the boiling-point by a fire beneath the boiler. Upon a suitable cradle or frame within said boiler and normally above the mixture I place the blocks, slabs, or any other piece of wood of any size and kind through an opening in the front or other suitable point in the boiler. The next step in the operation is to close the door hermetically and by means of a rack-and-gear mechanism or other suitable mechanism to lower the cradle or frame on which the wood to be treated has



been placed down into the boiling mixture in the boiler. I have found, however, that by simply immersing the wood in the liquor the latter will not sufficiently penetrate the pores of the wood, especially when hard wood is to be treated, to render the surface of the wood sufficiently tenacious to resist the pressure from a die or dies without tearing or distorting the fiber of the wood.

In order that the liquor or mixture may be readily driven into the wood, I have connected with the boiler a suitable exhaustor or air-pump, which when set in operation will exhaust all the air from within the boiler and also from the wood therein, whereby a vacuum is created in the said boiler. I then lower the cradle or frame, with the wood thereon, down into the boiling mixture, in which it is left for about five to ten minutes, thereby allowing the liquor to thoroughly impregnate the wood. After the cradle or frame has again been raised air is admitted into the boiler and the door opened to permit of the removal of the impregnated wood, which when dried within two or three days becomes very hard or petrified-like, and it is then ready to be subjected to the action of a die or dies bearing a design, and an ornamentation is produced in the surface of the wood in perfect imitation of hand-carving.

I will now endeavor to describe the construction of the several parts of the apparatus and the operations thereof in carrying out the process of treating blocks, slabs, or pieces of wood for ornamentation in imitation of hand-carving.

In the accompanying drawings, A indicates a suitably-constructed tank or boiler, which may be placed upon the usual form of boiler-setting  $b$ , of which  $b'$  is the front wall, provided with doors  $b^2$  and  $b^3$  for the fire-pot opening  $b^4$  and ash-pit opening  $b^5$ , respectively. Resting against the bridge-wall  $b^6$  and the inner surface of the wall  $b'$  are any well-known forms of grate-bars  $b^7$ , and  $b^8$  is a suitable stack or chimney for conveying the smoke and gases of combustion from the fire-chamber underneath the boiler. Said boiler is provided, preferably in the front, with an opening  $a$ , over which can be arranged a suitable door or cover  $a'$ , placed between lugs  $a^2$ , substantially as illustrated in Fig. 1. In suitable places said door is provided with slots or openings  $a^3$ , which are passed over lugs  $a^4$  directly upon the boiler. Pivottally-arranged jam-levers  $a^5$  on the door or cover  $a'$  can be brought into holding or locked engagement with said lugs  $a^4$  to firmly press or wedge a suitable packing  $a^6$  on the back of the door or cover  $a$  against the front of the boiler and to hermetically seal or close the opening  $a$  in said front. When the levers  $a^5$  are disengaged from the lugs  $a^4$ , the door or cover  $a'$  can be lifted off the lugs  $a^2$  and suspended by means of chains  $a^7$ , connected with the door or cover at  $a^8$  and with the front of the boiler at  $a^9$ , directly beneath the opening  $a$  in said

front, as will be clearly understood from Figs. 1 and 4. It will, however, be evident that any other suitable arrangement of door may be employed.

At any suitable point of the boiler A, I have arranged a glass gage  $c$  for indicating the height of the liquid mixture within the boiler, and also a temperature-indicator  $c'$ . Upon the top of the boiler in any convenient position are a suitable safety-valve  $a^{10}$  and a man or hand hole  $a^{11}$ , which are both of the usual and well-known forms of construction.

At any suitable point in the bottom of the boiler A is an outlet-pipe  $a^{12}$ , provided with a valve  $a^{13}$ , and  $a^{14}$  is a pipe which communicates with the top of the boiler at its one end and is connected at its other end with any well-known form of exhaustor or air-pump A' for exhausting the air from the boiler when the mechanism of the pump is set in operation. At any convenient point in said pipe  $a^{14}$  is a valve  $a^{15}$ , which is closed during the operation of exhausting the air from the boiler, but is opened to permit a fresh supply of air into the boiler when it is desired to remove the wood after it has been immersed in the liquor and again removed therefrom. Within said boiler A and normally above the level of the liquor therein is a suitable cradle or frame D, on which the blocks, slabs, or pieces of wood  $h$  are supported. Said cradle or frame, as will be seen from an inspection, more particularly of Fig. 5, comprises a pair of end pieces  $d$  and  $d'$ , suitably connected by means of cross stays or rods  $d^2$  and the longitudinal stays or rods  $d^3$ , upon which rods  $d^2$  and  $d^3$  the wood is arranged prior to its being immersed in the liquid mixture in the boiler. Said cradle or frame D is operatively connected with and supported within said boiler by means of a pair of upwardly-extending posts or uprights  $d^4$  and  $d^5$ , which pass through suitably-constructed stuffing-boxes  $f$  and  $f'$ , respectively, as will be clearly seen from the several figures of the drawings. Each upright  $d^4$  and  $d^5$  is provided with rack-teeth  $d^6$ , which are in operative mesh with suitable gear mechanism E and E' at each end of the boiler, as clearly illustrated in Figs. 1 and 3. Each gear mechanism E and E' comprises a pair of suitable brackets  $e$ , having a shaft rotatively arranged in bearings  $e^2$ , an operating handle or lever  $e^x$ , and a pinion  $e^3$ , which is in operative mesh with a toothed wheel  $e^4$  on a shaft  $e^5$ , rotating in a second pair of bearings  $e^6$  on said brackets  $e$ . On said shaft  $e^5$  is a miter-wheel  $e^7$ , meshing with a similar wheel  $e^8$ , secured upon an upwardly-extending shaft  $e^9$ , adapted to revolve in a bearing  $e^{10}$  at the lower end and in a bearing  $e^{11}$  at the top, said bearing  $e^{11}$  being connected with one of a pair of brackets  $e^{12}$ , secured to the top of the boiler, at or near each end thereof. In operative mesh with a miter-wheel  $e^{13}$  on each shaft  $e^9$  is a miter-wheel  $e^{14}$ , secured upon a shaft  $e^{15}$ , which is rotatively arranged in bearings  $e^{16}$ , connected with said brackets  $e^{12}$ , and



each shaft  $e^{15}$  has secured thereon a pinion, which is in operative mesh with the rack-teeth  $d^6$  on the respective upright  $d^4$  or  $d^5$ , connected with the cradle or frame D, as hereinabove set forth. It will thus be evident that by operating the cranks connected with the respective gear mechanism E and E' said cradle or frame D can be suitably lowered into the boiling mixture in the boiler or raised therefrom, as may be necessary, during the operation of preparing the wood, for the purposes hereinabove stated.

Of course it will be evident that any other suitable form of cradle or frame may be employed and the mechanism for lowering and raising said cradle or frame may be varied.

Other changes may be made in the general arrangement and combinations of the mechanism herein set forth and in the details of the construction of the parts thereof without departing from the scope of my present invention. Hence I do not limit myself to the several arrangements and combinations of the mechanism herein set forth or to the details of the construction of the parts thereof.

In Fig. 6 of the drawings I have illustrated the natural condition of the fiber of a piece of wood, as  $h$ , before it has been subjected to the hereinabove-described treatment, and in Fig. 7 said piece of wood  $h$  is represented with a tenacious and pressure-resisting surface  $h'$ , formed by the hardening of the chemicals with which the wood has been impregnated, and in Fig. 8 is illustrated the condition of the piece of wood after it has been subjected to pressure from a die or dies bearing a design for providing the surface of the wood with the desired ornamentation.

Having thus described my invention, what I claim is—

1. In an apparatus for preparing wood and rendering its surface tenacious and resistible to pressure, the combination, with a boiler containing the liquor or mixture with which the wood is to be impregnated, of a cradle or frame in said boiler movable vertically within and directly beneath the closed top of said boiler, a pair of uprights on said cradle or frame extending through the closed top of said boiler and having rack-teeth, and a gear mechanism in operative mesh with the rack-

teeth on said uprights for lowering and raising said cradle or frame, substantially as and for the purposes set forth.

2. In an apparatus for preparing wood and rendering its surface tenacious and resistible to pressure, the combination, with a boiler containing the liquor or mixture with which the wood is to be impregnated, of a cradle or frame in said boiler, a pair of uprights on said cradle or frame, a pair of stuffing-boxes in said boiler through which said uprights extend and are movable therein, rack-teeth on the free ends of said uprights, and a gear mechanism in operative mesh with the rack-teeth on said uprights for lowering and raising said cradle or frame, substantially as and for the purposes set forth.

3. In an apparatus for preparing wood and rendering its surface tenacious and resistible to pressure, the combination, with a boiler containing the liquor or mixture with which the wood is to be impregnated, of a cradle or frame in said boiler, a pair of uprights on said cradle or frame, having rack-teeth, a gear mechanism in operative mesh with the rack-teeth on said uprights for lowering and raising said cradle or frame, and an air exhauster or pump connected with said boiler, substantially as and for the purposes set forth.

4. In an apparatus for preparing wood and rendering its surface tenacious and resistible to pressure, the combination, with a boiler containing the liquor or mixture with which the wood is to be impregnated, of a cradle or frame in said boiler, a pair of uprights on said cradle or frame, a pair of stuffing-boxes in said boiler through which said uprights extend and are movable therein, rack-teeth on the free ends of said uprights, a gear mechanism in operative mesh with the rack-teeth on said uprights for lowering and raising said cradle or frame, and an air exhauster or pump connected with said boiler, substantially as and for the purposes set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 23d day of December, 1897.

SIGMUND WILLNER.

Witnesses:

H. W. QUITTENDEN,  
JAMES A. BUSH.