No. 883,450. PATENTED MAR. 31, 1908.

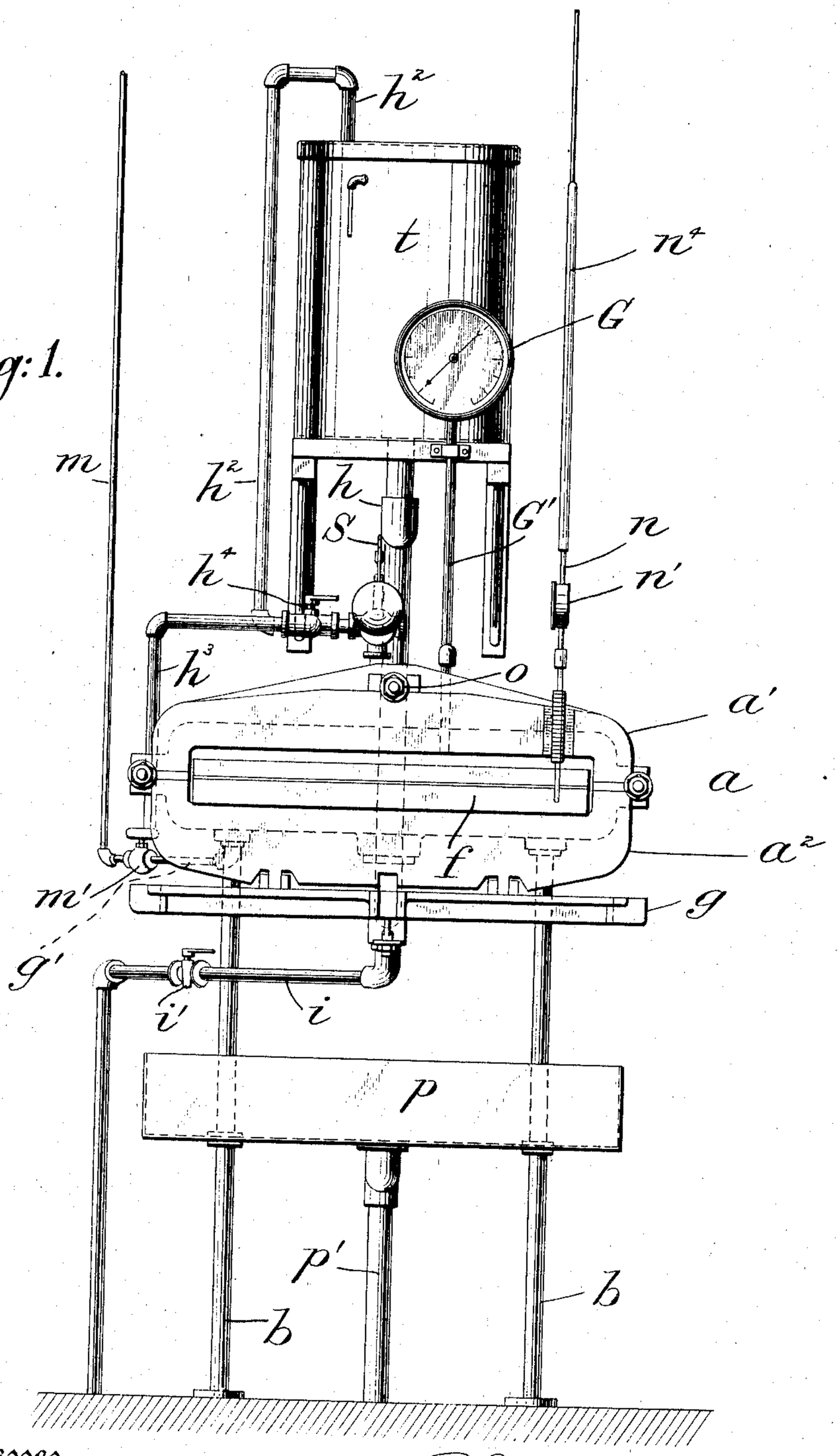
C. F. CHURCH.

APPARATUS FOR COVERING ARTICLES WITH MATERIALS.

APPLICATION FILED OCT. 15, 1907.

3 SHEETS—SHEET 1.

Fig: 1.



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3 SHEETS—SHEET 2.

Fig: 2

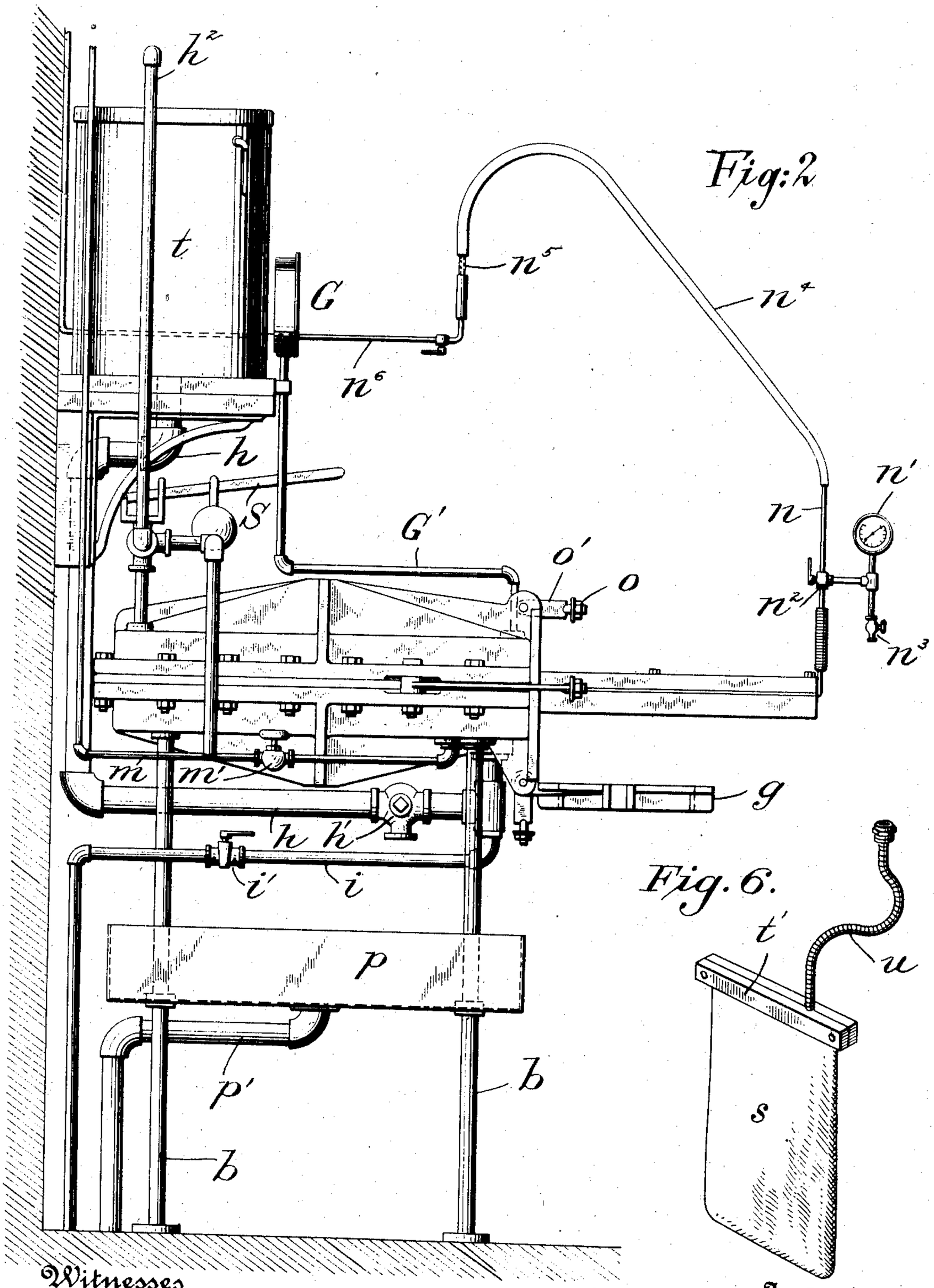

Fig. 6.

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3 SHEETS—SHEET 3.

Fig:3.

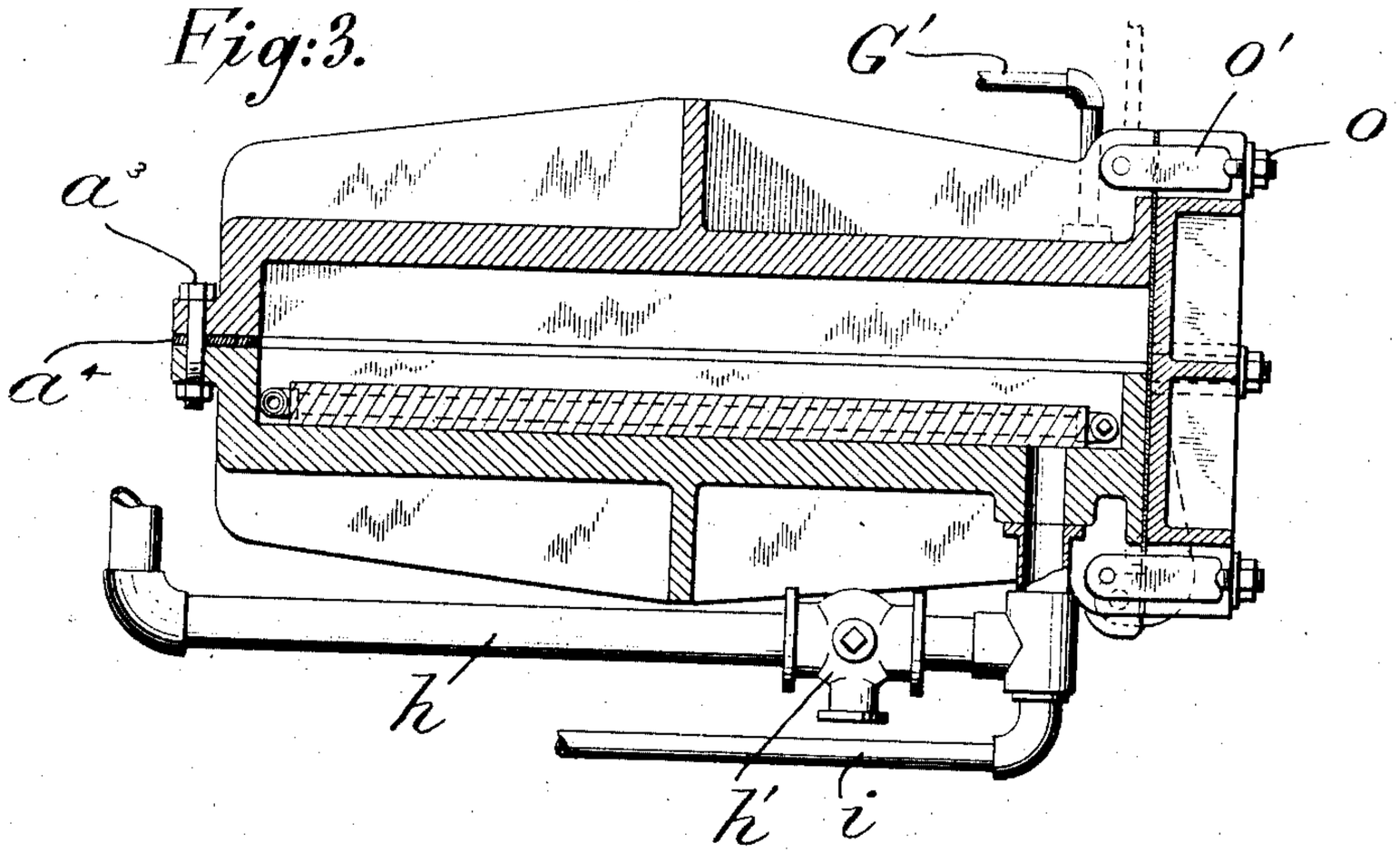


Fig:4.

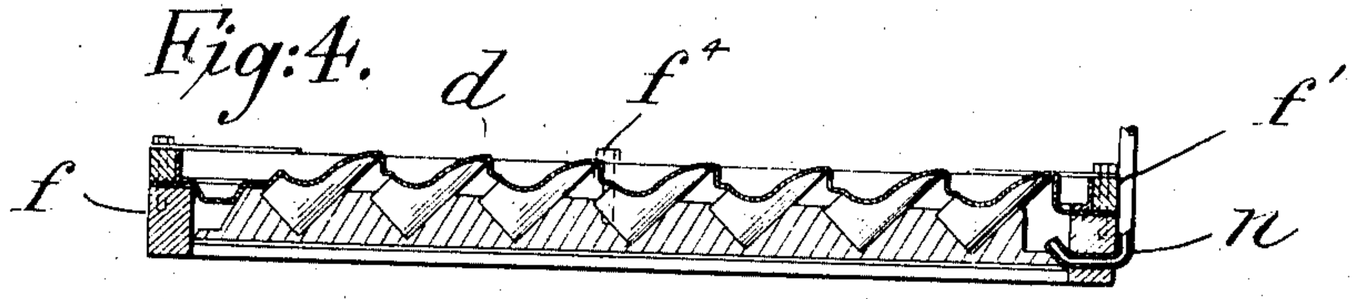
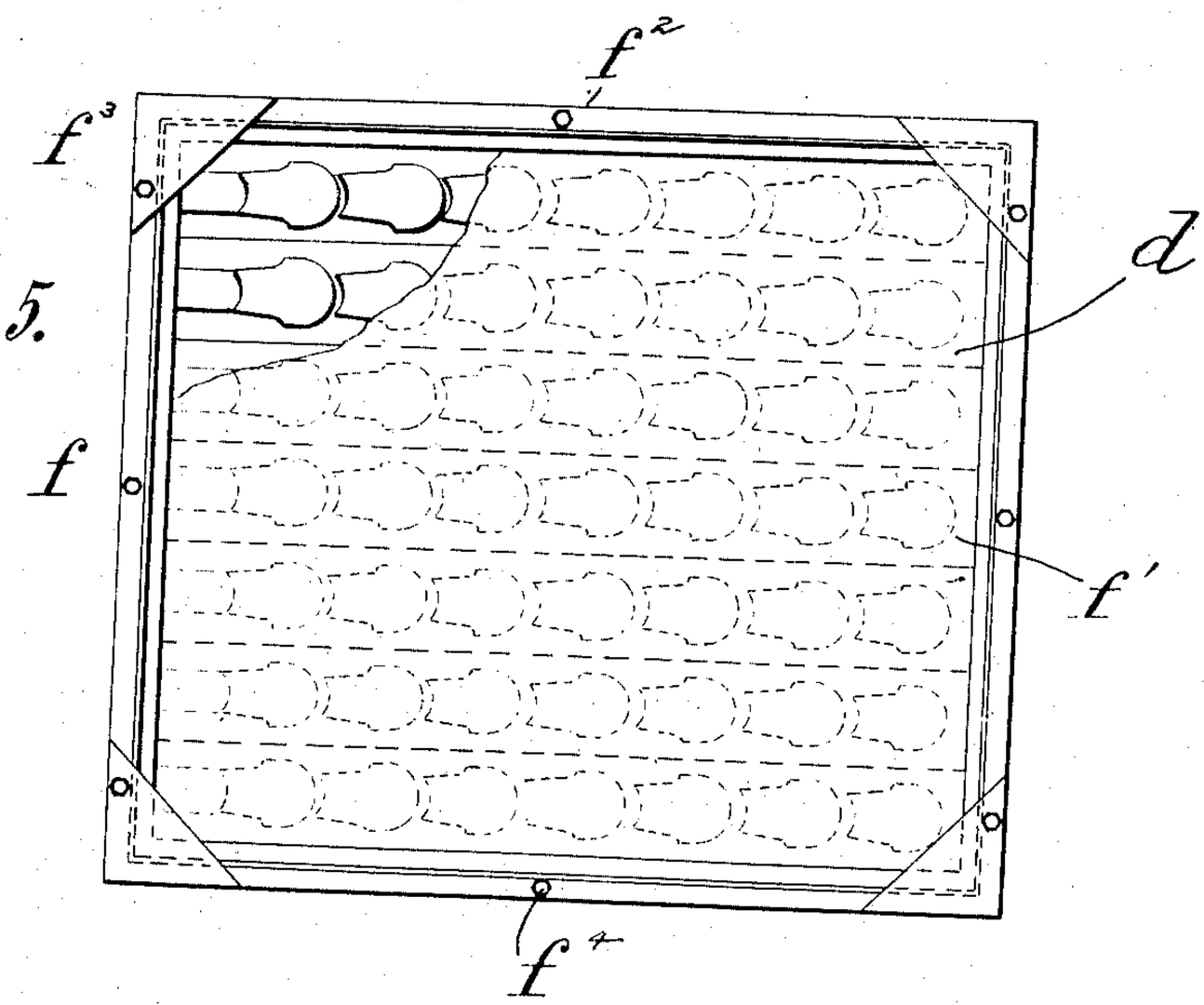


Fig:5.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR COVERING ARTICLES WITH MATERIALS.

No. 883,450. Specification of Letters Patent. Patented March 31, 1908.

Application filed October 15, 1907. Serial No. 397,502.

To all whom it may concern:

Be it known that I, CHARLES F. CHURCH, a citizen of the United States, and a resident of the borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Apparatus for Covering Articles with Materials, of which the following is a specification.

This invention relates to the art of covering articles of wood or other solid substances with a layer of celluloid or other material, which is capable of being made flexible and plastic so that it may be shaped about and united to an irregular surface, and the invention relates more specifically to an improved apparatus for covering articles of wood with a pyroxylin-compound, said apparatus comprising a closed compartment provided at one side with a hinged gate, means for admitting hot water to said compartment, means for admitting steam to the same, a hot-water tank connected with a hot-water pipe, a pipe for returning the water from the compartment into said tank, a frame for supporting the articles to be covered provided with a rack for supporting the same, a flexible diaphragm secured to said frame, means for establishing a vacuum in said frame below the diaphragm, and valves in the water, steam and vacuum pipes for controlling the operation of the apparatus.

The invention consists further of certain details of construction and combinations of parts to be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a front-elevation of my improved apparatus for covering articles with pyroxylin-compounds or other materials showing the gate of the compartment in open position. Fig. 2 is a side-elevation of Fig. 1. Fig. 3 is a vertical longitudinal section through the compartment, showing the gate in closed position. Fig. 4 is a vertical longitudinal section through the frame or chase in which the articles to be covered are supported. Fig. 5 is a plan-view of Fig. 4, with a portion of the flexible covering diaphragm broken away. Fig. 6 is a detailed view of a device which may be used in connection with my invention.

Similar letters of reference indicate corresponding parts in the different figures of the drawings.

Referring to the drawings, *a* represents a compartment in which the articles to be covered are placed. The compartment *a* is composed of two semi-sections a^1, a^2 which are firmly bolted together by means of fastening bolts a^3 at their outer edges and tightly closed at their meeting edges by a suitable packing a^4. The compartment is reinforced by exterior ribs and made of sufficient strength to resist the high pressure under which the articles are to be covered. The compartment is supported on four upright standards or legs *b* which are attached to the bottom-section of the compartment *a* and to the floor. Below the compartment *a* is arranged a water-pan *p* which is supported on the legs *b*, the latter passing through the bottom of the water-pan and being tightly fitted thereto. The compartment is open at one end and provided with a gate *g*, which is hinged at its lower part to the flanged end g^1 of the open end of the compartment *a*, the opening of the compartment being of sufficient size to permit of the introduction of a frame or chase *f* provided with means for supporting the article or articles to be covered.

In Figs. 4 and 5 the frame or chase *f* is provided with step-shaped racks f^1 so as to support a number of wooden heels. Any other suitable support for the articles to be covered may be used in place of the rack f^1. The chase *f* is formed of a bottom on which the racks are supported, and a detachable frame f^2 which is reinforced at the corners by triangular corner-pieces f^3, the frame holding a flexible diaphragm *d* of rubber or other suitable material in position on the chase *f*. The flexible diaphragm *d* may be stretched flat across the chase *f* or it may be provided with corrugations so as to correspond to some extent to the shape of the articles to be covered or may have a fullness to prevent much stretching. The retaining-frame f^2 is attached by means of fastening-screws f^4 to the chase *f* so as to hold the edges of the diaphragm *d* firmly and tightly in position on the chase *f*. The diaphragm is preferably made of a good quality of soft rubber that is capable of resisting the tension exerted on the same during the covering of the articles, when the same are subjected to a vacuum in the chase below the diaphragm. The diaphragm that I use in connection with my invention permits the user of the machine to cover almost any article for the reason that it is elastic and flexible and will readily partake of the shape and form of any article

without causing any wrinkles or drawing of the materials with which the articles are covered.

In Fig. 5 I have shown a chase having a diaphragm which is used for the purpose of covering heels for shoes but it is understood that my invention may be used for covering any shaped articles for the reason already given, it also being understood that the bottom of the chase or inclosure may be modified to support the articles in any way desired and it also being understood that the bottom of the chase or inclosure may be perfectly flat. A number of chases are used in connection with the machine, so as to permit the quick removal of one chase containing the covered articles and the replacing of the same by another chase containing the unfinished articles.

In Fig. 6 I have shown a modification of my invention wherein I use a bag. Referring to the figure *s* indicates the bag. The bag is provided with a tubing *u* which extends from the interior of the bag and may be connected with the pipe which leads to the vacuum pump. The bag *s* is also provided with a clamp t^1 whereby the mouth of the bag may be tightly closed and tightly closed around the tubing *u*. The bag may be placed in the chase. The diaphragm may be used or may not be used in coating the article when the bag is used, the process being the same as before. The use of the chase or casing greatly protects and extends the life of the apparatus for if bags are used alone the bags soon wear and tear so that they are of no further use and after they have been slightly worn the danger of forming a leak is so great that they are quickly dispensed with after being used a few times.

The bottom of the compartment *a* is connected by a supply-pipe *h* with a water-tank *t* that is supported at a suitable elevation above the compartment, and which contains sufficient water to fill the interior of the compartment. The supply-pipe is provided with a stop-cock h^1 so that the hot water can be conducted from the tank into the compartment *a* or into the water-pan *p* located below the same, or so that the water can be conducted off entirely from the compartment by a discharge-pipe *i* provided with a stop-cock i^1. The top of the compartment *a* is connected by a return-pipe h^2 with the upper end of the tank so that the hot water can be returned from the compartment *a* into the tank *t* whenever it should be necessary to do so. The water-tank is provided with an outlet near its upper end so as to indicate when the same has been filled with hot water up to the required level. The compartment *a* is provided with a weighted safety-valve S and with a pressure-gage G which is connected by a pipe G^1 with the top of the compartment, as shown clearly in Fig. 2.

The pressure-gage indicates the pressure in the compartment, while the safety-valve prevents the pressure from rising beyond the pressure to which the weighted safety-valve has been set. The bottom of the compartment is connected with a steam supply-pipe *m* having openings for direct heating or with a steam coil for indirect heating and having a stop-cock m^1 so that steam can be admitted into the compartment for raising the water in the same to a higher temperature, as required for the covering operation. The hinged gate *g* is held in closed position at the end of the compartment by means of pivoted screw-nuts *o*, o^1 which are applied to the exterior of the compartment and engage with recessed ears of the gate *g* so as to permit the tight screwing up of the gate to the flanged end of the compartment *a*, as shown in Fig. 3. The chase *f* is connected below the diaphragm *d* by a small vacuum-pipe *n* with a suitable vacuum-pump. The vacuum-pipe enters the chamber as shown in Fig. 4. It is provided with a vacuum-gage n^1, stop-cock n^2 and with a valve n^3 for permitting air to enter so as to regulate the vacuum. The upper end of the vacuum-pipe *n* is connected by a flexible pipe n^4 that is provided at one point with a glass indicator-tube n^5 with a stationary vacuum-pipe n^6 that connects with the vacuum-pump. The glass indicator-pipe n^5 serves for the purpose of showing any water that should pass from the chase into the vacuum-pipe in case of leakage caused by injury or wear of the diaphragm *d*, so that the covering operation can be instantly interrupted for preventing the spoiling of the articles to be covered in the chase. Previously, owing to the lack of the indicator-pipe, a considerable per cent. of the articles were spoiled in covering. By arranging an indicator-pipe in the vacuum-pipe a visual indicator is obtained, whenever any water should pass into the space in the chase below the diaphragm, so that the covering operation can be instantly interrupted and the chase removed from the compartment before the articles placed in the same are spoiled.

The operation of the vacuum-pump is such that all of the fluids contained in the chase or the inclosure in which the articles to be covered are placed will be removed. It also operates to draw the flexible and elastic diaphragm against the material with which the articles are to be covered and preventing any wrinkling or drawing or "pull-up" of the diaphragm and consequently preventing any wrinkling or drawing of the material or any part thereof with which the articles are to be covered. The vacuum-pump further operates not only to withdraw the air which may be contained in the inclosure but also to withdraw all fluid which may leak in or find its way into the inclosure. It operates

to remove all fluid that may leak into the inclosure immediately upon its entering the inclosure from the nearest point of its entrance so that the least possible amount of material will be injured by reason of such leak. The vacuum-pump further operates to reduce the size of the opening that may be formed, if any leak should occur, for the reason that the edges of the opening are immediately sucked down either against one of the articles to be covered or against the bottom of the chase or inclosure and thereby the least possible amount of the fluid exterior to the chase or inclosure will be permitted to enter the inclosure even if any of the said fluid at all is allowed to enter. The edges around the opening or leak will operate like a valve and will close down against one of the articles to be covered or against the bottom of the chase or inclosure.

The hot-water return-pipe h^2 is provided with an outlet h^3 having a stop-cock h^4, said outlet-pipe terminating above the water-pan so as to permit the emptying of the return-pipe h^2. The water-pan p is connected by a waste-pipe p^1 with the sewer.

The operation of my improved machine for covering wood and other articles with celluloid or other material is as follows: The articles to be covered are first coated with a plastic layer of celluloid or other material which is attached thereto by a suitable cement, then placed on a rack or other support on the bottom of the chase f, after which the diaphragm is firmly secured in position on the same by the retaining-frame f^2 and fastening-screws f^4. The chase is placed into the compartment and the gate g of the compartment tightly closed up by the bolts and nuts o, o^1. The vacuum-pipe n is then connected with the flexible pipe n^4. Hot water is then supplied to the interior of the compartment from the hot-water tank t so as to fill up the space above the diaphragm and press on the upper surface of the same. Steam is then admitted into the compartment, and thereby the temperature of the water raised to 200°or 300° F., according to the articles to be covered and according to the pressure under 100 lbs. contained in the compartment. The valve n^2 of the vacuum-pipe n is opened, and by the suction of the vacuum on the diaphragm, the flexible diaphragm is applied with considerable force around the covering-layer of the articles to be covered so that the same, raised to the proper temperature, is intimately united with the same. When the intimate connection between the covering-layer of celluloid or other materials and the articles is accomplished, it is necessary to cool the articles before removing the same from the compartment, for which purpose the hot-water supply-pipe is closed and the cock of the return-pipe h^2 opened, so that the heated water is returned to the tank by the pressure of the steam. The return of the water to the tank t by the steam-pressure holds the same at the proper temperature for starting the next covering operation. The supply is then interrupted so that the compartment can gradually become cooled. For removing the chase with the covered articles, the gate g is released from the fastening-bolts and nuts o, o^1 and dropped into its lower position, shown in Fig. 2, so that the chase can be removed. The connection with the vacuum is interrupted by closing one of the stop-cocks of the vacuum-pipe n and flexible pipe n^4. The covered articles are then removed from the same by unscrewing the retaining-frame of the diaphragm. The chase is then charged with new articles covered with layers of celluloid, or other material, as before described, and the diaphragm replaced in position thereon, ready to be returned to the compartment a. In the meantime, another chase in which the articles with a soft layer of celluloid or other material have been placed is returned to the compartment and the operation is repeated.

Any suitable articles of wood or other material may be covered in this manner with celluloid or other material such as heels for ladies' shoes, seats and covers for water-closets, attachments for bicycles, automobiles and the like. The machine can also be used for covering such articles with a layer of rubber, the rubber being applied to the articles while in soft condition and united thereto by the high temperature and pressure to which the same are exposed while in the compartment a. After the articles are removed from the chase they are properly trimmed and polished in the usual manner.

The advantages of my improved machine for covering wood or other articles with celluloid or other materials are, first, that every part of the operation is performed in a reliable manner, so that defective, spoiled articles are entirely precluded; second, that any leakage in the diaphragm can now be instantly discovered by means of the glass indicator which shows that the vacuum below the diaphragm in the chase has been broken and that water has made its exit through the chase, so that the operation is instantly interrupted and the articles removed before any further damage is done to the same; third, that the different operations of supplying the hot water, heating the same by steam, returning the hot water to the tank, permitting the vacuum to act on the diaphragm so as to properly lap the layers of plastic or other material around the articles, the cooling and removing of the covered articles, are performed in a reliable and effective manner, so that unskilled persons can operate the machine and produce articles of uniform quality and finish.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a machine for covering articles by celluloid or other materials, the combination of a compartment provided with a hinged gate at one end, means for supplying hot water and steam to the interior of said compartment, a removable chase or bags provided with means for supporting the articles to be covered, a flexible diaphragm above the same, and a vacuum-pipe connected with the said chase below the diaphragm for establishing the required degree of vacuum in the same.

2. In a machine for covering articles by celluloid or other materials, the combination, with a compartment and means for supplying water and steam to the same, of a chase provided with a flexible diaphragm placed in said compartment, a vacuum-pipe connected with the chase below the diaphragm, a vacuum-pipe connected with the vacuum-pump, and a flexible pipe provided with a glass indicator-tube between the vacuum-pipe on the chase and the vacuum-pump.

3. In a machine for covering articles with materials the combination of a casing, the said casing having a flexible diaphragm, a means for forcing liquid under great pressure against the said diaphragm, a means for withdrawing all fluids from said casing, a means for indicating the presence of any liquid.

4. In a machine for covering articles with materials, the combination of a casing, the said casing having a flexible diaphragm, a means for forcing liquid under great pressure against the said diaphragm, a means for withdrawing all fluids from the said casing, and for reducing the extent of any leak and means for indicating the presence of any liquid in the said inclosure.

5. In a machine for covering articles with materials, the combination of an inclosure, means for forcing a fluid against a part of the said inclosure, a means for withdrawing all fluids from the said inclosure and means for indicating the presence of any liquids in the said inclosure.

6. In a machine for covering articles by celluloid or other materials, the combination, with a compartment and means for supplying water and steam to the same, of a chase provided with an elastic diaphragm placed in said compartment, a vacuum-pipe connected with the chase below the diaphragm, a means for removing all fluid from the chase and a means for indicating the presence of liquid in the said chase.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

CHARLES F. CHURCH.

Witnesses:

ALFRED E. OWERS,

GEORGE F. YETMAN.