

(No Model.)

2 Sheets—Sheet 1.

W. T. HILDRUP, Jr.
REFRIGERATOR CAR.

No. 432,828.

Patented July 22, 1890.

Fig. 1—

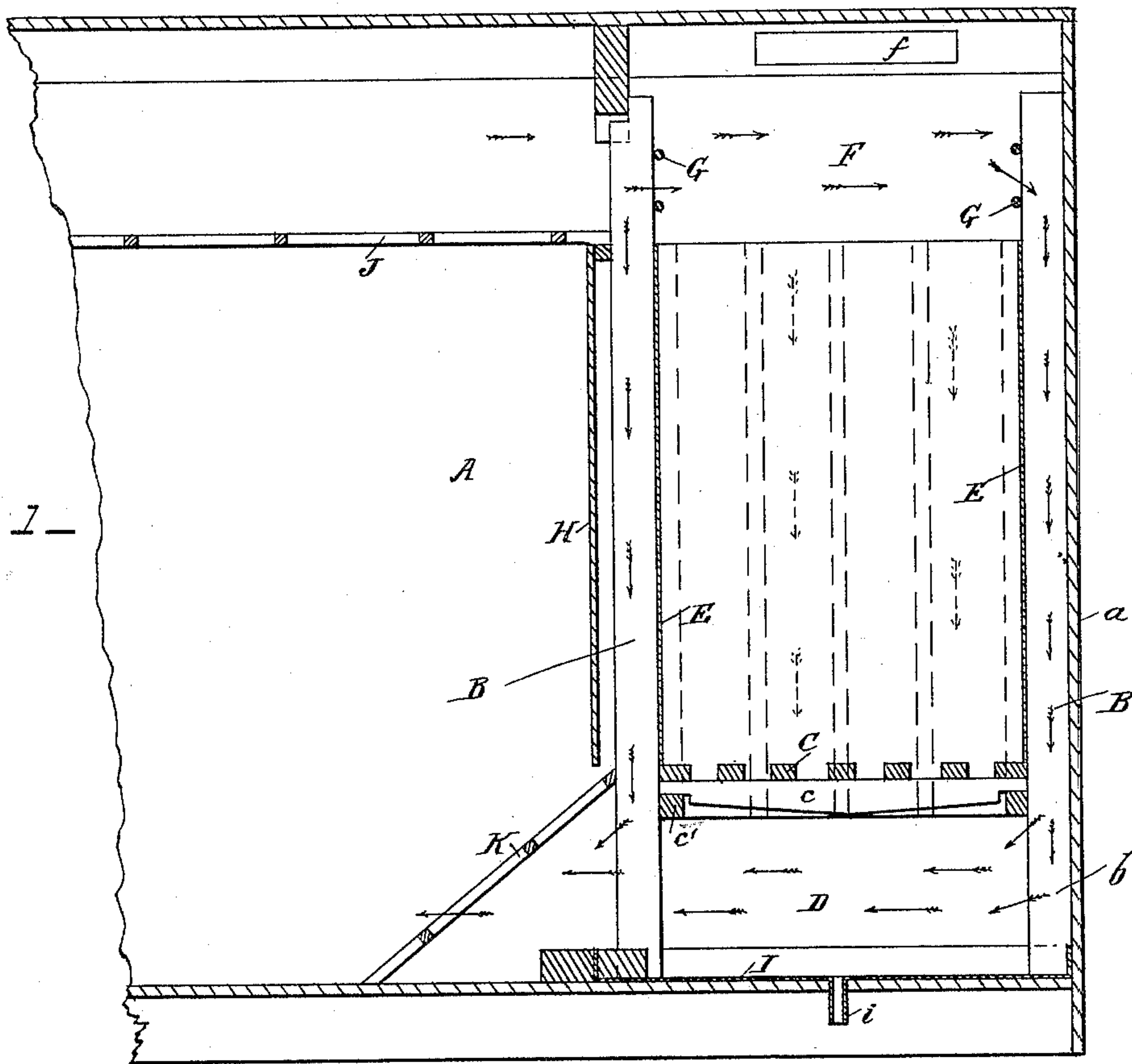
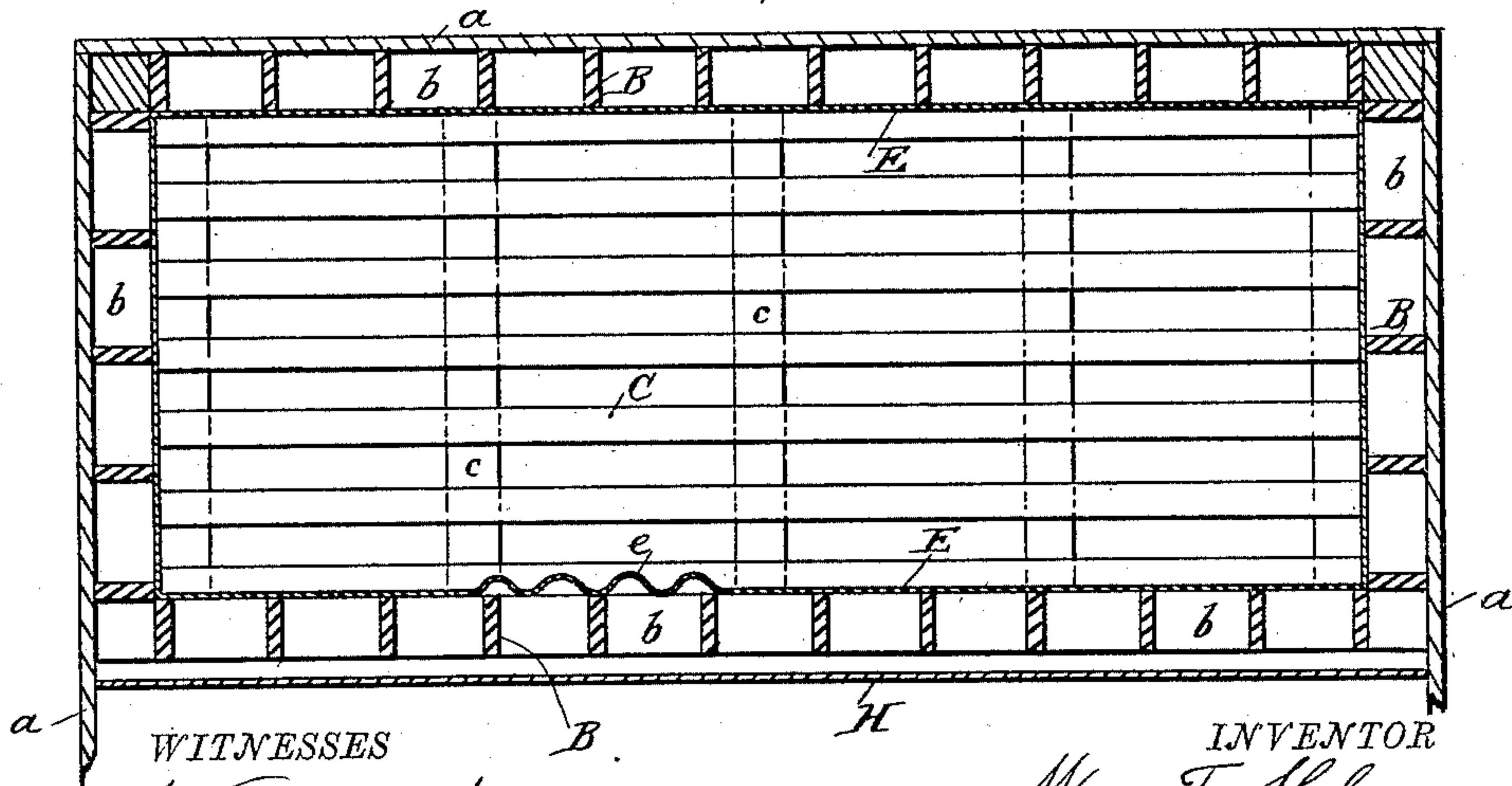


Fig. 2—



WITNESSES

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REFRIGERATOR CAR.

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Fig. 3—

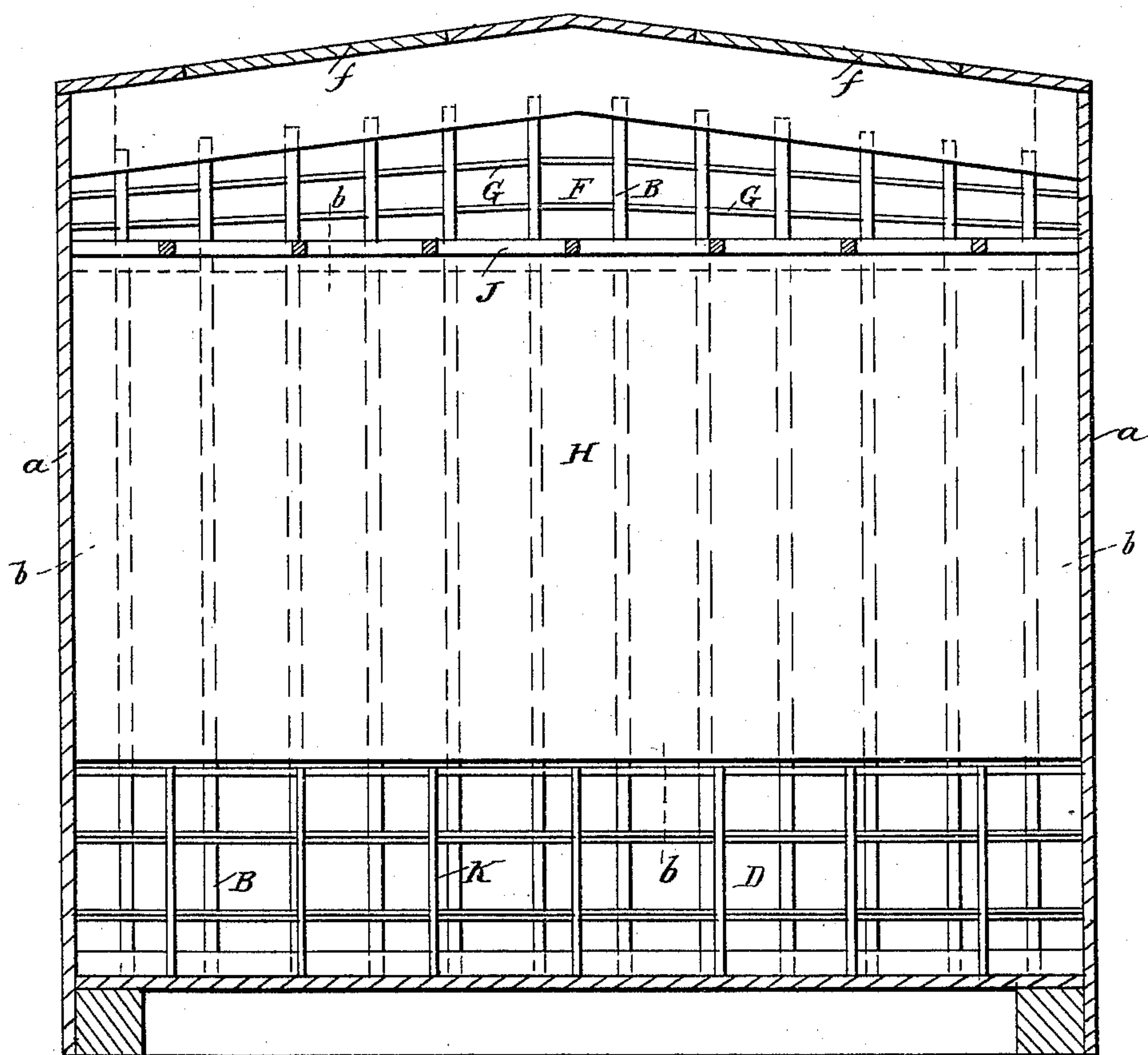
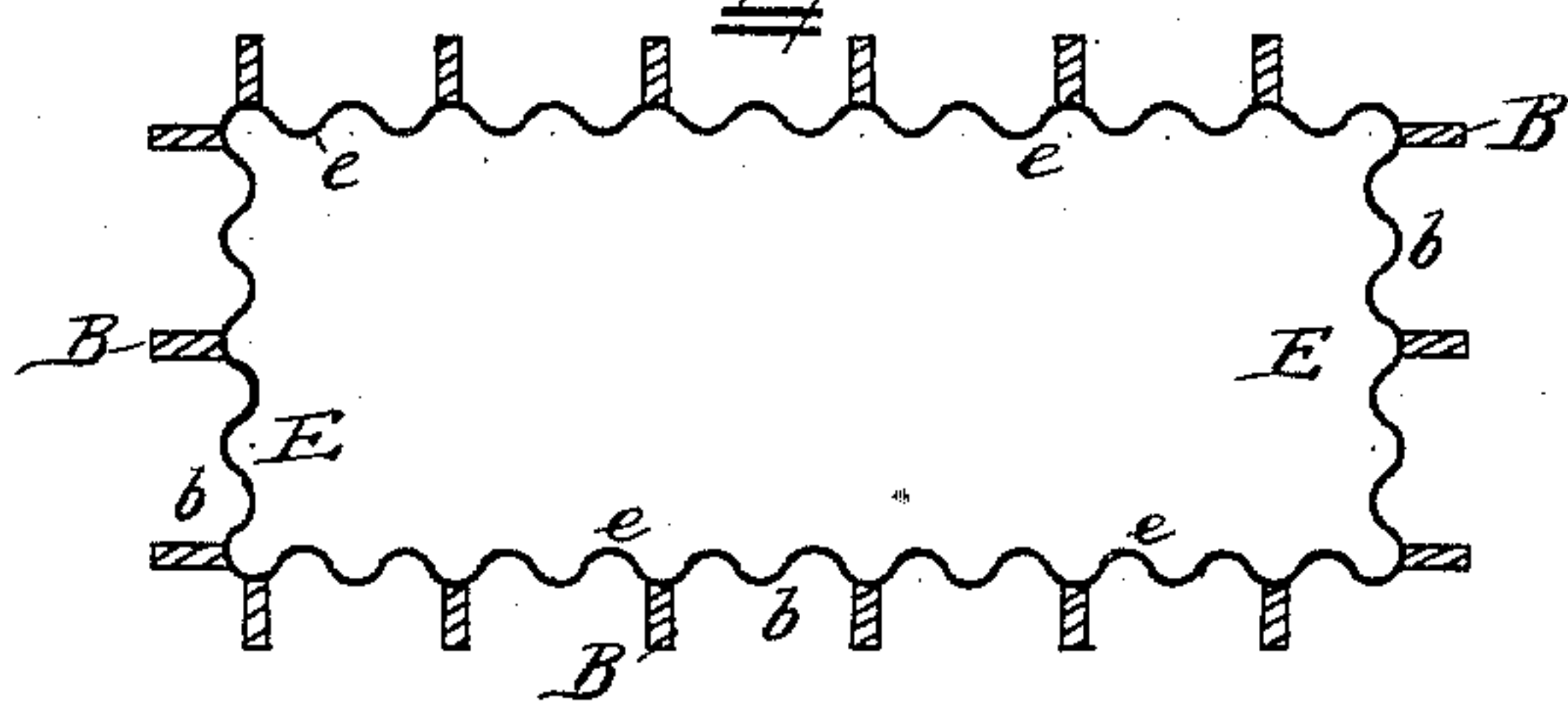


Fig. 4—



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UNITED STATES PATENT OFFICE.

WILLIAM THOMAS HILDRUP, JR., OF HARRISBURG, PENNSYLVANIA.

REFRIGERATOR-CAR.

SPECIFICATION forming part of Letters Patent No. 432,828, dated July 22, 1890.

Application filed May 8, 1890. Serial No. 351,042. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM THOMAS HILDRUP, Jr., a citizen of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented certain new and useful Improvements in Refrigerator-Cars; 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.

This invention relates to refrigerator-cars and other similar structures in which meat and vegetables are temporarily stored; and it consists in the novel construction and combination of the parts, hereinafter fully described and claimed.

In the drawings, Figure 1 is a longitudinal section through one end of a car constructed according to this invention. Fig. 2 is a sectional plan view of the same. Fig. 3 is a cross-section through the cooling-chamber, looking toward the ice-crate. Fig. 4 is a cross-section through an ice-crate provided with a corrugated liner according to this invention and drawn to a smaller scale.

A is the cooling-chamber, in which the meat or vegetables are placed, and *a* are the car-walls, forming the sides of said cooling-chamber. The car-walls are made of non-heat-conducting material, and may be of any approved construction adapted to resist the conduction of heat.

B are vertical posts of wood, oblong in cross-section, and arranged edgewise at suitable distances apart in the form of a parallelogram, preferably occupying the end of the car and close adjacent to its side and end walls. The posts constitute the sides of a crate for holding ice, and the spaces *b* between the posts form vertical draft-passages for cold air.

C is the bottom of the crate, consisting of a series of bars of wood or metal, supported upon the cross-bars *c* and frame *c'*, the latter being secured to the posts B at a considerable distance above the car-floor, so as to leave a space D for cold air underneath the crate-bottom, with which space all the draft-passages *b* may freely communicate at their lower ends.

E are thin sheet-metal liner-plates secured

to the inside of the posts B. These liner-plates may be of flat sheet metal, but are preferably corrugated, as shown at *e*, to increase the area of their conducting-surfaces. The liner-plates are not continued up to the top of the crate, and the ice in the crate is not piled up much above the tops of the liner-plates, so that a passage F may be left for the warm air to pass through the crate over the top of the ice to the draft-passages *b*. The crate is filled with ice through a door *f* in the roof of the car, and G are brace-rods, which extend across the front and rear of the crate at the top to strengthen it, and also to prevent lumps of ice from falling into the storage-space of the cooling-chamber and into the draft-passages.

H is a screen of non-heat-conducting material—such as wood or canvas—interposed between the front of the crate and the storage-space of the cooling-chamber A to prevent the direct radiation of cold from the front liner-plate, which would otherwise cool the vegetables close adjacent to the crate below the dew-point and spoil them by causing water to be condensed upon their surfaces. The warm air in chamber A rises to the top and passes over the top of the ice in the crate in the direction of the arrows. The air is cooled by contact with the ice, and as it increases in density it sinks down the draft-passages *b* upon all sides of the crate and is further cooled by contact with the metallic liner-plates E. The cold air passes from the passages *b* through the space D under the crate-bottom in the direction of the arrows and is discharged into the lower part of the storage-space of the cooling-chamber. A continuous circulation of cold air is thus established to refrigerate the contents of chamber A. When the supply of ice gets low in the crate, the air may pass downwardly through it in the direction of the dotted arrows, thereby compensating for the loss of cooling-surface in the passages *b* at the sides of the crate.

The vertical posts B make a very light and strong crate in consequence of being arranged edgewise and supported upon three sides by the car-walls, and the currents of air in the passages *b* are unimpeded by friction, as the posts are arranged at a considerable distance

apart, so that the draft-passages may be large in area. The thin metallic liner-plates present a large cooling-surface to the air in the passages *b*, and prevent lumps of ice from projecting between the vertical posts and obstructing the free circulation of air in the said passages.

I is a flat shallow tray under the ice-crate and below the cold-air space *D*, and *i* is the outlet-pipe for the water which collects in the tray. The ice-cold water which drips from the ice-crate falls in drops upon the flat surface of the tray *I*, and wets the whole of it before the drops collect together in sufficient volume to run off down the pipe *i*. The air in the space *D* is still further cooled by contact with the film of ice-cold water in the tray, over which it passes to the cooling-chamber, and the thin film of water collects in drops and runs off as soon as it has absorbed all the heat it can take up and is replaced by colder water dripping from the ice-crate.

J is a false ceiling of open lattice-work extending all over the storage-space level with the top of the liner-plates in the crate and level with the bottom of the warm-air space *F*. This causes the warm-air space of passage *F* to be extended the full length of the car, and prevents meat or vegetables from being piled up in the said space.

K is an inclined guard of open lattice-work projecting in front of the cold-air space *D* to prevent crates of vegetables from being piled up in front of the opening of said space in such manner as to obstruct the free circulation. The crates of vegetables are piled upon the car-floor at the bottom of the guard, and cannot rest upon the guard, owing to its inclination. The lattice-work may consist of wooden bars spaced at any convenient distance apart.

What I claim is—

1. The combination, with an inclosing cooling-chamber, of a crate adapted to be filled with ice and formed of vertical posts provided with a liner of corrugated metallic

plates, leaving a space for warm air above the ice-space of the crate, a space for cold air below the crate - bottom, and air-passages through the crate and around its sides for connecting the said air-spaces above and below the ice-space, and a screen in front of the said liner between the crate and the storage-space of the cooling-chamber, substantially as and for the purpose set forth.

2. The combination, with an inclosing cooling-chamber, of a crate adapted to be filled with ice and formed of vertical posts resting on the bottom of the said chamber and provided with a bottom of open-work for the ice to rest on, and a liner of corrugated metallic plates around the ice-space of the crate, leaving a space for warm air above the said ice-space, a space for cold air below the crate-bottom, and air-passages through the crate and around its sides for connecting the said air-spaces above and below the ice-space, a drip-tray under the crate provided with an outlet, and a screen in front of the said liner between the crate and the storage-space of the cooling-chamber, substantially as and for the purpose set forth.

3. The combination, with the inclosing cooling-chamber, of an ice-crate supported in said chamber, spaces for cold and warm air being left between the floor and roof of the said chamber and the bottom and top of the ice in the crate, whereby a continuous circulation of air may be established for refrigerating the contents of the cooling-chamber, a false ceiling of open lattice-work supported level with the bottom of the said warm-air space, and a guard of open lattice-work in front of the opening between the said cold-air space and the storage-space of the cooling-chamber, substantially as and for the purpose set forth.

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

WILLIAM THOMAS HILDRUP, JR.

Witnesses:

D. P. RAHTER,
ELMER FLOWERS.