

(No Model.)

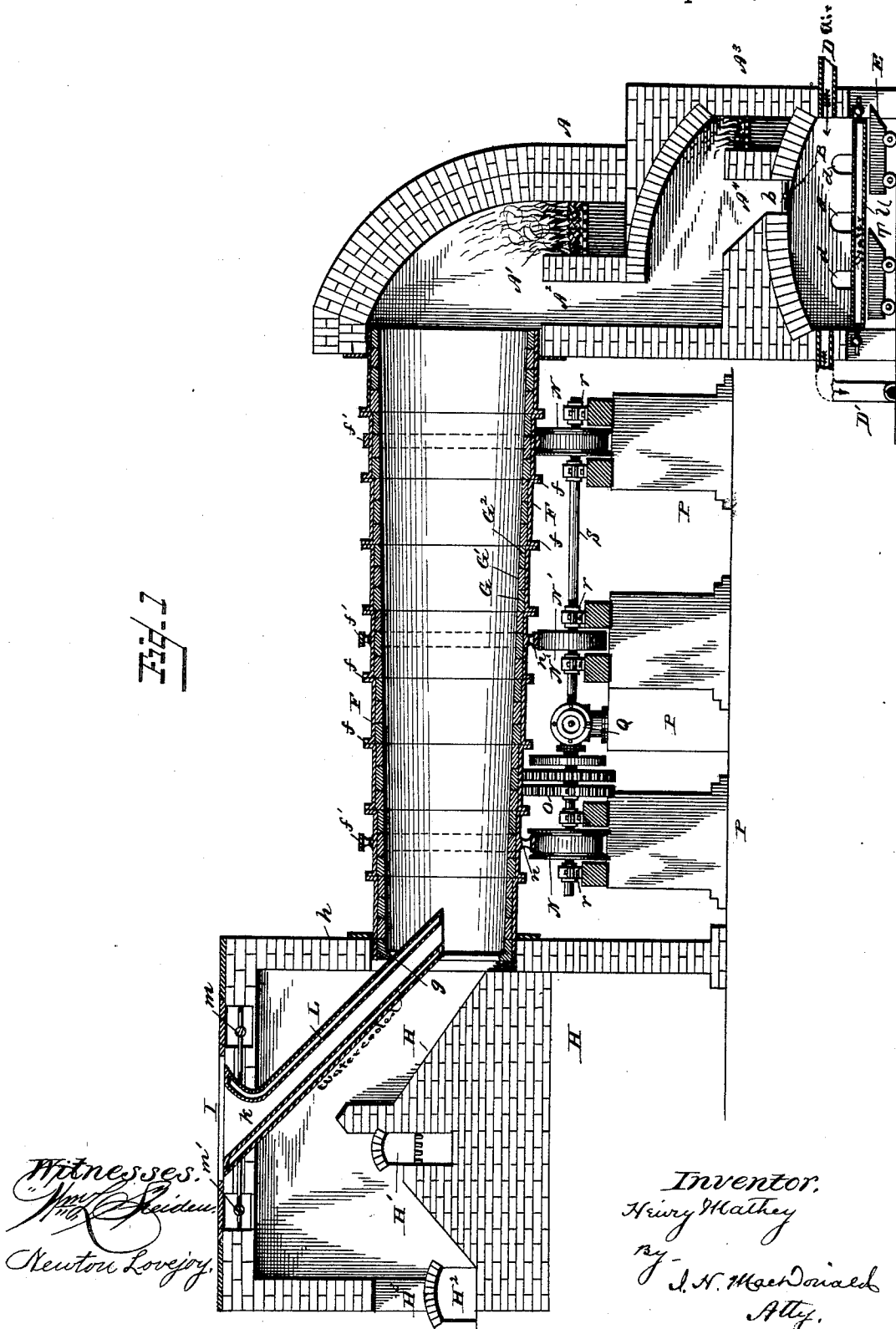
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H. MATHEY.

REVOLVING FURNACE.

No. 325,259.

Patented Sept. 1, 1885.



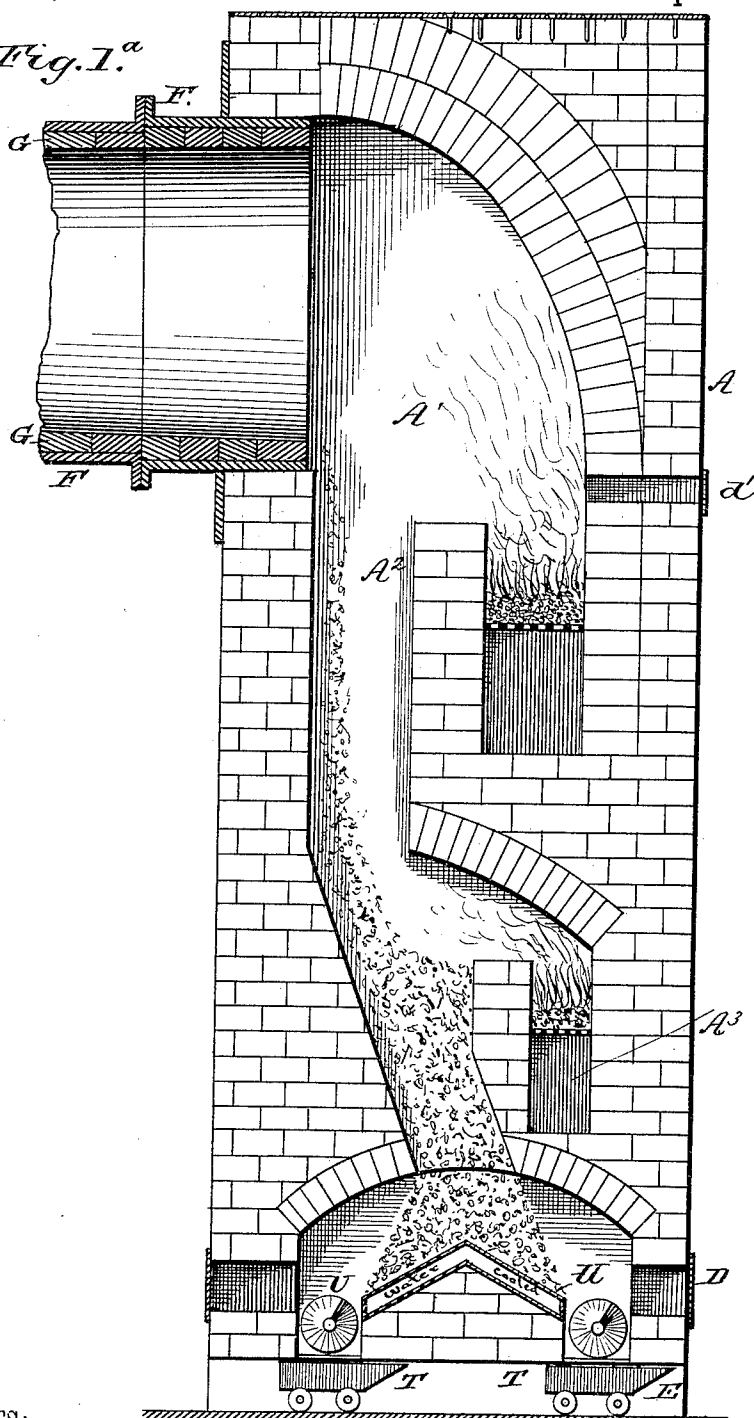
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Fig. 1.^a



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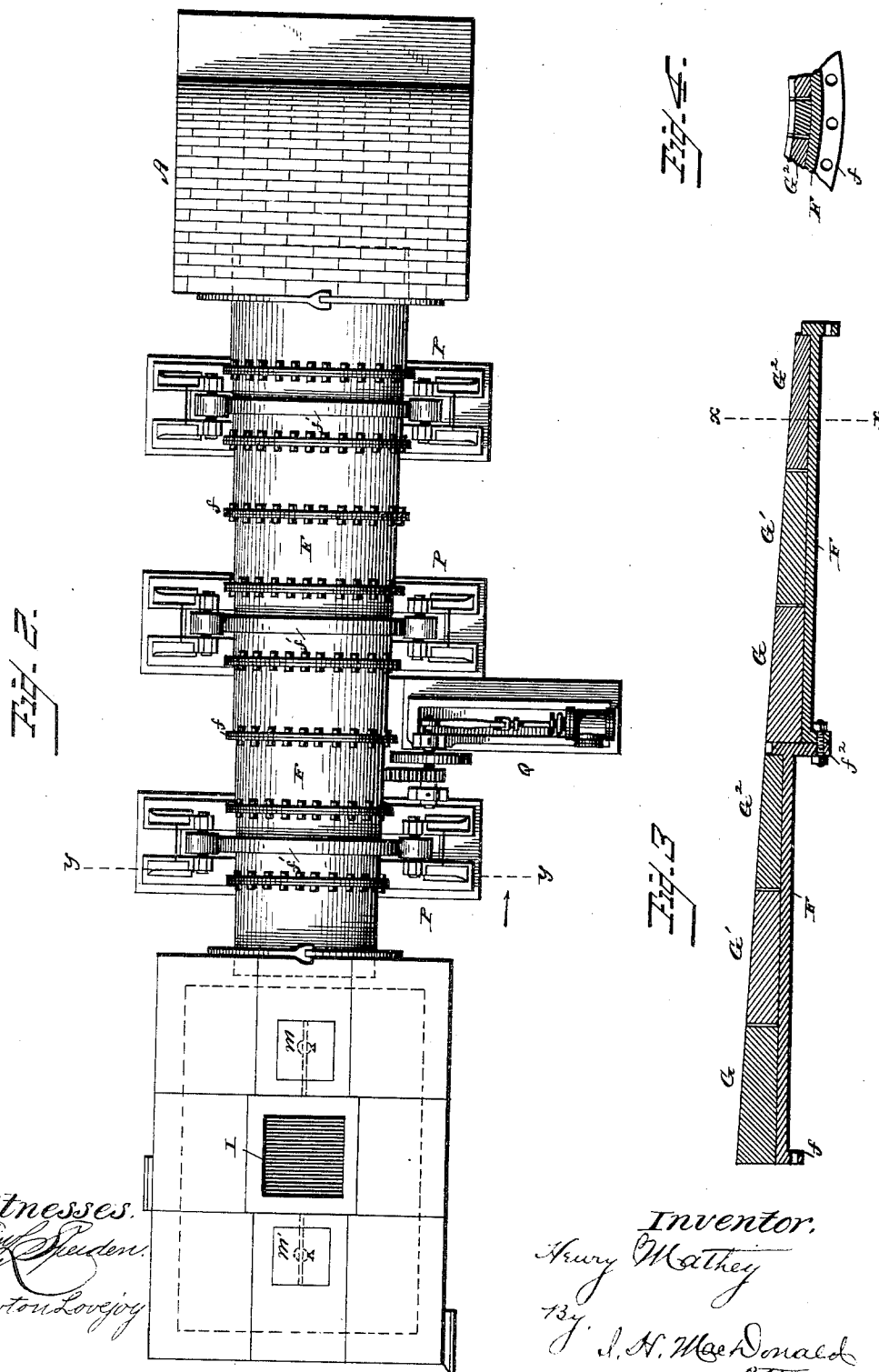
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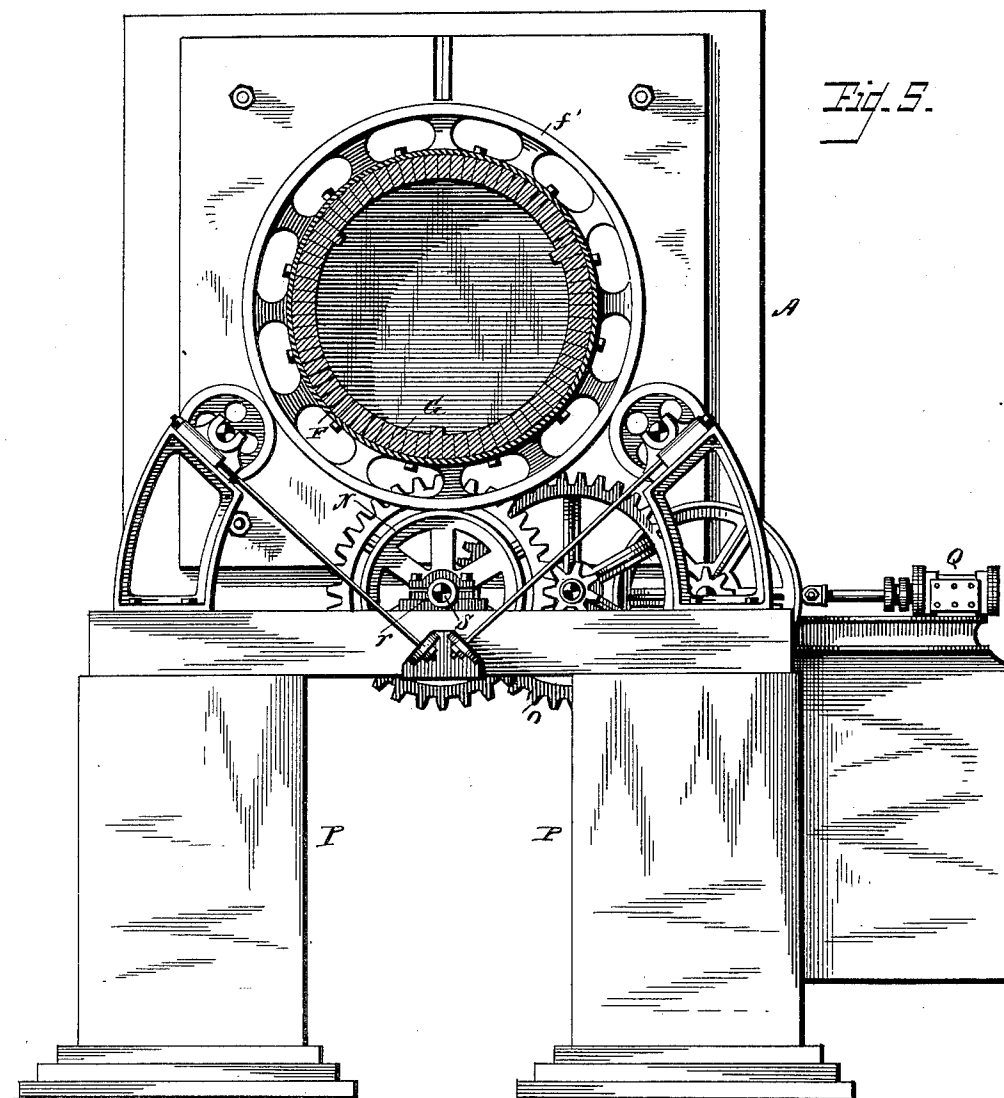
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UNITED STATES PATENT OFFICE.

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REVOLVING FURNACE.

SPECIFICATION forming part of Letters Patent No. 325,259, dated September 1, 1885.

Application filed March 17, 1885. (No model.)

To all whom it may concern:

Be it known that I, HENRY MATHEY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Improvement in Furnaces, of which the following is a full, clear, and exact description of the same, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in revolving furnaces, and has for its object the perfect and rapid calcining of cement-rock, burning of garbage, and roasting of ores.

The invention consists, first, in a revolving cylinder, each part of the shell of which is horizontal when in position, the conical shape of the inside being obtained by means of a particular lining, which will be hereinafter more particularly described.

It further consists of certain details of construction and operation of the several parts, as will be fully set forth in the specification, and pointed out in the accompanying drawings, in which—

Figure 1 is a transverse vertical section of the furnace; Fig. 1^a, a vertical section of the furnace-flues and cooling-chamber; Fig. 2, a plan view of the furnace; Fig. 3, a longitudinal section of the outer shell of the cylinder and its inside lining; Fig. 4, a section on the line $x x$, Fig. 3; and Fig. 5, an end view showing the bearings on the cylinder and adjustable frictional guides.

I will first describe the revolving cylinder, referring by similar letters to similar parts.

The cylinder F is composed of a series of wrought or cast iron sections diminishing uniformly from end to end, so that each section from the first is smaller than the preceding one. Each section is provided at one end with a flange, f , and at the opposite end with a flange, f^2 , extending upward into the shell and outward therefrom, as shown in Fig. 3. The downward part of the flanges permits the sections to be bolted together, and the inward portion of flange f^2 forms an abutment for the lining. The lining of each section consists of three or more fire-bricks, $G G' G^2$, filling exactly the space between the end flanges, $f f^2$,

and so decreasing in height that from flange f to flange f^2 the difference between the heights of the end bricks, $G G^2$, will be the exact difference in height of the several sections when bolted together, and therefore, when the sections are joined together, the lining will be cone-shaped, substantially as shown in Fig. 3. The object of this conical lining is to give a gradual descent or fall of the inclosed material from the charging to the discharging end of the furnace. The shell of the cylinder F is further provided with three or more exterior flanges, f' , which form frictional bearings for the friction-wheels $N N'$, which transmit motion to the cylinder. The crowns of these flanges f' are of different height, so as to arrive at the horizontality of the bearings on the friction-wheels $N N'$, the deepest crown being at the small end of the furnace, and illustrated in detail in Fig. 5. The cylinder F rests on the wheels $N N'$, the end ones having flanges n , the center one or more, N' , being without flanges, the object of these flanges being to keep the cylinder in place and prevent shifting. It is obvious, of course, that the wheels $N N'$ may be smooth and the crown-flanges f' have exterior guides which bear against the outside of the wheels $N N'$. These wheels $N N'$ are keyed or otherwise rigidly secured to a shaft, S, to which power is transmitted by means of gearing-wheels O, which are in turn set in motion by an engine, Q. The bearings r of the gearing-wheels O and friction-wheels $N N'$ are in the same horizontal plane, as it is apparent that the side friction on the flanges above mentioned is reduced to a minimum, and therefore the power necessary to revolve the cylinder is also decreased to a minimum. By this direct action of the power the speed of the cylinder can be so regulated that the time the material submitted to treatment has to remain in the furnace can be readily controlled, as it is easy to understand that the faster the cylinder revolves the faster the material will travel from end to end of the furnace. The furnace is heated by two fire-places, $A' A^3$. By the special disposition of fire-place A' it is nearer to the cylinder than in the furnaces generally constructed, and therefore giving a maximum amount

of caloric for a given amount of fuel. Through shaft A² falls the material from the cylinder after its first burning, and as it is discharged from the cylinder comes in contact with the flame generated by the fire-place A³, thereby completing the calcining, burning, desulphurizing, and roasting. The material, after being submitted to the two fire-places, falls into the shaft A⁴ (which is reduced in size from the shaft A²) onto a revolving trap-door, b, having a water-compartment. The door prevents the cold air from the cooling-room B rising into the heating-shafts just described. The object of the water-compartment is to keep the door b cool and prevent its warping. The cooling-room B is supplied with a draft, D, and an outlet, D', which passes underground to a ventilating-shaft erected outside. The floor U of said cooling-room is of wrought or cast iron, with a water-compartment, which, being kept cool by the passage of the water, assists in rapidly cooling the material treated before being discharged into the cars T through the discharge-doors d. Fig. 1^a shows the treated material automatically and regularly discharged by two screw-conveyers, V.

The material to be treated in the furnace is dumped into the feed-tube k, which is surrounded by a water-jacket, L, the water jacket having an outlet-pipe, m', and an inlet-pipe, m. The object of the water-jacket is to keep the feed-pipe cool, and thus prevent any caking of the material before it reaches the cylinder F. A flange, g, at the small end of the cylinder prevents the material dropping back into the dust-chamber H, having exit-flue H³ and door H². Said dust-chamber is so constructed with an inclined floor that when a certain amount of light material accumulates therein it falls back into the cylinder below the mouth of feed-tube k. In case of high chloruration of silver ore this dust-chamber is provided with an extra fire-place, H', which generates sufficient heat to transform into chloride of silver the light material which has been carried away by the draft into the sub-dust-chambers. These sub-chambers will also be constructed in case of burning garbage, and their object in this instance will be to receive, condense, and prevent any light material being carried into the atmosphere. I may also use petroleum for fuel instead of coal or wood.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a revolving furnace, a cylinder consisting of two or more sections suitably joined together, each section of said cylinder having a conical lining, substantially as described, and for the purpose set forth.

2. In a revolving furnace, a cylinder consisting of two or more sections, each section having one end flanged, projecting outwardly from the cylinder, the opposite end of the section having a flange projecting into and outwardly from the cylinder, substantially as and for the purpose set forth.

3. In a revolving furnace, a cylinder consisting of two or more sections, each section having an inwardly-projecting flange to form an abutment for the lining of the cylinder, substantially as and for the purpose set forth.

4. In a revolving furnace, a cylinder consisting of two or more sections, the lining of said cylinder consisting of a series of bricks of gradually-diminishing height, as described, whereby said lining is made cone-shaped, substantially as and for the purpose set forth.

5. In a furnace, a cylinder consisting of one or more sections, as described, and provided with a lining of fire-brick, the difference in height of the end brick of each section being the difference in height of the sections when bolted together, whereby the lining is rendered conical, while the sections remain horizontal, substantially as set forth.

6. In a furnace, a cylinder consisting of two or more sections, each section having a conical lining, in combination with wheels whose bearings are in the same horizontal plane, and mechanism for operating the same, whereby torsion and side friction on said wheels and cylinder is reduced to a minimum, substantially as described.

7. In a revolving furnace, the combination, with a cylinder, of two fire-places, one placed above and in advance of the other, and a flue-shaft, which permits the material heated by the first fire-place to come into direct contact with the heat from the lower fire-place as it falls from the cylinder, whereby the calcining, roasting, and burning is completed, substantially as described.

In testimony whereof I have hereunto signed my name in presence of two witnesses.

HENRY MATHEY.

Witnesses:

EMMA M. GILLET,
JOHN G. KROHR.