

No. 610,580.

Patented Sept. 13, 1898.

J. F. DORNFELD.

MALT KILN.

(Application filed Apr. 24, 1897.)

(No Model.)

2 Sheets—Sheet 1.

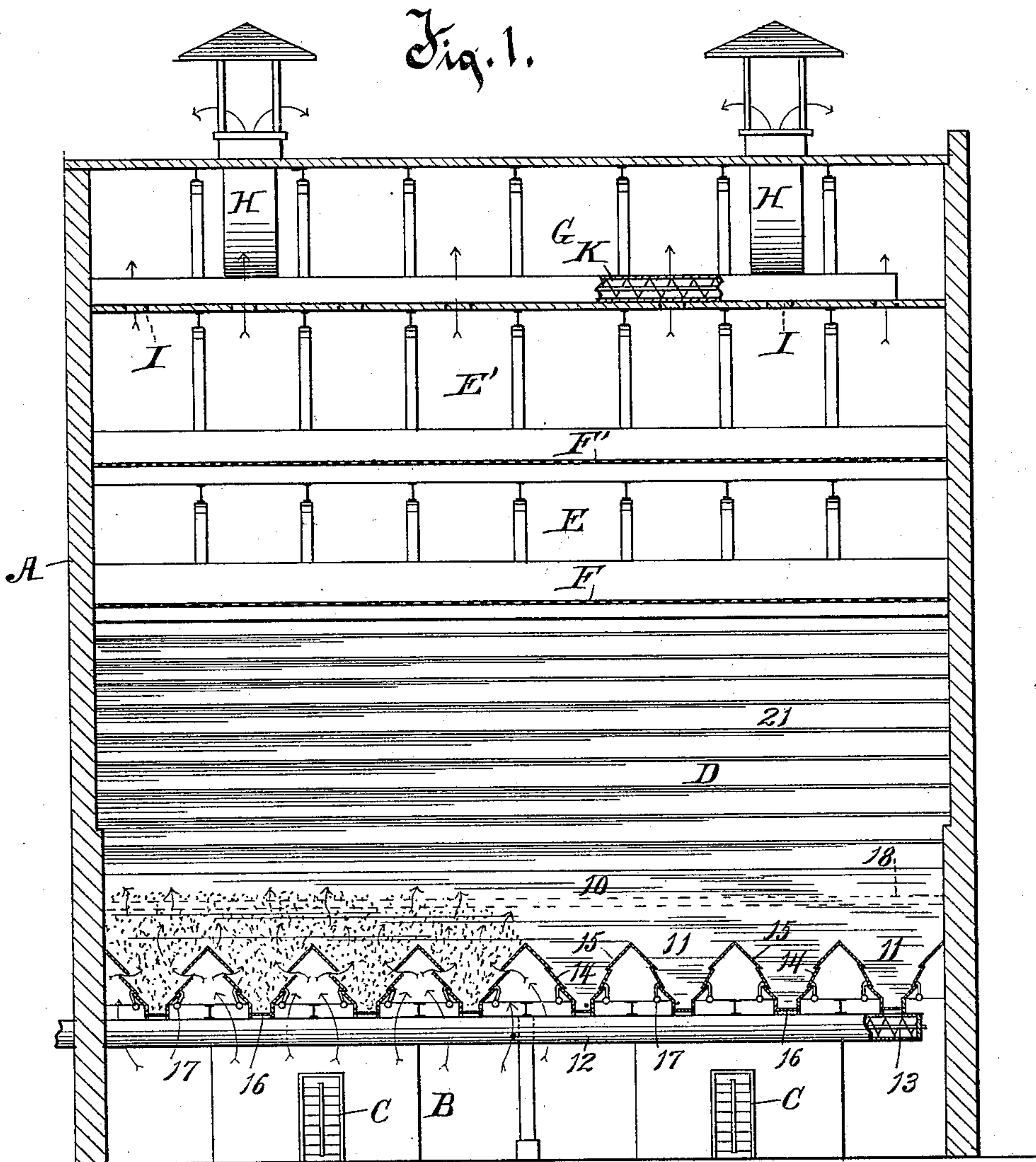
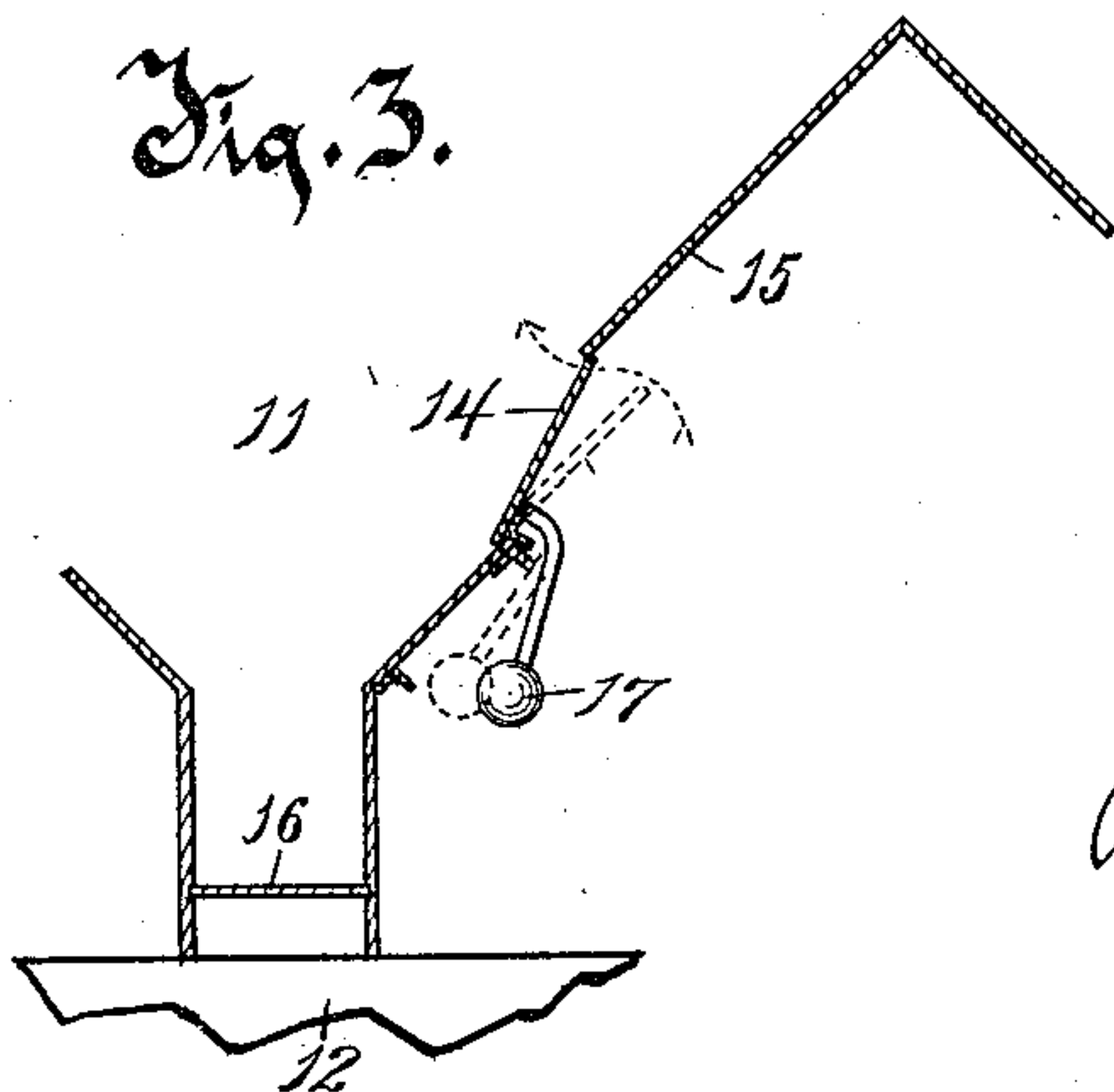


Fig. 3.



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2 Sheets—Sheet 2.

Fig. 2.

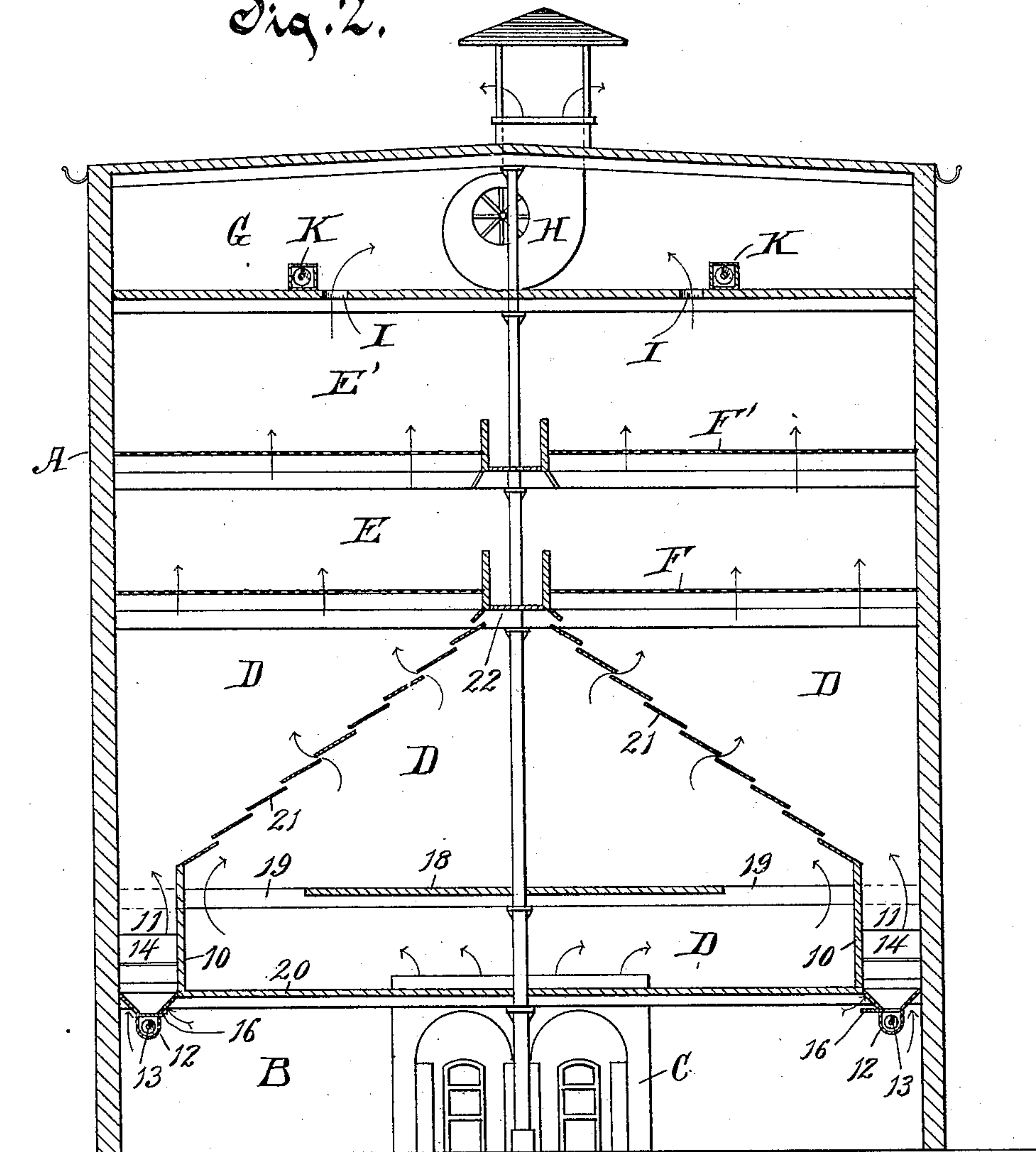
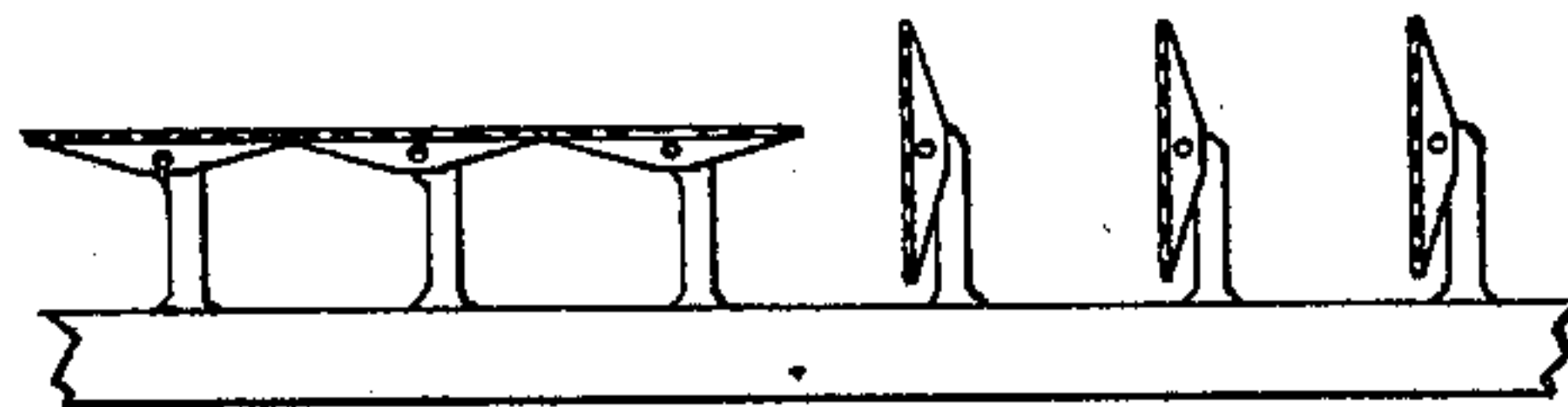


Fig. 4.



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# UNITED STATES PATENT OFFICE.

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## MALT-KILN.

SPECIFICATION forming part of Letters Patent No. 610,580, dated September 13, 1898.

Application filed April 24, 1897. Serial No. 633,615. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN F. DORNFELD, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Malt-Kilns, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

Among the principal objects of my present invention are, first, to provide means for preventing cinders, ashes, and foreign matter, especially such as escapes from the furnaces or fires and that are mingled and float in the air to a certain extent in the malt-kiln, from coming in contact with and getting into the malt; second, to provide improved means for moving and conveying the dried malt from the drying-floors out of the malt-kiln or to storage-bins, and, third, in connection therewith to provide improved means for ventilating and cooling the finished malt in the kiln and utilizing the heat therefrom.

Other improvements in the malt-kiln are incidental to the chief purposes of the invention, as stated.

In the drawings, Figure 1 is a vertical longitudinal section of a malt-kiln having my improvements therein. Fig. 2 is a transverse section of the same malt-kiln. Fig. 3 is a detail of one feature of the ventilating devices. Fig. 4 is a fragmentary detail of a drying-floor, showing the construction and method of tilting sections of the floor for dumping the malt therefrom.

In the drawings, A is a malt-kiln provided with a cold-air room B, in which a furnace or furnaces or open hearths C are located, above which is the hot-air room D, and above this hot-air room are one or more drying-rooms E and E', which rooms are provided with perforated malt-drying floors F F', respectively, which floors are preferably constructed in sections capable of being tilted for dumping the malt therefrom. An exhaust-air room G above the drying room or rooms is also preferably provided, in which exhaust-air room may be located a suction-fan or blower H for moving the air through and out of the malt-kiln. The drying-floors F F' are preferably arranged in compartments, with a walk or gangway between for the attending maltster. The space about the furnaces C, more or less

inclosed, is open upwardly into the hot-air room D, and the perforated floors above permit the passage of the hot air through them to the drying-rooms E E', and air-ports I I are provided in the ceiling of the upper drying-room for the passage of air therethrough into the exhaust-air chamber G, which chamber in turn is provided with an exhaust-air duct leading from the suction-fan H into the open air.

In the hot-air room D, directly above the furnaces C and the flues opening therefrom into the room D, there is a deflecting platform or hood 18, leaving open spaces 19 19 at the side edges thereof for the passage of air there-through upwardly, the construction being such that the platform or hood 18 serves to deflect the upward movement or current of hot air to the right and left and by means of this deflection of the air to also deflect or carry the cinders, ashes, and other foreign matter that comes up into the room D from the furnaces C to the right and left in the hot-air chamber and cause these cinders, ashes, and foreign matter mostly to fall on the floor 20 of the room D, thus preventing the cinders, ashes, and foreign matter largely from ascending farther. In addition to the deflecting-hood 18 above the furnaces C, I also provide in the room D a ventilating canopy or wall or floor adapted further and more completely to separate ashes and foreign matter from the ascending air and cause their deposit on the platform or hood 18 or floor 20, thus thoroughly purifying and depriving the air of foreign matter before it comes in contact with the malt being dried thereby on the floors F F'. The canopy consists of a number of plates or slats 21 21, arranged in two series extending, respectively, from the walls 10 10 upwardly and inwardly to a partial floor or gangway 22 near the lower drying-floor F. These slats or plates 21 extend entirely across the room D from end to end, being arranged one above the other in inclined positions and each being separated a little distance from the adjacent slat, so as to permit of ventilation between them, each slat at its lower edge overlapping the next lower slat. This construction and disposition of the slats forms not only a ventilating-canopy over the hood 18, adapted to deflect ascending ashes, but



also inclined and hopper-like walls underneath the drying-floors F F', adapted to receive therefrom the dried malt and by gravity to convey it downwardly and discharge it therefrom, as into the hoppers 11 11, when such hoppers are provided.

As it is desirable to discharge the finished malt from the kiln at one or more places to which it is gathered, and conveniently by a conveyer or conveyers, a series of hoppers may be used for gathering the malt discharged from the drying-floors. For this purpose the hot-air room D may have the partial walls 10 10, providing spaces between them and the walls of the building, in which spaces are a series of hopper-bins 11 11 for holding and discharging the malt through their throats, having slide-valves 16, into tubes or conduits 12 under each series of hoppers, respectively. These conduits are each provided with a spiral revolving conveyer 13, adapted to convey malt through them to the places of discharge therefrom.

A medial section 14 of each inclined side wall of each hopper is so constructed and arranged in the wall of the hopper as to form an automatic valve therein, adapted normally to close the valve-aperture, but under the weight of malt thereon, as shown at the left in Fig. 1, to open sufficiently to permit of the passage of cool air from the room B upwardly through the wall and through the malt, as indicated on Fig. 1. For this purpose the medial section or valve 14 is hinged to the edge of the wall below it and extends upwardly and laps against the under side of the wall 15 above. This valve is made to close automatically, normally by counterpoising it with a weight or weights 17, secured to the valve on the under side by an arm, the weight being so disposed with reference to the pivotal point of the valve as normally to close it upwardly against the hopper-wall 15 above and under weight of malt falling on the upper portion of the valve to permit the valve to yield limitedly, substantially to the extent indicated by dotted lines in Fig. 3, while the malt is thereon, thus permitting the passage of air through the valve-aperture when the valve is thus held open by the weight of malt thereon. The valves are thus opened automatically by the weight of the malt thereon and ventilation is secured thereby, and the valves close automatically as soon as the malt has passed off of them. By this construction the malt can be held in the hopper-bins 11 11 and cooled by passing cold or cool air through it, thus reducing it to a proper temperature before it is transferred to an elevator or general storage-bin, and the cool air that passes through the hot or warm malt will be raised in temperature and thus adapted to be utilized for drying green malt on the drying-floor above. Cool air from room B can pass freely upwardly past the conveyer-tubes 12 into the spaces between the hopper-bins 11 11 and thence through the valves 14.

Grain-conveyers K K, preferably located on the floor of the exhaust-air room G, are provided, adapted for conveying malt into and across the malt-kiln building, and from which it is discharged and distributed through the floor of the exhaust-air room on the drying-floors F F' below.

While the forms of construction shown and specified are considered to be the best for the results to be obtained, I do not wish to limit myself exclusively to such mechanical details from the employment of others substantially equivalent thereto and within the true meaning and spirit of this invention.

What I claim as my invention is—

1. In a malt-kiln, the combination with a drying-floor, of one or more hopper-bins for malt below said drying-floor said hopper-bins having an inclined wall provided with an aperture therein having a valve disposed at an inclination and so supported as to close normally but to open for ventilating purposes only, under the weight of malt on and moving across it.

2. In a malt-kiln, a malt-receiving hopper-bin, having an inclined wall provided with a valve-aperture therein, and a valve hinged in said aperture and provided with a counterpoise adapted normally to close the valve but to permit it to open limitedly for ventilating purposes only, under the weight of malt thereon.

3. In a malt-kiln, the combination with the kiln-building and a cold-air and furnace room in its lower portion, of a hot-air room over the furnace-room, a deflecting-hood in the hot-air room directly above the furnace-flue to said hot-air room, and passages for air upwardly past the hood in the hot-air room.

4. The combination with a malt-kiln building provided with a dumping drying-floor, of malt-receiving hopper-bins below the drying-floor, and an inclined hopper-like open-slatted ventilating-wall beneath the drying-floor and leading downwardly to the hopper-bins.

5. The combination with a malt-kiln building having a furnace in its lower portion and a perforated drying-floor in a room above, of a ventilating inclined slat-wall below the drying-floor disposed and adapted for ventilating malt and conveying it from the drying-floor downwardly and laterally by gravity.

6. In a malt-kiln, the combination with a drying and malt-dumping floor, of a series of hopper-bins below the drying-floor adapted to receive and discharge malt into a conveyer, and a ventilating inclined slat-wall so constructed and disposed as with the hoppers to receive the malt dumped from the entire drying-floor above, the ventilating inclined slat-wall being adapted by gravity to convey the malt falling from the drying-floor on it, to the hopper-bins.

7. In a malt-kiln, the combination with a perforated and dumping floor for drying and discharging malt, of hopper-bins below into which the malt discharged from the drying-



floor above is received, valves in the hopper-bins closed yieldingly and adapted to open automatically under the weight of malt discharged thereon from the drying and dumping floor and thereby to permit the passage of air therethrough while the malt is thereon to the drying-floor above.

8. In a malt-kiln, the combination with the kiln-building of a hot-air room arranged to receive hot air coming upwardly into it, of a deflecting-hood in the hot-air room above the hot-air flue or flues entering said room, and an inclined malt gathering and discharging wall or floor over the deflecting-hood, provided with ventilating-apertures adapted to permit the passage of air upwardly through said floor.

9. In a malt-kiln, the combination with a

perforated and dumping drying-floor, a hot-air room below the drying-floor provided with means for introducing hot air into the hot-air room at its lower part, and an inclined malt gathering and discharging wall or floor in the hot-air room, at a distance below the perforated drying-floor and above the hot-air inlet disposed and adapted for receiving and gathering finished malt thereon from the malting-floor, and provided with ventilating-apertures for the passage of hot air therethrough upwardly.

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

JOHN F. DORNFELD.

Witnesses:

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