

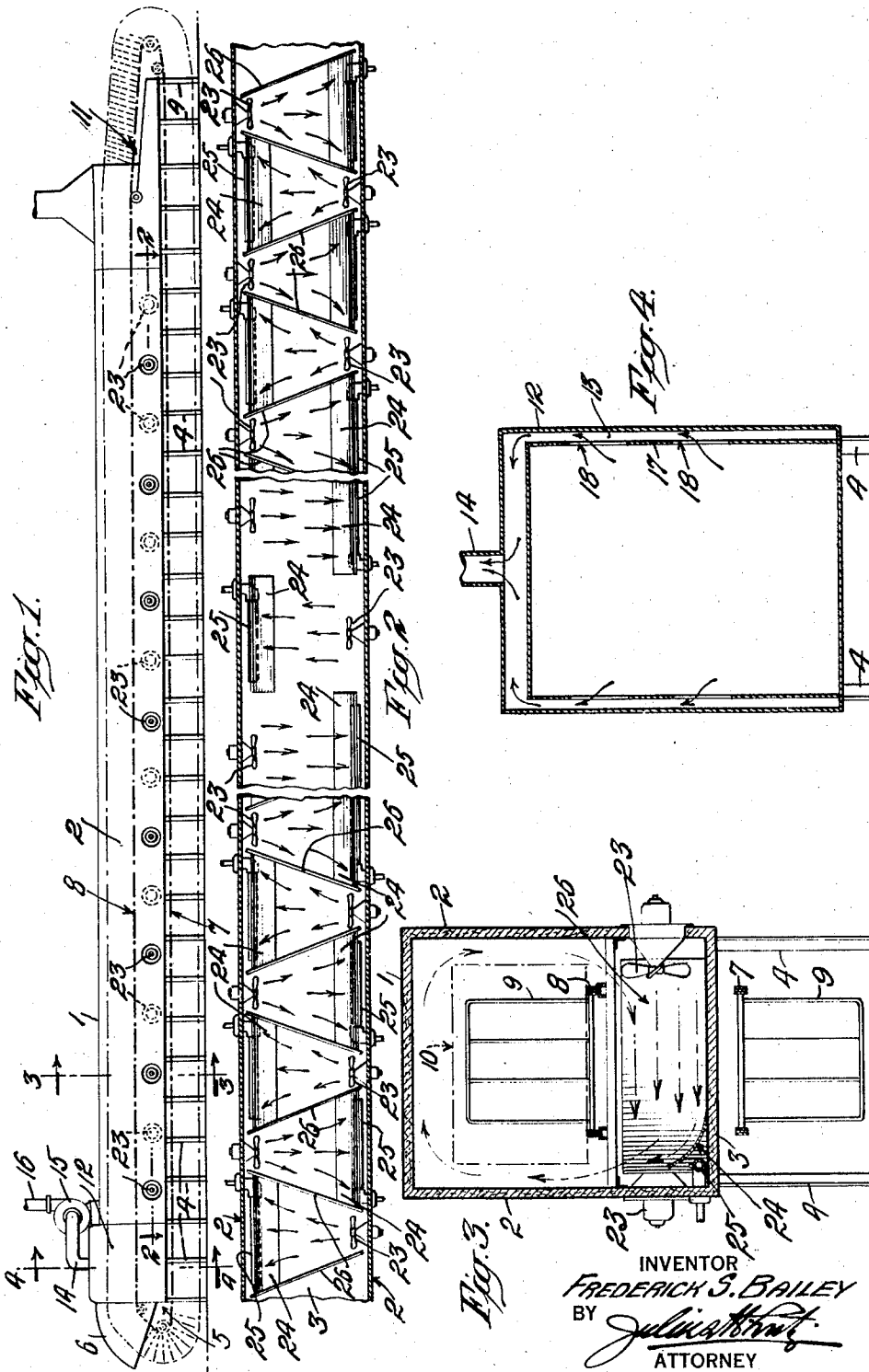
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METAL SHEET DRYING OVEN

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## METAL SHEET DRYING OVEN

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This invention relates to an apparatus for drying freshly-coated, lacquered or varnished sheet metal plates, and the object of the invention is to provide means for efficiently drying the plates while the same are moved on a conveyor through a drying chamber or oven.

More particularly, the invention contemplates the provision of a lengthy chamber or oven through which the plates to be dried are carried on a conveyor; the provision of a plurality of air-circulating elements or fans arranged along at least one of the walls of the chamber near the floor thereof to direct air blasts toward the opposite side wall of the chamber where a plurality of heating elements or burners are located, with deflector plates located between the fans and the burners. The invention also contemplates the provision of baffle plates by which the air blast of each fan is directed toward the deflector plates to concentrate the air blast thereon and to aid in the transverse circulation of heated air through the chamber between the plates to be dried.

In the accompanying drawing, wherein an embodiment of the invention is shown, Fig. 1 is a side elevation of the improved structure with certain portions thereof diagrammatically illustrated; Fig. 2 is a horizontal sectional view of a portion of the structure of Fig. 1; Fig. 3 is a sectional view on the line 3—3 of Fig. 1, looking in the direction of the arrows; and Fig. 4 is a sectional view on the line 4—4 of Fig. 1, looking in the direction of the arrows.

The drying chamber or oven is in the form of a lengthy structure which may be composed of sheet metal or other suitable material and provided with a top or roof 1, side walls 2, and a bottom or floor 3, the structure being supported in an elevated position upon supporting legs 4, or by any other suitable supporting means. The walls, top and bottom of the chamber are lined with an insulation or are otherwise suitably insulated. At one end, the chamber is open as indicated at 5, this end of the chamber comprising the entrance end, where the conveyor is loaded with the freshly coated plates, the entrance opening being provided with a hood or other protective device 6. Mounted to move through the chamber is an endless chain conveyor, which has its lower stretch 7 movable below the bottom or floor 3 of the chamber, and its upper stretch 8 movable through the chamber in a direction toward the right in Fig. 1.

The conveyor is provided with a plurality of spaced racks 9 between which the plates 10 to be

dried are supported on edge, so that the plates are carried through the chamber by the conveyor in the manner well understood in this art, the dried plates finally emerging out of the open exit end 11 of the drying chamber and being sufficiently cool to permit their being lifted off the conveyor. The structure thus far described is well known in this art.

At the entrance end 5 of the chamber, a double walled enclosure 12 is provided, the spaces 13 between the walls thereof forming passages or ducts through which vapors or fumes emanating from the varnished or coated plates which have just entered the chamber, may be drawn upwardly into the pipe 14 by means of the suction pump 12 and exhausted therefrom through the pipe 16 to atmosphere. The inner wall 17 of the chamber 12 is formed with a plurality of apertures 18 through which the vapors pass to enter the passages 13 as indicated by the arrows in Fig. 4.

As the plates are carried through the chamber on the upper stretch 8 of the conveyor they are carried past a plurality of air-circulating units which circulate air through the chamber and around the plates, the air thus circulated being heated by suitable heating means. In the form shown, each air-circulating unit comprises a fan 23 mounted in one of the walls 2 of the chamber near the bottom or floor 3 thereof and disposed to direct a blast of air toward the opposite side wall of the chamber. Located directly opposite to each of the fans 23 is a deflector plate 24, secured to the floor 3 and rising and curving upwardly therefrom and disposed directly in front of a gas burner 25 or similar heating device. As the fan directs an air blast toward the burner the upwardly curved, interposed deflector plate protects the gas flame from the blast, and the heated air is driven upwardly by the air blast from the fan and is caused to circulate transversely of the chamber and around the coated plates being carried by the conveyor.

It will be noted that the fans, the burners and deflector plates therefore are arranged in staggered relationship. That is to say, the burners along one of the side walls are spaced apart, with fans located in the spaces between them and a similar arrangement is had along the opposite wall, with the burners and deflector plates so arranged that those along one wall face fans on the opposite wall. The staggered arrangement of the fans and the cooperating burners and deflector plates will be clearly apparent from Fig. 1.

A plurality of angular baffle plates 26 extend upwardly from the floor 3 of the chamber and are arranged transversely of the chamber. Each pair of baffle plates 26 extends divergently from one of the fans and acts to provide a widening air passage from each fan to the deflector plate against which that particular fan directs its air blast. By means of this arrangement of baffle plates disclosed, the direct intermingling of air blasts from the oppositely disposed fans does not take place until each air blast has impinged against the deflector plate toward which it is directed, and has been deflected thereby to rise above the baffle plates and there mingle with the heated air being circulated in similar manner by the several fans.

For desirable results it has been found useful to utilize the arrangement of divergent baffle plates between the burners and within given areas in the chamber, namely, for a certain distance from the entrance end of the chamber and for a certain distance near the exit end of the chamber, leaving the intermediate portion of the chamber composed of fans, burners and deflector plates arranged as shown at the central portion of Fig. 2, or in other words, with the baffle plates omitted. In this central portion of the chamber a general transverse circulation of air will occur, while near the entrance and exit ends of the chamber a concentration of heated air will result. Of course, it will be understood that almost any arrangement of areas with or without the transverse baffle plates may be had according to various air-circulating arrangements desired, without departing from the spirit of the invention.

Briefly, the operation of the structure is as follows:

The coated plates are placed on the conveyor either manually or by mechanical means. As the plates are carried by the conveyor through the enclosure 12, the fumes and vapors arising from the freshly-coated plates will be drawn through the apertures 18 in the inner wall 17 and will pass out through the exhaust pipe 14. The conveyor thereafter successively carries the plates past the various fans 23, which with their associated burners, direct a continuous flow of heated air around the plates to dry the coating thereon. Any or all of the burners may be controlled thermostatically, if desired, to regulate the heated air temperature in any selected section of the chamber. When the plates approach the exit end 11 of the chamber, cooling means may be provided so that when they emerge from the exit end 11, they are sufficiently cooled to enable them to be conveniently lifted from the conveyor.

What I claim is:

1. An apparatus of the character described comprising, an elongated heating chamber having an entrance opening at one of its ends and an exit opening at its opposite end, a conveyor movable through the chamber from the entrance opening to the exit opening, a plurality of burners near the floor of the chamber and in spaced relationship, spaced fans near the opposite side walls of the chamber at points between the burners, deflector plates located in front of the burners, the fans at each side of the chamber being arranged to direct air blasts toward the deflectors located at the opposite side of the chamber.

2. An apparatus of the character described comprising, an elongated heating chamber having an entrance opening at one of its ends and an exit opening at its other end, a conveyor movable through the chamber from the entrance opening to and out of the exit opening, a plurality of spaced heating elements located near the floor of the chamber and spaced apart along both side walls of the chamber, a deflector plate disposed in front of each heating element, fans located between the deflector plates, the fans located at one side of the chamber being arranged to direct air blasts across the chamber toward deflector plates disposed in front of heating elements at the opposite side of the chamber, and baffle plates extending across the chamber and forming an air passage between each fan and the deflector plate at the opposite side of the chamber against which said fan directs an air blast.

3. An apparatus of the character described comprising, a chamber through which a plurality of coated plates are transported for drying, a plurality of spaced fans disposed along one side wall of the chamber and arranged to direct air blasts toward the opposite side wall, a plurality of burners arranged along the last-mentioned side wall in front of the fans, deflector plates located in front of the burners to receive the blasts from the fans, and a pair of baffle plates extending transversely across the chamber between a fan and a deflector plate, the plates being disposed at opposite sides of the fan at one end and at the ends of the deflector plate at the other end, each pair of said plates diverging from a fan toward a reflector plate.

4. An apparatus of the character described comprising, a chamber through which a plurality of coated plates are transported for drying, a plurality of spaced fans disposed along both side walls of the chamber, the fans on one side of the chamber being situated between those on the other side, all of the fans being arranged to direct air blasts to the side of the chamber opposite to that at which they are located, burners arranged along the side walls of the chamber between the fans, deflector plates in front of the burners, the deflector plates on each side of the chamber being disposed in front of the fans at the opposite side to receive air blasts therefrom, and baffle plates extending across the chamber to form an air passage between each fan and the deflector plate against which it directs an air blast.

5. An apparatus of the character described comprising, a chamber through which a plurality of coated plates are transported for drying, said chamber having entrance and exit openings, a plurality of spaced fans disposed along both side walls of the chamber, a plurality of spaced burners disposed along both side walls of the chamber, spaced deflector plates located in front of the burners, the fans at one side wall being located directly opposite to and directing air blasts against the deflector plates at the opposite side wall, baffle plates extending across the chamber and forming passage ways connecting each fan with the deflector plate against which said fan directs an air blast, said baffle plates being located adjacent fans situated near the entrance and exit openings.

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