Nov. 13, 1934. J. A. PAASCHE 1,980,224

EXHAUST SYSTEM

Filed July 19, 1930 2 Sheets-Sheet 1

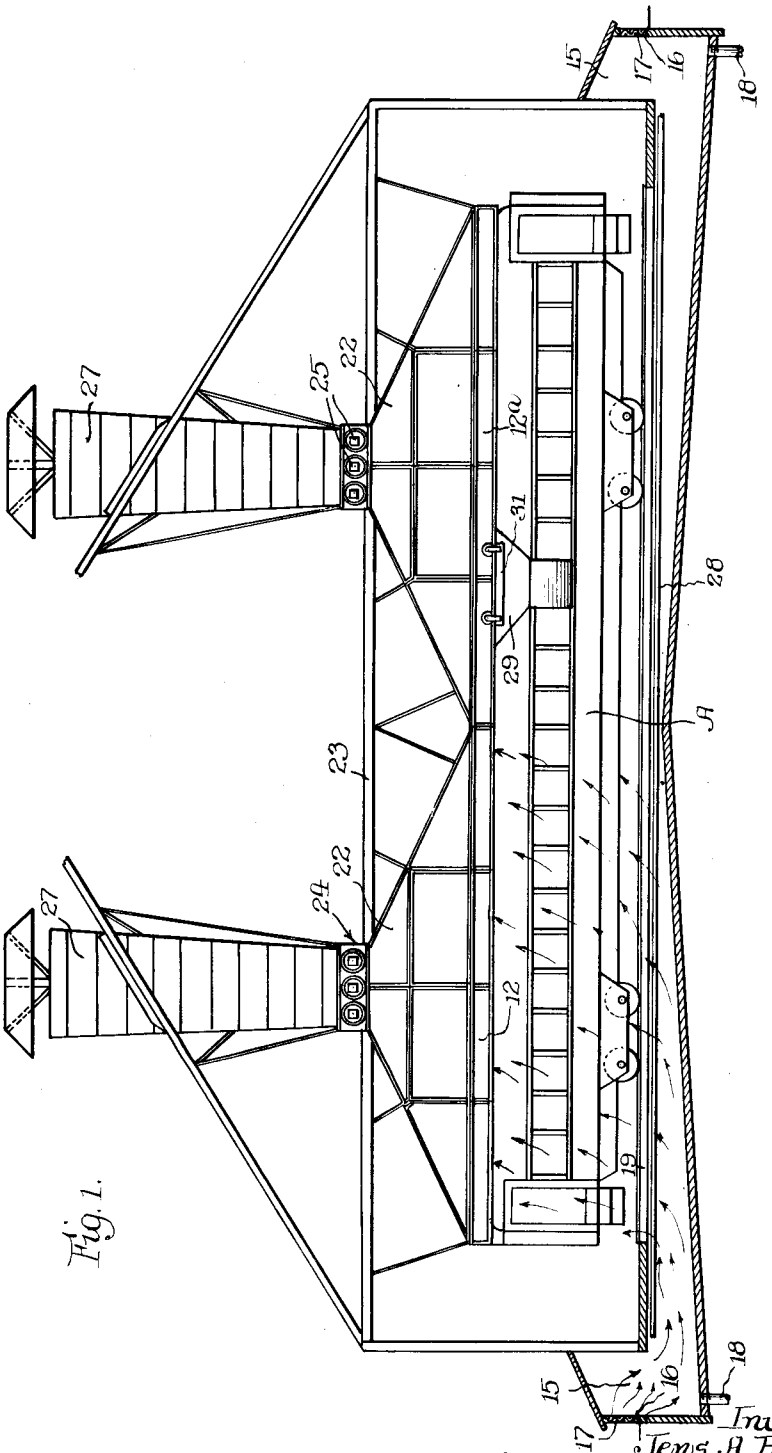


Fig. 1.

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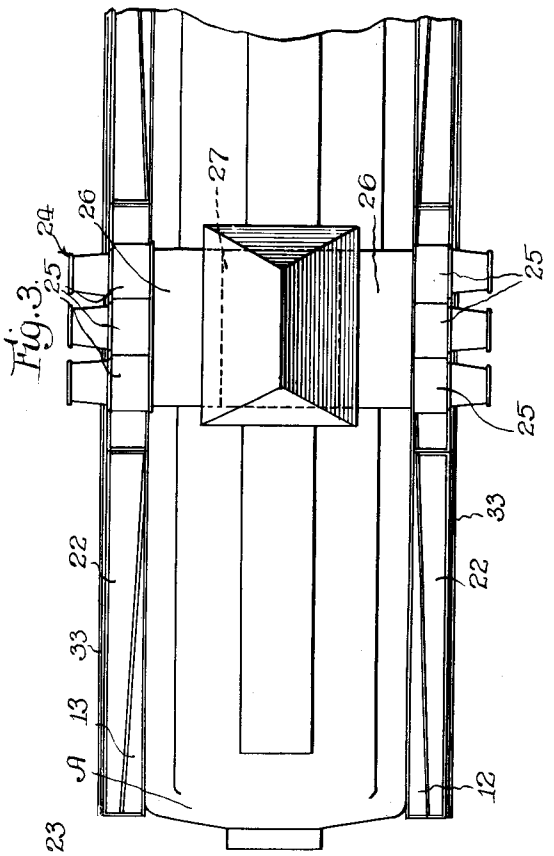


Fig. 3.

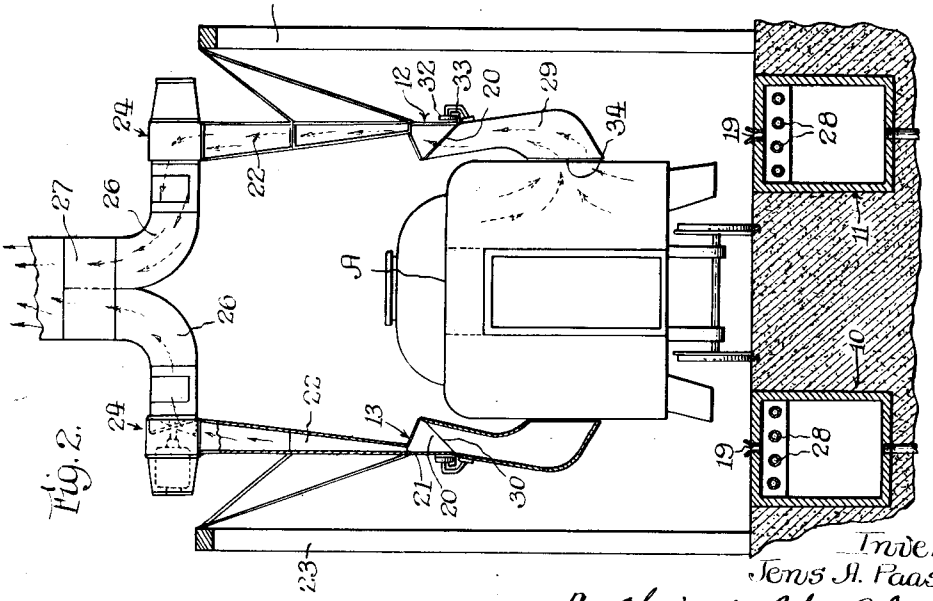


Fig. 2.

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1,980,224

EXHAUST SYSTEM

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Application July 19, 1930, Serial No. 469,037

6 Claims. (Cl. 91—60)

The invention relates generally to exhaust systems and more particularly to an exhaust system operable to remove and eliminate excess or unused coating fluid produced in connection with the use of spray-coating apparatus for painting or otherwise treating articles of substantial size, such as railway cars and coaches.

An object of the invention is to provide a new and improved system of the character set forth which is simple in construction, efficient in operation, may be easily cleaned of foreign matter or accumulations of coating fluid, and which is so arranged that the various parts of the system do not impair or interfere with the natural illumination of the object being treated.

More specifically stated, an object of the invention resides in the provision of a new and improved system which includes a pair of elongated ducts arranged to extend along the upper corners of a railway car or the like and to face inwardly and downwardly toward said corners, a pair of elongated conduits positioned in the floor directly beneath the sides of the car, said conduits being arranged to communicate with atmosphere and having upwardly opening emission openings underlying the sides of the car, and means connected to the upper ducts for creating a flow of air from said conduits into said ducts along the sides of the car to carry excess coating material away from the workman using the spray coating apparatus.

In conjunction with the foregoing, other objects of the invention are to provide means for heating the air current so that the system may also be used for drying coated objects, and in certain refinements of structure which facilitate cleaning of the system.

A further object of the invention is to provide a novel means for ventilating or inducing a flow of air through the interior of a railroad car or the like.

Another object of the invention resides in the provision of means for creating a current of air over the exterior of an object which includes means for creating a flow of air through the interior of said object or through a portion only of said interior.

Other objects and advantages will become apparent in the following description and from the accompanying drawings, in which:

Figure 1 is a side elevation of a system embodying the features of the device.

Fig. 2 is a transverse elevation of the system partially in section.

Fig. 3 is a fragmentary plan view of the system.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawings and will herein describe in detail the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

In the general organization of the system, means are provided for forming a number of elongated air-conducting passageways. These means are spaced regularly apart to define therebetween a space to be occupied by an object to be treated, such as a railway car, coach or the like. By the term "treating the object" is meant any process which operates on the surface of the object, and the particular adaptation of the invention herein illustrated is intended for use in connection with the spray coating or painting of the surface of the object, or in drying said surface after the object has been coated.

Means for creating a flow of air from one to another of the passageways is provided which, preferably, is in the nature of one or more exhaust fans communicating with the upper passageways and arranged to exhaust through stacks which are common thereto. The parts are so disposed that the space between each of the passageway defining means and the next adjacent means is free and open to make possible the substantially uninterrupted natural illumination of an object while the object is being treated.

Referring more particularly to the drawings, 10, 11, 12 and 13 indicate generally the passageways for air. Of these, 10 and 11 will be termed the pair of lower conduits, while the passageways 12 and 13 constitute a pair of upper or overhanging ducts. The conduits 10 and 11 are alike and only one will be described in detail. Inasmuch as the present system will, in almost every instance, be a permanent installation, the conduits are mounted in the floor and for this purpose a casing may be provided to define the conduit. Preferably, however, the conduit is moulded or otherwise shaped, as will be presently described, directly in the floor wherever a permanent floor of concrete or the like may be used.

Referring to Fig. 1, it may be seen that in the preferred form, each conduit is irregular in shape and is so fashioned that at each end thereof a chamber portion 15 of substantial size is formed. From the chambers, the bottom wall of the conduit slopes gently toward the top until an inter-

mediate point is reached to form a structure in which the cross-sectional area gradually decreases as the conduit progresses inwardly from the chambers.

At a suitable point in each chamber, an enlarged aperture 16 is formed in one of the walls of the chambers to communicate with the atmosphere, which apertures are preferably closed by a screen 17 or other suitable foraminous member. Each of the chambers is preferably of ample size to permit a workman to enter the chamber in order to clean the conduit. Each of the chambers has a drain 18 leading therefrom to carry away wash water, seepage, or other moisture.

The conduit has a longitudinally extending slot 19 (Fig. 2) in the upper wall thereof which opens outwardly through the surface of the floor. The relative position of the conduits 10 and 11 is such that the slots will be located substantially adjacent the planes of the opposite sides of the object to be treated, which is diagrammatically illustrated in the form of a railway coach A supported, as usual, on tracks intermediate the conduits.

While in construction the upper ducts 12 and 13 may comprise elongated unitary tubular members extending from one end to the other of the position to be occupied by the railway coach, it is preferred to simplify the construction and installation thereof by dividing the ducts into pairs arranged in end-to-end alinement. The present structure provides two ducts on each side as is shown at 12, 12a (Fig. 1). Since these smaller ducts are alike in construction, it will only be necessary to describe one of them in detail. Each of the ducts comprises an elongated hollow casing having a longitudinally extending open face 20 (Fig. 2) disposed at an angle to the floor so that the face opens inwardly and downwardly toward the corner of the railway coach. The face, furthermore, is of substantial width so that it extends for some distance on either side of an imaginary line representing the corner.

In spaced relation to the open face of the duct is an elongated slot 21 extending the length of the duct, which communicates with a hollow shell 22. As may be seen in Fig. 1, the walls of the shell converge sharply from the point of attachment of the shell with the duct to a substantially central point. The walls (see Fig. 3) also converge from the central point to the ends to taper the thickness of the shell.

This tapering construction eliminates what may be termed "dead-air" pockets or corners in the ducts and shells so that a free circulation of a high volume of air may be most efficiently obtained. The elimination of such pockets is also advantageous in that the highly inflammable dust and residue from the spray painting apparatus cannot collect in the parts and become a fire hazard. This construction furthermore has no parts which cannot be easily cleaned by merely flushing the parts with water or other cleansing mediums.

Suitable means, such as the upright and cross bar structure 23 is provided for supporting the duct and shell in position. The converging central portion of the shell communicates with the inlet side of an exhaust fan unit 24 formed of one or more exhaust fans 25 (Fig. 3). Three of these fans are shown herein as comprising each exhaust fan unit. The outlet side of the exhaust fan units for each transverse pair of ducts communicates through short arcuate conduits 26 with an intermediately positioned exhaust stack 27 which extends upwardly through and may be supported by the roof of the building. The stack preferably is fashioned to flare outwardly from the fan units.

The spaced relation of the ducts 12 and 13, shells 22 and fan units 24 as well as the position of the exhaust stack 27 makes possible the use of natural illumination through a sky-light or the like since the operative parts are comparatively small in size and do not materially hinder the flow of light to the coach.

In operating the device in connection with the spray coating of the exterior of a railway coach, the action of each exhaust fan unit draws a current of air through the upper ducts. Due to the angular relationship of the open faces of the ducts to the adjacent parts of the railway coach, a current of air is created which flows upwardly out of the slots 19 in the conduits 10, 11 and along the sides of the coach to the ducts. Consequently, a workman using a spray coating apparatus is fully protected from the excess or unused portion of the spray, since the upwardly flowing current of air will immediately convey such unused spray to the ducts. Moreover, the angular position of the open face creates a current of air flowing across the top of the coach to remove the excess of coating liquid when the top of the coach is being coated. The flaring construction of the shells 22 and stacks 27 provides a structure through which air may flow freely and with little loss in efficiency due to friction.

In this operation of the system, the tapering portion of the conduit in the floor is so arranged with respect to the suction normally exerted by the tapering portions of the ducts that a steady, evenly distributed and balanced flow of air from the conduits is produced. The provision of a number of overhead ducts and of an exhaust fan unit for each duct is advantageous in that each duct may be operated separately or in combination with any of the other ducts while the workmen spray a particular part of the coach. Moreover, the separated fan units insure that a required volume of air will be circulated over each part of the surface of the coach.

Where the nature of the work permits, the present system may be utilized to facilitate drying the object after it has been coated. While this may be accomplished by merely causing a circulation of air across the coated surface, it is desirable to provide heating units such as the steam coils 28 within the conduits 10 and 11. These heating units preferably extend the length of the conduits adjacent the slots 19 therein so that the air issues from the conduits in a highly heated condition.

Means are provided for adapting the system to ventilate or create a current of air flowing through the interior of the coach. In the present instance, this means comprises a somewhat arcuately shaped tubular member 29 (Figs. 1 and 2) having one end constricted to provide an open face 30 adapted to register with a portion of the open face 20 of the duct. The tubular member is secured to a carriage 31 which includes a pair of rollers or small wheels 32 arranged to engage a track or guide 33 mounted on the duct. The guide extends the full length of the alined ducts so that the position of the tubular member may be adjusted at any point along the length of the duct.

The lower or free end of the tubular member

is suitably formed to provide a vertically disposed open face 34 arranged to communicate with any of the windows of the coach or with any other suitable opening leading into the interior thereof. This construction permits the tubular member to be positioned at any of the windows of the coach so that upon operation of the exhaust fan units for the particular duct, upon which the tubular member is mounted, a current of air may be drawn through the interior of the coach. This is particularly advantageous when the workmen are engaged in painting the smaller compartments within the coach, since the circulation of air induced by the system is ample to withdraw the excess coating spray. Generally, one of the tubular members will be provided for each side of the coach.

The arcuate shape of the member 29 as well as of the conduit 26 allows the air to flow freely therethrough without undue friction loss and consequent reduction of efficiency. This structure coupled with the flaring construction of the other conduits and passageways produces an organization capable of high efficiency of operation with a low power consumption.

I claim as my invention:—

1. In an exhaust system, the combination of an exhaust duct arranged to extend along the upper side of a railway car or the like, means for drawing air through said duct, an extension for said duct in the form of a conduit arranged to communicate with said duct at any point along the length thereof, and means for adjustably mounting said extension along the length of said duct, said extension having a free end adapted to communicate with a window or other aperture leading into the interior of the railway car.

2. In an exhaust system, the combination of an elongated exhaust duct having an open face positioned substantially adjacent the space occupied by a railway car or similar object, means for creating a flow of air into said duct through the open face thereof, and a tubular member supported on said duct for movement longitudinally thereof, said tubular member having one end thereof arranged to communicate with the open face of said duct and having the other end positioned to communicate with the interior of a railway car through a window or like opening in said car.

3. In an exhaust system, the combination of means for creating a flow of air across the external surface of a railway car or the like, and an auxiliary duct communicating with said means and adjustably movable to communicate with any opening leading to the interior of the railway car.

4. In an exhaust system, the combination of an elongated exhaust duct having an open face positioned substantially adjacent the space occupied by a railway car or similar object, means for creating a flow of air into said duct through the open face thereof, and means for establishing communication between said duct and the interior of the object comprising an elongated tubular member, means providing a track-way along the length of said duct and a carriage on which said tubular member is mounted arranged to travel along said trackway and to support said tubular member with one end thereof in communication with the open face of said duct, said tubular member being of such length that the free end thereof may communicate with the windows or like apertures in the railway car.

5. In an exhaust system operable in connection with the process of treating the surface of a railway coach or the like, the combination of means for creating a flow of air over the surface of the coach, a conduit communicating with said means, and means for adjustably supporting said conduit in communication with one or another of the openings in the coach leading to the interior thereof.

6. In an exhaust system, the combination of an elongated overhanging duct adapted to be positioned along and substantially adjacent to an upper corner of a railway car or similar object, and means including an air impeller connected with said duct for creating a flow of air from the interior of said car through an opening in a wall thereof and into said duct.

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