Aug. 28, 1928. 1,682,407

E. H. NELSON ET AL

PAINT SPRAY BOOTH

Filed Aug. 18, 1927 2 Sheets-Sheet 1

Fig. 1.

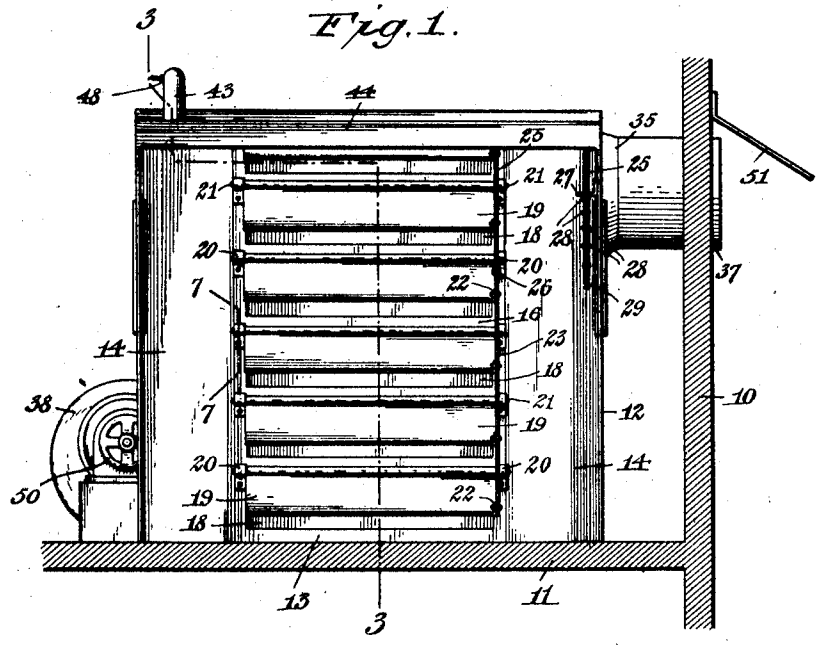


Fig. 2.

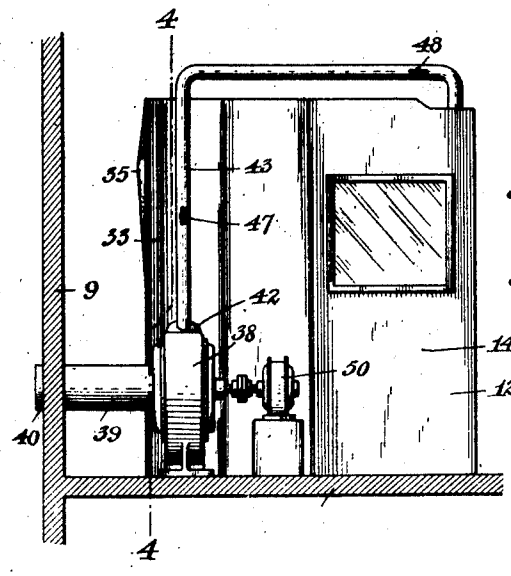
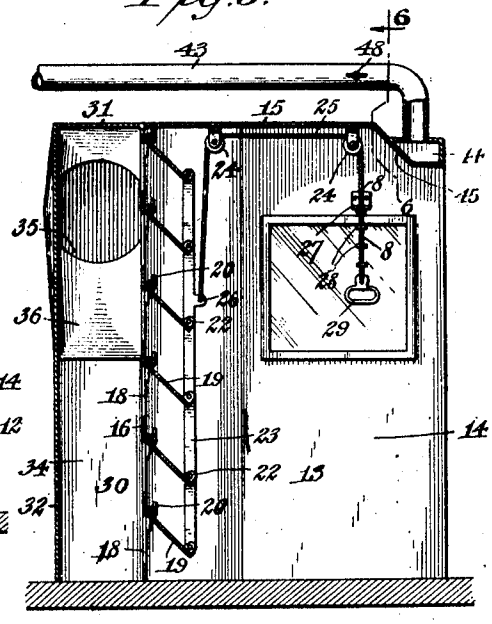


Fig. 3.



Witness:
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Fig. 4

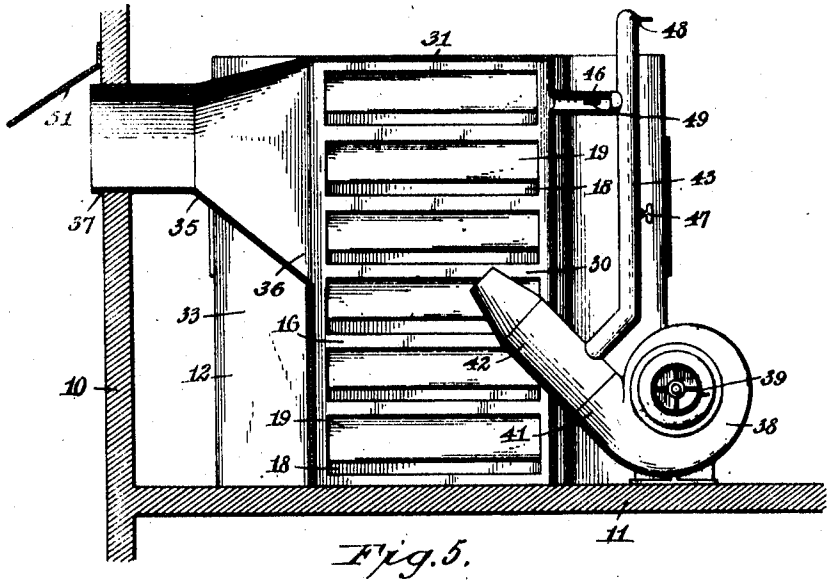


Fig. 5.

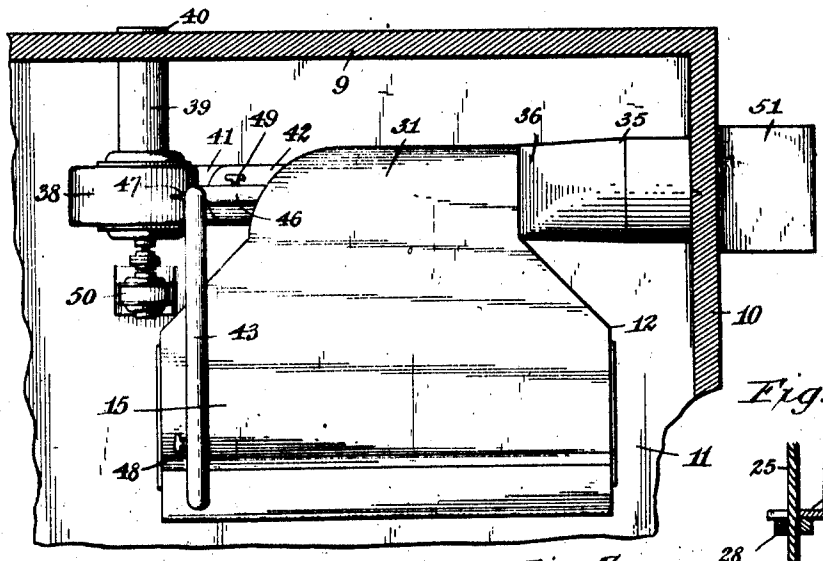


Fig. 8.

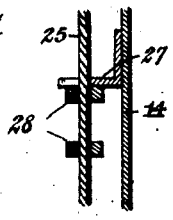


Fig. 6.

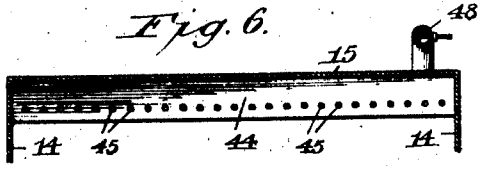
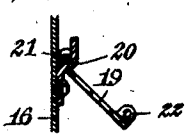


Fig. 7.



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Witness:
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Patented Aug. 28, 1928. 1,682,407

UNITED STATES PATENT OFFICE.

EDMUND H. NELSON AND EGON F. TINGWALL, OF JAMESTOWN, NEW YORK, ASSIGNORS TO JAMESTOWN BLOWER COMPANY, OF JAMESTOWN, NEW YORK, A CORPORATION OF NEW YORK.

PAINT-SPRAY BOOTH.

Application filed August 18, 1927. Serial No. 213,768.

Our invention relates to improvements in paint-spray booths, such as employed when spraying paint or the like onto furniture or other articles.

One of the objects of our invention is the provision of a paint-spray booth equipped with means for effectively drawing out paint mist which has failed to find proper lodgement on the article being sprayed, and also the paint fumes which are obnoxious and health-destroying.

Another object of our invention is to provide means for creating suction within the spray booth and centralizing the suction so that the paint mist or paint-spray failing to find lodgement on the article being sprayed, and the fumes, will be drawn out of the spraying compartment of the booth in an effective manner, from all parts thereof.

Another object of our invention is to provide a spraying compartment and a suction chamber and separate the two by a wall having openings provided with means adapted to control the suction within the spraying compartment.

A still further object of our invention is the provision of a spraying booth so equipped that the usual stack or draft flue extending upwardly through the roof of the building containing the booth, is dispensed with, and wherein provision is made for directing the exhaust out through the side wall of the building.

A still further object of our invention is to provide a spray booth having an air chamber extending transversely across its upper end and wherein provision is made for aiding in the exhaust the rising fumes, through the medium of said air chamber.

With the above and other objects in view, the invention consists in the novel features of construction and in the arrangement and combination of parts to be hereinafter described and more particularly pointed out in the subjoined claims.

In the drawings:

Fig. 1 is a front elevation of our improved paint-spray booth, showing the same within a building partly shown in section.

Fig. 2 is a side elevation of the paint-spray booth on a scale somewhat reduced from Fig. 1, the same being shown within a building.

Fig. 3 is a vertical section taken on line 3—3, Fig. 1.

Fig. 4 is an enlarged transverse section taken on line 4—4, Fig. 2.

Fig. 5 is a plan view of the paint-spray booth within a building.

Fig. 6 is a section taken on line 6—6, Fig. 3, looking in the direction of the arrow crossing said line.

Fig. 7 is an enlarged section taken on line 7—7, Fig. 1.

Fig. 8 is an enlarged section taken on line 8—8, Fig. 3, looking toward the left.

While we have referred to this invention as a paint-spray booth, the term "paint-spray" is understood to be used broadly so as to include varnishes and various other covering material capable of being sprayed, and while paint-spray booths of the general type to which this invention belongs are invariably used within buildings, it will be apparent that the apparatus may be operated outside of a building. We preferably, however, arrange the inlet and exhaust parts of the apparatus so that the latter can advantageously be placed within a building, with the air-inlet of the apparatus extending into or through a wall of the building and the exhaust extending into or through the same or another wall of the building.

So far as known, spray booths of this kind have heretofore been provided with vertical stacks extending up through the building and exhausting through the roof, which oftentimes makes it necessary to cut through several floors of a building. With our invention, regardless of the floor the booth may be placed on, the inlet and exhaust of the apparatus extend laterally from the apparatus and are directed so as to exhaust through one or more walls of a building.

In the drawings, the numerals 9 and 10 designate outer walls of a building, and 11 the floor, or one of the floors thereof. The apparatus is preferably set into a corner of one of the floors of a building, but as this is merely an advantageous location for the same, it may be otherwise located.

The apparatus comprises a spraying booth 12 having a spraying compartment 13, which has side walls 14, made to converge near their rear ends so as to gradually restrict the transverse dimension of the compartment along a portion of its depth. This compartment also has a top wall 15 and a rear wall 16 at the paint of its greatest restriction. In this

compartment, articles to be painted or otherwise coated are arranged and paint or other covering material issuing from a spraying nozzle of any approved type, is directed against them. The rear wall of the spraying compartment 13 has a number of superposed transversely-elongated openings 18 formed therein, and these are opened to any desired extent, or completely closed, as may be found desirable, by shutter plates 19 pivotally arranged along the upper ends of said openings. For this purpose, hangers 20 are secured to the rear wall 16 of the spraying compartment, and each of the shutter plates 19 has pivot studs 21 at opposite ends, which are seated in said hangers. At one end, each shutter plate is provided with a lug 22 to which is pivotally secured a connecter bar 23. so connecting said shutter plates that they move in unison and are adapted to open the openings in the rear wall 16 to equal degrees.

To the top wall of the spraying compartment 13, pulleys 24 are secured, over which an operating cord or cable 25 is passed, said cord or cable depending from said pulleys and having its inner depending end secured to the connector bar 23, as at 26. The outer depending end of said cord or cable passes through a forked retainer 27 fastened to one of the side walls 14 of the booth, and it is provided with a series of retainer collars 28, which are spaced apart, and anyone of which is adapted to be engaged with the under side of the forked retainer 27. The outer end of said cord or cable is provided with a handle 29 for conveniently manipulating the shutter plates. These shutter plates gravitate under their weight, and consequently it is only necessary to release the operating cord or cable from the forked retainer 27 and allow said cord or cable to be moved over its co-acting pulleys under the weight of the shutter plates and the connector bar attached to the outer ends thereof. When the shutter plates are closed to the desired degree, the retainer collar directly beneath the forked retainer will be moved into contact with the under side of said retainer, and thus hold said plates in adjusted position. It is, of course, apparent that the shutter plates may be otherwise manipulated.

The use of the shutter plates in connection with the openings in the rear wall of the spraying compartment, form what may be termed a louvre structure for the escape of the paint mist and fumes. Therefore, we consider it within the scope of our invention to attach said plates in fixed relation to said rear wall, although it will be apparent that by hinging or pivotally attaching them as shown and described, certain advantages not otherwise attainable, are secured. These shutter plates may also be termed baffle plates, since they serve to baffle the paint mist and compel it to take an upward and rearward course through the rear wall 16 of the spraying compartment.

In rear of the spraying compartment, a suction or ejector chamber 30 is provided, and the rear wall of the spraying compartment serves as the front wall for this chamber. This suction or ejector chamber has a top wall 31, which may be an extension of the top wall of the spraying compartment, a rear wall 32 and side walls 33, 34; the side wall 33 being curved to merge into said rear wall and the side wall 34 being preferably at right angles to said rear wall.

Opening laterally into the suction or ejector chamber at the upper end of the side wall 34, is an exhaust funnel 35, the inner end of which is rectangular and of considerable height, as shown at 36, Figs. 3 and 4, while the outer end thereof is cylindrical and extends through one of the walls of the building, as at 37.

Arranged outside of the spray booth is a blower 38, the eye of which has an air-inlet tube 39 connected thereto which extends through a wall of the building, as at 40. The exhaust of this blower is designated by the numeral 41, and is tangentially disposed in the usual manner, and it has connected thereto an exhaust-nozzle 42 which extends into the suction or ejector chamber 30 through the curved side wall of the same. This exhaust nozzle is directed toward the enlarged inner end of the exhaust funnel and terminates within the suction or ejector chamber approximately midway between its upper and lower ends. This nozzle may be included in the term "exhaust of the blower", and connected to this exhaust is an air tube 43, which extends upwardly and forwardly and is connected with an air chamber 44 disposed transversely along the upper wall of the spraying compartment at its front end. This air chamber has an inclined inner wall in which numerous air-escape openings 45 are arranged which direct air from said chamber downwardly and inwardly into the spraying compartment.

Connecting the air tube 43 with the side wall 34 of the suction or ejector chamber 30 is an air tube 46. This air tube opens into the suction or ejector chamber in line with the exhaust funnel thereof. In the air tube 43 between the air tube 46 and the exhaust of the blower, a valve 47 is arranged, which when closed, shuts off the air current to both the air chamber 44 and the air tube 46. In the air tube 43 between the air tube 46 and the air chamber 44, a valve 48 is provided, which when closed, prevents the air being supplied to said air chamber. In the air tube 46, a valve 49 is arranged so that this air may be shut off independent of the air tube 43. The blower is operated by means of an electric motor 50.

By gradually decreasing the width of the

spraying compartment along its rear portion and consequently diminishing the width of the louvered rear wall, the suction action on the paint mist and paint fumes is such that they are concentrated in their rearward passage through said louvered wall, with the result that the mist and fumes are more effectively acted upon and brought in concentrated form into the suction or ejector chamber 30 where they encounter the high pressure air stream issuing from the exhaust nozzle 42 and are carried through the exhaust funnel 35.

The paint mist driven through the exhaust funnel encounters a shield 51 fastened to the wall of the building and inclined downwardly and outwardly over the outlet of said exhaust funnel, with the result that the mist accumulates on said shield and drips from the edge thereof onto the ground, thus preventing soiling of surroundings onto or against which the paint mist would otherwise be directed.

The operation of the device is as follows:

The article to be paint-sprayed, or otherwise coated, is placed within the spraying compartment 13 and the paint directed thereagainst with a spraying nozzle, in the usual manner. The blower, when operated, exhausts through the exhaust nozzle 42, a current of air under high pressure being directed across the rear of the louvered wall 16 which separates the spraying compartment 13 from the suction or ejector chamber 30. The current of air directed from the nozzle passes out through the exhaust funnel and by reason of this nozzle being located in rear of said rear wall, it creates suction through the openings of said rear wall and at the rear of the spraying compartment; the suction being substantially even at all openings of said rear wall, or at least effective over the entire area of said rear wall, so that the paint-mist and fumes within the spraying compartment are drawn upwardly between the shutter or louvre plates and carried out through the exhaust funnel by the exhaust of the blower, the mist-laden exhaust being directed against the shield 51 arranged over the outlet of said funnel to prevent the spraying of surroundings with paint or other covering material, as hereinbefore mentioned.

The suction created at the rear end of the spraying compartment causes a partial vacuum to be established, and as the front of the spraying compartment is open, there will be an inrush of air into the compartment, with the result that even though the operator is stationed within the front end of said compartment, he will not ordinarily come in contact with any of the paint mist or fumes. But, if for any reason the fumes appear to be retained within the spraying compartment, it is only necessary to open the valves 47 and 48 in the air tube 43, whereupon a current of air will be directed into the air chamber 44 at the upper end of the spraying compartment. This air will be directed downwardly and rearwardly from said air chamber toward the louvered rear wall of said compartment and cause the fumes to be carried out into the suction or ejector chamber 30, where the action of the main exhaust from the exhaust nozzle will carry the fumes out through the exhaust funnel with the paint-mist. Should it be found that a speeding up of the exhaust is desired, the valve 49 in the air tube 46 may be opened, whereupon a cross current of air is directed through the upper end of the suction or ejector chamber, which cross current is forced directly into the exhaust funnel and accelerates the passage of the paint-mist and fumes through said funnel.

It will be clear that upon closing the valve 48 and opening the valves 47 and 49 this cross current may be maintained without directing the air into the air chamber 44. Upon closing the valve 49 and having the valves 47 and 48 open, the air may be directed into the air chamber without directing it into the suction or ejector chamber. Upon opening all of the valves, both a cross current of air into the exhaust funnel may be provided and also air currents directed downwardly and inwardly from the upper front end of the spraying compartment. The suction in the spraying compartment may be increased or diminished upon manipulation of the shutter or louvre plates in the manner hereinbefore mentioned.

Having thus described our invention, what we claim is:—

1. A paint-spray booth, comprising a spraying compartment having side walls, a top wall and a rear wall provided with openings, a suction-inducing device in rear of said rear wall, an air chamber at the upper end of said spraying compartment provided with air openings directed toward said rear wall, and means for introducing air under pressure into said air chamber.

2. A paint-spray booth, comprising a spraying compartment having a top wall, side walls and a rear wall provided with openings, a suction chamber in rear of said spraying compartment, a suction-inducing device to create suction through the openings of said rear wall, and means to direct currents of air toward said rear wall from the upper front portion of said spraying compartment.

3. A paint-spray booth, comprising a spraying compartment and a suction chamber in rear of said compartment separated from the latter by a dividing wall provided with openings therethrough, an exhaust funnel having an enlarged inner end opening into said suction chamber along the upper portion of one of its side walls and being gradually reduced in size outwardly, a blower outside of said booth having an exhaust extending

through the other side wall of said suction chamber, and an exhaust nozzle attached to said exhaust extending upwardly and inwardly therefrom toward the enlarged inner end of said exhaust funnel, and means for operating said blower.

4. A paint-spray booth, comprising a spraying compartment and a suction chamber separated from said spraying compartment by a wall having openings therethrough, said suction chamber having an exhaust directed laterally therefrom, an air chamber extending transversely across the front of said spraying compartment along its upper end, a blower outside of said booth having an exhaust directed into said suction booth to cause a current of air to be directed therefrom into the exhaust of said suction chamber, and an air tube leading from the exhaust of said blower to said air chamber.

5. A paint-spray booth, comprising a spraying compartment and a suction chamber in rear of said spraying compartment and separated therefrom by a wall having openings therethrough, an exhaust for said suction chamber in one of its side walls, a blower outside of said booth having an exhaust nozzle extending into said suction chamber to direct a current of air across said suction chamber toward the exhaust thereof, and an air tube connected to the exhaust nozzle of said blower and leading into said suction chamber above said nozzle, said air tube being adapted to direct a current of air through said suction chamber into the exhaust of the same.

6. A paint-spray booth, comprising a spraying compartment open at its front end, a suction chamber in rear of said spraying compartment and separated therefrom by a dividing wall having openings therethrough, said suction chamber having an exhaust funnel opening thereinto through one of its side walls along the upper end thereof, a blower outside of said booth having an exhaust extending into said suction chamber through the other side wall thereof and being directed toward said exhaust funnel, an air chamber at the upper end of said spraying compartment having air openings therethrough directed toward said dividing wall, an air tube extending from the exhaust of said blower to said air chamber, an air tube extending from said first-mentioned air tube into said suction chamber in line with the exhaust funnel thereof, and valves in said air tubes to control the passage of air therethrough.

7. A paint-spray booth having a spraying compartment and a suction chamber separated from said spraying compartment by a dividing wall having openings therethrough, an exhaust funnel extending laterally from one of the side walls of said suction chamber and being gradually restricted from said wall outwardly and terminating in a cylindrical outer portion, said exhaust funnel extending along the upper portion of said side wall, a blower situated outside of said booth and having an exhaust provided with an exhaust nozzle extending through the opposite side wall of said suction chamber at a low point thereof, said nozzle being directed upwardly and inwardly to cause a current of air to pass therefrom into said exhaust funnel, and means for operating said blower.

In testimony whereof we affix our signatures.

EDMUND H. NELSON.
EGON F. TINGWALL.