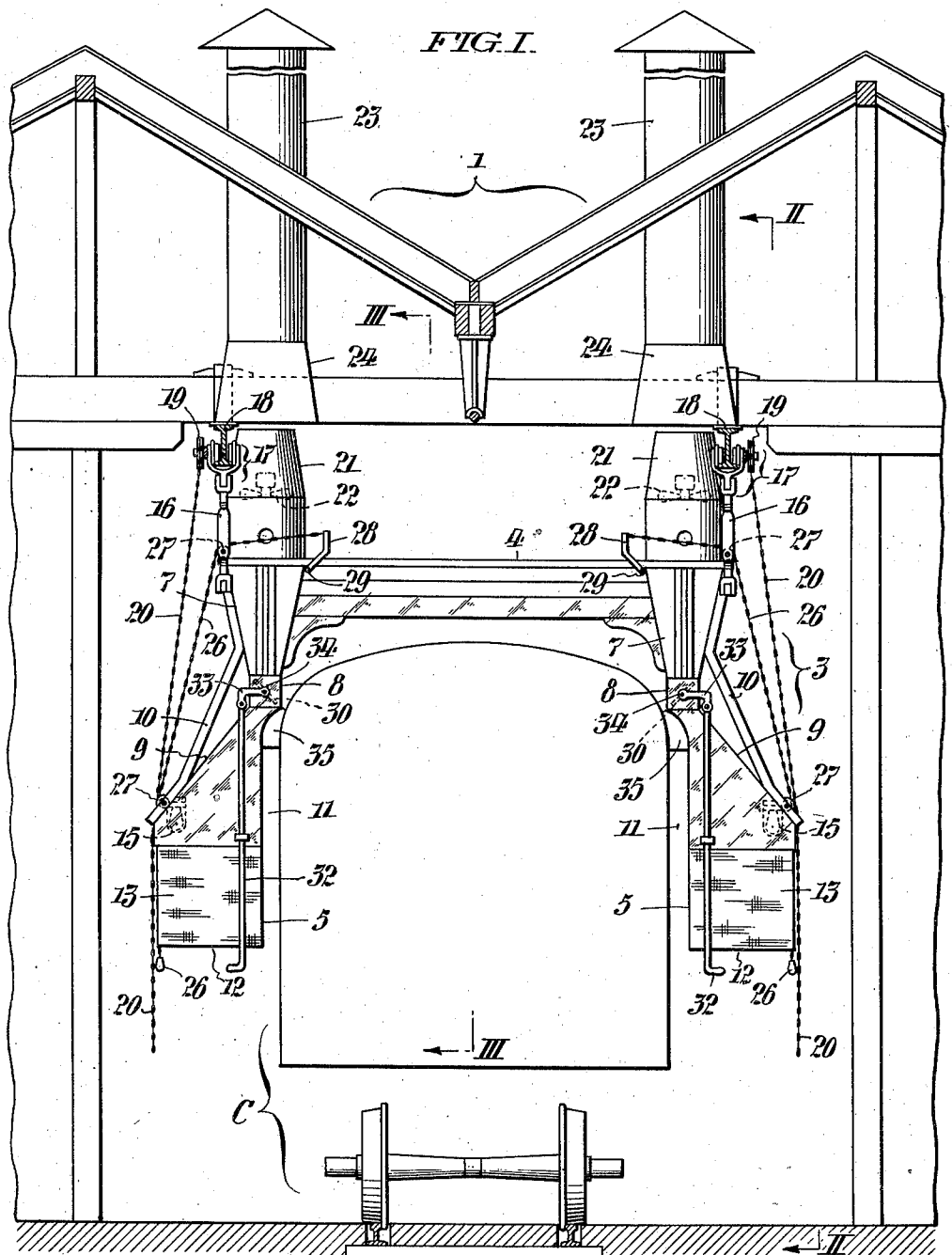
Nov. 22, 1938. C. K. STEINS 2,137,862

FUME EXHAUSTING APPARATUS

Filed Jan. 28, 1937 4 Sheets-Sheet 1

FIG. I.




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FUME EXHAUSTING APPARATUS

Filed Jan. 28, 1937 4 Sheets-Sheet 2

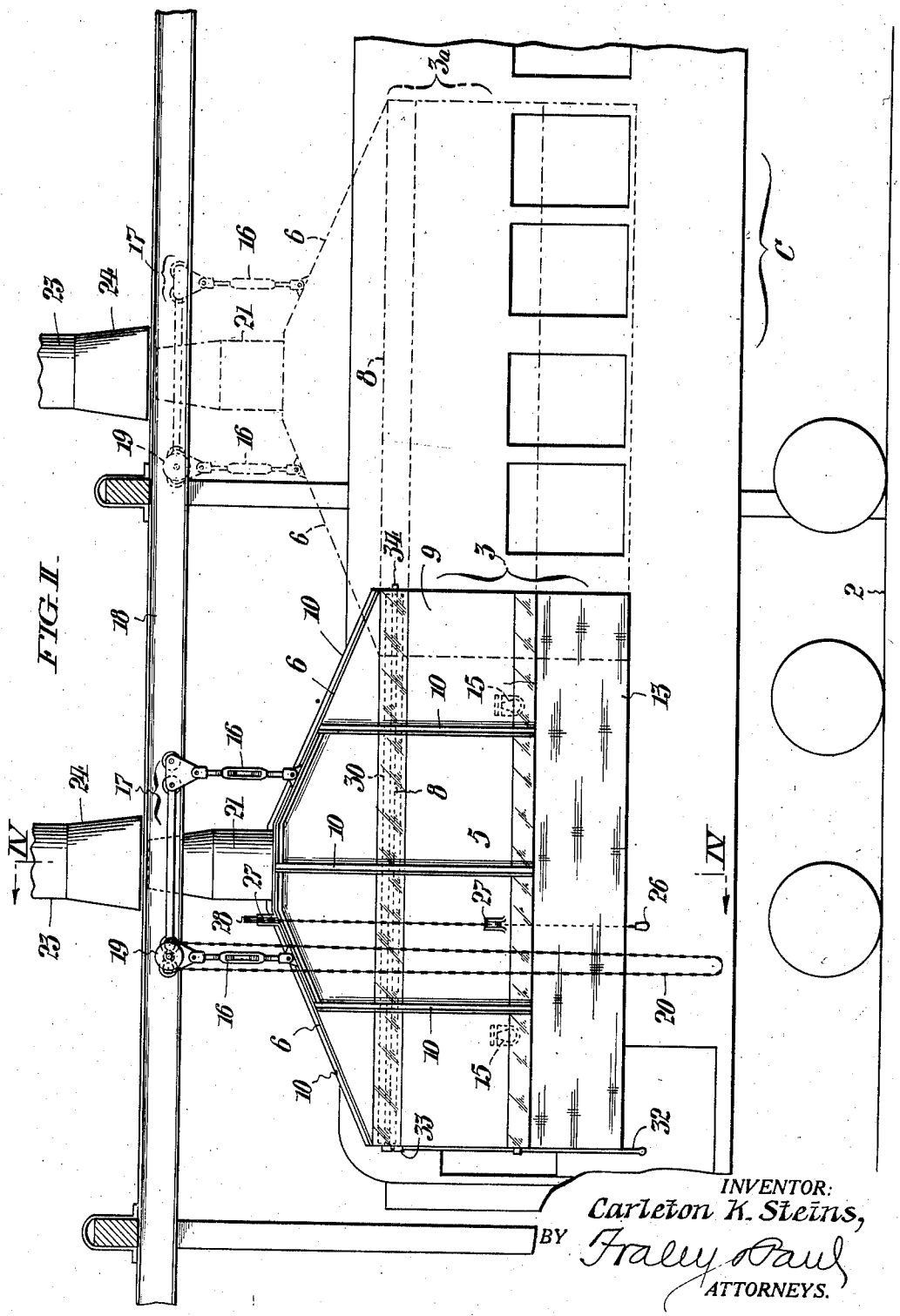



FIG. II.

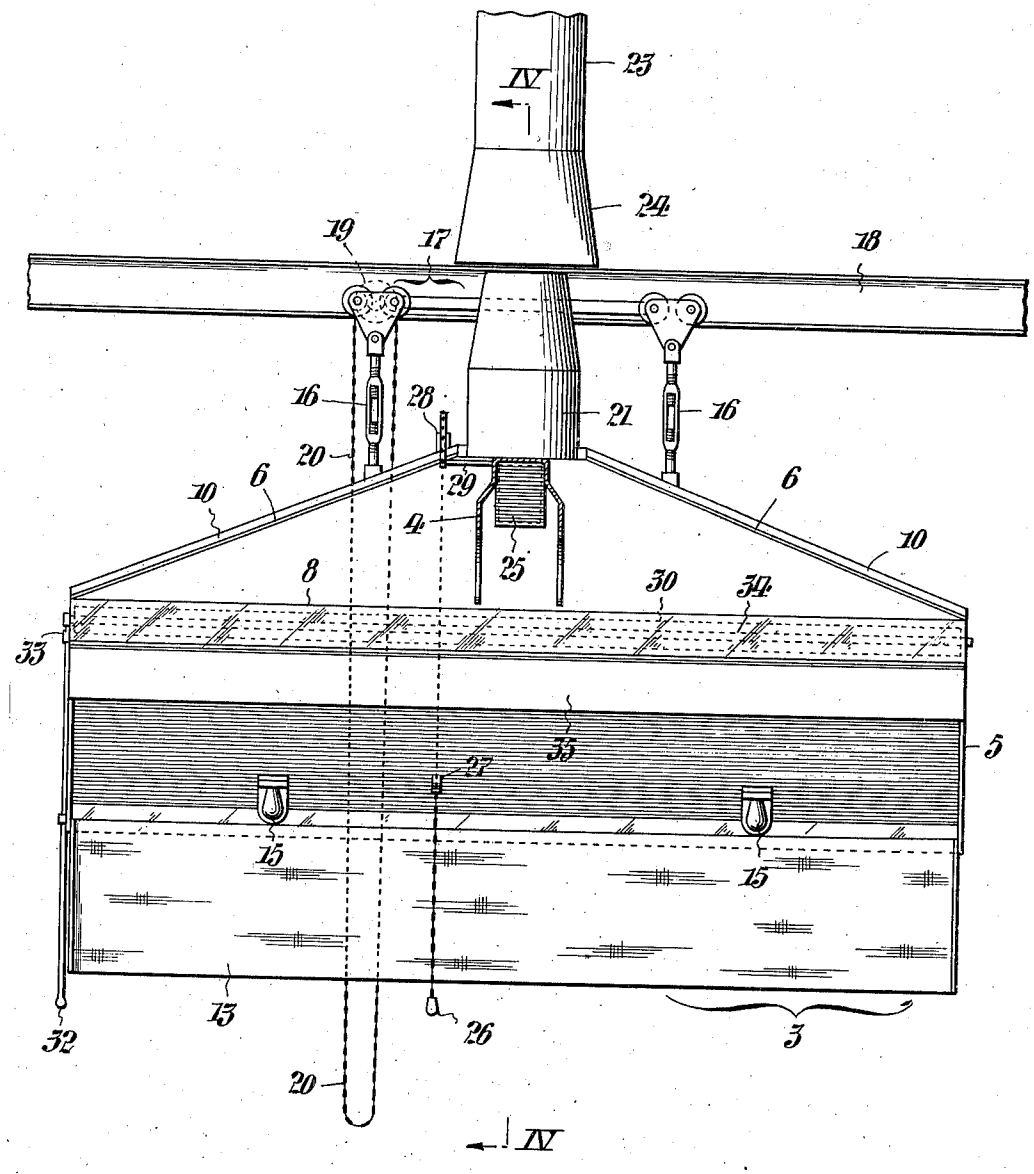
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FUME EXHAUSTING APPARATUS

Filed Jan. 28, 1937 4 Sheets-Sheet 3

FIG. III.




WITNESSES:
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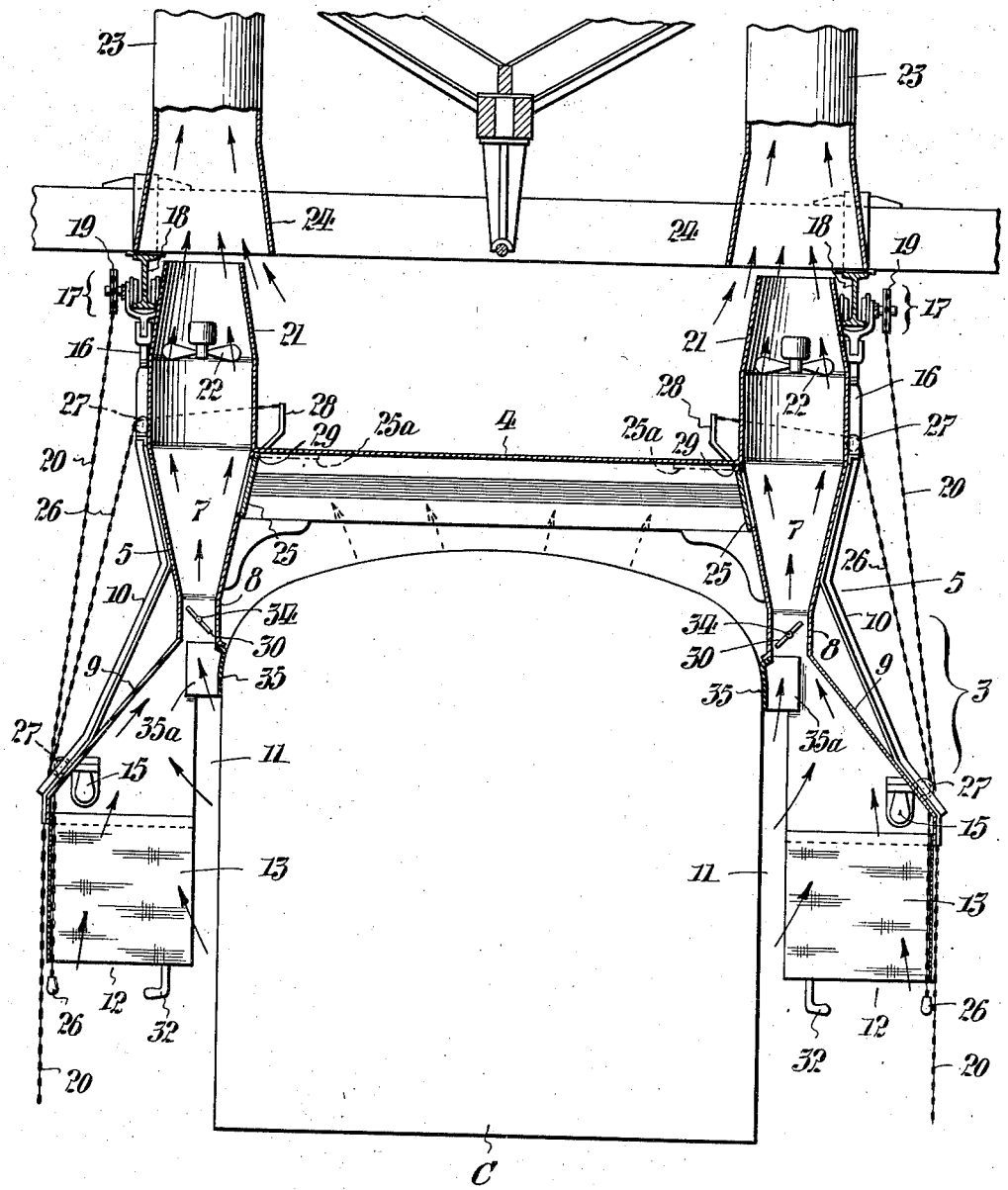
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Nov. 22, 1938. C. K. STEINS 2,137,862

FUME EXHAUSTING APPARATUS

Filed Jan. 28, 1937 4 Sheets-Sheet 4

FIG. IV.




WITNESSES:
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Patented Nov. 22, 1938 2,137,862

# UNITED STATES PATENT OFFICE

2,137,862

## FUME EXHAUSTING APPARATUS

Carleton K. Steins, Wilmington, Del.

Application January 28, 1937, Serial No. 122,719

16 Claims. (Cl. 91—60)

This invention relates to fume-exhausting apparatus; and it is concerned more particularly with apparatus suitable for removing fumes incident to paint-spraying of railway cars and the like.

The chief aim of my invention is to make it possible to paint-spray a railway car or series of them on a track within a shed or other enclosure more efficiently and economically than heretofore, and without the necessity for moving a finished car out of the way before spraying of another can be begun. This desiderata I realize in practice, as hereinafter more fully disclosed, through provision of a relatively small hood with an open bottomed transverse portion which reaches over the roof of the car, and with open-bottomed vertical portions reaching downwardly of the car sides, said hood being of a length to envelop only a portion of the car at a time and supported in suspension from a roller carriage confined to travel along an overhead guide rail for capacity to be shifted from one position to another along the car or train as the work proceeds.

Another object of my invention is to attain the foregoing advantages in a hood having an exhaust outlet in its top adapted to be selectively registered with suitably spaced exhaust outlets in the shed roof, as it is shifted from one position to another.

Another aim of my invention is to facilitate exhaust of spray fumes from beneath the hood as well as of stray fume leakage from the shed in the vicinity of the hood, through Venturi action, which objective I also secure, as hereinafter more fully disclosed, by forming the hood outlet as an upwardly tapering tube with a mounted motor driven blower fan axially of its interior, and by forming the roof outlets as chimneys with flaring lower ends.

Another aim of my invention is to provide valve means whereby one portion of the hood can be cut off from communication from the outlet tube to the exclusion of the others.

My invention is also directed toward the provision of means within easy reach from the ground level of the shed whereby the rollers of the suspension carriage can be actuated to effect progression of the hood from one position to another along the car or train.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings wherein, Fig. I is a fragmentary view in cross section of a car-spraying plant conveniently embodying the fume-exhausting apparatus of my invention.

Fig. II is a fragmentary longitudinal section taken as indicated by the arrows II—II in Fig. I.

Fig. III is a fragmentary longitudinal detail section on a larger scale taken as indicated by the arrows III—III in Fig. I; and

Fig. IV is a fragmentary cross section in detail, likewise on a larger scale, taken as indicated by the arrows IV—IV in Figs. II and III.

With more detailed reference to these illustrations, 1 comprehensively designates an enclosure in the form of a peak-roofed glazed shed with a railway track 2 running longitudinally through it. In practice, the shed 1 is preferably of a length to accommodate a series of railway cars, whereof one is shown at C, on the track 2. Suitably supported with capacity for being shifted lengthwise of the shed 1 in a manner later on explained, is a hood 3, the length of which, see Fig. II, is but a fraction of that of the car C. As shown the hood 3 has an open-bottomed crosswise portion 4 of relatively narrow invert channel cross section which extends over the roof of the car C, and connecting vertical flanking portions 5 which extend downwardly of the sides of the car. The flanking portions 5 of the hood 3, it will be observed from Figs. II and III, slope downwardly symmetrically from the center of their tops in the direction of their length as at 6, 6 and at the same time as seen in Figs. I and IV, taper downwardly as at 7 to a narrow cross-section 8 at the level of the car eaves where they attain their full length, from whence they extend outwardly and downwardly at a slope beyond the car sides as at 9 in Figs. I and IV. The construction of the hood 3 as far as described up to this point may be of sheet metal suitably reinforced longitudinally and vertically by angle iron bracings which are variously indicated by the numeral 10. The flanking portions 5 of the hood 3 are open towards the sides of the car as at 11, see Fig. IV, and also open at the bottom as at 12 so that the spraying may be accomplished from beneath. The hood 3 is moreover provided with pendant aprons 13 which may be of fabric or other suitably flexible sheet material attached to the bottom edges of its flanking portions 5. Protected electric light bulbs are shown at 15 as a means of illumination beneath the hood 3.

The hood 3 is suspended at each side, by a pair of turn buckle links 16, from roller carriages 17 which are confined to mono-rails 18 extending longitudinally of the shed 1 above

the track, see Figs. I and II. Gear-coordinated with a pair of the rollers of each carriage 17 is a drive pulley 19 with an actuating chain at 20 within easy reach from the ground level of the shed 1.

At the tops of its flanking portions 5, the hood 3 is provided with exhaust outlets in the form of upwardly tapering nozzle tubes 21 wherein are axially mounted individual motor driven blower fans 22 which are relied upon to create the suction. During shifting of the hood 3 from one position to another along the car C as the spraying proceeds, the exhaust nozzles 21 are registerable with pairs of chimneys 23 which are arranged at suitable intervals along the length of the shed 1 and which extend up through the shed roof as shown in Fig. I. The chimneys 23 are flared at the bottom as at 24 so as to be capable, by cooperating with the tapered exhaust nozzle outlets 21 of the hood 3, of stimulating exhaust of the paint fumes from beneath the latter as well as from the shed as a whole by Venturi action.

The flanking portions 5 of the hood 3 are intended to be used only during spraying of the car sides, and in order that communication between the crosswise portion 4 of the hood and the exhaust outlets 21 may be cut off at these times, pivoted valve dampers 25 have been placed at the ends of said crosswise portion. These valve dampers 25 are swingable from closed position shown in full lines in Fig. IV to the dot and dash line open position by means of individual operating chains 26 which pass over guide pulleys 27 and which at their upper ends are respectively connected to lever arms 28 on the pivot shafts 29 of said dampers, see Fig. IV also. The cross portion 4 of the hood 3, on the other hand, is intended to be used only during the spraying of the car ends, and therefore in order that the flanking portions 5 may be cut off from communication with the exhaust outlets 21 at these times, damper valves 30 have been placed in the passages 8. The damper valves 30 are operable, as shown in Fig. I, by means of individual actuating rods 32 which extend downward of the flanking portions 5 of the hood at one end of the latter, from lever arms 33 respectively secured on the shafts 34 of said valves.

Secured to the lower edges of the inner walls of the flanking vertical portions 5 of the hood 3 are strips 35 of sheet rubber or the like which seal against the sides of the car at the eaves and prevent fume leakage in this region. It will be noted from Fig. IV that the ends of the strips 35 turn inward as at 35*a* against the end walls of the hood portions 5.

Due to the diminutive size of the hood 3 in comparison to the car C, it will be apparent that exhausting of the fumes can be effected with blower fans 22 of relatively small capacity requiring a correspondingly small amount of power for their actuation. The exhausting apparatus of my invention is accordingly highly efficient and therefore economic in its operation. By actuation of the carriages 17 through the pendant chains 20, the hood can be easily progressed on the rails 18 in shifting the hood from one field of operation to another along the car, as, for example from the full line position in Fig. I to the dot and dash line position 3*a* and when one car is finished, advanced to the next. In this way, a number of cars can be sprayed in succession without necessitating moving of any of them until the whole series is finished, as a result of which considerable time is obviously saved. Due to the described construction of the outlet tubes 21 and the chimneys 23, not only is the exhaust of the fumes from beneath the hood 3 stimulated, but a circulation set up within the shed by which stray fume leakage exteriorly of said hood is carried off as indicated by the arrows in Fig. IV.

Having thus described my invention, I claim:

1. Fume-exhausting apparatus comprising a hood adapted to reach crosswise over and downward of the sides of a car or the like within a paint-spraying shed, and having an exhaust outlet at its top; means whereby the hood is supported with capacity for being bodily shifted to different positions along the car or other cars entrained therewith in the shed; and a series of outlets in the roof of the shed with which the exhaust outlet of the hood is selectively registerable; and means movable with the hood for inducing exhaust through its top outlet.

2. Fume-exhausting apparatus according to claim 1, wherein the hood supporting means includes a suspension carriage and an overhead rail extending longitudinally of the shed for guiding the carriage.

3. Fume-exhausting apparatus according to claim 1, wherein the exhaust outlet of the hood is in the form of a vertical tube which tapers toward its top, and the outlet in the roof of the shed in the form of a chimney with a flaring lower end, whereby exhausting of the paint fumes is effected through Venturi action.

4. Fume-exhausting apparatus according to claim 1, wherein the suction is created by blower means within the hood exhausting outlet.

5. Fume-exhausting apparatus according to claim 1, wherein the exhaust outlet of the hood is in the form of a vertical tube which tapers towards its upper end, and the outlet in the roof of the shed in the form of a chimney with a flaring lower end whereby exhausting of the fumes is effected through Venturi action; and wherein the suction is created by blower means within the hood outlet.

6. Fume-exhausting apparatus comprising a hood with a portion extending crosswise of a car within a shed, communicating vertical portions extending downward of the sides of the car, and exhaust outlets at the tops of said vertical portions; means whereby the hood is supported with capacity for being bodily shifted to different positions along the car; and a double series of outlets in the roof of the shed with which the exhaust outlets of the hood are selectively registerable.

7. Fume-exhausting apparatus according to claim 6, wherein the hood-supporting means includes a suspension carriage; and an overhead guide rail for the carriage.

8. Fume-exhausting apparatus according to claim 6, wherein the hood-supporting means includes a suspension roller carriage; an overhead guide rail for the carriage; and means within reach from the ground level of the shed whereby the rollers of the carriage can be actuated for the purpose of progressing the hood.

9. Fume-exhausting apparatus according to claim 6, wherein the hood-supporting means includes a pair of carriages from which the hood is suspended at opposite sides; and parallel overhead guide rails respectively for the carriages.

10. Fume-exhausting apparatus according to claim 6, wherein the hood-supporting means includes a pair of roller carriages from which the hood is suspended at opposite sides; parallel over-

head guide rails respectively for the carriages; and means within reach from the ground level whereby the rollers of the carriages can be actuated for the purpose of progressing the hood.

11. Fume-exhausting apparatus according to claim 6, wherein the exhaust outlets of the hood are in the form of vertical tubes which taper toward their upper ends, and the outlets in the roof of the shed in the form of chimneys with flaring lower ends, the top ends of the tubes clearing the bottom ends of the chimneys to permit movement of the hood as aforesaid.

12. Fume-exhausting apparatus according to claim 6, including separate blower means within the hood outlets for creating the suction.

13. Fume-exhausting apparatus according to claim 6, wherein the exhaust outlets of the hood are in the form of vertical tubes which taper toward their upper ends, and the outlets of the shed roof in the form of chimneys with flaring lower ends, the top ends of the tubes clearing the bottom ends of the chimneys to permit movement of the hood as aforesaid; and wherein the suction is created by separate blower means in the hood outlets.

14. Fume-exhausting apparatus comprising a hood with an open-bottomed portion extending crosswise of the top of a car or the like which is to be sprayed, vertical portions extending downwardly of the sides of the car, and exhaust outlets at the tops of the vertical portions; valve means at opposite ends of the crosswise portion of the hood whereby communication can be cut off between the latter and the exhaust outlet; and separate valve means whereby communication between the vertical portions of the hood and said outlets can be shut off.

15. Fume-exhausting apparatus comprising a hood adapted to overreach a car or the like which is to be sprayed, and having portions extending vertically of the car sides, said portions being open at the bottom and at their inner sides toward the car; a suspension carriage support permitting the hood to be bodily shifted to different positions along the car; and means on the hood to seal longitudinally the sides thereof against the car body in the region of the eaves.

16. Fume-exhausting apparatus comprising a hood adapted to overreach a car or the like which is to be sprayed and having portions extending vertically of the car sides, said portions being open at the bottom and at their inner sides toward the car; a suspension carriage support permitting the hood to be bodily shifted along the car; and flexible longitudinal strips of sheet rubber or the like secured to the hood and adapted to seal against the car body at the region of the eaves.

CARLETON K. STEINS.