Nov. 3, 1953 A. P. FOWLER 2,657,666

APPARATUS FOR LIQUID TREATMENT OF VEHICLE BODIES

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FIG. 1.

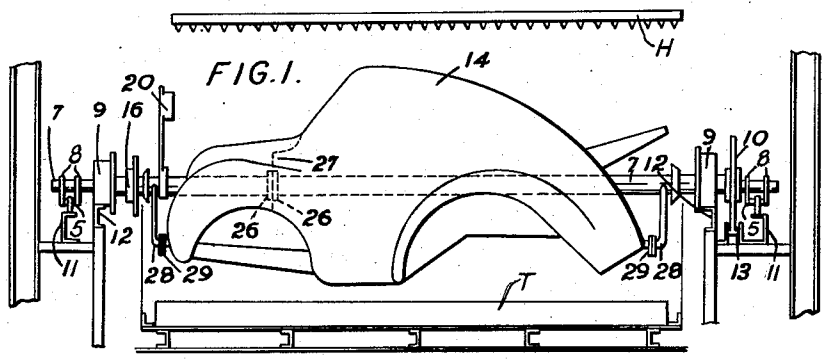


FIG. 2.

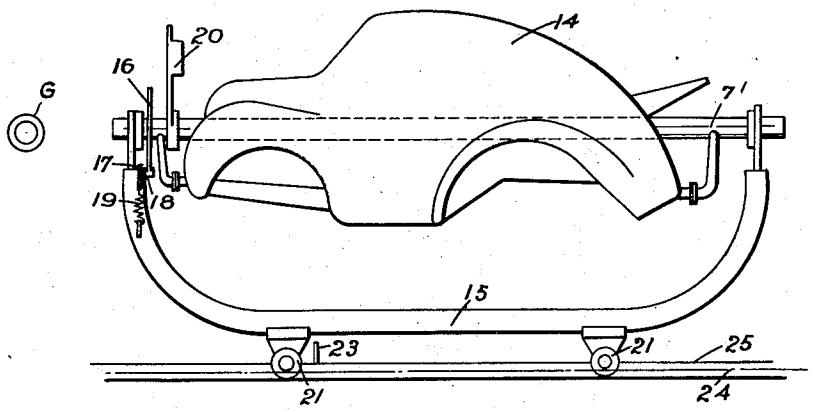
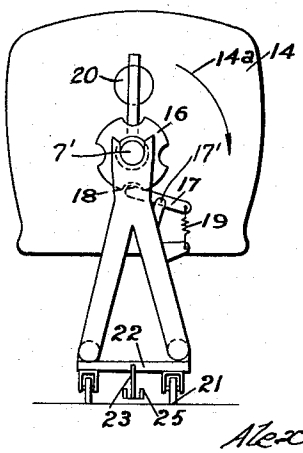


FIG. 3.



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FIG.4.

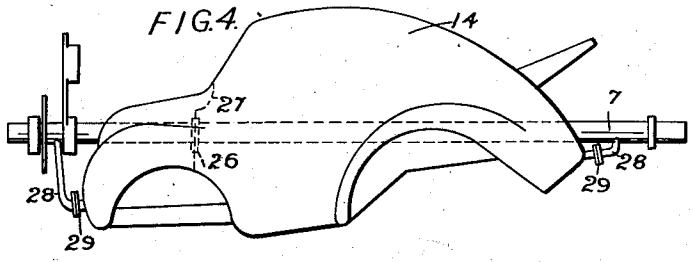


FIG.5.

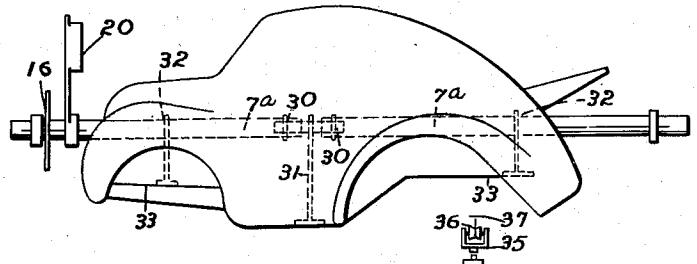


FIG.7.

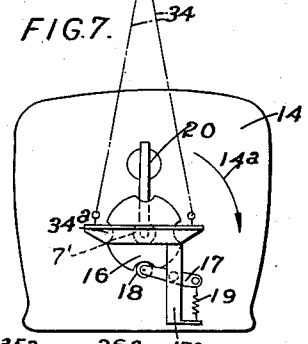
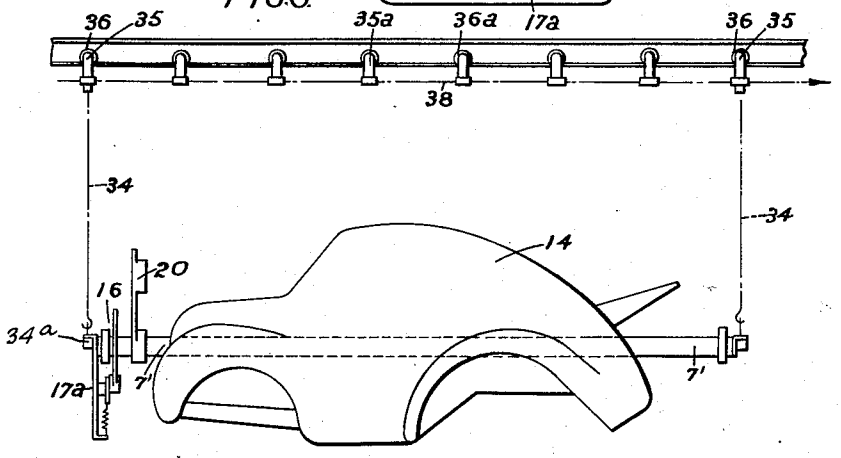


FIG.6.



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APPARATUS FOR LIQUID TREATMENT OF VEHICLE BODIES

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Application March 16, 1949, Serial No. 81,768

Claims priority, application Great Britain March 17, 1948

4 Claims. (Cl. 118—322)

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This invention relates to apparatus for cleaning, rust-proofing, prime coating and spray painting sheet metal articles such as vehicle bodies on a quantity production basis.

In U. S. Patent application Serial No. 8,835, filed February 17, 1948, there is disclosed a method of treating vehicle bodies, in which a vehicle body is so mounted as to be rotated about a horizontal axis disposed longitudinally of and intersecting the vehicle body, as the body is advanced sideways through an installation in which at each treatment stage of cleaning, rust-proofing and prime coating the treating liquid is applied to the body. The apparatus for accomplishing the foregoing method is described and claimed in application Serial No. 100,724, filed June 22, 1949, now Patent No. 2,598,201, and which was divided from the above-identified application, Serial No. 8,835.

The main object of the present invention is to make more economical the foregoing and other methods of and apparatus for treating vehicle bodies by reducing the quantity of treating liquid used in each bath or dip, and to eliminate stoppages for cleaning cradles, and further to minimize the filtering operation effected on the treating liquids, particularly paint.

Briefly, the apparatus for mounting a vehicle body for conveyance through the treating stages of cleaning, protecting, prime coating and spray painting the body, according to the present invention, consists in threading a spindle through the body lengthwise thereof, rigidly connecting the body to the spindle, and rotatably connecting the spindle to the conveying means for passage to or through the various liquid applying or treating stations. The vehicle body is rotated on a normally, substantially horizontal axis and simultaneously advanced over the successive treating baths or through the spray booths, dipping tanks or other treating stations. In the dipping apparatus, the spindle is supported and arranged so that the part of the body below the spindle can depend into and below the liquid level of the baths.

The apparatus of the present invention may be used in the individual steps of cleaning, rust-proofing and prime coating a body whether the steps are successively performed in one installation or as discontinuous processes. Moreover, instead of providing baths of the treating liquid,

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a rain of the liquid may be employed, the body being advanced while rotating through the rain, and in the case of rust-proofing, the method of operation preferably involves the employment of both the bath and the rain so that the whole surface of the body is progressively coated by partial immersion and the part of the body above the surface of the bath is continuously wetted with a rain of the liquid, whereby drying of the coating liquid is prevented until the end of the treatment.

When the vehicle body being rotated and advanced is conveyed over treating baths, the body moves in a serpentine or cycloidal path, thereby ensuring a gradual and smooth entry and exit of the article into and out of each treating liquid.

As compared with the cradle apparatus disclosed in the aforesaid Patent No. 2,598,201, the omission of the cradle therein described is effected by the present invention, and in consequence both the depth and width of each bath can be very considerably reduced, while only the body dips into the bath and the introduction of oxidized paint is minimized by the absence of the cradle, and filtering is very considerably reduced.

In order that the invention may be more clearly understood, some preferred embodiments thereof will now be described with reference to the accompanying diagrammatic drawings in which:

Figure 1 is a sectional elevation showing the spindle, on which the vehicle body is mounted, supported on wheels running on tracks at the sides of the tank as illustrated in Patent No. 2,598,201.

Figures 2 and 3 show in side and end elevation respectively a modified spindle and mobile carriage for supporting the spindle with a threaded body for transport to and/or through a spray booth, dipping tank or drying means;

Figures 4 and 5 each show in elevation other modifications of the spindle and means for mounting the body on the spindle; and

Figures 6 and 7 show in side and end elevation respectively a modification for suspending the spindle and threaded body for transport to and/or through a spray booth, dipping tank or drying means.

In the drawings like references designate the same or similar parts.

In the construction shown in Figure 1, the

spindle 7 on which the vehicle body 14 is threaded intersects the dash bulkhead 27 thereof as well as a rear bulkhead, if any. The spindle is freely supported on two wheels 9, which run on tracks 12. The spindle is displaced laterally by two conveyor chains 5 running parallel to the tracks on runways 11 and fitted with driving dogs 8, which straddle the ends of the spindle as clearly described in the aforesaid Patent No. 2,598,201. One end of the spindle carries a sprocket 10, which engages in a rack 13, so that rotation of the sprocket, and accordingly of the spindle, is enforced as the spindle is displaced laterally. Thus a body mounted on the spindle is advanced sideways and simultaneously rotated without employing the cradle shown in the aforesaid patent but, as disclosed in said patent, the body is dipped into a tank T and/or passed under a spray head H.

After the body has received the prime coat and the coat is set, the body on its spindle may be removed from the tracks and rested on a stillage (not shown), whereupon the spindle may be detached, and another spindle 7' carrying a locking device, hereafter described, may be substituted, as shown in Figures 2 and 3. According to this modification, the spindle may be mounted on a trestle or carriage 15.

The spindle 7' carries means for locking the spindle against relative rotation with the trestle, which means includes a fixed notched plate 16. On the trestle shown in Figures 2 and 3 is an arm 17' pivotally supporting a ratchet lever 17 carrying a roller 18, which seats in one or other of the notches in the plate 16, the roller being urged by a spring 19 into engagement with the plate 16. Thereby the spindle is secured to the trestle against inadvertent rotation in a direction counter to the arrow 14a (Figures 3 and 7), which arrow indicates the desired direction of the body on the spindle. Thus the body can be safely and rapidly turned by hand as required in a spray booth or in front of a spray gun G or the like, as indicated in Figure 2, and to prevent sudden angular movements due to the asymmetrical disposal of the vehicle body with respect to the spindle 7 a balance weight 20 is fitted to the spindle.

The trestle is provided with wheels 21 mounted on cross bearers 22, which are engaged by dogs 23 fixed to a towing chain 24 running in a channel guide 25.

As shown in Figure 4, the longitudinal axis of the body may be slightly inclined to the axis of the spindle 7 so as to improve drainage of liquid from the body.

As shown in Figures 1 and 4, the spindle 7 may be in two parts each provided with coupling flanges 26, which are bolted together through the dash bulkhead 27, and brackets 28 emanating from the spindle 7 are bolted to the bumper strong points 29 so that rotation of the body relatively to the spindle 7 is rigidly prevented. The bulkhead of the body is accordingly apertured for the passage of the spindle and the aperture is afterwards closed in any suitable manner. In the alternative arrangement shown in Figures 2 and 6, the spindle may comprise a single shaft-like member 7' or, as shown in Figure 5, the spindle 7a may be a tube in two parts, and the inner ends fit over spigots 30 mounted on a central bracket 31, the middle part of each half being supported by brackets 32 fixed to the body frame structure 33.

From the foregoing it will be observed that the present invention comprises apparatus for mounting a vehicle body for rubbing down or the like operation, comprising a spindle adapted to support the body when threaded lengthwise thereof, means for rotatably supporting the spindle, rigid means on the spindle for connecting the vehicle body thereto, and means for obstructing unintentional rotation of said spindle in one direction.

A vehicle body mounted on a spindle in accordance with the present invention may be also conveyed through a spray booth or over a dipping tank by being suspended from an overhead rail. To this end, as shown in Figures 6 and 7, the spindle 7' is suspended at each end by a pair of chains 34 depending from a stirrup 35 carrying wheels 36 running on the lower flanges of an overhead rail 37, the stirrups 35 at each end being connected by a towing chain 38, which is supported as required by other stirrups 35a carrying wheels 36a. The lower ends of the pairs of chains 34 are respectively hooked to cross arms 34a each carrying a bearing in which the respective end of the spindle 7' is rotatably mounted. In this construction the ratchet arm 17 of the locking device is mounted on a support 17a emanating from the respective cross arm 34a.

We claim:

1. Apparatus for processing a vehicle body, comprising, in combination, a liquid applying station, spindle means for supporting a vehicle body and of an overall length for insertion longitudinally through such body as a spit therefore, means for rigidly connecting the body to said spindle means with said spindle means extending longitudinally through the body with the ends of said spindle means respectively extending beyond the ends of the body and conveyor mechanism including means for rotatably supporting the ends of said spindle means with the axis of said spindle means normally substantially horizontal, and means for moving said supporting means past said liquid applying station while supporting said spindle means, whereby a treating liquid is applied to the body as it revolves and moves past said station.

2. Apparatus as defined in claim 1 wherein said spindle means comprises two spindle sections dividing the spindle means intermediate its overall length to enable respective insertion of each section into the opposite ends of the body, and means for releasably connecting the adjacent ends of said spindle sections to the body, each of said spindle sections being independently supported by said supporting means.

3. Apparatus for processing a vehicle body by moving the body past a liquid applying station, comprising, in combination, spindle means of an overall length to extend substantially longitudinally through a vehicle body and supporting means for rotatably supporting the vehicle body with said spindle means extending longitudinally through the vehicle body as a spit therefor, and conveyor means for moving said spindle with its axis normally substantially horizontal past the liquid applying station.

4. Apparatus for processing a vehicle body, comprising a liquid applying station having means for applying a treating liquid to the body, spindle means or supporting a vehicle body and being of an overall length for passing longitudinally through a vehicle body as a spit therefor, means for rigidly connecting the body to said spindle means with said spindle means extending longitudinally through the body with the ends of said spindle means respectively extending beyond

the respective ends of the body, means for rotatably supporting the ends of said spindle means with the axis of said spindle normally substantially horizontal, conveyor means for moving said supporting means past said liquid applying station while supporting said spindle means, and drive mechanism for rotating said spindle means as it is moved by said conveyor mechanism, whereby a treating liquid is applied to the body as it is revolved and moved past the liquid applying station.

ALEXANDER P. FOWLER.

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