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METHOD OF ELECTROPLATING

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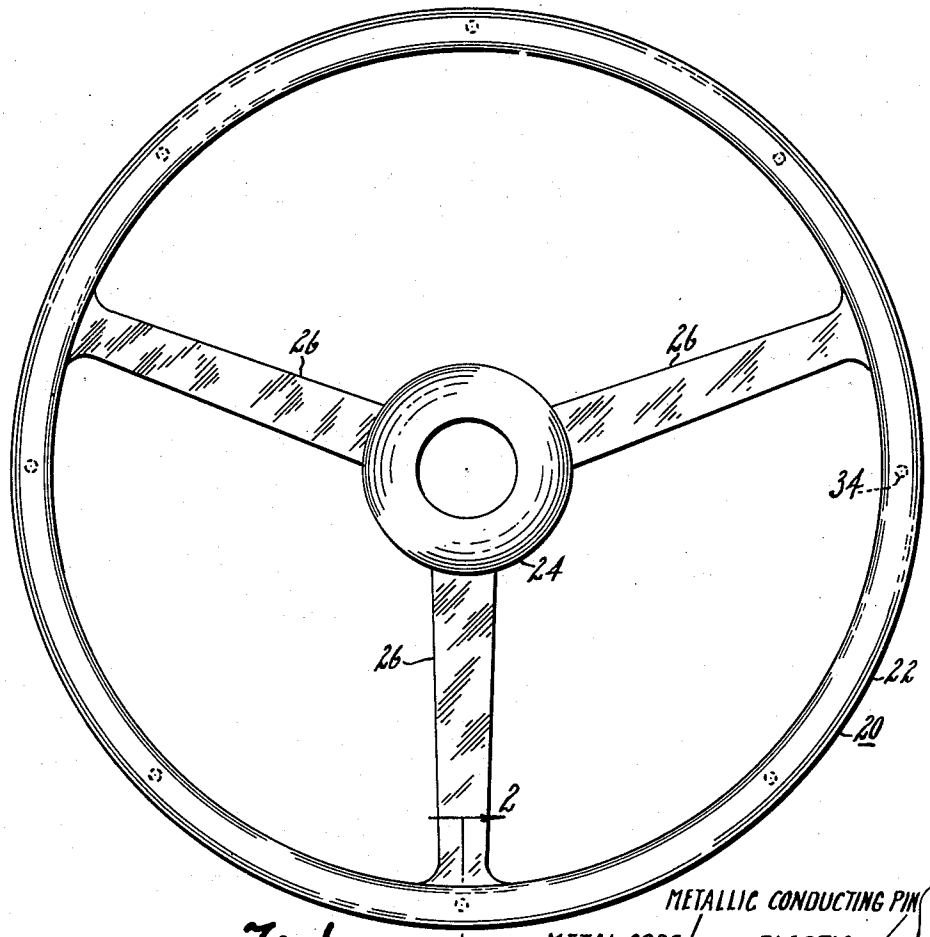


Fig. 1

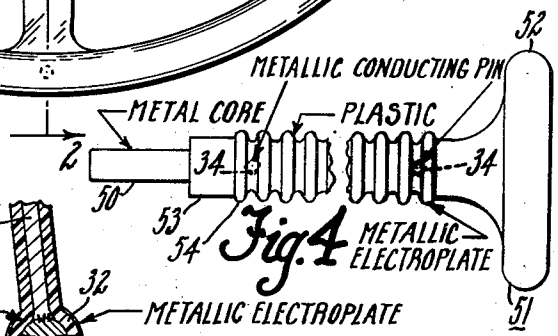


Fig. 4

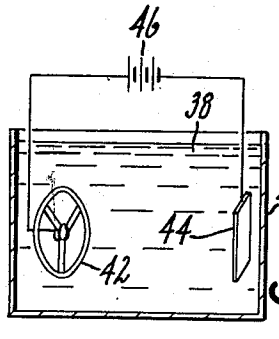


Fig. 3

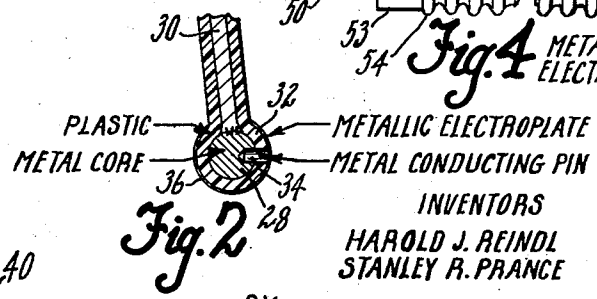


Fig. 2

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METHOD OF ELECTROPLATING

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This invention relates to plating and is particularly concerned with electroplating the surfaces of plastic objects having a metal core wherein the plate is deposited on the plastic per se.

It is, therefore, the prime object of the present invention to provide a method for depositing a metallic plate on selected portions of the surface of a plastic article which includes a metal core therein, wherein the plate is free from blemishes and the like.

In carrying out the above object, it is a further object to electroplate selected portions of a metal cored plastic article wherein a conductive coating is provided on the portions of the surface of a plastic article which are desired to be plated and wherein the electrical contact for the plating operation to said portions of the article is made at a point remote from where the plate is deposited.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing, wherein preferred embodiments of the present invention are clearly shown.

In the drawing:

Fig. 1 is a plan view of a steering wheel, this being illustrative of one type of article which may be plated by the method disclosed.

Fig. 2 is a fragmentary view taken on the line 2—2 of Fig. 1.

Fig. 3 is a diagrammatic view showing the plating setup.

Fig. 4 is a view of a handle wherein the plated portion is used for decorative purposes.

In the manufacture of plastic articles, it is often desirable to electroplate certain portions of the surfaces thereof to enhance the appearance and, in some cases, to change the surface characteristics. In order to electroplate plastic articles, which are substantially non-conductive, it is necessary to provide a conductive coating thereover either in the form of a metallic paint such as, silver, copper, etc., a conductive lacquer or other binder including conductive carbon black or graphite, or a metal evaporated film or the like. After the selected portion of the article is coated with the conductive material, it may then be made the cathode in an electroplating bath wherein electroplate may be deposited on the conductive portion thereof. In each case, however, it is necessary to provide electrical contact to the conductive portion so that the electrodeposition will take place. In this connection, it is the general practice to wrap a wire around the article in contact with the conductive portion,

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which wire carries the current. It is obvious that during the plating operation, this wire becomes covered with the electroplate and when the operation is completed and the wire removed, there is a blemish in the plate at the portion where the wire or other electrical conducting means has been attached to the part to be plated. Copper, nickel, chrome, silver, gold, cadmium, zinc, etc. or combinations may all be electro-deposited by conventional plating procedures.

The present invention is directed to a method for plating selected portions of a plastic article wherein the current may be supplied to the applied conductive surface of the plastic from a point remote therefrom so that when the article is plated and polished, no blemish is apparent at any portion thereof. The present method is applicable only to articles wherein the plastic includes a metal core therein.

For illustrative purpose only, a steering wheel 20 is shown in Fig. 1, including a rim 22 and a hub 24 connected by three spokes 26. The rim 22 includes a metal core 28 therein which is welded to cores 30 of the spokes, which cores 30 are welded also to the hub 24. Plastic material 32 is molded over the core 28 to form the rim 22 and may extend an appreciable distance up the spokes 26 covering the core thereof or in some cases, the spokes may be polished metal as desired. The specific construction of the spokes is of little import here, since the invention resides in the plating of the rim portion only of the wheel.

To accomplish this, the rim 22 is provided with a plurality of pins or wires 34 passing through the plastic and contacting the core 28, in conducting relation, as shown in Fig. 2. These pins emerge at the surface of the rim 22 and are perfectly flush therewith. Any desired number may be used although it is necessary that the number be sufficient to provide the proper electrical characteristics for the part to be plated.

The pins 34 may be portions of the core 28 which extend upwardly or outwardly as the case may be and which are always flush with the surface of the plastic. In all cases, it is desirable to have the pins 34 spaced so that no excessive distance is apparent therebetween and in this connection, the spacing is best arrived at by trial for the specific plating operation desired since it is apparent that the conductive coverings vary in resistivity with thickness of coating and type of material therein, and therefore a spacing for any operation should be subjected to a trial run in order to determine the optimum conditions. In

this instance, we have found that spacing of about 6'' for the pins is satisfactory on a ¾ to 1'' diameter article when using a silver or copper paint as the conductive medium. It is also desirable to have equal distances between the pins.

In connection with an article such as is shown in Fig. 4, it is desirable to have the conducting pins set so that the dimension from the end pin to the end of the portion to be electroplated is equal to not more than one-half the distance between pins, so that current passes through substantially equal areas of conductive material at all times.

In the practice of the process, the rim 22 is next covered with a metallic pain or other conductive pain which is placed on the plastic at any portions thereof which are desired to be plated and which paint coextensively covers the rim 22 and contacts the pins 34. If the spokes 26 and hub 24 are metal, it is necessary that these portions be masked out during the painting operation or if they are plastic covered, such expedient is not required since if no conductive paint is applied thereto, these portions will not be effected by the plating operation. The conductive paint is shown by the film 36 in Fig. 2. The next step in the process of plating is to immerse or partially immerse the wheel as regulated by the extent of the plating operation in a plating solution 38, as shown in Fig. 3, contained in a vat 40. Electrical contact for the operations on the wheel 20 is made at the hub as shown at 42 while an anode 44 of the desired metal is provided which is connected to the other side of the current source 46. After the hookup is complete and the electrolyte 38 is in position, the system may be energized and the electro-deposition progresses. In this instance, the portions of plastic which are electrically conductive due to the coating 36, accept the plate since they are connected to the current source through the coating 36, pins 34, cores 28 and 30 and hub 24. When sufficient electro-deposition has taken place, the wheel may be removed and the plated portions polished and the plating step repeated in a different bath if desired to obtain a specific electro-deposited coating thereon. In each instance, however, it will be noted that the current is supplied to the applied conductive surface of the plastic from a point remote, through the metal cores and the conducting pins 34. Thus, when the operation is completed, the pins 34 have disappeared since they are now covered with electroplate and those portions of the plastic which were desired to be plated are also coextensively covered with the metallic plate. At no time is any blemish noticable since no external contact has been made with conductive surfaces of the plastic, this being taken care of by the pins 34 which contact the metallic core.

In connection with Fig. 4, an umbrella handle is shown having a metal core 50 which extends from one end thereof, a plastic covering 51 terminating in a knob 52 at the other end thereof. Intermediate the ends is a ribbed portion 54 which is plated for decorative purposes leaving the knob 52 and the plastic end portion 53 unplated for contrast.

Conducting pins 34 are provided as in the case of the steering wheel 20. The plating operation is carried out by painting the ribbed portion only with conductive paint and then immersing the handle in the plating bath with the exposed portion of core 50 remaining out of the bath. Electrical contact is made with this core portion.

It is apparent that in place of a steering wheel any metal cored plastic article may have its surface selectively plated with a clear, smooth plate free of blemishes or contact portions.

While the embodiments of the present invention as herein disclosed, constitute preferred forms, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. In the method of plating a steering wheel made from plastic material including a metal core and the rim portion thereof connected by metal spokes to a hub, comprising the steps of; inserting a plurality of metal pins through said plastic material and into said core wherein the portion of said pins which are exposed at the surface of the plastic are flush therewith, painting the surface of the plastic material with a conductive paint so that the paint completely covers the plastic rim and overlies and connects the exposed ends of said metal pins, connecting the core at a point remote from said metal pins to one side of a current source and then immersing the wheel in a plating bath including an anode which is connected with the other side of the source whereby electrodeposition of the metal plate on the conducting surface of the paint occurs for coextensively covering the plastic and the ends of said metal pins for forming a smooth decorative cover thereover.

2. The method as claimed in claim 1, wherein said pins are spaced at equal distances around said core and providing equal areas to be plated therebetween.

3. In a method of electroplating selected portions of a steering wheel made from plastic material including a metal core therein, comprising the steps of; providing a plurality of metallic conducting points connected with said core and extending through the plastic material so as to be exposed at the surface thereof, painting the selected portions of the surface of the plastic to be electroplated with a conductive paint so that the paint completely covers said portions of the plastic and overlies and electrically connects the exposed portions of said conducting points, immersing the wheel in a plating bath including an anode, and then supplying electric current to the bath by connecting said anode and said core at a point remote from said conducting points to an electrical current source whereby electrodeposition of the metal plate on the conducting surface of the paint occurs for coextensively covering the painted portions only of the plastic and for simultaneously covering the exposed conducting points for forming a smooth decorative electroplated surface thereover.

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