

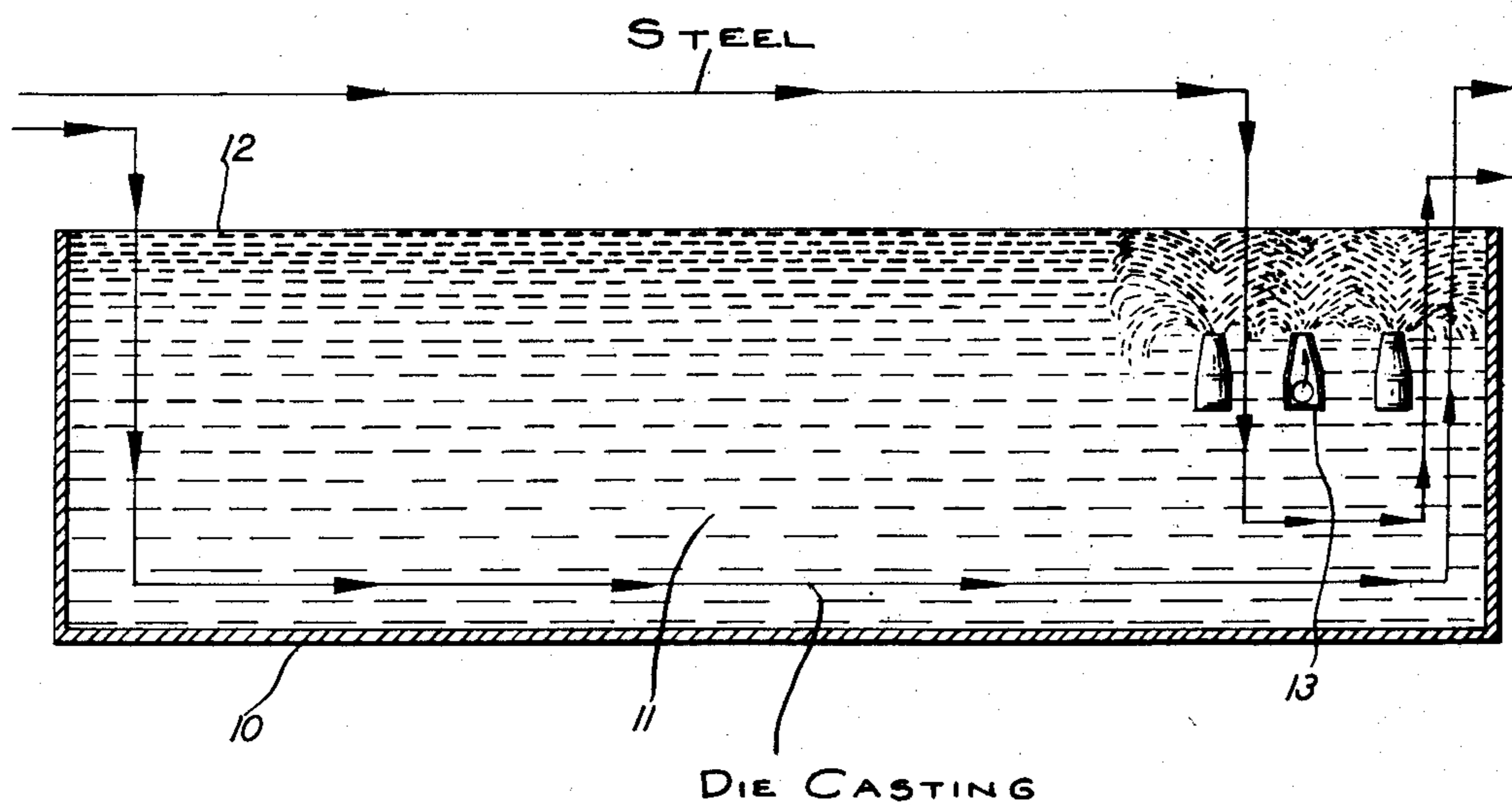
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COMBINATION STEEL AND DIE CASTING CLEANING PROCESS

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## UNITED STATES PATENT OFFICE

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COMBINATION STEEL AND DIE CASTING  
CLEANING PROCESSJulius A. Thomas, Monroe, Mich., assignor to  
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This invention is concerned with the electroplating industry and more particularly with that segment of the metal finishing industry in which large numbers of similar pieces are automatically electroplated.

In the automotive industry it has been found commercially desirable to protect and decorate both fabricated steel parts and zinc base die cast parts by chromium plating. Conventional chromium plating involves first a flash or strike of copper followed by a heavier copper plate upon which is superimposed a nickel plate. Finally a thin flash of chromium is added to the nickel-plated surface. In this plating procedure, as in all plating procedures, it is necessary that surface to be covered be meticulously cleaned before plating. The ordinary zinc base die castings are usually subjected to a dip in a tank containing water or other aqueous base cleaning solution, heated to about 150° F. upon which is floated a layer approximately 1 inch thick, of a water insoluble hydrocarbon or other grease solvent having a boiling point range corresponding to ordinary kerosene. This is the first step in the cleaning process and is usually followed by a dip in a heated alkali phosphate bath.

This procedure is quite satisfactory for die castings but if it be used upon fabricated steel parts, unsatisfactory results are certain to ensue. Fabricated steel parts invariably contain crevices and seams produced in the manufacturing operations and particularly in spot-welding procedures. When such a part is passed through a layer of kerosene, this material fills such crevices and it is commercially impracticable to remove this kerosene with the thoroughness necessary to produce satisfactory plated articles. In the past this difficulty has required that separate cleaning lines be employed for steel parts and die cast parts despite the obvious economy which would be effected if both types of parts could be cleaned in the same apparatus.

The instant invention has been developed to enable steel and zinc die castings to be cleaned in the same apparatus. This invention is probably best understood from a study of the attached drawing which is a vertical section taken through the length of a cooling tank.

In this drawing a steel tank is indicated at 10 and is filled to a depth of about six feet with a layer of water 11. A layer of kerosene 12 about one inch in thickness is floated upon the top of layer of water 11. Adjacent one end of this tank are located air nozzles 13. These nozzles are positioned about twelve inches beneath the level

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of the kerosene-water interface and are pointed upwards. When the tank is in operation the water is heated to about 150° F. and a vigorous stream of air is forced through nozzles 13. This vigorous stream of air violently agitates the end of the tank in which the nozzles 13 are located and effectively prevents the layer of kerosene 12 from extending over that portion of the tank. Instead of occurring as a separate layer, the kerosene in this section of the tank occurs as an emulsion scattered throughout that portion of the tank.

In the operation of this tank, the operator permits the die cast parts to descend into the hot water through the unbroken kerosene layer occurring in all parts of the tank remote from nozzles 13. In this way advantage is taken of the very potent grease dissolving action of hot kerosene. When steel parts are to be cleaned, the operator causes these parts to enter and leave the cleaning tank only through that part of the tank in which the layer of kerosene has been dissipated by the action of the nozzles 13. In this way the crevices of the steel parts will fill predominantly with water rather than kerosene and only sufficient kerosene in emulsion form contacts the steel part to perform the necessary cleaning operations. In the drawing the path of the die cast parts is indicated by the lower lines and the path of the steel parts by the upper lines. However, the path of the die cast articles may be varied if convenient, so that they leave the tank through the kerosene layer or the emulsified area.

By so operating this apparatus, it is possible to simultaneously employ the same cleaning and plating line to plate steel and die cast parts and avoid the expense of individual lines.

I claim as my invention:

1. The process of cleaning steel and die cast articles in a single container comprising filling said container with an aqueous base cleaning solution upon which is floated a layer of a water insoluble grease solvent, agitating one portion of the surface area of the container sufficiently vigorously to substantially completely dissipate the grease solvent layer over the agitated area and emulsify the grease solvent, immersing the die cast articles into the container through an unagitated area, removing the die cast articles and immersing and removing the steel articles only through the agitated area.

2. The process of cleaning steel and die cast articles in a single container comprising filling said container with an aqueous base cleaning solution upon which is floated a layer of a water

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insoluble grease solvent, agitating one portion of the surface area by means of air jets sufficiently vigorously to substantially completely dissipate the grease solvent layer over the agitated area immersing die cast articles into the container through the unagitated area, removing the die cast articles and immersing and removing the steel articles only through the agitated area.

3. The process of cleaning steel and die cast articles in a single container comprising filling said container with an aqueous base cleaning solution upon which is floated a layer of water insoluble grease solvent, agitating one portion of the surface area by means of an air stream in-

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roduced about twelve inches below the surface and in a vertical direction, immersing die cast articles into the container through the unagitated area, removing the die cast articles and immersing and removing the steel articles through the agitated area.

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