Aug. 26, 1941. G. F. PALMER 2,253,576

WORK-HANDLING MECHANISM

Filed Oct. 31, 1938

Fig. 1.

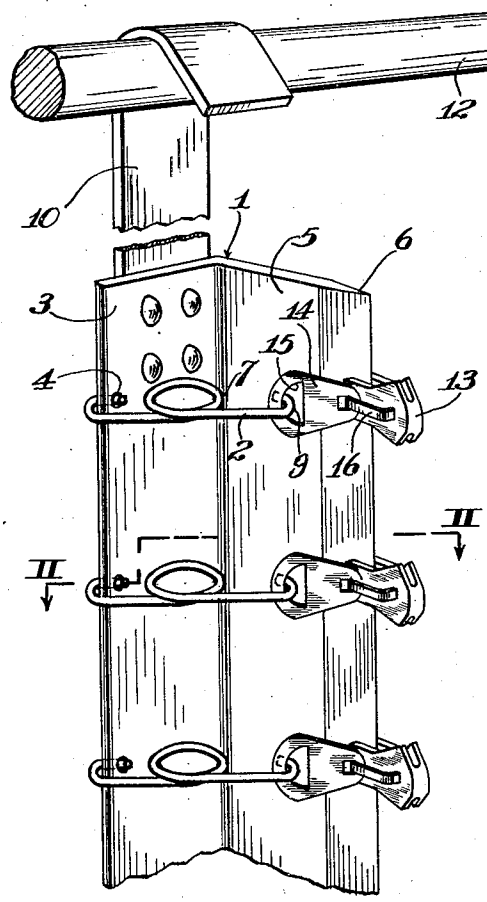


Fig. 2.

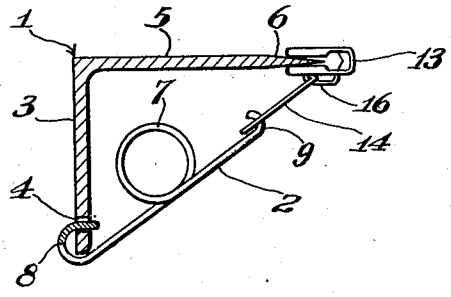
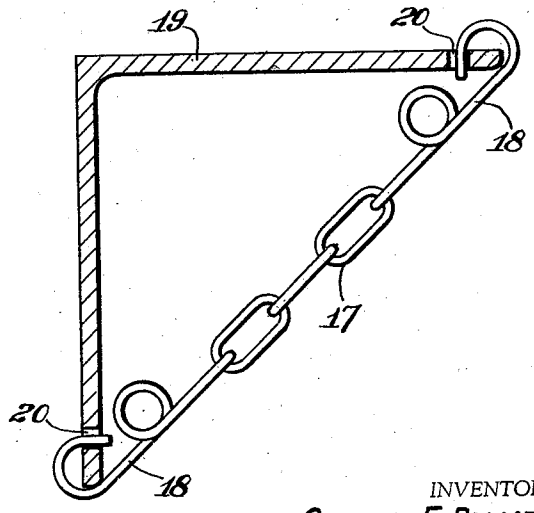


Fig. 3.



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WORK-HANDLING MECHANISM

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4 Claims. (Cl. 204—297)

This invention relates in general to a work-handling method and mechanism for treating articles which are assembled in relatively movable relationship. More particularly, the invention is preferably directed to a method and means for supporting such articles during their treatment in a liquid bath, such as an electrolytic surface treatment bath. The method and means of this invention may, however, be employed in numerous other manufacturing processes, exemplary of which are those methods which entail the performance of a working step upon objects which have previously been assembled in part, or completely, in series, and in relatively movable relationship.

Although the invention has a wide range of useful and economical adaptation in the manufacturing arts in general, I have elected to describe it in its association with electroplating and analogous electrolytic processes.

During electroplating and other electrolytic operations, great difficulty has been experienced in providing means for holding, in a liquid bath, articles composed of a plurality of parts serially assembled in relatively movable relationship, such as, for example, articles made up of interlinked elements. Since the various parts of such articles are loosely connected, it has been a problem to draw them sufficiently closely together to insure a definite relationship and electrical contact therebetween during electrolysis.

This problem has been especially troublesome in the electrolytic treatment of articles of relatively small size, since their light weight aggravates the difficulty of providing close electrical contact between the catenated parts. This difficulty is particularly noted in the treatment of interlinked aluminum sliders and pulls used in hookless fasteners, which as anode in a sulfuric acid solution electrolyte, or in fact any other suitable electrolyte, may be given a protective coating of aluminum oxide. Such articles cannot effectively be supported during the operation in ordinary electroplating baskets or freely suspended upon wires or hooks within the bath, since their light weight prevents the pulls and sliders from drawing together in close electrical contact, and from adhering tightly to their support, all of which disadvantages react to produce an inferior surface treatment.

The object of this invention is to provide an improved method and means for supporting objects which are assembled in series in relatively movable relationship during their surface treatment in a liquid. More particularly, the object of this invention is to provide a method and means whereby articles composed of interlinked members may be held with the members tightly drawn together so as to permit the flow of electrical current therethrough during electrolytic treatment thereof.

The particular object of this invention is to provide a rack adapted to hold assembled metal, such as aluminum, hookless fastener sliders and pulls with positive electrical contact therebetween during an electrolytic coating operation.

Specific embodiments of the invention are illustrated in the drawing, in which:

Fig. 1 is a perspective view of an improved rack embodying the features of the invention as utilized in artifically providing a protective coating of aluminum oxide upon the surface of aluminum sliders and pulls for fasteners of the hookless type;

Fig. 2 is a cross-sectional view taken along the line II—II of Fig. 1;

Fig. 3 is a cross-sectional view illustrating a modification of the apparatus of this invention as used in supporting chain-links during electrolytic treatment thereof.

Referring to Figs. 1 and 2, a rack suitable for supporting typical hookless fastener, sliders and pulls during their electrolytic treatment is shown, which preferably consists of a suitable angle bar or member 1 having a plurality of spring-wire clips or hook members 2 associated therewith. The leg 3 of the angle bar is provided with a series of apertures 4 disposed in spaced relationship along its free edge to receive one end of the aforementioned resilient hook members 2, while the leg 5 is gradually beveled or tapered, as illustrated at 6, along its free edge, the purpose of which will be hereinafter described. The spring-wire clips 2 are preferably each formed centrally into a loop 7, and at their free ends into hooks 8 and 9. The hook 8 of each wire clip is adapted to be inserted into one of the apertures 4, whereby the spring-wire clips are detachably attached, or held in place, on the angle bar 1. Connected by any suitable means, such as rivets or the like, to the angle bar 1 is a hook-shaped strip 10 which serves to support the rack 1 from any suitable work-supporting rod 12, thereby permitting the angle bar to be immersed within an electrolyte or other desired surface-treating bath.

The hookless fastener sliders and pulls, respectively, are designated by reference numerals 13 and 14. As is customary, the pulls 14 are each provided with an aperture 15 within which

the hook 9 of an aforedescribed spring clip 2 may be inserted, the pulls being otherwise attached to the sliders by any suitable form of relatively movable interlocking connection represented in its entirety at 16.

In the coating or surface-treating operation of the preferred practice of the invention, the sliders 13 are each mounted astride the tapered edge 6 of the angle bar. Thereafter the spring-wire clips 2, and the pulls 14, movably attached or connected to each of the sliders, are drawn together under the influence of the spring clips 2 which are inserted within apertures 15 of the pulls. It will be seen from this manner of mounting the relatively movable assembled elements 13 and 14 of a hookless fastener, slider and pull unit, that the pull members 14 are resiliently retained and maintained in definite position with respect to the sliders 13, against the influence of spring clip members 2.

In the further step of treating the surfaces of the elements 13 and 14 in an electrolytic bath, an electric current is passed through the work rod 12, through the hookless fastener elements 13, 14, spring members 2, and rack 1, all of which are constructed from electrically conductive materials. All of the aforementioned elements may form the anode in the particular electrolytic treatment herein described, the bath container (not shown) serving as the cathode, as is also well known in this art. The positive strain applied through the medium of the spring clips 2 upon the sliders and pulls insures close electrical contact between the elements 13 and 14, and between the angle bar and the spring-wire clips, thus insuring an uninterrupted flow of current and resulting in a highly satisfactory surface treatment, in this case, the formation of an aluminum oxide coating. On completion of an electrolytic treatment such as described, the spring clips 2 are readily detached from the pulls 14 by disengagement of their hooked ends 9, the sliders 13 being removed from the rack by overcoming their wedging action upon the tapered edge 6 of the bar 1.

It will be seen that the aforedescribed method of electrically treating the assembled sliders and pulls of a hookless fastener unit permits the assembly of the pulls 14 and their sliders 13 prior to electrolytic treatment thereof. It is also to be noted that the positive tensile force exerted by the spring clips 2 upon the pulls 14 maintains the pulls 14 in a definite position, with respect to their sliders 13, which is substantially that normally assumed by a hookless fastener slider and pull unit in its actual use. Moreover, points of contact between the support or rack 1 and the members being coated occur where the absence of a protective coating or subsequent coloring of said coating, when a coloring step has been employed, is least noticeable.

In the embodiment of the invention shown in Fig. 3 chain-links 17 have been substituted for the slider and pull unit 13, 14. In this particular embodiment of the invention the chain-links 17 are positively and resiliently held in positive relationship with respect to the individual links through the medium of two spring clip members 18, the rack 19 in this particular instance being provided with apertures 20 along both of its extending legs. Otherwise the manner of supporting, and the subsequent surface treatment of the chain-links may be similar to that described in connection with the preferred form of the invention.

The work-supporting rack of this invention may be constructed from various materials, but aluminum is recommended in the preferred practice of my invention, particularly because of its high electrical conductivity and resistance to electrolytic attack. It will be quite manifest, however, that the invention is not limited to any specific type of electrolytic treatment, since surface treatment generally of articles which are assembled in relatively movable relationship, such as the application of an enamel coating or the like through the medium of bath immersion, lends itself readily to the rack and method of this invention. In surface treating processes of this latter type, which do not involve the necessity of an electric current, the rack does not require to be constructed from electrically conductive material, any suitable material being satisfactory.

Various modifications are possible in the construction of the rack. For example, the interlinked elements of articles being coated may be held under tension between the oppositely disposed portions of supporting structures having forms other than the integral angle bar member illustrated. Moreover, positive positioning means of types other than the spring-wire clips described herein may be used. Since these and other modifications in structural detail will occur to those skilled in the art, it is understood that the specific forms of the supporting rack described above are shown for illustrative purposes only and that the invention is not limited to the actual embodiments described herein.

I claim:

1. A rack for supporting assembled sliders and pulls for hookless fasteners during electrolytic treatment thereof, comprising a member having two angularly and rigidly disposed legs, one leg of said member having a beveled edge adapted for insertion within a slider in electrical contact therewith, and a spring element attached at one end to the other leg adapted to extend toward said first leg and to hold said pull under tension and in electrical contact therewith, whereby the slider is positively maintained upon the beveled edge of said leg.

2. A rack for supporting assembled sliders and pulls for hookless fasteners as anodes to be given a protective anodic coating in an electrolyte, comprising an angle bar, a spring element, and means for electrically charging said angle bar, one leg of said angle bar having a beveled edge adapted to be wedged within said sliders in electrical contact therewith, said spring element being held upon the other leg and adapted to extend toward said first leg and to hold said pulls under tension and in electrical contact therewith, whereby the sliders are maintained upon the beveled edge of said angle bar leg.

3. A rack for supporting assembled aluminum sliders and pulls for hookless fasteners during surface treatment in an electrolyte, said rack comprising a member having two angularly and rigidly disposed legs, one leg having a beveled edge adapted for insertion within a slider in electrical contact therewith, and a looped spring element attached to the other leg and adapted to extend toward said first leg and to be connected to said pull to hold an assembled slider and pull in tension and in electrical contact therewith, whereby the slider is positively maintained upon the beveled edge of said leg.

4. A rack for supporting assembled aluminum sliders and pulls for hookless fasteners as anodes to be given a protective oxide coating in an elec-

trolyte, said rack comprising an angle bar, a spring element, and means for electrically charging said angle bar, one leg of said angle bar having a beveled edge adapted to be wedged within a slider in electrical contact therewith, said spring element being held upon the other leg and connected to a pull to hold an assembled slider and pull under tension and in electrical contact therewith, whereby the slider is maintained upon the beveled edge of said angle bar leg.

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