Dec. 5, 1950 C. MANASERI 2,532,849

APPARATUS FOR MOVING ARTICLES

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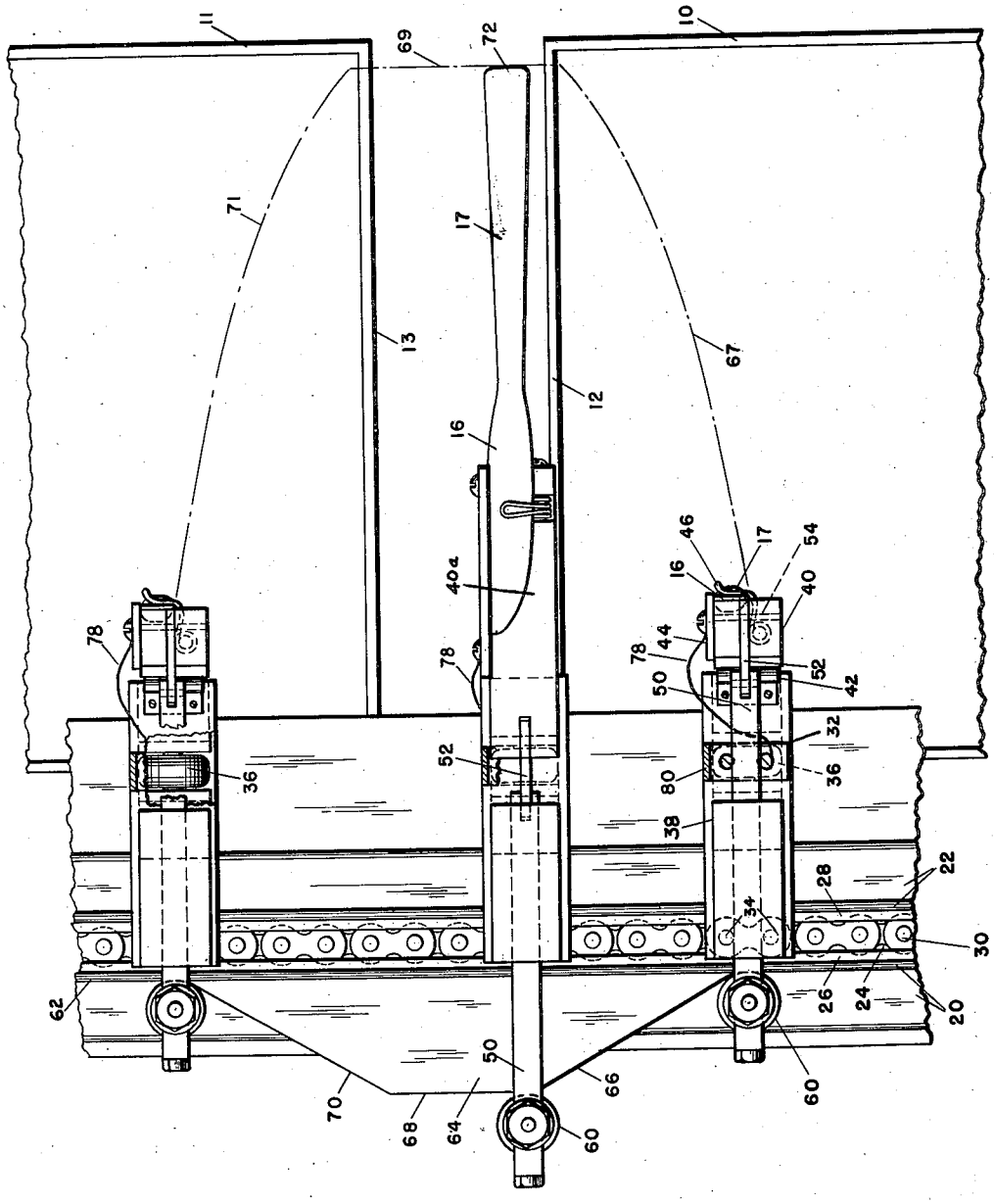


Fig. 1

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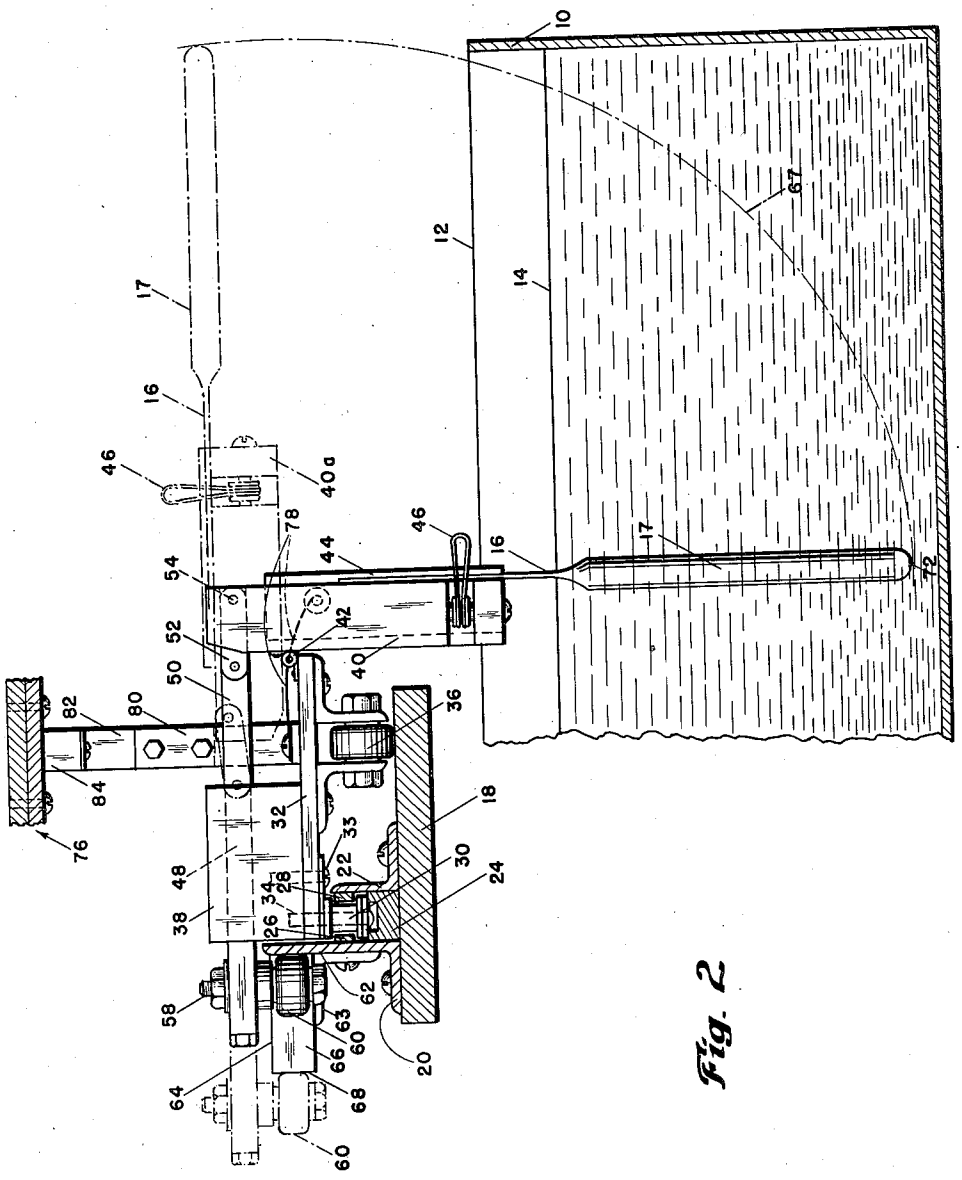


Fig. 2

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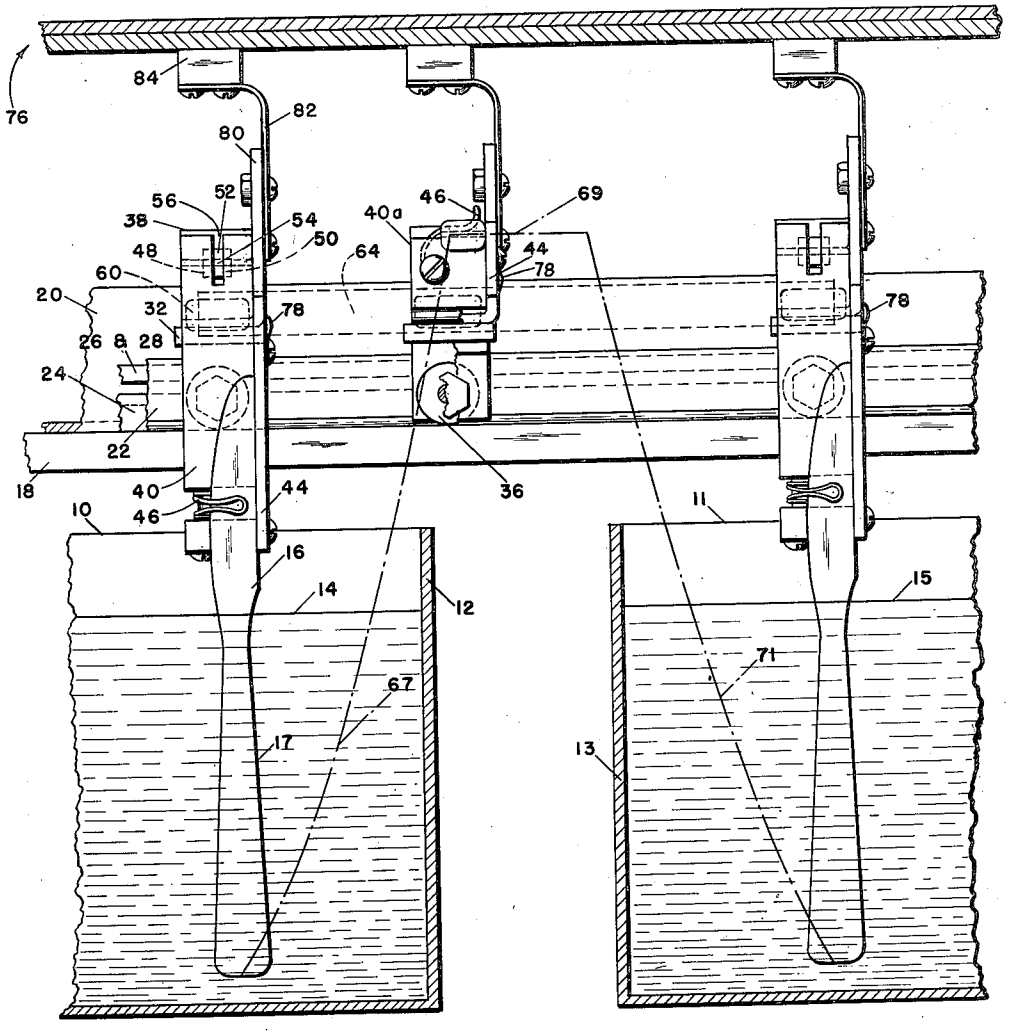


Fig. 3

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UNITED STATES PATENT OFFICE

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APPARATUS FOR MOVING ARTICLES

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Application February 18, 1947, Serial No. 729,293

3 Claims. (Cl. 198—19)

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This invention relates to mechanism for moving an object along a path in such a manner that normal translatory motion of the object in its path is modified at predetermined intervals by a superimposed swinging motion.

By way of example, the mechanism of this invention may be employed in the operations of electroplating silver tableware, wherein it is desired that the ware to be plated should move along continuously and uniformly from one bath to the next, through a plurality of baths, without the necessity for hand labor to lift the ware from one bath and lower it into the next succeeding bath. Apparatus is now in common use for this purpose with respect to tableware of which the entire surface is plated; such apparatus accomplishes the movement of the completely submerged ware on a rack through one bath, vertical non-swinging elevation of the rack with the ware at the end of its travel through that bath, continued movement of the elevated rack and ware over the confining walls of that bath and the next succeeding bath, lowering of the rack and ware into the latter bath, movement therethrough, and so on. But such apparatus cannot be conveniently used for the plating of ware which cannot be completely submerged—e. g. in the plating of knives having stainless steel blades, the plate being applied only upon the handle.

The mechanism of this invention, when used for plating such knives for example, causes the ware to move through any one of the plating or other baths, partially submerged to the proper extent, until the far confining wall of that bath is nearly reached; the mechanism then causes the ware to swing up out of the bath to such a height that, as the constant translatory motion continues, the ware moves along above the top of said wall and above the top of the near confining wall of the next succeeding bath, after which the mechanism causes the ware to swing down into position for operation in said succeeding bath, and so on.

The baths may be not only plating baths, but also any other baths associated with the plating operation—e. g. strike solutions, washing treatments, cleaning solutions, etc. Furthermore, the baths may not necessarily be associated with plating, but may be for cleaning, coating, polishing, electropolishing, etching, or other operations. And furthermore, baths of liquid may not be involved in the operations. Instead, for example, the apparatus of this invention may be employed to position the articles to be treated or processed in zones where sand blasting, infra-red drying, spraying, or other operations take place.

The articles to be plated, cleaned, or otherwise treated in a succession of baths are initially loaded onto position on the apparatus of this invention, which then carries these articles in

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continuous motion through each successive bath lifting each article in succession over the end walls of the baths as those walls are approached, without requiring hand operations to perform such lifting and transfer from bath to bath. At the end of the succession of baths, the articles are unloaded, for whatever further treatment, use, packaging, etc. may be in order.

More broadly, this invention provides apparatus which moves a succession of articles through a processing zone, then swings them up and out of said zone, and then swings them down into another processing zone, and so on.

The above and other features of this invention will now be described with reference to the accompanying drawings, wherein

Fig. 1 is a plan view of a typical embodiment which is illustrative of the present invention;

Fig. 2 is a side elevational view, partly in section, of the device shown in Fig. 1; and

Fig. 3 is a front elevational view of the same device.

In the drawings, numerals 10 and 11 represent two adjacent tanks having facing end walls 12 and 13 respectively. Each tank contains a body of plating solution or other liquid, the surfaces of which are represented by numerals 14 and 15 respectively. Suspended in the solution is a knife or the like 16, having a handle 17 which is to be plated in the solution and which extends below the surface 14 of the solution, said knife being held and carried by the mechanism of this invention presently to be described.

This mechanism comprises a base of supporting platform 18, upon which are mounted angle irons 20 and 22 which run the length of the platform and which are spaced apart throughout their length by spacer member 24. The angle irons 20 and 22 are also provided with bars 26 and 28 respectively, which run the length of the angle irons and which, together with the facing sides of said angle irons and the top of spacer member 24, serve as a guide and traveling space for chain or the like flexible drive 30.

Spaced along the chain 30 at suitable intervals are the carriages for carrying and moving the knives or other ware to be processed. Three such carriages are shown in each figure of the drawings, illustrating three different points in the travel and motion of the article being processed; it being understood that as many of these carriages as required may be positioned upon chain 30, and at whatever intervals may be desired. These carriages are moved along steadily by chain 30, which is actuated by passing over a sprocket or other driving member (not shown).

Each carriage comprises a base plate 32, which is affixed to chain 30 by bolt 33 and restrained from sideways movement by extended chain link pins 34, and which is also spaced and supported

above the upper surface of base 18 by means of roller 36. Mounted near one end of the top of base plate 32 is block 38, while at the edge of the other end is positioned the knife (or other ware) holder 40. This holder 40 is attached to the edge of base plate 32 through roller means 42, about which it can swing up to position 40*a* as described in more detail hereinafter. Holder 40 is also provided with means for holding the ware 16, for example with plate 44 and spring 46. The spring 46 holds the ware in proper position against plate 44 and holder 40, and the ware may be removed from or inserted into the apparatus by pushing spring 46 away from plate 44.

During the plating or other operations on knife or other ware 16 the ware and the holder 40 are in substantially vertical position so that the to-be-processed part 17 is within the processing solution and moving through it. In order to swing the ware up and over the tops of the walls 12 and 13 of tanks 10 and 11, the following mechanism is provided: In block 38 is provided a passageway 48 in which a bar 50 is positioned so that it slides easily in the passageway. At one end of bar 50 is attached a link 52 pivoted to holder 40 at point 54, which is above roller means 42 at which holder 40 is pivoted to the carriage. Holder 40 may be provided with slot 56 to receive link 52. At the other end of bar 50 is a bolt assembly 58 carrying a roller 60. This roller normally travels along the outer surface 62 of the vertical portion of angle iron 20, and is held against it by the force of gravity acting upon the ware 16 and the holder 40. Attached at suitable intervals along the surface 62 by angles 63 are risers 64 in the path of roller 60, which latter accordingly follows the path 66—68—70 over each riser. In doing so, roller 60 causes motion of bar 50 (leftwardly, with respect to Figs. 1 and 2) which through link 52 acts upon holder 40 and the ware 16 to lift them to a more or less horizontal position as shown at 40*a* sufficient to allow the ware to pass over the tops of the walls 12 and 13 of tanks 10 and 11. In so moving, holder 40 pivots about roller 42 mounted on base plate 32, as already indicated. It will be noted that a vertical plane passing through holder 40 and roller 60 will be substantially at right angles with the line of travel of the carriages, at its point of intersection therewith, which line of travel is of course substantially parallel to the axis of the row of processing tanks (including tanks 10 and 11) in order that the ware may be introduced into and processed in each tank in series.

Each riser 64 is accordingly placed substantially opposite each adjacent pair of end walls 12 and 13 of the solution tanks, so that a vertical plane passing half way between each such pair of end walls and at right angles to the line of travel referred to above will pass substantially through the center of path 68, which is that part of the path effecting the maximum upward motion of holder 40 and the ware carried by it. At least the major parts of approach paths 66 and 70 of each riser 64 are opposite the solution tanks, so that a vertical plane passing through the end wall of any such tank at right angles to said line of travel will cut the path 66—68—70 at a point fairly close to the junction of path 68 with either path 66 or path 70. E. g. when said plane passes through end wall 12, it will cut said path at or adjacent to the junction of paths 66 and 68.

The extreme end 72 of the ware accordingly follows the curve 67—69—71 as the roller 60 follows the paths 66, 68 and 70 respectively. The configuration of curve 67—69—71 may be modified by modifying the shape of path 66—68—70, which need not necessarily be composed of straight lines as shown but may be more or less curved at the points of joining surface 62 and also where path 68 joins paths 66 and 70, to avoid sharp changes in direction. Nevertheless, such modifications should not appreciably change the shape of the paths as shown, nor be such as to prevent the desired motion of the ware.

In order to operate the apparatus of this invention, power is supplied to chain 30 to drive it at substantially constant speed, and an operator loads the ware 16 into each holder 40 before it reaches the first tank or operating position. This loading may be done either when the holder is in vertical position, or when it is in horizontal position as shown by 40*a*. In general, the latter is more convenient, and may of course be provided for by arranging a riser such as 64 in a suitable position before the first tank. The ware is thereafter carried continuously from tank to tank for the desired sequence of operations, and is automatically lifted over the end wall of each tank as such wall is approached in the path of the ware, and lowered into the next tank after passing over the end wall thereof adjacent the end wall of the next preceding tank. After passage through the last of the tanks, the ware is removed by an operator, and the holders and associated mechanism are carried along by the chain to the point of beginning, where they are reloaded.

When the operation is one of plating, suitable anodes (not shown) are placed in either or both of tanks 10 and 11, and those anodes and the ware to be plated are connected with a suitable source of electric current, the ware being the cathodes. Supply of such electric current to the ware may be provided, for example, from bus bar 76, through contacts 84 mounted by means of conductive spring strips 82 on conductive angle bars 80, which are in turn connected through flexible jumper wires 78 to conductive plates 44 which are in contact with the ware. Angle bars 80 are mounted on base plates 32. By making base plate 32, block 38, and holder 40 of non-conductive materials, the rest of the apparatus may be insulated from the source of plating current.

What is claimed is:

1. In a device for automatically moving an article through a row of processing zones, while swinging said article upwardly at substantially the end of its travel through each one of said zones and then downwardly into position for traversing the next succeeding zone, the combination of carriage means actuated by driving means moving said carriage means at a substantially constant speed substantially parallel to the axis of said row of processing zones, said carriage means supporting a holder for said article, said holder being swingably pivoted intermediate its vertical length at one end of said carriage means to depend vertically and to permit swinging about the point of pivoting in a plane at right angles to said axis, a roller positioned adjacent the end of said carriage means opposite to said holder and supported by said carriage, and so positioned that said plane passes through said roller, connecting means between said roller and a point

on said holder above the point at which said holder is pivoted to said carriage means, a surface along which said roller rolls, the normal course of said surface being parallel to the line of travel of said carriage means, and deflections in said surface for causing said roller to move horizontally away from said holder at each of the intervals between each adjacent pair of said processing zones, said horizontal movement of said roller causing its associated holder and the article held thereby to swing upwardly out of the processing zone just traversed and into a substantially horizontal position.

2. A device in accordance with claim 1 wherein said holder has mounted thereon a plate and a spring, said spring being positioned to urge the article against said holder and said plate.

3. In a device for automatically moving an article along a path and periodically swinging said article upwardly and then downwardly at predetermined intervals, the combination of carriage means actuated by driving means moving said carriage means at a substantially constant speed, said carriage means supporting a holder for said article, said holder being swingably pivoted intermediate its vertical length at one end of said carriage means to depend vertically and to permit swinging about the point of pivoting

in a plane at right angles to said axis, a roller positioned adjacent the end of said carriage means opposite to said holder and supported by said carriage, and so positioned that said plane passes through said roller, connecting means between said roller and a point on said holder above the point at which said holder is pivoted to said carriage means, a surface along which said roller rolls, the normal course of said surface being parallel to the line of travel of said carriage means, and deflections in said surface for causing said roller to move horizontally away from said holder at predetermined intervals, said horizontal movement of said roller causing its associated holder and the article held thereby to swing upwardly and into a substantially horizontal position.

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