July 5, 1960 E. E. DOTTERER ET AL 2,943,749

MULTIPLE CLAMPING OF MOUNT STEMS

Filed Oct. 18, 1956 2 Sheets-Sheet 1

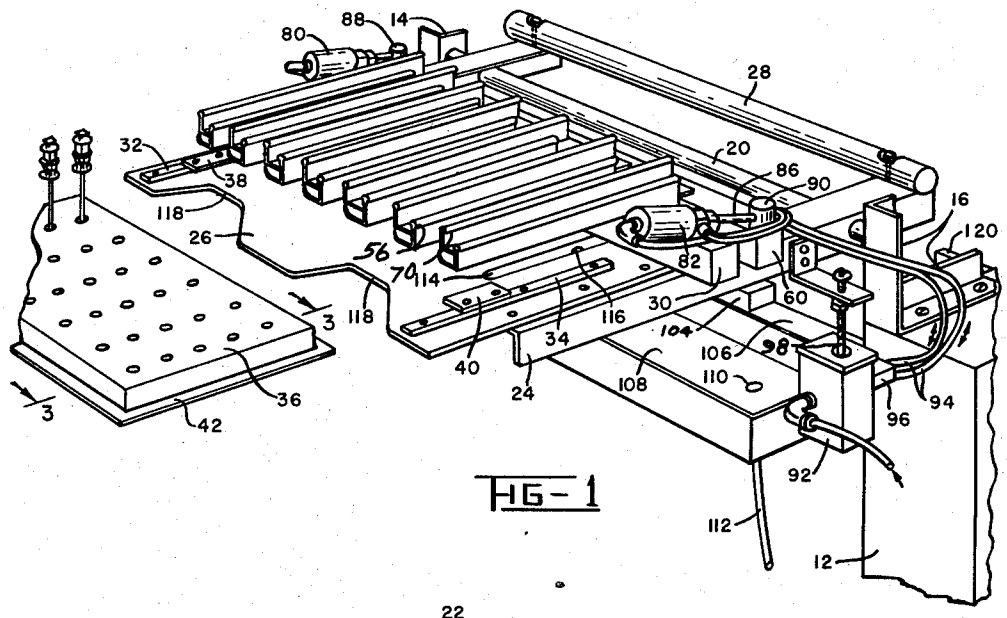



FIG-1

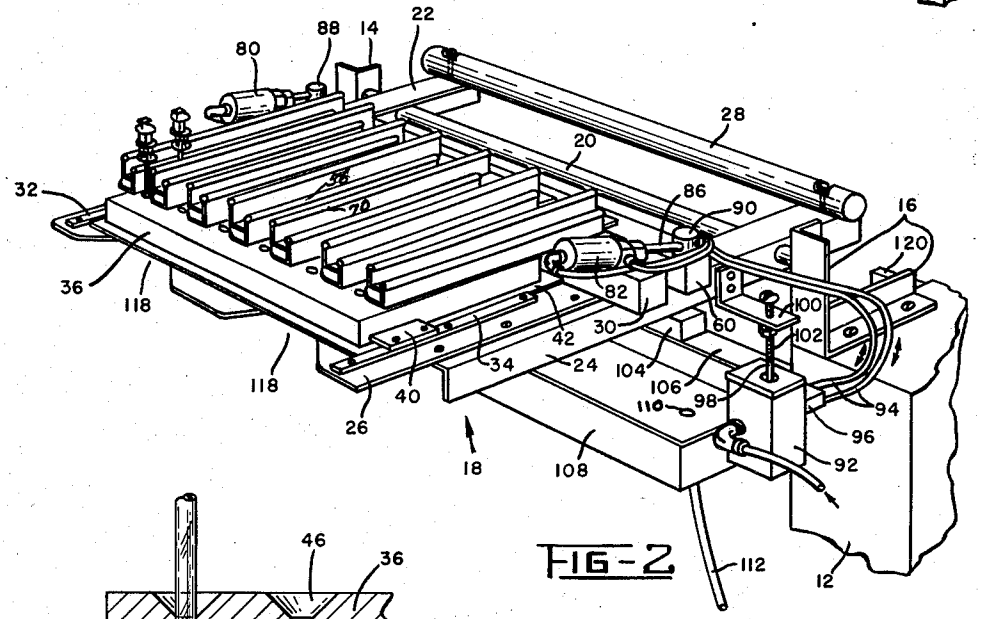



FIG-2




FIG-3


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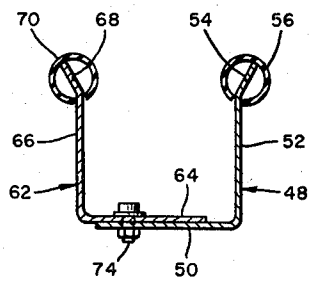



FIG-7

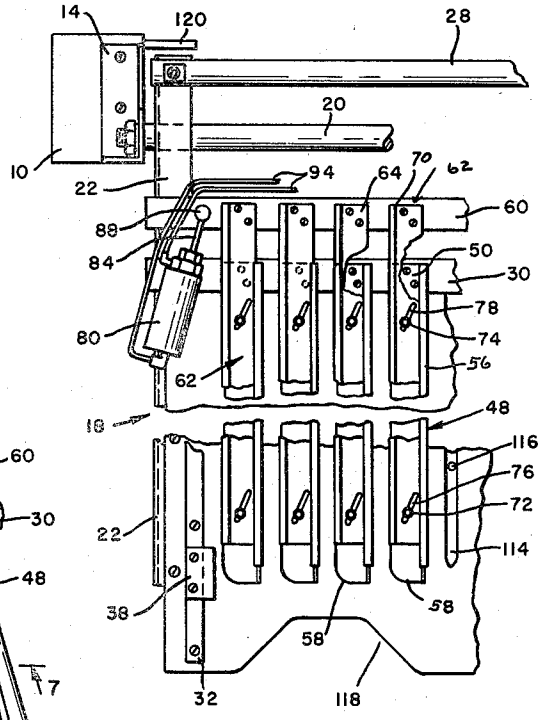



FIG-4

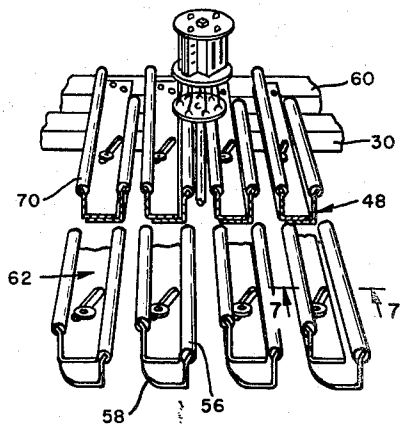



FIG-5

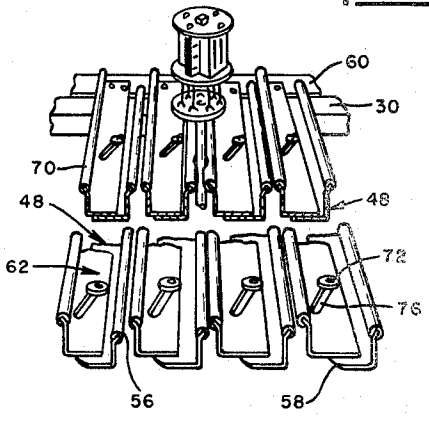



FIG-6

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# MULTIPLE CLAMPING OF MOUNT STEMS

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5 Claims. (Cl. 214—1)

This invention relates to article handling. It relates to a means for multiple clamping of a number of equi-sized objects between sets of fixed and movable clamping bars. More specifically it relates to the handling of articles whereby they may all be temporarily loaded in a clamp rack and inverted while in the rack for some treatment, as, immersion within a cleaning fluid.

In the manufacture of electron tubes, it has been found necessary to wash electrode elements after they have been assembled with respect to each other and fixed on to a supporting stem with exhaust tubulation affixed thereto, the stem forming the base of the finished tube. This assembly or mount with tubulated stem is subsequently sealed into a bulb and after further treatment becomes the finished tube. In the past these mounts with their tubulated stems were washed by being first placed in the trays with multiple rows of aligned holes in the upper surface, the lower ends of the exhaust tubes of the stems being received within the holes. These trays were then placed in a loading rack with guide holes at opposite ends of the rack. Then rectangular bars were individually or in pairs threaded through the holes, one bar for each row of mounts, the bars overlying the stems to prevent their falling out when the racks were inverted. This was a rather clumsy time consuming mechanism and also necessitated the multiplication of racks, if more than one tray was prepared in a rack for immersion, as was often the case, even though the immersions were for a few seconds.

An object of this invention is to provide a structure whereby trays of tubulated stem mounts may be very conveniently and quickly inserted in a clamping tray holder for mount washing purposes.

A further object of the invention is to provide means whereby clamping of the mount exhaust stems is effected by mere tilting of the tray holder preparatory to dipping of the mounts in a cleaning bath.

Still another object of the invention is to provide means to facilitate the dipping operation by providing fixed pivots for the holder located in proper relationship to the tank or bath so that unnecessary transportation of the holder is avoided.

Still another object of the invention is to provide mechanism whereby only a single holder is needed to effect the dipping and cleaning operation in a large plant, since but a few seconds of dipping of mounts in a loaded holder is necessary to atain the desired cleaning.

Other objects will become apparent upon consideration of the following specification when taken in conjunction with the accompanying drawings in which:

Fig. 1 is a perspective view of a clamping tray holder, together with a tray partially loaded with tubulated stems with their mounts.

Fig. 2 is a perspective view of the clamping tray holder, with a tray therein, only two of all the possible mounts being shown.

Fig. 3 is a cross-section through a portion of a tray



showing how a tubulation is positioned in a recess in the tray.

Fig. 4 is a fragmentary plan view of the tray holder.

Fig. 5 is a perspective view of the tray holder with a tubulated stem and mount shown in position ready to be clamped by the holder bars.

Fig. 6 is a view similar to Fig. 5 but with the bars in tubulation clamping position, and

Fig. 7 is a section on the line 7—7 of Fig. 5 looking toward the rearward ends of the bars.

Considering the drawings in greater detail, at 10, 12, Figs. 4 and 1, respectively, are shown a pair of posts on which are secured angle irons 14, 16 pivotally mounting the clamping holder generally indicated as 18, through the intermediary of a pivot rod 20 fixed to vertical legs of the angle irons. The frame of the clamping holder comprises two side angle bars 22 and 24 pivoted on the rod 20 and held in any conventional fashion against sliding movement longitudinally of the rod. Besides the side angle bars 22 and 24, the frame 18 comprises a base board 26 bolted to the angle bars, a heavy counter weight bar 28 bolted to the rear ends of the angle bars and a rectangular cross bar 30 of wood or the like, fastened to the angle bars in any suitable manner. Fastened to the base board 26 there are two cleats 32 and 34, both parallel with the angle bars 22 and 24 and spaced apart a distance equal to the width of the mount trays, one of which is fragmentarily shown at 36 in Fig. 1. Mounted on the cleats are retaining blocks 38 and 40 to overlie lateral flanges 42 of the trays. The trays themselves are conventional and each consists of a rectangular flanged block with equally spaced aligned rows of bores 44 extending downwardly from the top surface, the bores having flaring mouths 46 to facilitate the insertion of mount tubulations in the tray. Usually a tray will contain a large number of bores. Although only thirty bores are illustrated, the conventional tray employs many more, as one hundred bores, twenty rows across and five from front to back of the tray. While only two mounts from front to back are shown in the tray of Fig. 1 or of Fig. 2, it should be understood that in practice before inserting a tray into the holder 18 for mount washing, it is desirable to fill all of the bores in the tray.

To clamp the tubulations in place when the tray is loaded into the holder, the following instrumentalities are employed:

Fixed to the cross bar 30 are a number of angle irons 48, hereinafter termed stationary fingers, each extending forwardly of the cross bar and in parallel spaced relationship to each other. All of these stationary fingers, see Figs. 4 and 7, have horizontal webs 50 fastened to the bar 30 and vertical webs 52 at the right hand side of the horizontal webs, when the structure is viewed from the front, as in the several views. The upper edges of the vertical webs are inclined slightly upwardly and to the right, as indicated at 54, and surmounting the inclined portions are split rubber tubes or pads 56. The forward end of each horizontal web is arcuate as indicated at 58 for ease of insertion of the tubulations alongside of the fingers. Slidably resting on the angle bars 22, 24 is a support bar 60 of wood or the like. This bar is parallel to the cross bar 30 and rigidly supports a number of angle irons 62, hereinafter termed movable fingers, complementary to the fingers 48. Each of these movable fingers has a horizontal web 64 fastened to the bar 60 and a vertical web 66 to the left of the horizontal web, as viewed from the front of the machine. The upper edge of the vertical web is inclined upwardly to the left as indicated at 68, and surmounting this inclined edge is a split rubber tube or pad 70, cooperating with the rubber tube or pad 56 of an adjoining stationary finger, when the movable

fingers are operated, as will be described. Each of the stationary fingers has upstanding, at two spaced points along the horizontal web thereof, a pair of bolts **72**, **74**, these bolts riding in parallelly inclined slots **76**, **78** in the horizontal webs of the movable fingers. Thus when the rear slidable bar **60** is moved toward and away from the stationary bar **30**, each of the movable fingers **62** will be moved so that its rubber tube **70** will move away from and toward a companion rubber hose **56** on an adjacent stationary finger **48**. To effect the movements of the bar **60**, there is fixedly mounted on the bar **30** a pair of double acting cylinders **80** and **82** whose piston rods **84** and **86** are pivotally secured to pins **88** and **90** affixed to bar **60**. To control the actuation of the cylinders, there is provided a conventional valve mechanism within casing **92** with hose **94** connected parallelly to the two cylinders to cause them to operate in unison either to force the piston rods out of the cylinder or to retract them. A conventional needle valve **96** or the like is employed to retard the flow of fluid to the cylinders, particularly on release of the tubulations, to prevent spinning action of the pads on the tubulations. To operate the valve mechanism in casing **92**, there is provided a valve operating stem **98** extending upwardly through the casing and the pivoted holder **18** is provided with a bracket **100** adjustably supporting a valve stem operator pin **102**. When the holder is in the position shown in Figs. 1 and 2, the valve mechanism is operated to move the bar **60** rearwardly, thus opening the spaces between rubber pads **70** and **56**. Where the holder is tilted toward inverted positions the released valve mechanism causes the cylinders to pull bar **60** toward bar **30** and thereby clamp tubulations between the pads. To limit the movement of the holder toward tray loading and unloading position there is provided a stop block **104** on an angle iron **106** extending between and secured to the posts **10** and **12**, said stop block lying beneath the vertical flange of the angle bar **24**. A similar block is located at the left hand end of the angle iron **106** beneath the angle bar **22**. At the front end of the machine for convenience in receiving drippings from the washed mounts on the holder there is provided a narrow rectangular pan **108** with drain opening **110** and drain hose **112**. The base **26** may be suitably grooved as at **114**, see Fig. 4, and perforated as at **116** to allow drippings to fall into the pan **108**. The front of the base is provided with finger recesses **118** to facilitate insertion and retraction of the mount holding trays **36**. Any suitable washing tank (not shown) may be provided at the rear of the machine whose edges could be provided with stops to limit inverting movement of the tray to substantially 180° or stops such as stop pin **120** may be positioned on the posts **10** and **12** to engage the horizontal webs of the angle bars **22** and **24**.

In use, a mount tray **36** is fully loaded or substantially fully loaded with tubulated mounts and the tray is inserted into the holder **18**. Because of the trackway formed by the cleats **32** and **34**, the tubulations will be in position to slide in between the sets of fingers, being assisted in that movement by the arcuate edges **58** of the stationary fingers. At this time the movable fingers are separated from the companion fixed fingers of an adjacent overlapped pair of fingers and the valves in casing **92** are operated to cause the piston rods **84** and **86** to hold the bar **60** rearwardly. After thrusting the tray home against bar **30**, the operator tilts the holder from its initial position through approximately 180°. At the start of the tilting movement, the valve operator pin **102** leaves the valve stem **98** and the movable fingers are moved toward the fixed fingers to cause the rubber pads to clamp the tubulations. The operator retains the mount dipping holder in inverted washing position for several seconds and then tilts the holder back to initial position, whereupon the pin **102** again engages the valve stem **98** and because of the action of needle valve **96**, the movable fingers separate from the fixed fingers at a rate slow enough to prevent tubulation spinning. Then the tray is removed, placed in a drying rack, and another tray is loaded into the holder for repeat operation.



Although the clamping mechanism has been exemplified as used in conjunction with electron tube parts, it is obvious that other similar articles may be clamped by the holder.

Having thus described the invention, what is claimed is:

1. A tray holder and article clamping mechanism comprising a frame having a trackway for receiving a tray loaded with straight rows of articles, a bar fixed on said frame transversely of the trackway and fixedly carrying a number of spaced parallel fingers parallel with the trackway, a second bar parallel to said first bar fixedly carrying a second set of fingers alternating with and parallel to the fingers on the first bar, means for diagonally moving one bar toward and from the other, and means for supporting the frame for pivotal movement about an axis perpendicular to the fingers.

2. A tray holder and article clamping mechanism comprising a pivoted frame having a trackway for receiving a tray loaded with straight rows of articles, a bar fixed on said frame transversely of the trackway and fixedly carrying a number of spaced parallel fingers parallel with the trackway, a second bar parallel to said first bar fixedly carrying a second set of fingers alternating with and parallel to the fingers on the first bar, means for diagonally moving one bar toward and from the other, means for pivotally supporting the frame about an axis perpendicular to the fingers, said moving means comprising a motive means interacting between the bars and control means for said motive means comprising a part fixed on a non-movable part of the machine and a second cooperating part mounted for movement with the pivoted frame whereby the first part is contacted by the second in one position of the frame and is out of contact relationship in other positions of the frame.

3. A tray holder and article clamping mechanism comprising a frame having a trackway for receiving a tray loaded with straight rows of articles, a bar fixed on said frame transversely of the trackway and fixedly carrying a number of spaced parallel fingers, a second bar parallel to said first bar fixedly carrying a second set of fingers alternating with and parallel to the fingers on the first bar, means for diagonally moving one bar toward and from the other, means for supporting the frame for pivotal movement about an axis perpendicular to the fingers, said moving means comprising at least one motor in the form of a double acting cylinder and piston interconnecting the two bars, and control means for said motor comprising a valve and valve stem mounted on an immovable part of the machine, said valve having a valve stem operator on the pivoted frame in position to contact and depress the valve stem in one position of the frame and to move out of contact with the valve stem in other swung positions of the frame.

4. A tray holder and article clamping mechanism comprising a frame having a trackway for receiving a tray loaded with straight rows of articles, a bar fixed on said frame transversely of the trackway and fixedly carrying a number of spaced parallel fingers parallel with the trackway, a second bar parallel to said first bar fixedly carrying a second set of fingers alternating with and parallel to the fingers on the first bar, means for diagonally moving one bar toward and from the other, means for supporting the frame about a pivot means perpendicular to the fingers, and a counterbalance weight mounted on said frame with said pivot means located intermediate the second bar and the weight, with the frame portion extending rearwardly of the pivot means of small extent compared to the length of the frame portion forwardly of the pivot means.

5. A tray holder and article clamping mechanism comprising a frame having a trackway for receiving a

tray loaded with rows of articles, a set of fingers mounted on the frame above the trackway, a second set of fingers supported by the frame alternating with and parallel to the first set of fingers, motor means on the frame adapted to effect clamping action of the fingers on the articles held in the tray and positioned between a finger and its companion alternating finger, a support for the frame, means pivotally mounting the frame on the support, and associated control means on the frame and on the support to control the operation of the motor means to effect clamping action of the fingers on the articles in the tray when the frame is tilted away from a normal tray loading and unloading position, and to release the fingers when the frame is restored to said position.



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