Jan. 5, 1932. W. C. CRIMMINS 1,839,867

RADIO APPARATUS

Filed Jan. 9, 1930 2 Sheets-Sheet 1

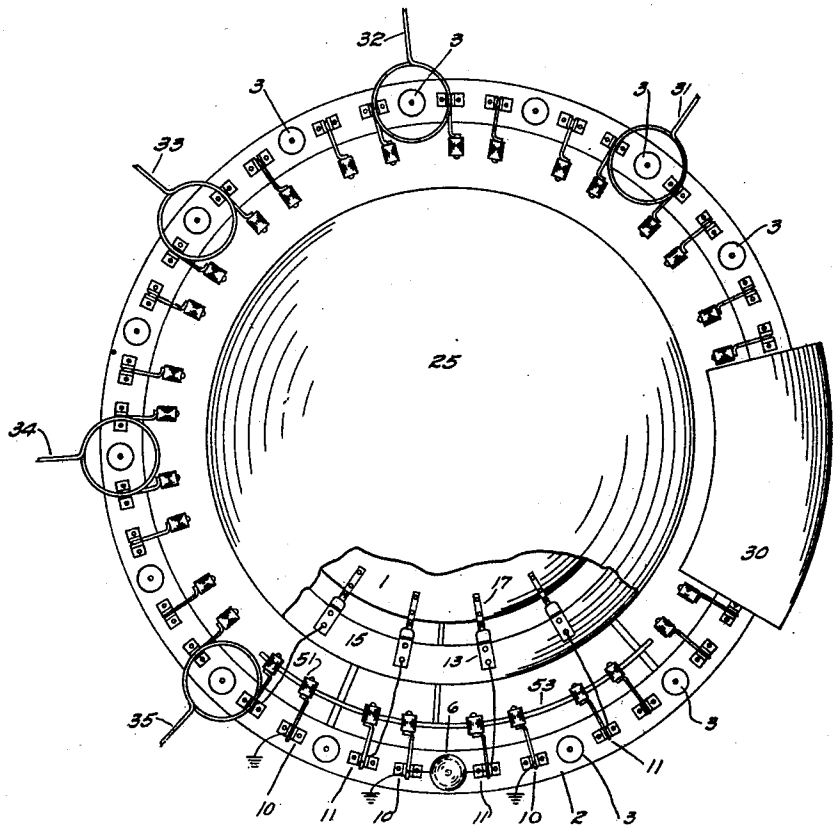


FIG-1

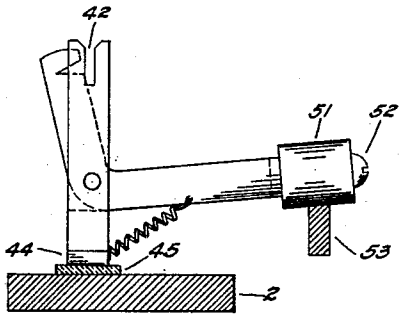


FIG-2

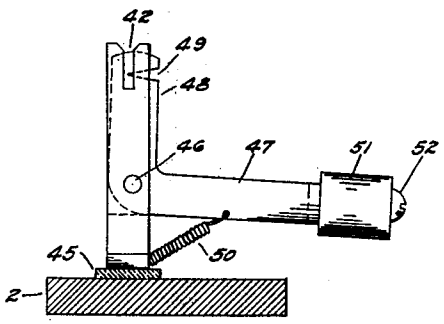


FIG-3

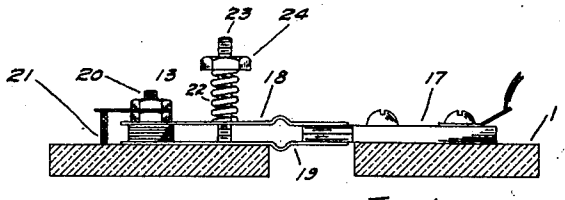


FIG-4

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RADIO APPARATUS

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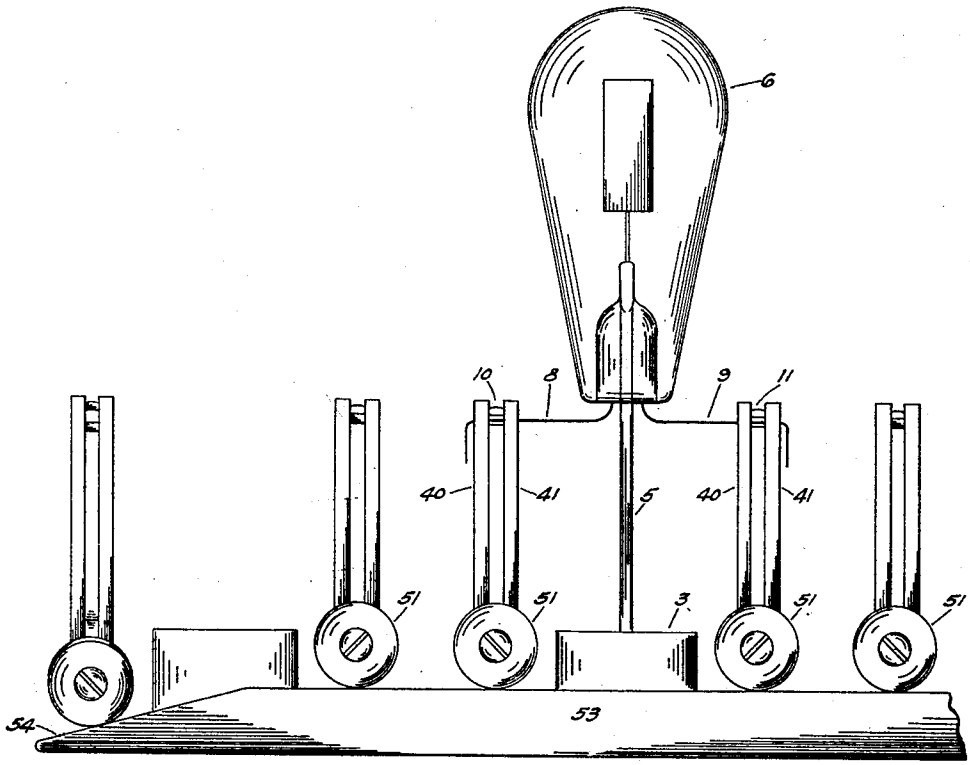


FIG-5

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Patented Jan. 5, 1932 1,839,867

UNITED STATES PATENT OFFICE

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RADIO APPARATUS

Application filed January 9, 1930. Serial No. 419,577.

This invention relates to radio apparatus and particularly to machines for manufacturing the same. In exhausting vacuum tubes, it is necessary to heat the cathode so that thorough removal of gases is effected. To accomplish this an exhaust machine having a stationary central portion and an annular intermittently rotating turret provided with a plurality of ports is used. The ports are connected through suitable valves and piping to exhaust pumps.

Into each port the tubulation of a vacuum tube is inserted. The turret indexes or moves from one position to another a distance, equal to that between ports, and during a complete revolution passes the tube through an oven to bake the glass, brings it successively under the influence of a plurality of high frequency coils to heat the electrodes and finally to a tipping off mechanism where the tube leaves the machine.

During the processing of the tube on an exhaust machine, it is necessary to heat the cathode to varying degrees, depending upon the position of the tube. To do this, contact making mechanism on each side of every port is connected to the tube leads to energize the cathode. Commutating switches are provided to energize the cathodes at each position.

The contact making mechanism or lead clamps adjacent the ports for connecting the tube leads to the current source have usually consisted of a pair of spring members between which the leads were to be retained. In practice, however, it has been found that due to dirt as well as the unevenness of the surface of the metallic spring members, the leads were frequently loosely maintained and sometimes were even free of the contact making mechanism. Under these circumstances, often no contact, or poor contact, occurred with the consequent failure of processing of the cathode. Inasmuch as this defect became apparent only when the tube was finally finished and tested and resulted in a complete loss of the tube, a serious waste was involved.

An object of this invention is to devise lead clamps which will be positive, provide a firm contact at all times, and be simple in operation. In general, the mechanism consists of a plurality of members mounted adjacent each port, at least one of said members being pivotally mounted, and, with the remaining members, adapted to form a scissor-like clamp which will maintain lead wires in firm contact.

In its simplest preferred form, my invention consists of a pair of metal members having slotted ends, between which is mounted a third member adapted to pivot in such manner that when a wire is placed in the slot of the two members, the third member will wedge the wire firmly into place. Means are provided for automatically opening and closing the lead clamp at predetermined positions of each port.

Referring to the drawings,

Fig. 1 is a top view of a portion of an exhaust machine provided with a form of my improved lead clamps;

Figs. 2 and 3 are detail views of the clamps in open and closed positions, respectively;

Fig. 4 is a detail view of one of the commutating switch elements;

Fig. 5 is a view from the stationary portion of the machine, looking outwardly to the turret and showing the cam track.

The exhaust machine comprises a central stationary portion 1, around which an annular turret 2 is adapted to be intermittently indexed. Turret 2 is provided with a plurality of ports 3, each of which is connected by suitable piping to exhaust pumps. Into each port a tubulation 5 of a vacuum tube 6 is adapted to be inserted. Leads 8 and 9 of tube 6 are gripped by individual lead clamps 10 and 11. In order to supply current to these clamps, one of each pair; for example, 10, may be grounded to the machine while 11 is connected by wire to a commutating switch 13. Switches 13 are carried by an annular insulating bar 15 suitably supported by turret 2 and turning therewith. Stationary portion 1 of the machine is provided with knife blades 17, each of which is connected to a desired source of current. As shown in Fig. 4, switch portion 13 comprises two metallic spring members 18 and 19 bolted together at 20 and

having a connecting lead 21. A spring 22 surrounding a bolt 23 and provided with an adjusting nut 24 is used to vary the tension of blades 18 and 19. In order to protect the commutating switch portion, a shield 25 covering the central portion of the exhaust machine may be provided.

As turret 2 indexes from one position to another, tube 6 is brought into oven 30 and then under the influence of coils 31 to 35, inclusive. Each coil is suitably energized by high frequency and serves to heat the electrodes of the tube so that occluded gases may be removed. In the position beyond coil 35, the tubes are tipped off and removed from the machine. New tubes are inserted into positions adjacent the tipping off positions.

The lead clamps on each side of the port, comprise two metallic members 40 and 41 having slots 42 at their free ends. Members 40 and 41 may be provided with a common base 44 and are insulatingly mounted on turret 2 by means of an insulating block 45. Pivoted at 46 is a bell crank lever 47 having a vertical arm 48 adapted to move between two members 40 and 41. Arm 48 is provided with a notch 49, whose axis is approximately perpendicular to the direction of slot 42 in members 40 and 41. It is clear that if a comparatively soft, flexible wire is inserted in slot 42 opposite the notch 49 when the clamp is in open position, as shown in Fig. 2, and then closed, as shown in Fig. 3, that the wire will be caught by the notch 49 and locked.

In order to operate the clamp a spring 50 connecting lever 47 and base 44 is provided. This spring and lever combine to lock the clamp. At the horizontal end of lever 47 is a roller 51 secured by a bolt 52. A cam track 53 is suitably supported by stationary portion 1 of the machine and is adapted to automatically operate the clamp at any desired positions. This cam track preferably extends between coil 35 and oven 30 and is provided with end sloping portions 54.

It is evident that after a tube has passed coil 35 the rollers 51 of the clamps adjacent the tube come up inclined portion 54 of the cam track and raise arm 47 against spring 50. When the rollers are on the flat portion 53 of the cam track, the clamp is in open position as shown in Fig. 2 and permits the withdrawal of leads 8 and 9. Upon the insertion of a new tube into the port, the soft, flexible leads 8 and 9 are disposed opposite the notch 49 in slots 42 which are open. When the tube is indexed to the oven, rollers 51 are free of cam track 53, permitting spring 50 to pull arm 47 down and locking the clamp.

It is obvious that instead of the central member being movable, the two outer members 40 and 41 may be movable. If desired, only one stationary member may be provided for gripping the wire.

It is clear that once the leads have been inserted into slots 42 and the clamp closed, it is practically impossible for the leads of the tube to become loose. Due to the shearing action at the edges of the clamp good contact results under all conditions.

What I claim is:

1. An exhaust machine having an intermittently indexing turret provided with a plurality of ports, a lead clamp disposed adjacent every port, said clamp comprising two relatively rotatable slotted members and means for causing one of said members to sweep by said other member whereby any wire inserted in one of said slots is securely locked.

2. An exhaust machine having a turret provided with a plurality of ports, a lead clamp comprising a stationary member adjacent every port, a movable member pivoted to said stationary member and adapted to form a pair of locking jaws with said stationary member and means for automatically opening and closing said jaws at predetermined index positions of the turret.

3. An exhaust machine comprising a stationary portion, a turret having a plurality of ports, a lead clamp comprising a member mounted adjacent every port, a pivotally mounted member adjacent said stationary member and forming a pair of jaws for positively locking a wire, and means on the stationary portion of the machine for operating said jaws at predetermined index positions.

4. An exhaust machine comprising a stationary portion, a turret adapted to intermittently index around said stationary portion, said turret being provided with a plurality of ports, a lead clamp comprising a member mounted adjacent every port, another member pivotally mounted thereon adapted to form a pair of locking jaws therewith and a cam track on the stationary portion of said machine for opening and closing said jaws at predetermined index positions.

5. An exhaust machine having a turret provided with a plurality of ports, a lead clamp adjacent every port comprising two stationary members, a member pivoted between said stationary members and means for turning said pivoted member so that a wire inserted between said stationary and pivoted members is securely locked.

6. An exhaust machine comprising a stationary portion and a turret provided with a plurality of ports, lead clamps adjacent every port, each lead clamp comprising a plurality of pivoted members and means for turning certain of said members whereby a shearing action is obtained.

7. An exhaust machine comprising a stationary portion, a turret provided with a plurality of ports, lead clamps adjacent said ports, each lead clamp comprising a vertical stationary member having its free ends slotted, a member pivotally mounted adjacent

said stationary member and means for turning said last named member so that its end portion sweeps past the slotted end of the stationary member.

8. An exhaust machine comprising a stationary portion and a turret provided with a plurality of ports, lead clamps adjacent each port, each lead clamp comprising slotted members, one of said members being movable, and a cam track on the stationary portion of the machine adapted to operate said movable member so that said two members tend to shear a wire disposed in the slot of one member.

9. An exhaust machine having a stationary portion, a turret intermittently indexing from one position to another, said turret being provided with a plurality of ports, lead clamps adjacent each port, means on said clamps for normally maintaining said clamp in a locked position and means on the stationary portion of the machine for automatically unlocking said clamps at predetermined index positions.

10. An exhaust machine comprising a stationary portion, an intermittently rotating turret, said turret being provided with a plurality of ports, lead clamps adjacent said ports, each lead clamp comprising a plurality of pivoted members, each clamp having slotted end portions, means for normally maintaining said clamps in a locked position and a cam track on the stationary portion for automatically unlocking said clamps at predetermined turret positions.

In testimony whereof he affixes his signature.

WILLIAM C. CRIMMINS.